



Wood Buffalo Environmental Association

AUGUST 2017 MONTHLY REPORT

CONTINUOUS MONITORING
INTEGRATED MONITORING
September 27, 2017

Operations, Data Collection,
QA/QC, Data Validation and Reporting by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta



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September 27, 2017

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**RE: Monthly Ambient Air Quality Monitoring Report August 2017
Wood Buffalo Environmental Association**

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Enclosed is the August 2017 Ambient Air Quality Monitoring Report for the continuous ambient air quality monitoring stations of the Wood Buffalo Environmental Association regional air quality monitoring network.

The continuous ambient air quality monitoring network stations are:

AMS 1 - Fort McKay – Bertha Ganter
AMS 2 - Mildred Lake
AMS 3 - Lower Camp B (meteorology)
AMS 4 - Buffalo Viewpoint
AMS 5 - Mannix
AMS 6 - Patricia McInnes
AMS 7 - Athabasca Valley
AMS 8 - Fort Chipewyan
AMS 9 - Barge Landing
AMS 11 - Lower Camp (air quality)
AMS 13 - Fort McKay South
AMS 14 - Anzac
AMS 15 - Horizon
AMS 16 - Muskeg River
AMS 17 - Wapasu
AMS 18 - Stony Mountain
AMS 19 - Firebag
AMS 20 - MacKay River
AMS 21 - Conklin
AMS 22 - Janvier
AMS 23 - Fort Hills
AMS 25 - Waskōw ohci Pimâtisiwin
AMS 500 - Christina Lake
AMS 502 - Surmont
AMS 505 - Sawbones Bay

This report is submitted by WBEA on behalf its members and for some members to satisfy the requirements contained in their EPEA Approvals (as amended):



| Member | EPEA Approval No. |
|---------------------------------|----------------------------|
| Athabasca Oil Corporation | 289664-00-00; 241311-00-00 |
| Canadian Natural Resources Ltd. | 149968-01-00 |
| Cenovus Energy | 48522-01-00 |
| Connacher Oil and Gas Ltd. | 240008-00-00 |
| ConocoPhillips Canada | 48263-01-00 |
| Devon Canada Corporation | 224816-00-00 |
| Finning Canada Ltd. | Not Applicable |
| Fort Hills Energy Corporation | 151469-01-00 |
| Hammerstone Corporation | 189942-00-00 |
| Husky Oil Operations Ltd. | 206355-01-00 |
| Imperial Oil Ltd. | 00046586-00-00 |
| Inter Pipeline Offgas Ltd. | 73203-02-00 |
| MEG Energy Corporation | 00216466-01-00 |
| Nexen Energy ULC. | 137467-01-00; 236394-00-00 |
| PetroChina Canada Ltd. | 254465-00-00 |
| Shell Canada Energy | 20809-01-00 |
| Suncor Energy Inc. | 094-02-00 |
| Sunshine Oilsands Ltd. | 305529-00-00 |
| Syncrude Canada Ltd. | 026-02-00 |
| Teck Resources Ltd. | EIA Application |
| Total E&P Canada Ltd. | 228044-00-00 |

Government and Non-Industrial Organizations

Alberta Energy Regulator
Alberta Environment & Parks
Alberta Health Services
Alberta Health & Wellness
Environment Canada
Health Canada
Parks Canada
Pembina Institute for Appropriate Development
Regional Municipality of Wood Buffalo
Saskatchewan Environment

Aboriginal Communities

| | |
|-------------------------------------|--------------------------------|
| Chipewyan Prairie Dene First Nation | Fort McKay Métis Local 63 |
| Christina River Dene Nation Council | Fort McMurray First Nation 468 |
| Fort McKay First Nation | Fort McMurray Métis Local 1935 |

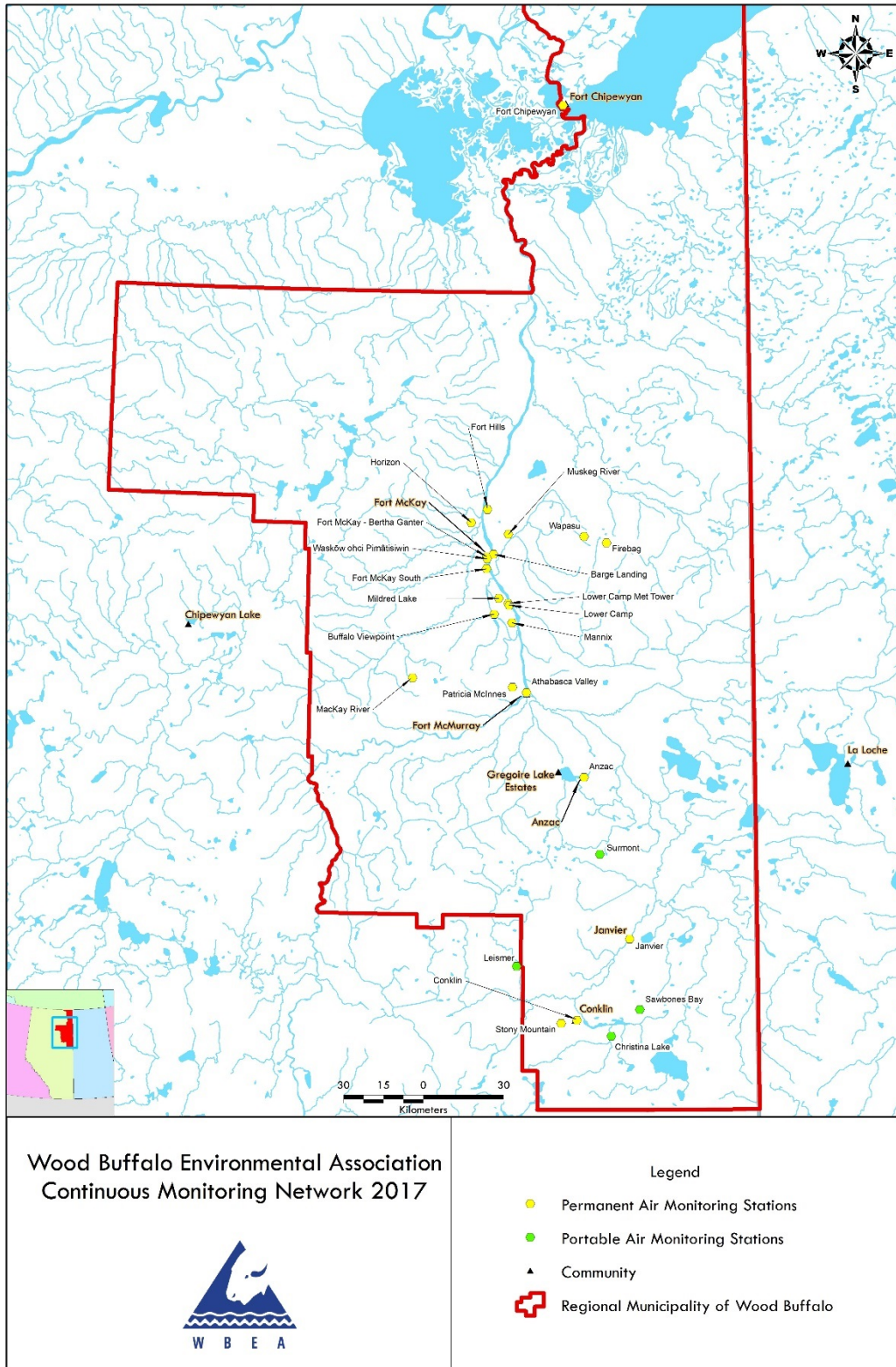


Figure 1: Map of WBEA Continuous Monitoring Network.

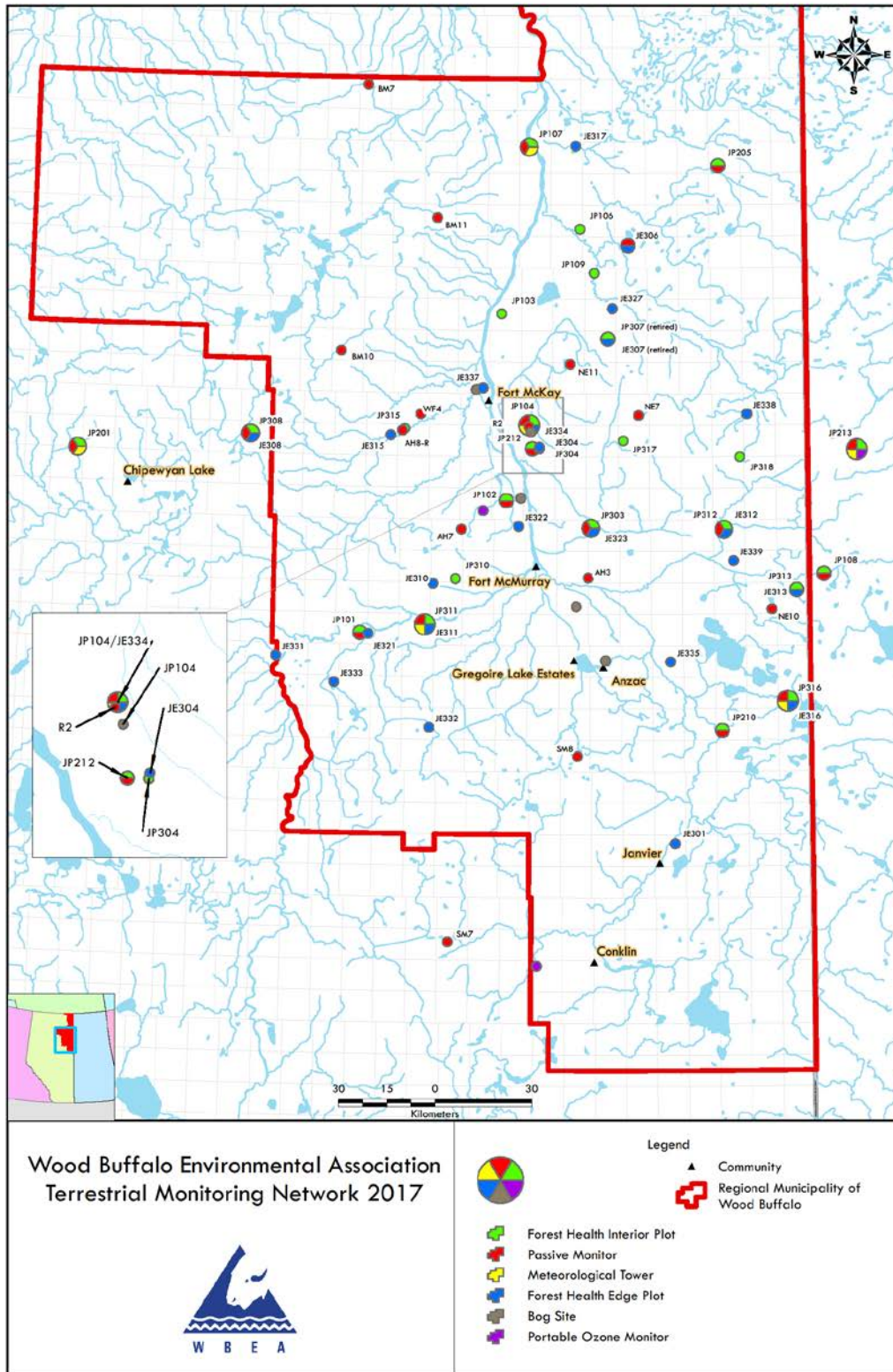


Figure 2: Map of WBEA Terrestrial Monitoring Network.

The following operational notes are provided as per the Air Monitoring Directive requirements.

1.0 Concentrations in Excess of Alberta Ambient Air Quality Objectives

There were no ambient concentrations in excess of the air quality objectives as indicated in the Air Monitoring Directive Section III.A.3 (a & b) for CO, O₃, NH₃, NO₂, and SO₂.

There were 8 ambient ground level concentrations in excess of the 1-hour and 24-hour H₂S air quality objectives reported to the Energy and Environmental Response Centre in real time. After data processing to account for analyzer drift with baseline correction, there were 5 concentrations in excess of the 1-hour H₂S air quality objective and 1 concentration in excess of the 24-hour H₂S air quality objective.

There were 4 ambient ground level concentrations in excess of the 24-hour PM_{2.5} air quality objective reported to the Energy and Environmental Response Centre in real time. After data processing to account for analyzer drift with baseline correction, there were 4 concentrations in excess of the 24-hour PM_{2.5} air quality objective

The following table provides the status of the incidents and final data averages.

| <u>Site</u> | <u>Parameter</u> | <u>Date / Time</u> | <u>Reference</u> | <u>Period</u> | Concentration ppb or ug/m ³ | | <u>Status</u> |
|-----------------------|-------------------|--------------------|------------------|---------------|---|--------------|---------------|
| | | | | | <u>Reported</u> | <u>Final</u> | |
| AMS 5 Mannix | H ₂ S | 01Aug17, 22:00 | 327861 | 1hr | 14 | 14 | exc |
| AMS 5 Mannix | H ₂ S | 01Aug17, 23:00 | 327862 | 1hr | 13 | 13 | exc |
| AMS 5 Mannix | H ₂ S | 22Aug17. 04:00 | 328674 | 1hr | 10 | 10 | nae |
| AMS 5 Mannix | H ₂ S | 22Aug17. 05:00 | 328674 | 1hr | 14 | 14 | exc |
| AMS 5 Mannix | H ₂ S | 22Aug17. 06:00 | 328674 | 1hr | 11 | 11 | exc |
| AMS 5 Mannix | H ₂ S | 22Aug17. 07:00 | 328674 | 1hr | 11 | 11 | exc |
| AMS 5 Mannix | H ₂ S | 22Aug17. 09:00 | 328674 | 1hr | 10 | 9 | nae |
| AMS 5 Mannix | H ₂ S | 22Aug17. 024:00 | 328674 | 24hr | 4 | 4 | exc |
| AMS 18 Stony Mountain | PM _{2.5} | 14Aug17, 24:00 | 328354 | 24hr | 41 | 41 | exc |
| AMS 21 Conklin | PM _{2.5} | 14Aug17, 24:00 | 328356 | 24hr | 41 | 41 | exc |
| AMS 22 Janvier | PM _{2.5} | 14Aug17, 24:00 | 328355 | 24hr | 31 | 31 | exc |
| AMS 23 Fort Hills | PM _{2.5} | 14Aug17, 24:00 | 328357 | 24hr | 35 | 35 | exc |

*status legend:

- late exceedance, raw values were not found to be in exceedance in real time, and/or were not reported, but final values were found to be an exceedance after data processing.
- exc exceedance, raw values reported in real time were confirmed to be in exceedance after data processing.
- nae not an exceedance, raw values reported in real time were found not in exceedance after data processing.

ret retracted, reported exceedance was found to be not an exceedance after investigation of measurement system status and/or validation of raw data in conjunction with all associated measurement parameters.

1.1 Data Processing and Validation

Concentrations reported in near real-time were raw values. The final values were determined after processing of data for reporting. For all parameters except PM_{2.5}, the final 5-minute data values were determined by subtracting from the raw 5-minute data values, the daily zero responses interpolated to the time of each raw 5-minute value. The final 5-minute data values were then rounded to one decimal place greater than the reporting precision indicated in the Air Monitoring Directive (AMD). The final 1-hour data values were calculated from final 5-minute data values and then rounded to reporting precision. The final 24-hour data values were calculated from final 1-hour values.

After data processing and validation, NO₂ concentrations were re-calculated from baseline-corrected NO_x and NO concentrations. Specifically, the NO concentration was subtracted from the NO_x concentration to determine the NO₂ concentration. In cases where the NO_x and/or NO values exceeded the operating range of the analyzer, values reported for NO₂ were determined as the largest of either the difference between baseline-corrected NO_x and NO values, or the NO₂ value reported by the data acquisition system with baseline correction applied.

1.2 Revisions to AEP Airdata Warehouse

Due to upload issues with the Airdata Warehouse, May 2017 data for Firebag AMS required re-upload to the Airdata Warehouse on September 12, 2017.

2.0 Operational Status

Continuous Monitoring

In August 2017, there was 1 instance of a compliance monitoring instrument operating less than 90% of the time.

1. The ammonia (NH₃) analyzer at Fort McKay – Bertha Ganter AMS operated less than 90% of the time in August 2017, which is a contravention of the Air Monitoring Directive (1989, as amended), Chapter 6, Clause DQ 4-C.

There were four issues associated with the operation of the NH₃ analyzer, resulting in 108 hours of invalid data:

- Ammonia gas used to perform daily span checks has a long residency period in the analyzer, which requires additional stabilization time to return to ambient conditions. Throughout the month of August, 2 to 3 hours each day were flagged as invalid data following each daily span check, for a total of 67 hours of stabilization time.
- A data collection error on August 11 resulted in 1 hour of downtime.
- Maintenance to replace the converter core on August 22 and associated recovery time resulted in 37 hours of operational downtime.

- A baseline shift occurred on August 23 as a result of maintenance completed the previous day. Maintenance to recalibrate the analyzer to adjust baseline shift resulted in 3 hours of downtime.

In August 2017, the NH₃ analyzer at Fort McKay – Bertha Ganter AMS operated for 85% of the reporting period. This incident was reported to Alberta Environment and Parks on September 20, 2017 (reference number 329898).

In August 2017, there was 1 incident of a monitoring instrument not required for air quality compliance operating less than 90% of the time:

The 45m meteorological sensors at AMS 3 – Lower Camp Met Tower had 132 hours of invalid data due to wiring issues, requiring a contractor to climb the tower. Repairs are in the process of being scheduled at the time of this report.

Intermittent Monitoring

Results for integrated monitoring of precipitation, PAH, VOC, PM_{2.5}, PM₁₀, and passive samples for July 2017 are included with this report.

3.0 Monitoring Notes

General Network Notes

In August 2017, analyzers for NO₂, O₃, and PM_{2.5} were installed at Buffalo Viewpoint to meet criteria for Environment and Climate Change Canada Enhanced Deposition sites.

The Ammonia (NH₃) analyzer currently operates on a 0 to 2500 ppb operating range with a detection level of 5 ppb in the WBEA network. In data processing, values less than 5 ppb have been considered below detection levels and are reported as zero.

Monitoring notes for the continuous monitoring stations are provided on a station by station basis.

Station 1, Fort McKay - Bertha Ganter

The NH₃ analyzer required additional time to stabilize to levels below ambient concentrations following the automated daily spans and routine monthly multipoint calibrations. Additional time for stabilization after exposure to high concentrations of NH₃ gas is an inherent behavior in the NH₃ analyzer operations resulting from the properties of the NH₃ gas. Data for 1-2 hours following the daily spans have been reported as invalid for a total of 67 hours this month.

Maintenance and cleaning of the sample manifold on August 22 interrupted the normal operation of the NO₂, O₃, SO₂, THC, and TRS analyzers for 1 hour this reporting period.

A data collection error on August 11 interrupted the data collection of the NH₃ analyzer for 1 hour this reporting period.

Station operator activities on August 21 affected the normal operation of the TRS analyzer for one hour.

Maintenance to replace the converter core on August 22 and subsequent stabilization time interrupted the normal operation of the NH₃ analyzer for 37 hours.

On August 23, the NH₃ analyzer was calibrated to address baseline shift due to replacement of the converter core on August 22. This resulted in 3 hours of downtime this reporting period.

Due to baseline drift issues associated with the calibration system zero air generator, maintenance to recalibrate the THC analyzer on August 23 interrupted the routine operation of the THC analyzer for 2 hours.

The temperature sensors at 2 and 10 m are independent sensors and are not an integrated delta-t system. Although reported values are representative of ambient temperatures, they may not be suitable as measurements of vertical temperature gradients.

Station 2, Mildred Lake

An internal WBEA audit on July 31 interrupted the normal operations of all air quality analyzers for 2 hours.

A power outage at the station on July 22 affected the normal operations of all analyzers for 2 to 3 hours.

Flat-lines in the output signal of the wind sensor resulted in 1 hour of invalid data this reporting period.

Station 3, Lower Camp - Meteorology

Meteorological sensors at the 45m elevation did not record data for 132 hours due to wiring issues. Repairs require a contractor to climb the tower and are in the process of being scheduled at the time of this report.

Unstable operation on August 15 affected the normal operation of the 167 meter vertical wind speed sensor for 2 hours this month.

Station 4, Buffalo Viewpoint

Note: install calibration files for the NO₂, O₃, and PM_{2.5} analyzers are included with routine monthly calibration files, in the report section of this station. The NO₂ and O₃ analyzers officially commenced operation on August 1, 2017, and the PM_{2.5} analyzer began operation on August 4, 2017.

An internal WBEA audit on August 11 and 14 interrupted the normal operations of all air quality analyzers for 2 to 4 hours.

Maintenance and cleaning of the sample manifold on August 16 interrupted the normal operation of the H₂S, NO₂, SO₂, and THC analyzers for 1 hour this reporting period.

Flat-lines in the output signal of the wind sensor resulted in 1 hour of invalid data this reporting period.

Station 5, Mannix

Zero-air generator failure on August 15 caused the FID flame to go out and resulted in an interruption of the THC analyzer for 2 hours.

Unstable operation on August 15 affected the normal operation of the 167 meter vertical wind speed sensor for 1 hour this month.

Station 6, Patricia McInnes

The NH₃ analyzer required additional time to stabilize to levels below ambient concentrations following the automated daily span and routine monthly multipoint calibration periods. Additional time for stabilization after exposure to high concentrations of the NH₃ gas is an inherent behavior in the NH₃ analyzer operations resulting from the properties of the NH₃ gas. Data for 1-2 hours following each daily span has been reported as invalid for a total of 56 hours this month.

Maintenance and cleaning of the sample manifold on August 10 interrupted the normal operation of the NO₂, O₃, SO₂, THC, and TRS analyzers for 1 hour this reporting period.

Station 7, Athabasca Valley

Maintenance and cleaning of the sample manifold on August 18 interrupted the normal operation of the NO₂, O₃, SO₂, THC, and TRS analyzers for 1 hour this reporting period.

Unstable operation due to baseline drift on August 24 affected the normal operation of the PM_{2.5} analyzer for 1 hour this month.

Station 8, Fort Chipewyan

Maintenance and cleaning of the sample manifold on August 15 interrupted the normal operation of the O₃ analyzer for 1 hour this reporting period.

Unstable operation due to baseline drift on August 29 affected the normal operation of the PM_{2.5} analyzer for 2 hours this month.

Station 9, Barge Landing

Flat-lines in the output signal of the wind sensor resulted in 5 hours of invalid data this reporting period.

Station 11, Lower Camp

An internal WBEA audit on August 28 and 29 interrupted the normal operations of all air quality analyzers for 2 hours.

Maintenance and cleaning of the sample manifold on August 9 interrupted the normal operation of the H₂S analyzer for 1 hour.

Station 13, Fort McKay South

Maintenance and cleaning of the sample manifold on August 2 interrupted the normal operations of the O₃ and TRS analyzers for 1 hour.

Confirmation of reference points for O₃ calibration on July 18 interrupted the normal operation of the NO₂ analyzer for 3 hours.

Three instances of unstable operation due to baseline drift throughout the month affected the normal operation of the PM_{2.5} analyzer for 3 hours this reporting period.

There were two issues associated with operation of the NO₂ analyzer resulting in 66 hours of invalid data this month. On August 6, the automated daily zero/span response of the NO₂ analyzer did not meet operational criteria. On-site investigation revealed low sample flow, which required pump replacement and analyzer calibration. Data was flagged from the last valid daily span on August 5 until maintenance was completed on August 6 resulting in 32 hours of invalid data. On August 8, it was discovered that the newly deployed pump had failed. Downtime associated with the failed pump as well as maintenance to replace the pump on August 8 interrupted the operation of the NO₂ analyzer for an additional 34 hours.

Station 14, Anzac

Unstable operation due to a depleted SOx scrubber on August 8 interrupted the normal operation of the TRS analyzer for 29 hours. Maintenance on August 9 to replace the depleted SOx scrubber and calibrate the TRS analyzer resulted in an additional 3 hours of invalid data.

Maintenance and cleaning of the sample manifold on August 9 interrupted the normal operations of the O₃ and TRS analyzers for 1 hour.

Replacement of the carrier gas cylinder at the station on August 24 affected the normal operation of the THC analyzer for 1 hour.

Station 15, Horizon

An internal WBEA audit on August 1 and 2 interrupted the normal operations of all air quality analyzers for 2 hours.

Maintenance to verify the daily span response on August 25 interrupted the normal operation of the NO₂ analyzer for 1 hour.

Station 16, Muskeg River

Maintenance to verify the daily span response on August 31 interrupted the normal operations of the NO₂ analyzer for 2 hours this reporting period.

Station 17, Wapasu

No operational issues to report this month.

Station 18, Stony Mountain

Flat-lines in the output signal of the wind sensor resulted in 1 hour of invalid data this reporting period.

Station 19, Firebag

A data collection error on August 29 interrupted the data collection of all air quality analyzers for 1 hour this reporting period.

Station 20, MacKay River

A power outage at the station on August 11 affected the normal operations of all analyzers for 1 to 3 hours.

Three instances of intermittent unstable operation due to baseline drift affected the normal operation of the H₂S analyzer for a total of 5 hours this reporting period.

Maintenance to verify the span response on August 12 interrupted the normal operations of the SO₂ analyzer for 1 hour this reporting period.

Maintenance and cleaning of the sample manifold on August 23 interrupted the normal operations of the H₂S analyzer for 1 hour.

Station 21, Conklin

On August 21, the automated daily zero/span response of the NO₂ analyzer did not meet operational criteria. On-site investigation revealed low sample flow, which required pump replacement and analyzer re-calibration. Data was flagged from the last valid daily span on August 20 until maintenance was completed on August 21 resulting in 35 hours of invalid data.

Maintenance and cleaning of the sample manifold August 22 interrupted the normal operations of the TRS, NO₂, SO₂, and THC analyzers for 1 hour.

Flat-lines in the output signal of the wind sensor resulted in 6 hours of invalid data this reporting period.

Station 22, Janvier

The automated daily zero/span response of the TRS analyzer did not meet operational criteria on August 16. Station operator activities to investigate and verify analyzer response interrupted the routine operation of the TRS analyzer for 5 hours. Maintenance to verify the span response on August 25 interrupted the normal operations of the TRS analyzer for 1 hour this reporting period.

There were two issues with the operation of the NO₂ analyzer resulting in 48 hours of invalid data this month. The NO₂ analyzer required removal for repairs to improve analyzer performance. Maintenance to replace the analyzer and complete an installation calibration resulted in 43 hours of downtime. Additionally, data collection errors throughout the month resulted in 5 hours of invalid data this reporting period.

Flat-lines in the output signal of the PM_{2.5} analyzer resulted in 9 hours of invalid data this reporting period.

A failed pressure sensor interfered with the analog inputs on the data logger, which interrupted the routine data collection of the wind speed and wind direction sensor inputs for 51 hours.

Station 23, Fort Hills

Maintenance and cleaning of the sample manifold on August 2 interrupted the normal operation of the TRS analyzer for 1 hour.

Internal WBEA audits on August 8, 9, 10, and 31 interrupted the normal operations of all air quality analyzers for 2 to 12 hours.

Maintenance to adjust baseline response and re-calibrate on August 22 interrupted the routine operation of the THC analyzer for 3 hours.

Three instances of unstable operation due to baseline drift affected the normal operation of the PM_{2.5} analyzer for 5 hours this reporting period.

Flat-lines in the output signal of the wind sensor resulted in 2 hours of invalid data this reporting period.

Station 25, Waskōw ohci Pimâtisiwin

Maintenance and cleaning of the sample manifold on August 1 interrupted the normal operation of the H₂S analyzer for 1 hour.

Station 500, Christina Lake

Maintenance and cleaning of the sample manifold on August 15 interrupted the normal operation of the H₂S analyzer for 1 hour.

Station 502, Surmont

Maintenance and cleaning of the sample manifold on August 23 interrupted the normal operation of the NO₂ and SO₂ analyzers for 1 hour.

Numerous instances of unstable operation due to baseline drift throughout the month affected the normal operation of the H₂S analyzer for 15 hours this month.

Station 505, Sawbones Bay.

Maintenance and cleaning of the sample manifold on August 11 interrupted the normal operation of the H₂S analyzer for 1 hour.

Flat-lines in the output signal of the wind sensor resulted in 1 hour of invalid data this reporting period.

If additional information is required, please contact either Mike Martineau at (780) 715 1770 ext. 222 or the Wood Buffalo Environmental Association at (780) 799 4420.

Yours sincerely,

Wood Buffalo Environmental Association

Mike Martineau
Data Lead

Emilie Briggs
Air Program Coordinator

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION
 MONTHLY AIR MONITORING SUMMARY
 for AMD SECTION III.B.1(c)

AUGUST 2017

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Prepared: Sep 25 2017 09:33

| APPROVAL NUMBERS | REPORT DATE | | | | | | |
|------------------|-------------------------------|----------|--------------------|-----------------------|---------------------------|-----------------------|---------------------------|
| | MONTH | YEAR | | | | | |
| 289664-00-00 | 8 | 2017 | | | | | |
| 241311-00-00 | CONTINUOUS AMBIENT MONITORING | | | | | | |
| 254465-00-00 | CONTINUOUS AMBIENT MONITORING | | | | | | |
| 149968-01-00 | CONTINUOUS AMBIENT MONITORING | | | | | | |
| 48522-01-00 | CONTINUOUS AMBIENT MONITORING | | | | | | |
| 240008-00-00 | | | ONE-HOUR AVERAGE | | 24-HOUR AVERAGE | | |
| 48263-01-00 | PARAMETER | STN. NO. | % TIME OPERATIONAL | MAXIMUM CONCENTRATION | NO. READINGS > REGULATION | MAXIMUM CONCENTRATION | NO. READINGS > REGULATION |
| 151469-01-00 | SO2(ppm) | 1 | 99.87 | 0.046 | 0 | 0.004 | 0 |
| 224816-00-00 | SO2(ppm) | 2 | 99.87 | 0.044 | 0 | 0.012 | 0 |
| 189942-00-00 | SO2(ppm) | 4 | 99.60 | 0.074 | 0 | 0.008 | 0 |
| 206355-00-00 | SO2(ppm) | 5 | 100.00 | 0.044 | 0 | 0.014 | 0 |
| 46586-00-00 | SO2(ppm) | 6 | 99.87 | 0.021 | 0 | 0.004 | 0 |
| 73203-02-00 | SO2(ppm) | 7 | 99.87 | 0.014 | 0 | 0.002 | 0 |
| 216466-01-00 | SO2(ppm) | 8 | 100.00 | 0.003 | 0 | 0.001 | 0 |
| 137467-01-00 | SO2(ppm) | 11 | 99.73 | 0.094 | 0 | 0.012 | 0 |
| 236394-00-00 | SO2(ppm) | 13 | 100.00 | 0.024 | 0 | 0.003 | 0 |
| 20809-01-00 | SO2(ppm) | 14 | 100.00 | 0.002 | 0 | 0.001 | 0 |
| 094-02-00 | SO2(ppm) | 15 | 99.60 | 0.048 | 0 | 0.006 | 0 |
| 305529-00-00 | SO2(ppm) | 16 | 100.00 | 0.028 | 0 | 0.003 | 0 |
| 026-02-00 | SO2(ppm) | 17 | 100.00 | 0.031 | 0 | 0.006 | 0 |
| 228044-00-00 | SO2(ppm) | 18 | 100.00 | 0.002 | 0 | 0.001 | 0 |
| | SO2(ppm) | 19 | 99.87 | 0.019 | 0 | 0.005 | 0 |
| | SO2(ppm) | 20 | 99.73 | 0.016 | 0 | 0.003 | 0 |
| | SO2(ppm) | 21 | 99.87 | 0.002 | 0 | 0.001 | 0 |
| | SO2(ppm) | 22 | 100.00 | 0.004 | 0 | 0.001 | 0 |
| | SO2(ppm) | 23 | 99.73 | 0.017 | 0 | 0.003 | 0 |
| | SO2(ppm) | 25 | 100.00 | 0.037 | 0 | 0.004 | 0 |
| | SO2(ppm) | 500 | 100.00 | 0.028 | 0 | 0.005 | 0 |
| | SO2(ppm) | 502 | 99.87 | 0.010 | 0 | 0.002 | 0 |
| | SO2(ppm) | 505 | 100.00 | 0.022 | 0 | 0.007 | 0 |
| | H2S(ppm) | 2 | 99.87 | 0.007 | 0 | 0.002 | 0 |
| | H2S(ppm) | 4 | 99.60 | 0.003 | 0 | 0.001 | 0 |
| | H2S(ppm) | 5 | 100.00 | 0.014 | 5 | 0.004 | 1 |
| | H2S(ppm) | 11 | 99.60 | 0.010 | 0 | 0.002 | 0 |
| | H2S(ppm) | 17 | 100.00 | 0.001 | 0 | 0.000 | 0 |
| | H2S(ppm) | 19 | 99.87 | 0.001 | 0 | 0.000 | 0 |
| | H2S(ppm) | 20 | 98.79 | 0.003 | 0 | 0.000 | 0 |
| | H2S(ppm) | 25 | 99.87 | 0.002 | 0 | 0.001 | 0 |
| | H2S(ppm) | 500 | 99.87 | 0.001 | 0 | 0.000 | 0 |
| | H2S(ppm) | 502 | 97.98 | 0.004 | 0 | 0.001 | 0 |
| | H2S(ppm) | 505 | 99.87 | 0.001 | 0 | 0.001 | 0 |
| | TRS(ppm) | 1 | 99.73 | 0.003 | 0 | 0.001 | 0 |
| | TRS(ppm) | 6 | 99.87 | 0.002 | 0 | 0.001 | 0 |
| | TRS(ppm) | 7 | 99.87 | 0.002 | 0 | 0.001 | 0 |
| | TRS(ppm) | 9 | 100.00 | 0.003 | 0 | 0.001 | 0 |
| | TRS(ppm) | 13 | 99.87 | 0.003 | 0 | 0.001 | 0 |
| | TRS(ppm) | 14 | 95.56 | 0.001 | 0 | 0.000 | 0 |
| | TRS(ppm) | 15 | 99.73 | 0.003 | 0 | 0.001 | 0 |
| | TRS(ppm) | 18 | 100.00 | 0.001 | 0 | 0.000 | 0 |
| | TRS(ppm) | 21 | 99.87 | 0.001 | 0 | 0.000 | 0 |
| | TRS(ppm) | 22 | 99.19 | 0.001 | 0 | 0.001 | 0 |
| | TRS(ppm) | 23 | 97.58 | 0.001 | 0 | 0.001 | 0 |
| | THC(ppm) | 1 | 99.60 | 4.6 | - | 2.3 | - |
| | THC(ppm) | 2 | 99.87 | 4.7 | - | 2.9 | - |
| | THC(ppm) | 4 | 99.60 | 3.8 | - | 2.6 | - |
| | THC(ppm) | 5 | 99.73 | 4.5 | - | 2.7 | - |
| | THC(ppm) | 6 | 99.87 | 2.4 | - | 2.1 | - |
| | THC(ppm) | 7 | 99.87 | 2.6 | - | 2.1 | - |
| | THC(ppm) | 9 | 100.00 | 3.9 | - | 2.5 | - |
| | THC(ppm) | 11 | 99.73 | 4.5 | - | 2.7 | - |
| | THC(ppm) | 13 | 100.00 | 3.7 | - | 2.5 | - |
| | THC(ppm) | 14 | 99.87 | 2.7 | - | 2.1 | - |
| | THC(ppm) | 15 | 99.73 | 5.5 | - | 2.6 | - |
| | THC(ppm) | 16 | 100.00 | 4.2 | - | 3.1 | - |
| | THC(ppm) | 17 | 100.00 | 2.8 | - | 2.2 | - |
| | THC(ppm) | 18 | 100.00 | 2.3 | - | 2.1 | - |
| | THC(ppm) | 19 | 99.87 | 3.0 | - | 2.4 | - |
| | THC(ppm) | 20 | 99.60 | 2.6 | - | 2.3 | - |
| | THC(ppm) | 21 | 99.87 | 3.7 | - | 2.4 | - |
| | THC(ppm) | 22 | 100.00 | 2.8 | - | 2.2 | - |
| | THC(ppm) | 23 | 98.52 | 5.0 | - | 3.0 | - |

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION
MONTHLY AIR MONITORING SUMMARY
for AMD SECTION III.B.1(c)

AUGUST 2017

page 2 of 3

Prepared: Sep 25 2017 09:33


| APPROVAL NUMBERS | REPORT DATE | | | | | | |
|------------------|-------------------------------|----------|--------------------|-----------------------|---------------------------|-----------------------|---------------------------|
| | MONTH | YEAR | | | | | |
| 289664-00-00 | 8 | 2017 | | | | | |
| 241311-00-00 | CONTINUOUS AMBIENT MONITORING | | | | | | |
| 254465-00-00 | | | | | | | |
| 149968-01-00 | | | | | | | |
| 48522-01-00 | | | | | | | |
| 240008-00-00 | | | | ONE-HOUR AVERAGE | | 24-HOUR AVERAGE | |
| 48263-01-00 | PARAMETER | STN. NO. | % TIME OPERATIONAL | MAXIMUM CONCENTRATION | NO. READINGS > REGULATION | MAXIMUM CONCENTRATION | NO. READINGS > REGULATION |
| 151469-01-00 | THC(ppm) | 505 | 100.00 | 20.6 | - | 3.9 | - |
| 224816-00-00 | O3(ppm) | 1 | 99.87 | 0.056 | 0 | 0.041 | - |
| 189942-00-00 | O3(ppm) | 6 | 99.87 | 0.058 | 0 | 0.049 | - |
| 206355-00-00 | O3(ppm) | 7 | 99.87 | 0.062 | 0 | 0.050 | - |
| 46586-00-00 | O3(ppm) | 8 | 99.87 | 0.068 | 0 | 0.048 | - |
| 73203-02-00 | O3(ppm) | 13 | 99.87 | 0.055 | 0 | 0.040 | - |
| 216466-01-00 | O3(ppm) | 14 | 99.87 | 0.055 | 0 | 0.045 | - |
| 137467-01-00 | O3(ppm) | 17 | 100.00 | 0.056 | 0 | 0.050 | - |
| 236394-00-00 | O3(ppm) | 18 | 100.00 | 0.061 | 0 | 0.051 | - |
| 20809-01-00 | O3(ppm) | 21 | 100.00 | 0.059 | 0 | 0.046 | - |
| 094-02-00 | O3(ppm) | 22 | 100.00 | 0.058 | 0 | 0.042 | - |
| 305529-00-00 | NO2(ppm) | 1 | 99.87 | 0.029 | 0 | 0.006 | - |
| 026-02-00 | NO2(ppm) | 6 | 99.87 | 0.017 | 0 | 0.009 | - |
| 228044-00-00 | NO2(ppm) | 7 | 99.87 | 0.019 | 0 | 0.008 | - |
| | NO2(ppm) | 8 | 100.00 | 0.007 | 0 | 0.002 | - |
| | NO2(ppm) | 13 | 91.13 | 0.020 | 0 | 0.005 | - |
| | NO2(ppm) | 14 | 100.00 | 0.007 | 0 | 0.002 | - |
| | NO2(ppm) | 15 | 99.46 | 0.030 | 0 | 0.008 | - |
| | NO2(ppm) | 16 | 99.73 | 0.034 | 0 | 0.010 | - |
| | NO2(ppm) | 17 | 100.00 | 0.012 | 0 | 0.005 | - |
| | NO2(ppm) | 18 | 100.00 | 0.004 | 0 | 0.001 | - |
| | NO2(ppm) | 19 | 99.87 | 0.019 | 0 | 0.005 | - |
| | NO2(ppm) | 20 | 99.73 | 0.011 | 0 | 0.004 | - |
| | NO2(ppm) | 21 | 95.16 | 0.014 | 0 | 0.004 | - |
| | NO2(ppm) | 22 | 93.55 | 0.002 | 0 | 0.001 | - |
| | NO2(ppm) | 23 | 99.60 | 0.030 | 0 | 0.012 | - |
| | NO2(ppm) | 500 | 100.00 | 0.011 | 0 | 0.005 | - |
| | NO2(ppm) | 502 | 99.87 | 0.027 | 0 | 0.009 | - |
| | NO2(ppm) | 505 | 100.00 | 0.015 | 0 | 0.006 | - |
| | CO(ppm) | 7 | 100.00 | 0.8 | 0 | 0.3 | - |
| | NH3(ppm) | 1 | 85.48 | 0.000 | 0 | 0.000 | - |
| | NH3(ppm) | 6 | 92.47 | 0.000 | 0 | 0.000 | - |
| | PM2.5(ug/m3) | 1 | 100.00 | 104.7 | - | 25.1 | 0 |
| | PM2.5(ug/m3) | 6 | 100.00 | 97.9 | - | 29.5 | 0 |
| | PM2.5(ug/m3) | 7 | 99.87 | 87.4 | - | 24.2 | 0 |
| | PM2.5(ug/m3) | 8 | 99.73 | 146.0 | - | 22.6 | 0 |
| | PM2.5(ug/m3) | 13 | 99.60 | 104.2 | - | 24.8 | 0 |
| | PM2.5(ug/m3) | 14 | 100.00 | 60.2 | - | 18.1 | 0 |
| | PM2.5(ug/m3) | 15 | 100.00 | 85.5 | - | 21.5 | 0 |
| | PM2.5(ug/m3) | 16 | 100.00 | 165.7 | - | 28.3 | 0 |
| | PM2.5(ug/m3) | 17 | 100.00 | 113.4 | - | 23.8 | 0 |
| | PM2.5(ug/m3) | 18 | 100.00 | 124.8 | - | 41.4 | 1 |
| | PM2.5(ug/m3) | 21 | 100.00 | 125.5 | - | 41.2 | 1 |
| | PM2.5(ug/m3) | 22 | 98.79 | 102.6 | - | 30.8 | 1 |
| | PM2.5(ug/m3) | 23 | 99.33 | 125 | - | 35 | 1 |
| | PM2.5(ug/m3) | 505 | 100.00 | 82 | - | 27 | 0 |
| | WIND | 1 | 100.00 | - | - | - | - |
| | WIND | 2 | 100.00 | - | - | - | - |
| | WIND | 4 | 99.87 | - | - | - | - |
| | WIND | 5 | 100.00 | - | - | - | - |
| | WIND | 6 | 100.00 | - | - | - | - |
| | WIND | 7 | 100.00 | - | - | - | - |
| | WIND | 8 | 100.00 | - | - | - | - |
| | WIND | 9 | 99.33 | - | - | - | - |
| | WIND | 11 | 100.00 | - | - | - | - |
| | WIND | 13 | 100.00 | - | - | - | - |
| | WIND | 14 | 100.00 | - | - | - | - |
| | WIND | 15 | 99.87 | - | - | - | - |
| | WIND | 16 | 100.00 | - | - | - | - |
| | WIND | 17 | 100.00 | - | - | - | - |
| | WIND | 18 | 99.87 | - | - | - | - |
| | WIND | 19 | 100.00 | - | - | - | - |
| | WIND | 20 | 100.00 | - | - | - | - |
| | WIND | 21 | 99.19 | - | - | - | - |
| | WIND | 22 | 93.15 | - | - | - | - |

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION
 MONTHLY AIR MONITORING SUMMARY
 for AMD SECTION III.B.1(c)

AUGUST 2017

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Prepared: Sep 25 2017 09:33

| APPROVAL NUMBERS | REPORT DATE | | | | | | |
|------------------|---|----------|--------------------|-----------------------|---------------------------|-----------------------|---|
| | MONTH | YEAR | | | | | |
| 289664-00-00 | 8 | 2017 | | | | | |
| 241311-00-00 | CONTINUOUS AMBIENT MONITORING | | | | | | |
| 254465-00-00 | | | | | | | |
| 149968-01-00 | | | | ONE-HOUR AVERAGE | | 24-HOUR AVERAGE | |
| 48522-01-00 | PARAMETER | STN. NO. | % TIME OPERATIONAL | MAXIMUM CONCENTRATION | NO. READINGS > REGULATION | MAXIMUM CONCENTRATION | NO. READINGS > REGULATION |
| 240008-00-00 | WIND | 23 | 99.73 | - | - | - | - |
| 48263-01-00 | WIND | 25 | 100.00 | - | - | - | - |
| 151469-01-00 | WIND | 500 | 100.00 | - | - | - | - |
| 224816-00-00 | WIND | 502 | 100.00 | - | - | - | - |
| 189942-00-00 | WIND | 505 | 100.00 | - | - | - | - |
| 206355-00-00 | WIND | 505 | 100.00 | - | - | - | - |
| 46586-00-00 |  | | | | | | |
| 73203-02-00 | | | | | | | |
| 216466-01-00 | | | | | | | |
| 137467-01-00 | | | | | | | |
| 236394-00-00 | | | | | | | |
| 20809-01-00 | | | | | | | |
| 094-02-00 | | | | | | | |
| 305529-00-00 | | | | | | | |
| 026-02-00 | | | | | | | |
| 228044-00-00 | | | | | | | SIGNATURE OF ASSOCIATION REPRESENTATIVE |



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 1
BERTHA GANTER FORT MCKAY
AUGUST 2017

Operations, Data Collection,
QA/QC, Data Validation and Reporting by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

September 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT McKAY - BERTHA GANTER (AMS 1)
 JULY 2017

MONTHLY SUMMARY for
 AMD SECTION III.B.1(c)

| Parameter | Hours of Data | Hours of Calibration | Hours without Data | Operational Time | Maximum 1-Hour Value | 1-Hour Exceedances | Maximum 24-Hour Value | 24-Hour Exceedances |
|---------------------------------------|---------------|----------------------|--------------------|------------------|----------------------|--------------------|-----------------------|---------------------|
| SO2(ppb) Average | 693 | 35 | 51 | 97.85 | 21 | 0 | 4 | 0 |
| TRS(ppb) Average | 697 | 34 | 47 | 98.25 | 3 | 0 | 1 | 0 |
| THC(ppm) Average | 692 | 35 | 52 | 97.72 | 5.5 | - | 2.3 | - |
| NMHC(ppm) Average | 692 | 35 | 52 | 97.72 | 3.436 | - | 0.239 | - |
| CH4(ppm) Average | 692 | 35 | 52 | 97.72 | 2.5 | - | 2.1 | - |
| O3 (ppb) Average | 690 | 37 | 54 | 97.72 | 51 | 0 | 31 | - |
| NO2 (ppb) Average | 693 | 36 | 51 | 97.98 | 22 | 0 | 6 | - |
| NO (ppb) Average | 693 | 36 | 51 | 97.98 | 21 | - | 3 | - |
| NOX (ppb) Average | 693 | 36 | 51 | 97.98 | 38 | - | 8 | - |
| NH3 (ppb) Average | 609 | 47 | 135 | 88.17 | 0 | 0 | 0 | - |
| PM2.5 (ug/m3) Average | 728 | 2 | 16 | 98.12 | 41.6 | - | 17.9 | 0 |
| Wind Speed 10 m (km/h) Average | 744 | 0 | 0 | 100 | 27 | - | 18 | - |
| Wind Direction 10 m (deg) Average | 744 | 0 | 0 | 100 | - | - | - | - |
| Temperature 2 m (C) Average | 744 | 0 | 0 | 100 | 32.3 | - | 24.4 | - |
| Temperature 10 m (C) Average | 744 | 0 | 0 | 100 | 31.8 | - | 24.6 | - |
| Relative Humidity (%) Average | 744 | 0 | 0 | 100 | 99 | - | 77 | - |
| Precipitation (mm) Total | 744 | 0 | 0 | 100 | 2.3 | - | 4.8 | - |
| Leaf Wetness (% of range) Average | 744 | 0 | 0 | 100 | 80 | - | 21 | - |
| Global Solar Radiation (W/m2) Average | 744 | 0 | 0 | 100 | 897 | - | 337 | - |

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BERTHA GANTER FORT McKAY (AMS 1)
 JULY 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

| Parameter | Number | Mean | StnDev | Total | Percentile | | | | | | |
|---------------------------------------|--------|-------|--------|-------|------------|------|------|--------|------|------|-------|
| | | | | | Min | P10 | Q1 | Median | Q3 | P90 | Max |
| SO2 (ppb) Average | 693 | 0.8 | 2 | - | 0 | 0 | 0 | 0 | 0 | 1 | 21 |
| TRS (ppb) Average | 697 | 0.5 | 0 | - | 0 | 0 | 0 | 0 | 0 | 1 | 3 |
| THC (ppm) Average | 692 | 2.08 | 0.2 | - | 1.9 | 1.9 | 1.9 | 2 | 2.2 | 2.4 | 5.5 |
| NMHC(ppm) Average | 692 | 0.077 | 0.178 | - | 0 | 0 | 0 | 0 | 0.1 | 0.2 | 3.436 |
| CH4(ppm) Average | 692 | 2 | 0.1 | - | 1.9 | 1.9 | 1.9 | 2 | 2.1 | 2.2 | 2.5 |
| O3 (ppb) Average | 690 | 21.9 | 11 | - | 0 | 6 | 14 | 22 | 29 | 36 | 51 |
| NO2 (ppb) Average | 693 | 2.6 | 3 | - | 0 | 0 | 0 | 1 | 4 | 8 | 22 |
| NO (ppb) Average | 693 | 0.7 | 2 | - | 0 | 0 | 0 | 0 | 0 | 2 | 21 |
| NOX (ppb) Average | 693 | 3.3 | 5 | - | 0 | 0 | 0 | 1 | 5 | 9 | 38 |
| NH3 (ppb) Average | 609 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PM2.5 (ug/m3) Average | 728 | 8.42 | 6.7 | - | 0.3 | 1.7 | 3.2 | 6.7 | 12 | 17.5 | 41.6 |
| Wind Speed 10 m (km/h) Average | 744 | 7.8 | 5 | - | 1 | 3 | 4 | 7 | 10 | 15 | 27 |
| Wind Direction 10 m (deg) Average | 744 | - | - | - | - | - | - | - | - | - | - |
| Temperature 2 m (C) Average | 744 | 19.64 | 5.3 | - | 5.3 | 13.1 | 15.5 | 19.1 | 23.7 | 26.8 | 32.3 |
| Temperature 10 m (C) Average | 744 | 19.74 | 4.9 | - | 7.2 | 13.5 | 16.1 | 19.4 | 23.1 | 26.2 | 31.8 |
| Relative Humidity (%) Average | 744 | 62.4 | 20 | - | 24 | 36 | 46 | 61 | 78 | 92 | 99 |
| Precipitation (mm) Total | 744 | - | - | 18.78 | - | - | - | - | - | - | - |
| Leaf Wetness (% of range) Average | 744 | 2.3 | 10 | - | -2 | -1 | -1 | -1 | 0 | 8 | 80 |
| Global Solar Radiation (W/m2) Average | 744 | 246.2 | 265 | - | 0 | 0 | 1 | 143 | 456 | 689 | 897 |

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BERTHA GANTER Fort McKAY (AMS 1)
AUGUST 2017

OPERATIONAL NOTES

| Parameter | Period Start | Period End | Duration (Hours) | Notes |
|-----------------------|-------------------|-------------------|---------------------|---|
| NO2, O3,SO2, THC, TRS | 22 Aug 2017 10:00 | 22 Aug 2017 10:00 | 1 | Maintenance - manifold cleaning |
| TRS | 21 Aug 2017 13:00 | 21 Aug 2017 13:00 | 1 | Maintenance - Station operator on site |
| THC | 23 Aug 2017 13:00 | 23 Aug 2017 14:00 | 2 | Maintenance - calibration to address baseline drift |
| NH3 | 01 Aug 2017 07:00 | 31 Aug 2017 08:00 | 67 | Stabilization after daily span |
| NH3 | 11 Aug 2017 10:00 | 11 Aug 2017 10:00 | 1 | Data collection error |
| NH3 | 21 Aug 2017 16:00 | 22 Aug 2017 10:00 | 19 | Maintenance to replace converter core |
| NH3 | 22 Aug 2017 16:00 | 23 Aug 2017 09:00 | 18 | Stabilization after converter core replacement |
| NH3 | 23 Aug 2017 10:00 | 23 Aug 2017 12:00 | 3 | Maintenance - calibration to address baseline drift |



| | |
|---|--|
| Number of Exceedences (AAQO): 1-hr: 0 24-hr: 0 | Hours in Service: 744 |
| Maximum Value: 46 ppb on Aug 29 12:00 | Maximum Daily Average: 4.3 ppb on Aug 29 |
| Minimum Value: 0 ppb on Aug 28 23:00 | Hours of Data: 709 |
| Maximum Diurnal Average: 3.8 ppb at hour 12 | Hours of Missing Data: 35 |
| Monthly Average: 1.1 ppb | Hours of Calibration: 34 |
| Minimum Daily Average: 0.1 ppb on Aug 28 | Percent Operational Time: 99.9 |
| Minimum Diurnal Average: 0.3 ppb at hour 2 | |
| Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 14 | |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 2-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 3-Aug | 0 | 0 | 0 | 1 | Z | 0 | 1 | 1 | 1 | 1 | 5 | 7 | 6 | 5 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1.5 | 7 | |
| 4-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | |
| 5-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 12 | 25 | 19 | 23 | 4 | 3 | 1 | 3 | 1 | 2 | 0 | 1 | 1 | 0 | 4.3 | 25 | |
| 6-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | |
| 7-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | |
| 8-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0.3 | 1 | |
| 9-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 4 | 2 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0.8 | 4 | |
| 10-Aug | 0 | 0 | 0 | 3 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.8 | 3 | |
| 11-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | C | C | C | 11 | 7 | 2 | 1 | 1 | 2 | 2 | 1 | 1.7 | 11 | |
| 12-Aug | 1 | Z | 1 | 1 | 1 | 1 | 1 | 2 | 4 | 8 | 6 | 4 | 3 | 5 | 5 | 1 | 1 | 2 | 1 | 0 | 0 | 1 | 1 | 2.1 | 8 | |
| 13-Aug | 1 | 1 | Z | 1 | 0 | 0 | 1 | 1 | 12 | 11 | 5 | 3 | 4 | 5 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 4 | 4 | 3 | 3.0 | 12 |
| 14-Aug | 1 | 0 | 0 | Z | 0 | 0 | 0 | 2 | 5 | 12 | 17 | 8 | 10 | 7 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.9 | 17 | |
| 15-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 1 | 1 | 1 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0.7 | 3 | |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | |
| 17-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | |
| 18-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | |
| 19-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | |
| 20-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | |
| 21-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | |
| 22-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | |
| 23-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 6 | 6 | 6 | 2 | 0 | 2 | 2 | 2 | 4 | 3 | 7 | 5 | 2 | 7 | 5 | 2.9 | 7 | |
| 24-Aug | 3 | Z | 2 | 1 | 2 | 1 | 1 | 1 | 0 | 8 | 2 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.2 | 8 | |
| 25-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | |
| 26-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | |
| 27-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | |
| 29-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 46 | 15 | 3 | 1 | 1 | 1 | 4 | 3 | 2 | 2 | 1 | 0 | 4.3 | 46 | |
| 30-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 13 | 10 | 9 | 5 | 2 | 4 | 6 | 4 | 2 | 1 | 1 | 1 | 2.8 | 13 | |
| 31-Aug | 1 | 0 | Z | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 2 | |

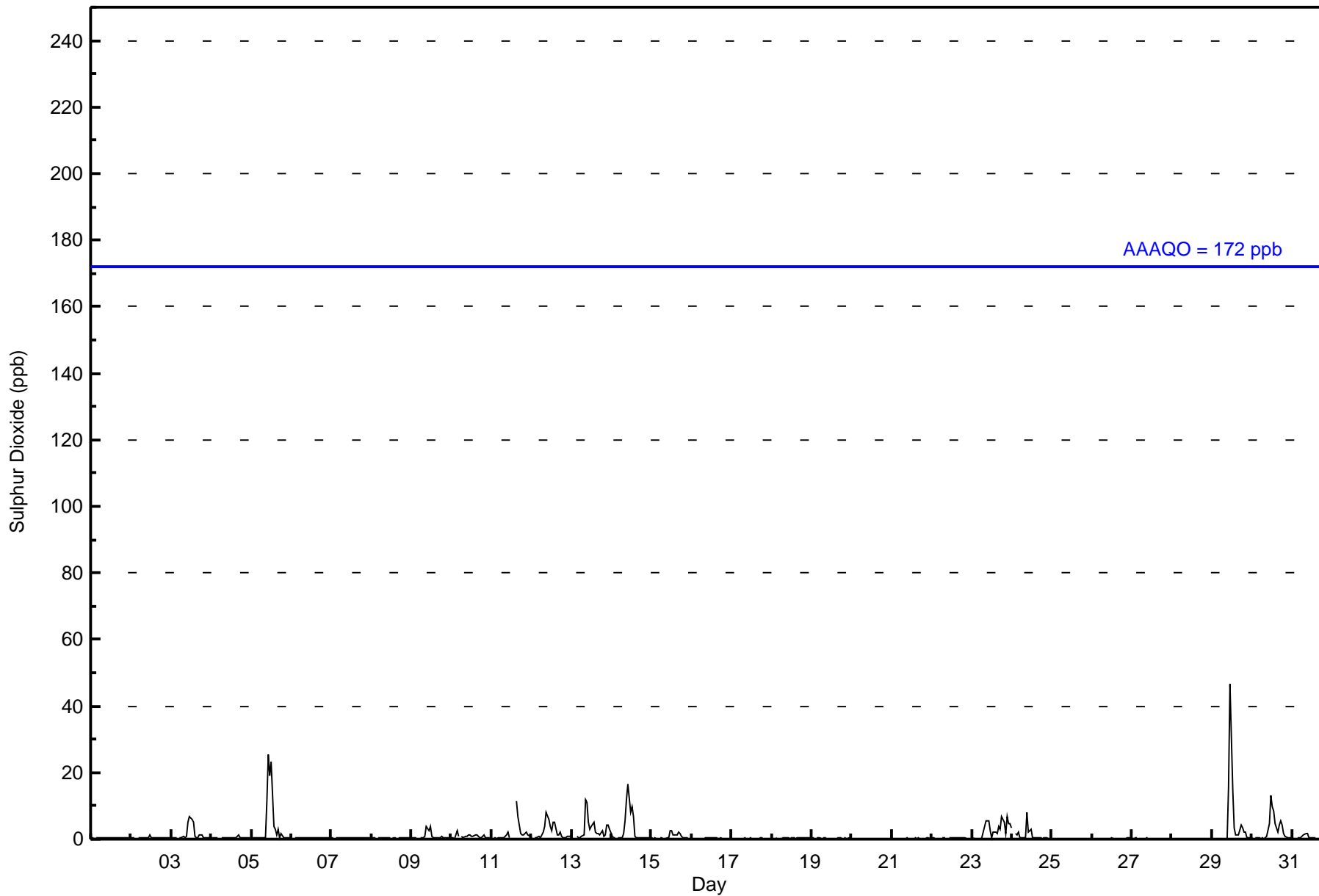
| | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|
| 0.5 | 0.3 | 0.3 | 0.4 | 0.4 | 0.3 | 0.3 | 0.5 | 1.2 | 2.4 | 3.2 | 3.8 | 2.7 | 1.6 | 0.9 | 0.9 | 1.0 | 0.9 | 0.9 | 0.6 | 0.5 | 0.7 | 0.6 | 0.5 | Diurnal Average |
| 3 | 1 | 2 | 3 | 2 | 1 | 1 | 2 | 12 | 12 | 25 | 46 | 23 | 9 | 5 | 11 | 7 | 6 | 7 | 5 | 2 | 7 | 5 | 5 | Diurnal Maximum |

Z - zerospan C - Calibration M - Maintenance
 Alberta Ambient Air Quality Objectives (AAQO): 1-hr 172 ppb 24-hr 48 ppb



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Fort McKay - Bertha Ganter - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort McKay - Bertha Ganter - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 10 | 696 | 98.17 | 98.17 |
| 11 - 20 | 10 | 1.41 | 99.58 |
| 21 - 60 | 3 | 0.42 | 100.00 |
| 61 - 110 | 0 | 0.00 | 100.00 |
| 111 - 172 | 0 | 0.00 | 100.00 |
| > 172 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 709

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort McKay - Bertha Ganter - August 2017

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|---|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 10 | 33 | 19 | 9 | 7 | 7 | 6 | 33 | 106 | 111 | 77 | 67 | 60 | 44 | 59 | 38 | 20 | 696 |
| 11 - 20 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| 21 - 60 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 61 - 110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 111 - 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 33 | 19 | 9 | 7 | 9 | 7 | 36 | 113 | 111 | 77 | 67 | 60 | 44 | 59 | 38 | 20 | 709 |

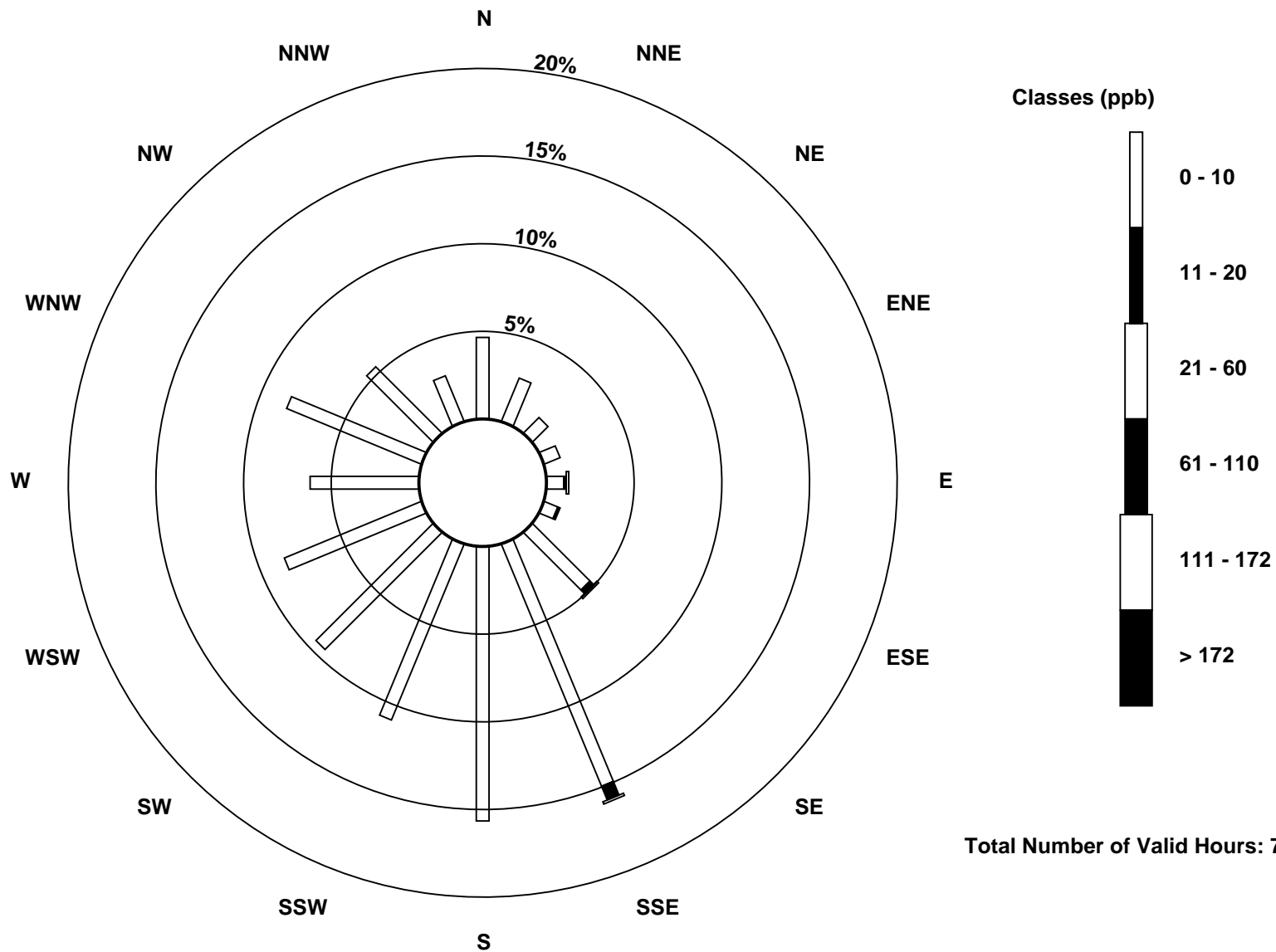
Total Number of Valid Hours: 709

Total Number of Hours: 744

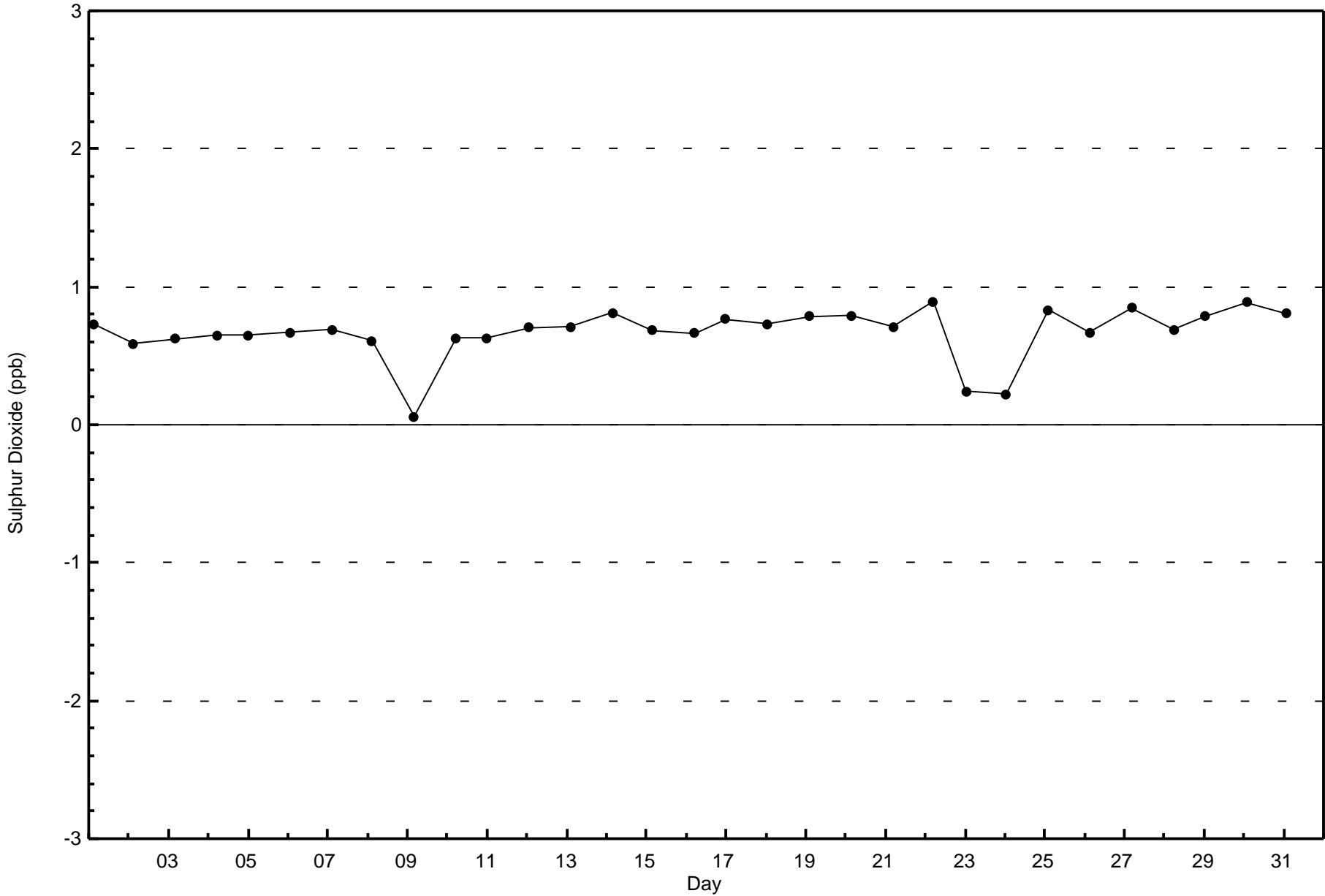


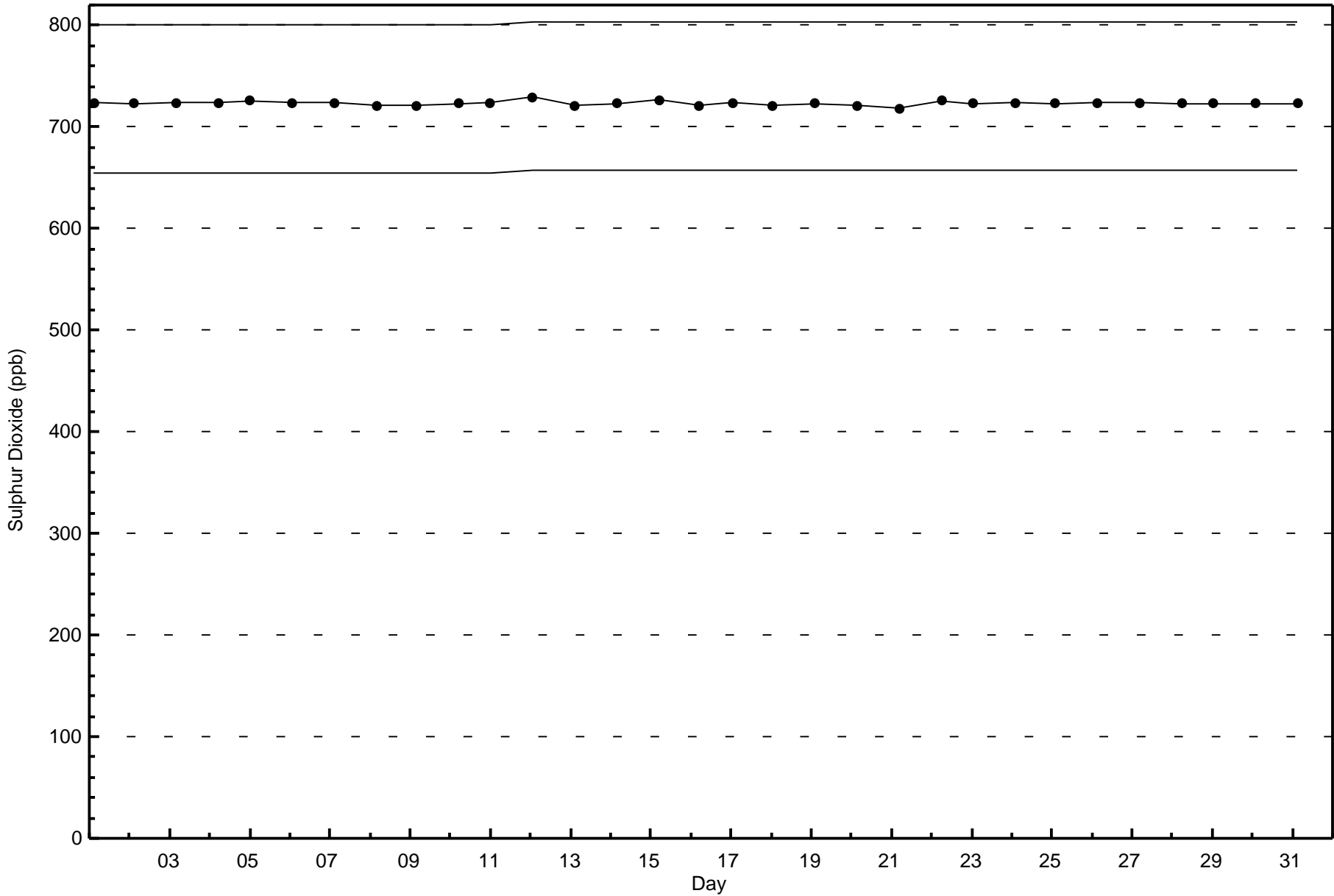
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Sulphur Dioxide (SO₂) - ppb
Fort McKay - Bertha Ganter (AMS 1)



Total Number of Valid Hours: 709







Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

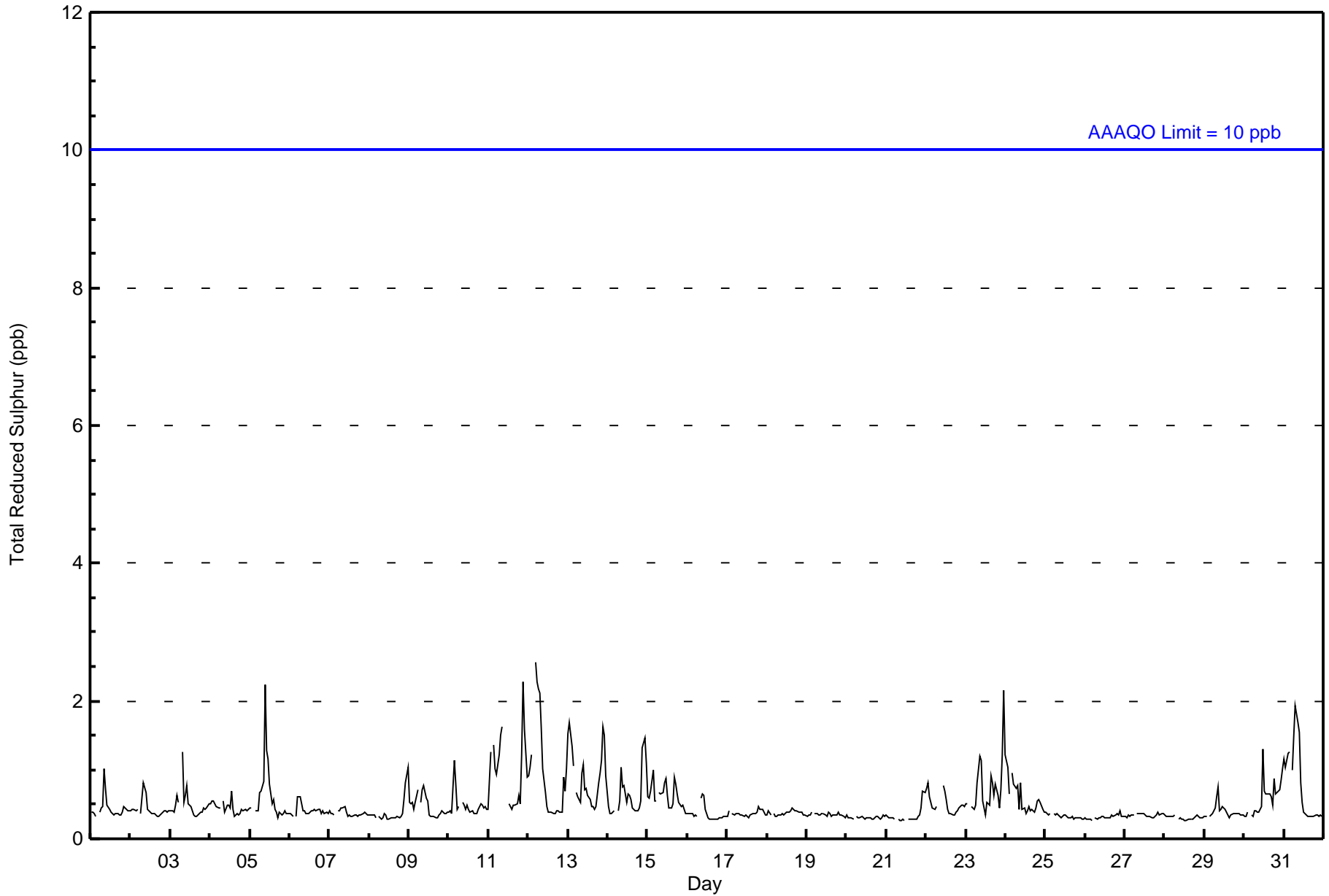
Fort McKay - Bertha Ganter - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | |
|---|-------------------------------|---|---|---|---|---|---|---|---|--|----|----|----|----|----|----|----|----|----|--------------------------------|----|----|----|-----------------|---------------|---------------|---|
| Maximum Value: 3 ppb on Aug 12 05:00 | | | | | | | | | | Maximum Daily Average: 1.0 ppb on Aug 11 | | | | | | | | | | Hours of Data: 708 | | | | | | | |
| Minimum Value: 0 ppb on Aug 28 14:00 | | | | | | | | | | Minimum Daily Average: 0.3 ppb on Aug 28 | | | | | | | | | | Hours of Missing Data: 36 | | | | | | | |
| Maximum Diurnal Average: 0.7 ppb at hour 9 | | | | | | | | | | Minimum Diurnal Average: 0.4 ppb at hour 18 | | | | | | | | | | Hours of Calibration: 34 | | | | | | | |
| Monthly Average: 0.5 ppb | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 2 | | | | | | | | | | Percent Operational Time: 99.7 | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | |
| 2-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | |
| 3-Aug | 0 | 0 | 0 | 0 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.5 | 1 | |
| 4-Aug | 1 | 1 | 1 | 1 | 0 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 1 | |
| 5-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 2 | |
| 6-Aug | 0 | 0 | 0 | Z | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | |
| 7-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 0 | |
| 8-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0.4 | 1 |
| 9-Aug | 1 | 1 | 1 | 0 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 1 | |
| 10-Aug | 0 | 0 | 0 | 1 | 1 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0.5 | 1 | |
| 11-Aug | 0 | 1 | Z | 1 | 1 | 1 | 1 | 2 | 2 | C | C | C | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1.0 | 2 | |
| 12-Aug | 1 | 1 | 1 | Z | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1.0 | 3 | |
| 13-Aug | 2 | 2 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 1 | 1 | 0.9 | 2 | |
| 14-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0.6 | 1 | |
| 15-Aug | 1 | 1 | 1 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0.6 | 1 | |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Z | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | |
| 17-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 0 | |
| 18-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 0 | |
| 19-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | |
| 20-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | UO | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.3 | 1 |
| 22-Aug | 1 | 1 | 1 | 1 | 0 | 0 | 0 | Z | 1 | M | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 1 | |
| 23-Aug | 1 | 1 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 2 | 0.7 | 2 | |
| 24-Aug | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0.6 | 1 | |
| 25-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | |
| 26-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | |
| 29-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | |
| 30-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0.6 | 1 | |
| 31-Aug | 1 | 1 | 1 | 1 | Z | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.8 | 2 | |
| 0.5 0.5 0.5 0.5 0.5 0.6 0.6 0.7 0.7 0.6 0.5 0.5 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.5 0.6 0.6 0.6 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | |
| 2 2 1 1 3 2 2 2 2 2 2 1 1 1 1 1 1 1 1 1 1 1 2 2 2 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | |
| Z - zerospan C - Calibration M - Maintenance UO - Unstable Operation | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Fort McKay - Bertha Ganter - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Fort McKay - Bertha Ganter - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2 | 707 | 99.86 | 99.86 |
| 3 - 4 | 1 | 0.14 | 100.00 |
| 5 - 7 | 0 | 0.00 | 100.00 |
| 8 - 11 | 0 | 0.00 | 100.00 |
| > 11 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Fort McKay - Bertha Ganter - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|---|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2 | 31 | 19 | 10 | 7 | 9 | 7 | 33 | 119 | 105 | 79 | 67 | 56 | 44 | 61 | 40 | 20 | 707 |
| 3 - 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 5 - 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 - 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 31 | 19 | 10 | 7 | 9 | 7 | 33 | 119 | 106 | 79 | 67 | 56 | 44 | 61 | 40 | 20 | 708 |

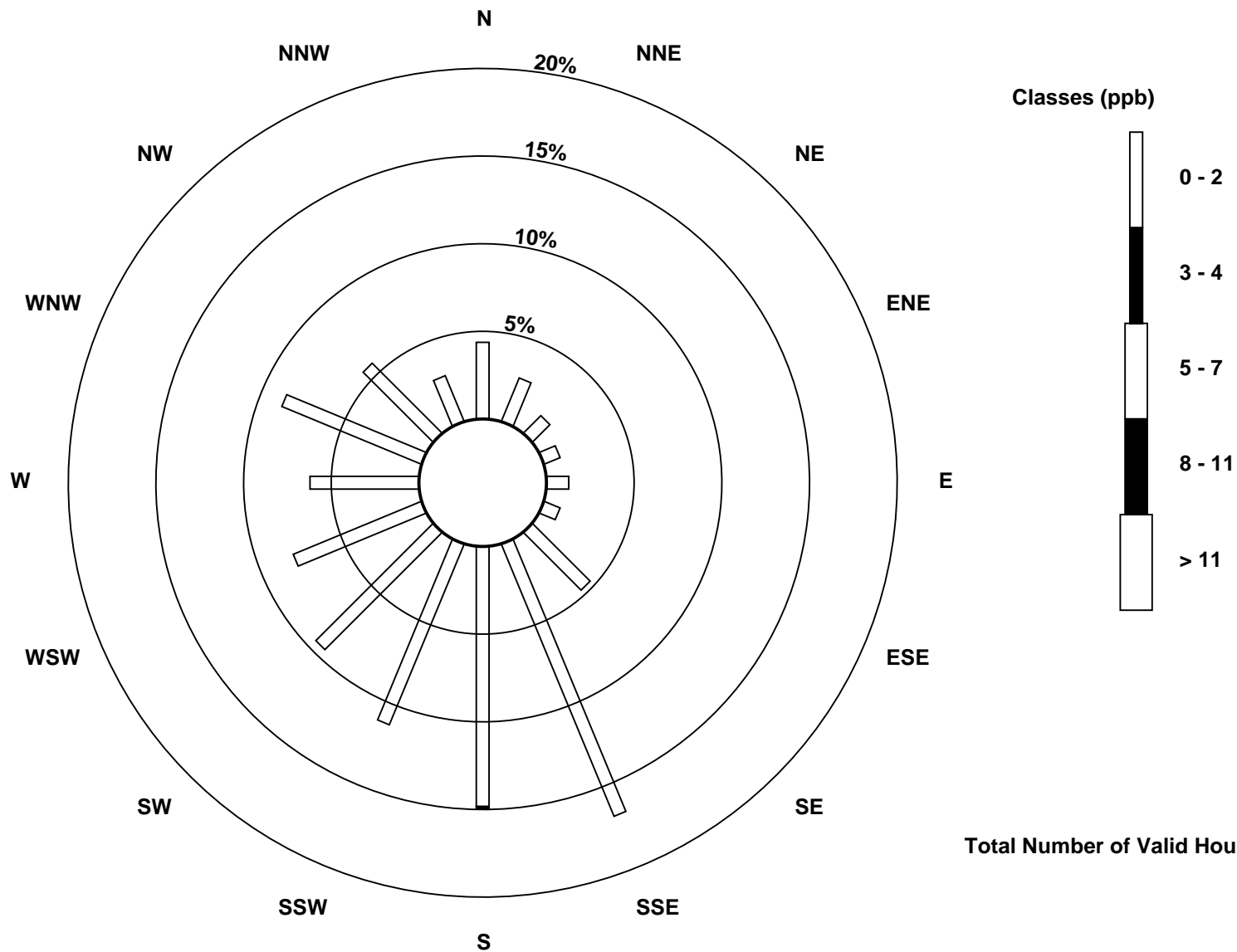
Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

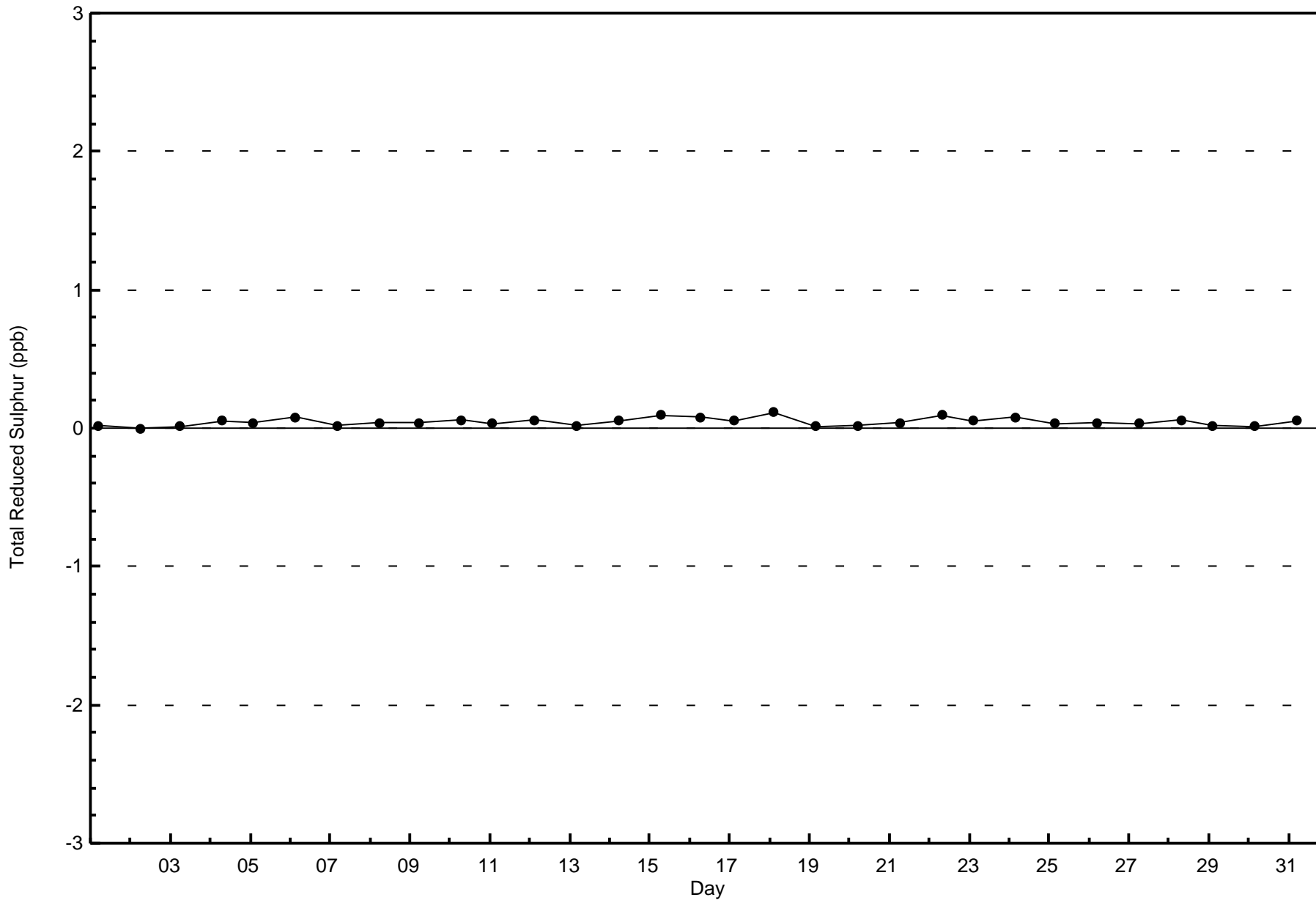
Total Reduced Sulphur (TRS) - ppb
Fort McKay - Bertha Ganter (AMS 1)





Wood Buffalo Environmental Association
Zero Responses

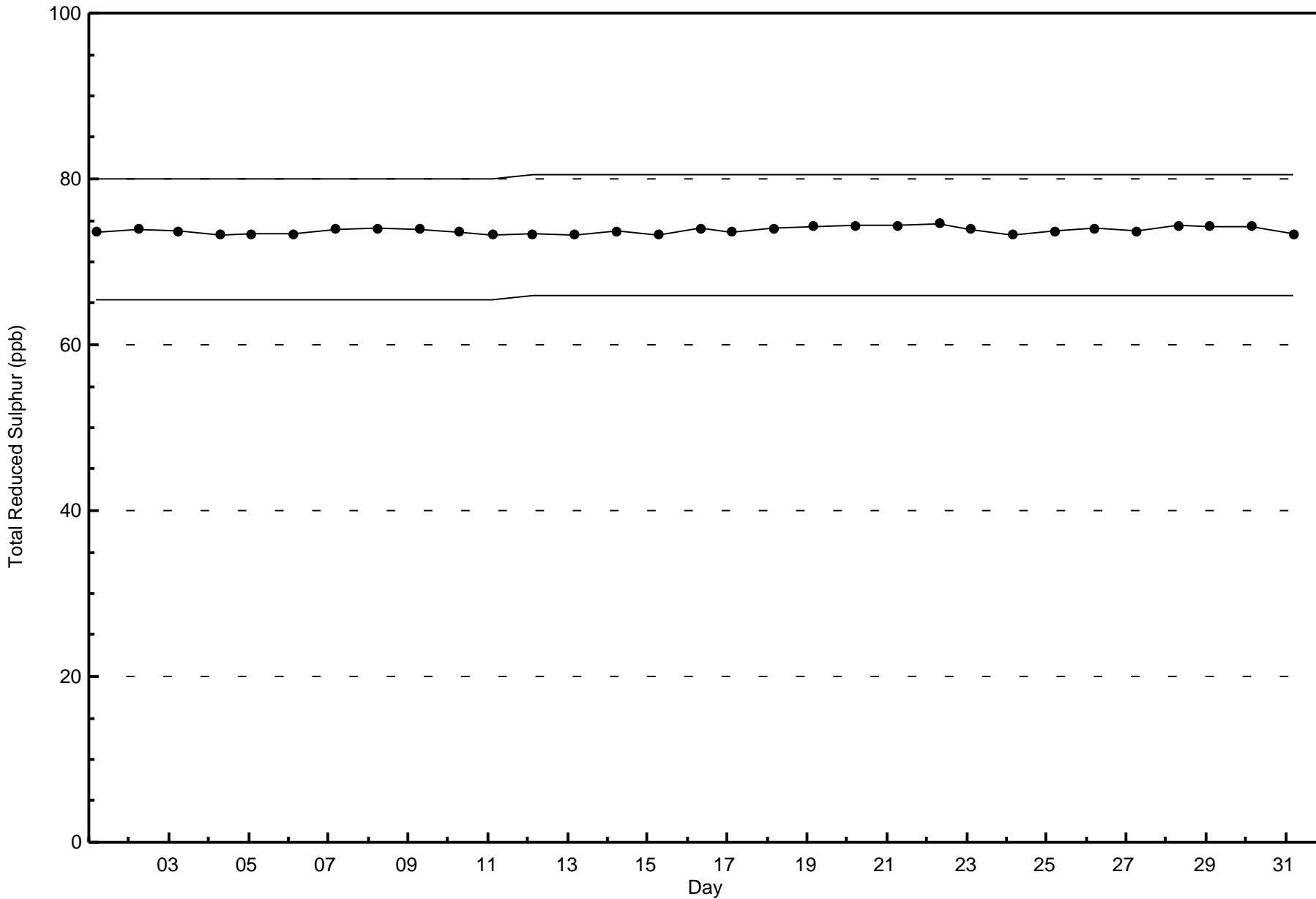
Total Reduced Sulphur (TRS) - ppb
Fort McKay - Bertha Ganter - August 2017





Wood Buffalo Environmental Association
Span Responses

Total Reduced Sulphur (TRS) - ppb
Fort McKay - Bertha Ganter - August 2017





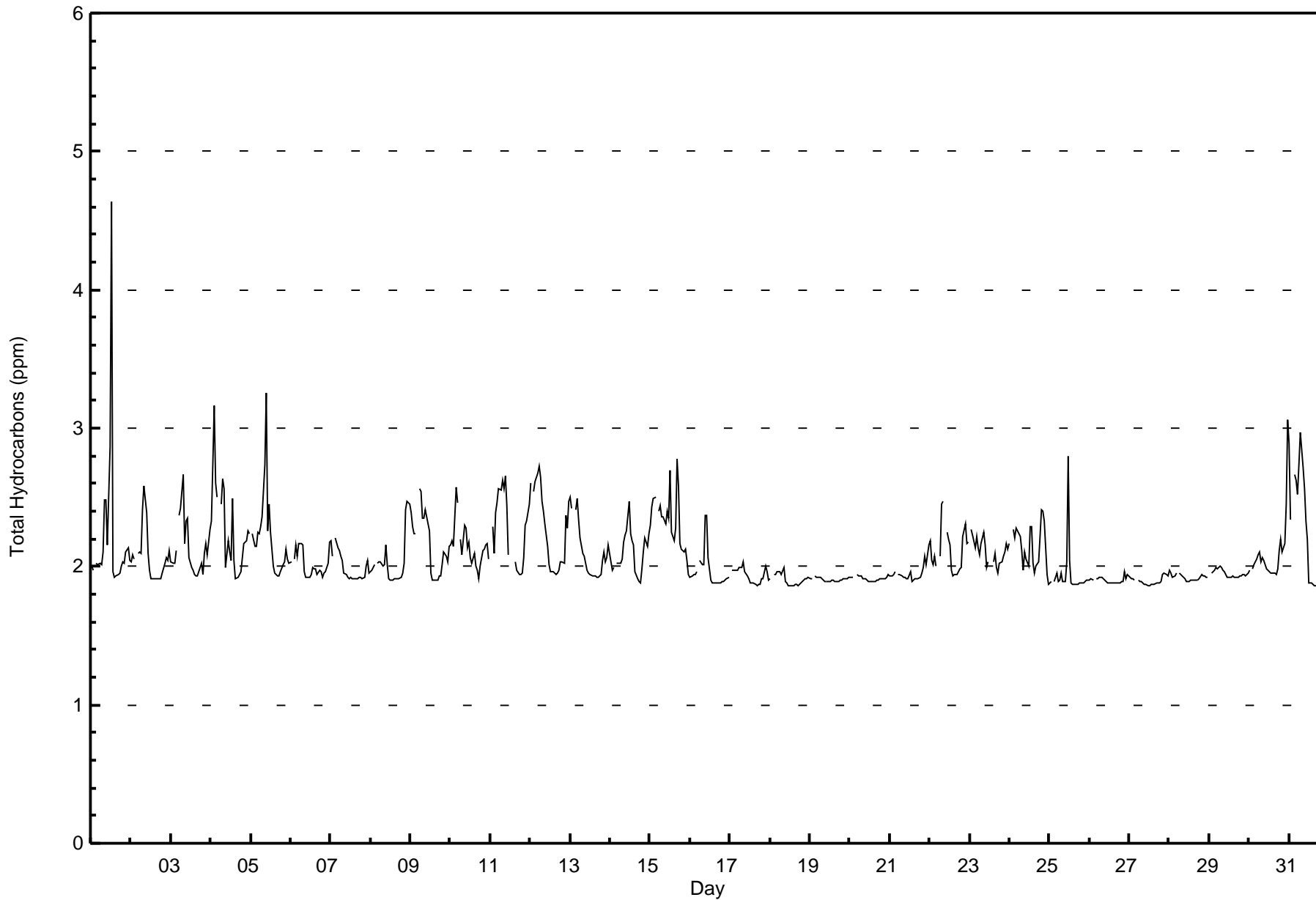
Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Fort McKay - Bertha Ganter - August 2017

| Maximum Value: 4.6 ppm on Aug 1 13:00 | | | | | | | | | | | | | | | | | | | | Maximum Daily Average: 2.3 ppm on Aug 15 | | | | | Hours in Service: 744 | | |
|--|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|-----|-----|-----|-----------------|--------------------------------|---------------|-----|
| Minimum Value: 1.9 ppm on Aug 18 14:00 | | | | | | | | | | | | | | | | | | | | Minimum Daily Average: 1.9 ppm on Aug 27 | | | | | Hours of Data: 707 | | |
| Maximum Diurnal Average: 2.2 ppm at hour 8 | | | | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 1.9 ppm at hour 16 | | | | | Hours of Missing Data: 37 | | |
| Monthly Average: 2.07 ppm | | | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 2.0 Q ₃ = 2.2 P ₉₀ = 2.4 P ₉₉ = 2.9 | | | | | Hours of Calibration: 34 | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 99.6 | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 2.0 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.5 | 2.5 | 2.2 | 2.9 | 4.6 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.0 | 2.2 | 4.6 |
| 2-Aug | 2.0 | 2.1 | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.4 | 2.6 | 2.4 | 2.1 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.1 | 2.0 | 2.1 | 2.1 | 2.6 |
| 3-Aug | 2.0 | 2.0 | 2.0 | 2.1 | Z | 2.4 | 2.4 | 2.7 | 2.2 | 2.3 | 2.4 | 2.1 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 2.0 | 1.9 | 2.1 | 2.2 | 2.1 | 2.3 | 2.1 | 2.7 |
| 4-Aug | 2.3 | 2.7 | 3.2 | 2.6 | 2.5 | Z | 2.4 | 2.6 | 2.6 | 2.0 | 2.2 | 2.1 | 2.0 | 2.5 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | 2.1 | 2.2 | 2.2 | 2.3 | 2.2 | 2.2 | 2.3 | 3.2 |
| 5-Aug | Z | 2.2 | 2.1 | 2.1 | 2.2 | 2.2 | 2.3 | 2.4 | 2.7 | 3.3 | 2.3 | 2.5 | 2.2 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.0 | 2.2 | 2.2 | 3.3 |
| 6-Aug | 2.0 | Z | 2.1 | 2.2 | 2.1 | 2.2 | 2.2 | 2.2 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 1.9 | 2.0 | 2.0 | 1.9 | 2.0 | 2.0 | 2.0 | 2.2 | 2.0 | 2.2 | 2.2 |
| 7-Aug | 2.2 | 2.1 | Z | 2.2 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.2 |
| 8-Aug | 2.0 | 2.0 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.2 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.4 | 2.5 | 2.5 | 2.0 | 2.5 | 2.5 | 2.5 |
| 9-Aug | 2.4 | 2.3 | 2.2 | 2.2 | Z | 2.6 | 2.5 | 2.3 | 2.4 | 2.4 | 2.3 | 2.3 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.1 | 2.1 | 2.0 | 2.1 | 2.2 | 2.6 | 2.6 |
| 10-Aug | 2.2 | 2.2 | 2.1 | 2.6 | 2.5 | Z | 2.2 | 2.1 | 2.3 | 2.3 | 2.1 | 2.2 | 2.1 | 2.0 | 2.1 | 2.0 | 2.0 | 1.9 | 2.0 | 2.1 | 2.1 | 2.2 | 2.2 | 2.1 | 2.1 | 2.6 | 2.6 |
| 11-Aug | Z | 2.3 | 2.1 | 2.4 | 2.5 | 2.6 | 2.5 | 2.6 | 2.6 | 2.7 | 2.4 | 2.1 | C | C | C | 2.0 | 2.0 | 1.9 | 1.9 | 2.0 | 2.1 | 2.3 | 2.3 | 2.4 | 2.3 | 2.7 | 2.7 |
| 12-Aug | 2.6 | Z | 2.5 | 2.6 | 2.7 | 2.7 | 2.6 | 2.5 | 2.4 | 2.3 | 2.2 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.4 | 2.3 | 2.5 | 2.3 | 2.7 | 2.7 |
| 13-Aug | 2.5 | 2.4 | Z | 2.4 | 2.5 | 2.3 | 2.2 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.1 | 2.0 | 2.1 | 2.2 | 2.1 | 2.5 | 2.5 |
| 14-Aug | 2.0 | 2.0 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.1 | 2.2 | 2.2 | 2.3 | 2.5 | 2.2 | 2.2 | 2.2 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | 2.1 | 2.2 | 2.1 | 2.2 | 2.2 | 2.1 | 2.5 |
| 15-Aug | 2.3 | 2.4 | 2.5 | 2.5 | Z | 2.4 | 2.4 | 2.4 | 2.4 | 2.3 | 2.4 | 2.3 | 2.7 | 2.2 | 2.2 | 2.3 | 2.8 | 2.6 | 2.2 | 2.1 | 2.1 | 2.1 | 2.0 | 1.9 | 2.3 | 2.8 | 2.8 |
| 16-Aug | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.4 | 2.4 | 2.1 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.4 |
| 17-Aug | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 1.9 | 1.9 | 2.0 | 2.0 |
| 18-Aug | 1.9 | Z | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 |
| 19-Aug | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| 20-Aug | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| 21-Aug | 1.9 | 1.9 | 1.9 | 2.0 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.1 | 2.0 | 2.2 | 2.0 | 2.2 | 2.2 |
| 22-Aug | 2.2 | 2.0 | 2.0 | 2.1 | 2.0 | Z | 2.1 | 2.4 | 2.5 | M | 2.2 | 2.2 | 2.2 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.2 | 2.3 | 2.2 | 2.2 | 2.1 | 2.5 |
| 23-Aug | Z | 2.3 | 2.2 | 2.1 | 2.2 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.0 | 2.0 | M | M | 2.0 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.2 | 2.1 | 2.1 | 2.3 | 2.3 |
| 24-Aug | 2.2 | Z | 2.3 | 2.2 | 2.3 | 2.3 | 2.2 | 2.1 | 2.0 | 2.1 | 2.1 | 2.0 | 2.3 | 2.3 | 2.0 | 1.9 | 2.0 | 2.0 | 2.2 | 2.4 | 2.4 | 2.3 | 1.9 | 1.9 | 2.1 | 2.4 | 2.4 |
| 25-Aug | 1.9 | 1.9 | Z | 1.9 | 2.0 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 2.0 | 2.8 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.8 |
| 26-Aug | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 |
| 27-Aug | 1.9 | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| 28-Aug | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | Z | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 |
| 29-Aug | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 |
| 30-Aug | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.0 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 2.0 | 2.1 | 2.2 | 2.1 | 2.2 | 2.5 | 3.1 | 2.1 | 3.1 | 3.1 |
| 31-Aug | 2.9 | 2.3 | Z | 2.7 | 2.6 | 2.5 | 2.7 | 3.0 | 2.7 | 2.6 | 2.3 | 2.2 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.2 | 3.0 | 3.0 |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | |
| Z - zerospan C - Calibration M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | | |





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Fort McKay - Bertha Ganter - August 2017

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2.0 | 458 | 64.78 | 64.78 |
| 2.1 - 3.0 | 245 | 34.65 | 99.43 |
| 3.1 - 10.0 | 4 | 0.57 | 100.00 |
| > 10.0 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Fort McKay - Bertha Ganter - August 2017**

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|---|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2.0 | 17 | 11 | 5 | 1 | 4 | 7 | 16 | 61 | 58 | 54 | 58 | 48 | 36 | 46 | 26 | 10 | 458 |
| 2.1 - 3.0 | 16 | 8 | 3 | 6 | 5 | 0 | 19 | 52 | 50 | 23 | 9 | 12 | 7 | 13 | 12 | 10 | 245 |
| 3.1 - 10.0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 4 |
| > 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 33 | 19 | 9 | 7 | 9 | 7 | 36 | 113 | 109 | 77 | 67 | 60 | 44 | 59 | 38 | 20 | 707 |

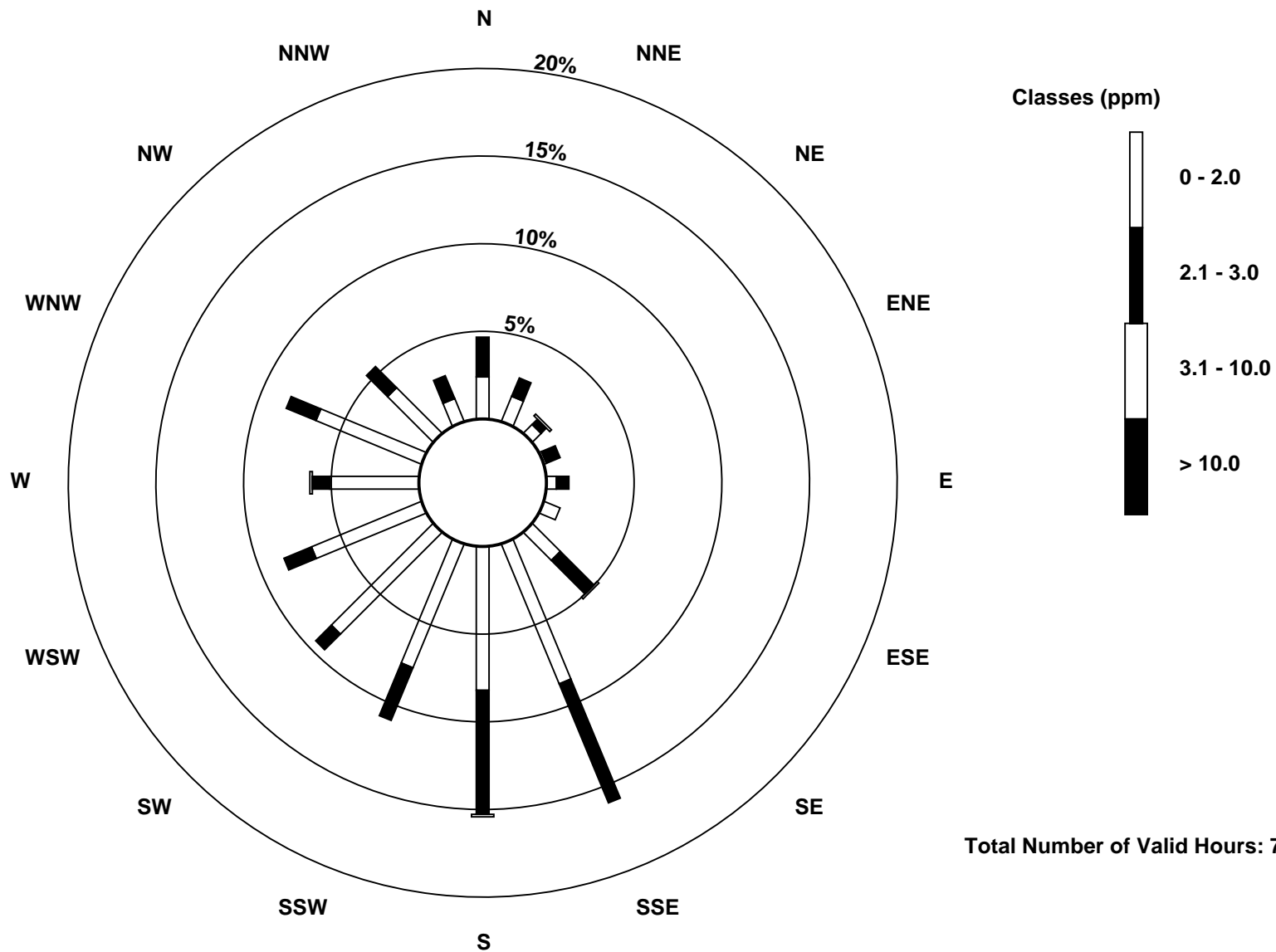
Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Total Hydrocarbons (THC) - ppm
Fort McKay - Bertha Ganter (AMS 1)



Total Number of Valid Hours: 707

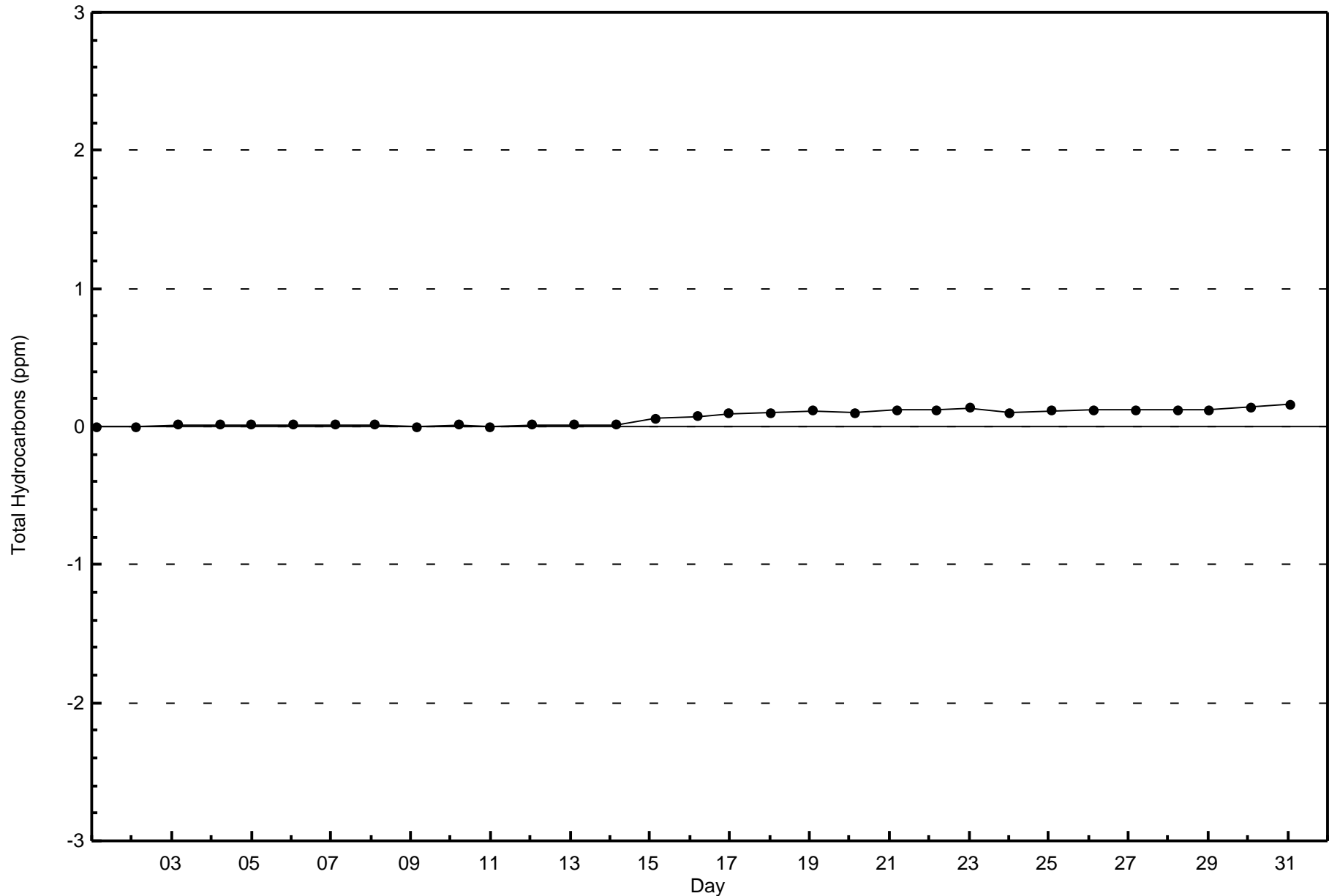


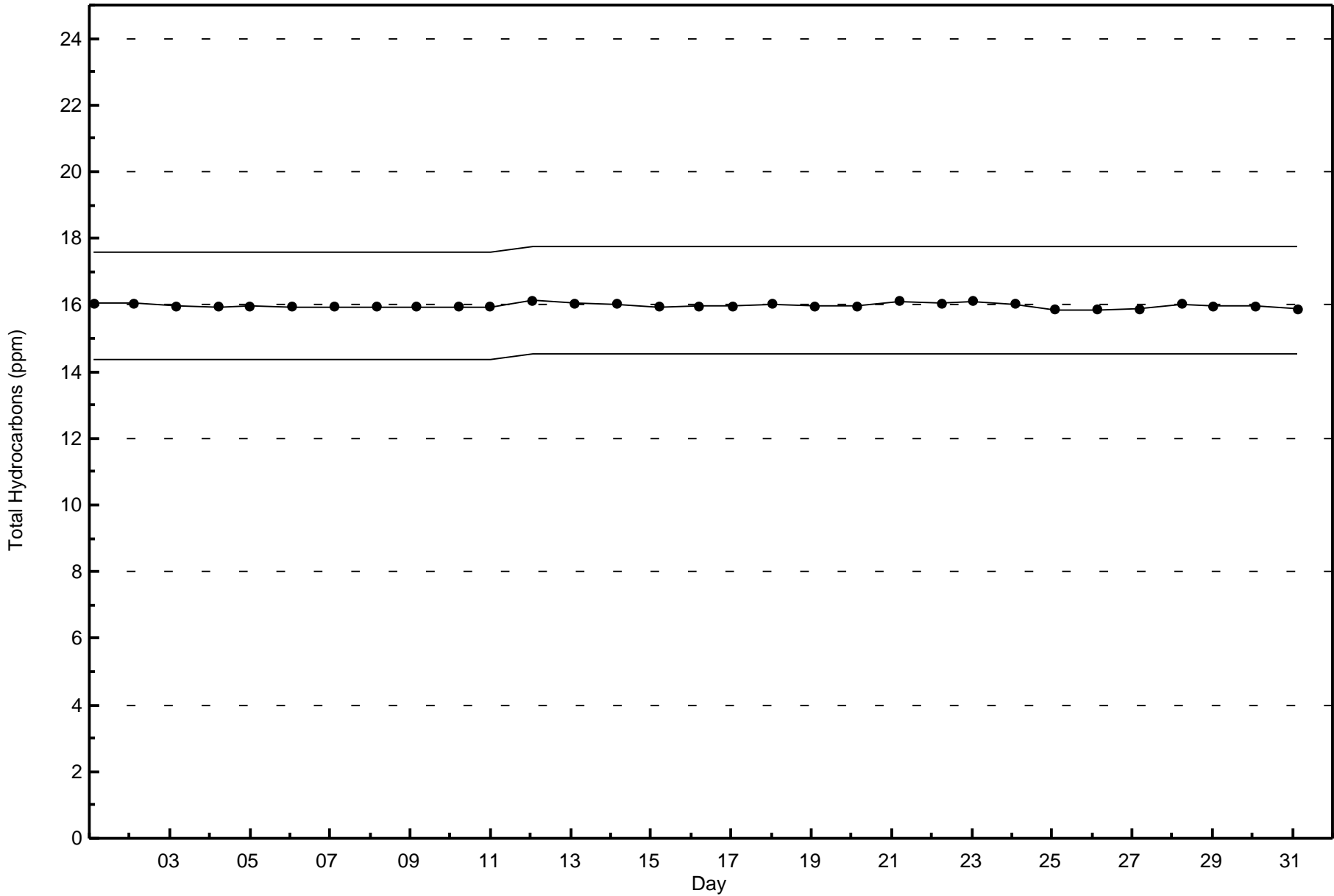
Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Fort McKay - Bertha Ganter - August 2017







Wood Buffalo Environmental Association
Summary of Hour Averages

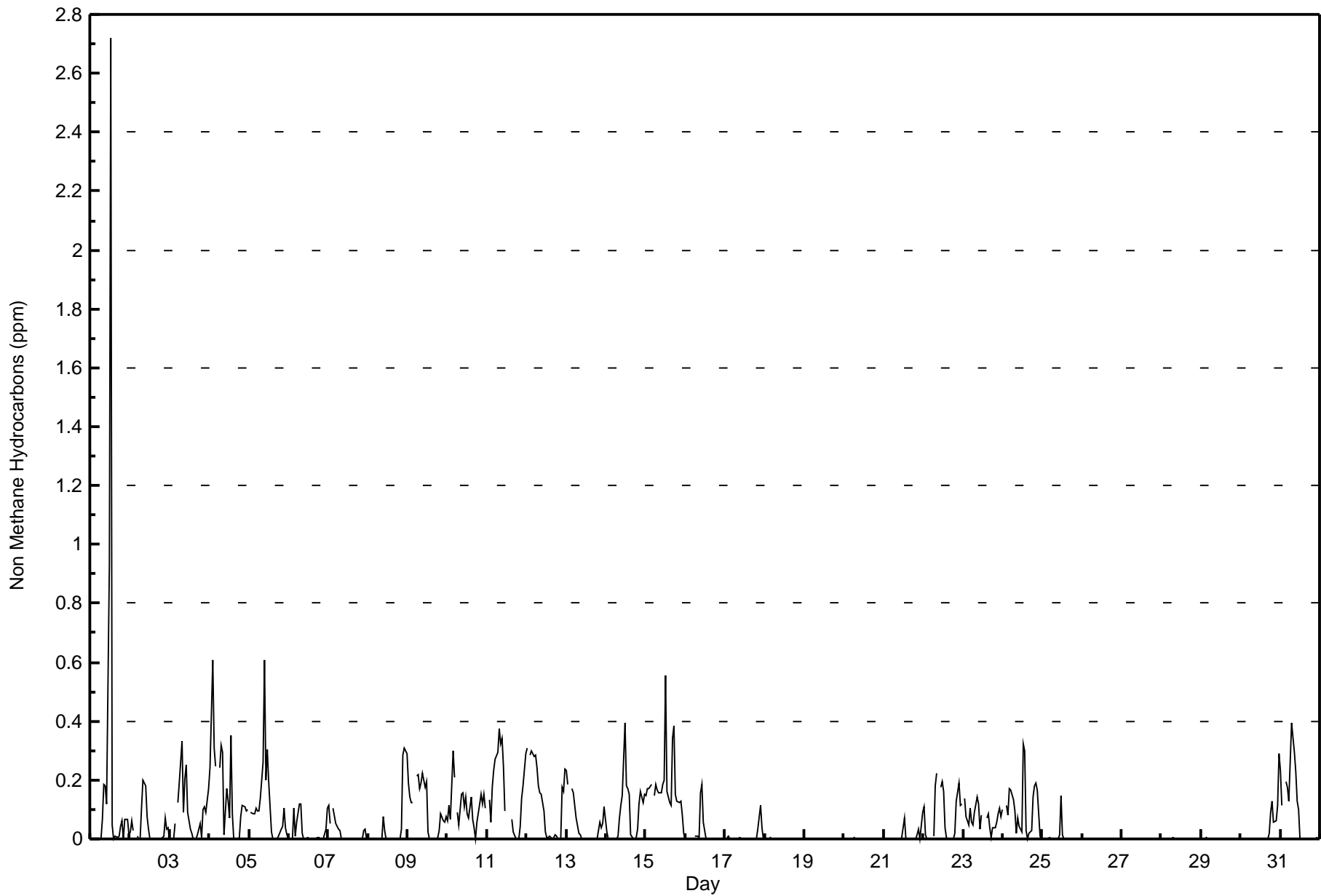
Non Methane Hydrocarbons (NMHC) - ppm
Fort McKay - Bertha Ganter - August 2017

| Maximum Value: 2.718 ppm on Aug 1 13:00 | | Maximum Daily Average: 0.197 ppm on Aug 1 | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|--|-------|--------------------------------|-------|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----------------|--|
| Minimum Value: 0.000 ppm on Aug 1 01:00 | | Minimum Daily Average: 0.000 ppm on Aug 26 | | Hours of Data: 707 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 0.153 ppm at hour 13 | | Minimum Diurnal Average: 0.012 ppm at hour 16 | | Hours of Missing Data: 37 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 0.062 ppm | | Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.1 P ₉₀ = 0.2 P ₉₉ = 0.4 | | Hours of Calibration: 34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Percent Operational Time: 99.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 0.000 | 0.001 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.068 | 0.187 | 0.181 | 0.116 | 0.930 | 2.718 | 0.047 | 0.000 | 0.008 | 0.006 | 0.010 | 0.042 | 0.062 | 0.001 | 0.068 | 0.065 | 0.012 | 0.197 | 2.718 | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 0.026 | 0.062 | 0.026 | Z | 0.009 | 0.000 | 0.000 | 0.105 | 0.198 | 0.181 | 0.078 | 0.033 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.008 | 0.071 | 0.032 | 0.039 | 0.038 | 0.198 | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 0.001 | 0.000 | 0.000 | 0.053 | Z | 0.125 | 0.191 | 0.333 | 0.088 | 0.205 | 0.251 | 0.089 | 0.032 | 0.021 | 0.001 | 0.000 | 0.000 | 0.015 | 0.052 | 0.004 | 0.099 | 0.111 | 0.088 | 0.169 | 0.084 | 0.333 | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 0.242 | 0.420 | 0.606 | 0.311 | 0.245 | Z | 0.244 | 0.318 | 0.294 | 0.016 | 0.170 | 0.127 | 0.071 | 0.352 | 0.086 | 0.000 | 0.000 | 0.000 | 0.003 | 0.075 | 0.114 | 0.110 | 0.095 | 0.098 | 0.174 | 0.606 | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | Z | 0.089 | 0.085 | 0.083 | 0.104 | 0.097 | 0.097 | 0.137 | 0.261 | 0.609 | 0.200 | 0.306 | 0.195 | 0.023 | 0.000 | 0.000 | 0.000 | 0.000 | 0.010 | 0.032 | 0.045 | 0.102 | 0.040 | 0.014 | 0.110 | 0.609 | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 0.000 | Z | 0.000 | 0.103 | 0.010 | 0.056 | 0.119 | 0.120 | 0.020 | 0.000 | 0.000 | 0.007 | 0.001 | 0.000 | 0.000 | 0.000 | 0.004 | 0.007 | 0.000 | 0.000 | 0.000 | 0.031 | 0.104 | 0.025 | 0.120 | | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 0.115 | 0.051 | Z | 0.104 | 0.054 | 0.044 | 0.031 | 0.030 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.027 | 0.034 | 0.000 | 0.021 | 0.115 | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.076 | 0.031 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.033 | 0.284 | 0.311 | 0.290 | 0.045 | 0.311 | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 0.190 | 0.141 | 0.123 | 0.124 | Z | 0.214 | 0.217 | 0.173 | 0.191 | 0.223 | 0.177 | 0.193 | 0.024 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.003 | 0.027 | 0.087 | 0.061 | 0.059 | 0.074 | 0.100 | 0.223 | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 0.062 | 0.112 | 0.069 | 0.299 | 0.208 | Z | 0.088 | 0.049 | 0.151 | 0.157 | 0.109 | 0.142 | 0.087 | 0.070 | 0.144 | 0.066 | 0.040 | 0.001 | 0.058 | 0.117 | 0.150 | 0.119 | 0.152 | 0.104 | 0.111 | 0.299 | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | Z | 0.133 | 0.056 | 0.178 | 0.231 | 0.268 | 0.296 | 0.374 | 0.322 | 0.343 | 0.248 | 0.095 | C | C | C | 0.067 | 0.026 | 0.000 | 0.000 | 0.000 | 0.042 | 0.139 | 0.181 | 0.288 | 0.164 | 0.374 | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 0.307 | Z | 0.283 | 0.301 | 0.280 | 0.285 | 0.240 | 0.181 | 0.157 | 0.153 | 0.094 | 0.024 | 0.003 | 0.007 | 0.008 | 0.000 | 0.003 | 0.015 | 0.008 | 0.000 | 0.000 | 0.176 | 0.160 | 0.238 | 0.127 | 0.307 | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 0.234 | 0.184 | Z | 0.169 | 0.156 | 0.114 | 0.072 | 0.017 | 0.013 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.030 | 0.057 | 0.036 | 0.052 | 0.107 | 0.054 | 0.234 | | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 0.025 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.009 | 0.069 | 0.115 | 0.149 | 0.394 | 0.182 | 0.170 | 0.153 | 0.013 | 0.002 | 0.001 | 0.003 | 0.032 | 0.117 | 0.159 | 0.124 | 0.151 | 0.081 | 0.394 | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 0.149 | 0.169 | 0.172 | 0.187 | Z | 0.146 | 0.185 | 0.164 | 0.158 | 0.156 | 0.184 | 0.200 | 0.555 | 0.163 | 0.122 | 0.116 | 0.343 | 0.387 | 0.150 | 0.127 | 0.121 | 0.129 | 0.080 | 0.017 | 0.182 | 0.555 | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.007 | 0.009 | 0.005 | 0.155 | 0.185 | 0.057 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.018 | 0.185 | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | Z | 0.003 | 0.009 | 0.002 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.003 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.031 | 0.114 | 0.038 | 0.000 | 0.009 | 0.114 | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 0.000 | Z | 0.001 | 0.004 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.004 | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 0.000 | 0.000 | Z | 0.002 | 0.000 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.002 | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 0.000 | 0.000 | 0.000 | Z | 0.001 | 0.000 | 0.003 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.003 | 0.003 | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.001 | 0.001 | 0.000 | 0.002 | 0.001 | 0.006 | 0.073 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.017 | 0.035 | 0.000 | 0.089 | 0.010 | 0.089 | | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 0.110 | 0.014 | 0.002 | 0.001 | 0.000 | Z | 0.007 | 0.181 | 0.224 | M | 0.175 | 0.193 | 0.162 | 0.037 | 0.004 | 0.000 | 0.000 | 0.002 | 0.001 | 0.018 | 0.128 | 0.188 | 0.113 | 0.116 | 0.076 | 0.224 | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | Z | 0.139 | 0.074 | 0.047 | 0.104 | 0.056 | 0.045 | 0.093 | 0.144 | 0.117 | 0.034 | 0.081 | M | M | 0.070 | 0.085 | 0.040 | 0.005 | 0.040 | 0.040 | 0.059 | 0.084 | 0.102 | 0.076 | 0.073 | 0.144 | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 0.099 | Z | 0.115 | 0.081 | 0.170 | 0.168 | 0.132 | 0.097 | 0.020 | 0.072 | 0.041 | 0.025 | 0.323 | 0.299 | 0.027 | 0.000 | 0.020 | 0.027 | 0.143 | 0.180 | 0.190 | 0.167 | 0.011 | 0.000 | 0.105 | 0.323 | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 0.000 | 0.000 | Z | 0.000 | 0.004 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.015 | 0.149 | 0.013 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.008 | 0.149 | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.002 | 0.002 | 0.000 | 0.000 | 0.002 | 0.002 | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.004 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.004 | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | Z | 0.001 | 0.000 | 0.003 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.003 | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 0.000 | Z | 0.002 | 0.001 | 0.002 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.001 | 0.018 | 0.091 | 0.127 | 0.057 | 0.064 | 0.116 | 0.290 | 0.034 | 0.290 | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 0.234 | 0.113 | Z | 0.195 | 0.174 | 0.126 | 0.260 | 0.394 | 0.296 | 0.226 | 0.130 | 0.099 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.004 | 0.000 | 0.098 | 0.394 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.069 | 0.063 | 0.065 | 0.086 | 0.067 | 0.065 | 0.072 | 0.092 | 0.090 | 0.100 | 0.077 | 0.102 | 0.153 | 0.041 | 0.020 | 0.012 | 0.015 | 0.016 | 0.020 | 0.028 | 0.044 | 0.072 | 0.061 | 0.073 | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.307 | 0.420 | 0.606 | 0.311 | 0.280 | 0.285 | 0.296 | 0.394 | 0.322 | 0.609 | 0.251 | 0.930 | 2.718 | 0.352 | 0.153 | 0.116 | 0.343 | 0.387 | 0.150 | 0.180 | 0.190 | 0.284 | 0.311 | 0.290 | Diurnal Maximum | |
| Z - zerospan | | C - Calibration | | | | M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm
Fort McKay - Bertha Ganter - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Fort McKay - Bertha Ganter - August 2017**

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 0.005 | 385 | 54.46 | 54.46 |
| 0.006 - 0.05 | 88 | 12.45 | 66.90 |
| 0.06 - 0.1 | 124 | 17.54 | 84.44 |
| > 0.1 | 110 | 15.56 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Fort McKay - Bertha Ganter - August 2017**

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|---|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 0.005 | 12 | 4 | 2 | 0 | 4 | 4 | 11 | 45 | 45 | 50 | 53 | 44 | 36 | 43 | 23 | 9 | 385 |
| 0.006 - 0.05 | 6 | 5 | 3 | 0 | 0 | 2 | 7 | 17 | 15 | 7 | 6 | 4 | 2 | 6 | 7 | 1 | 88 |
| 0.06 - 0.1 | 10 | 5 | 1 | 4 | 3 | 1 | 4 | 30 | 22 | 12 | 5 | 8 | 4 | 6 | 3 | 6 | 124 |
| > 0.1 | 5 | 5 | 3 | 3 | 2 | 0 | 14 | 21 | 27 | 8 | 3 | 4 | 2 | 4 | 5 | 4 | 110 |
| Totals | 33 | 19 | 9 | 7 | 9 | 7 | 36 | 113 | 109 | 77 | 67 | 60 | 44 | 59 | 38 | 20 | 707 |

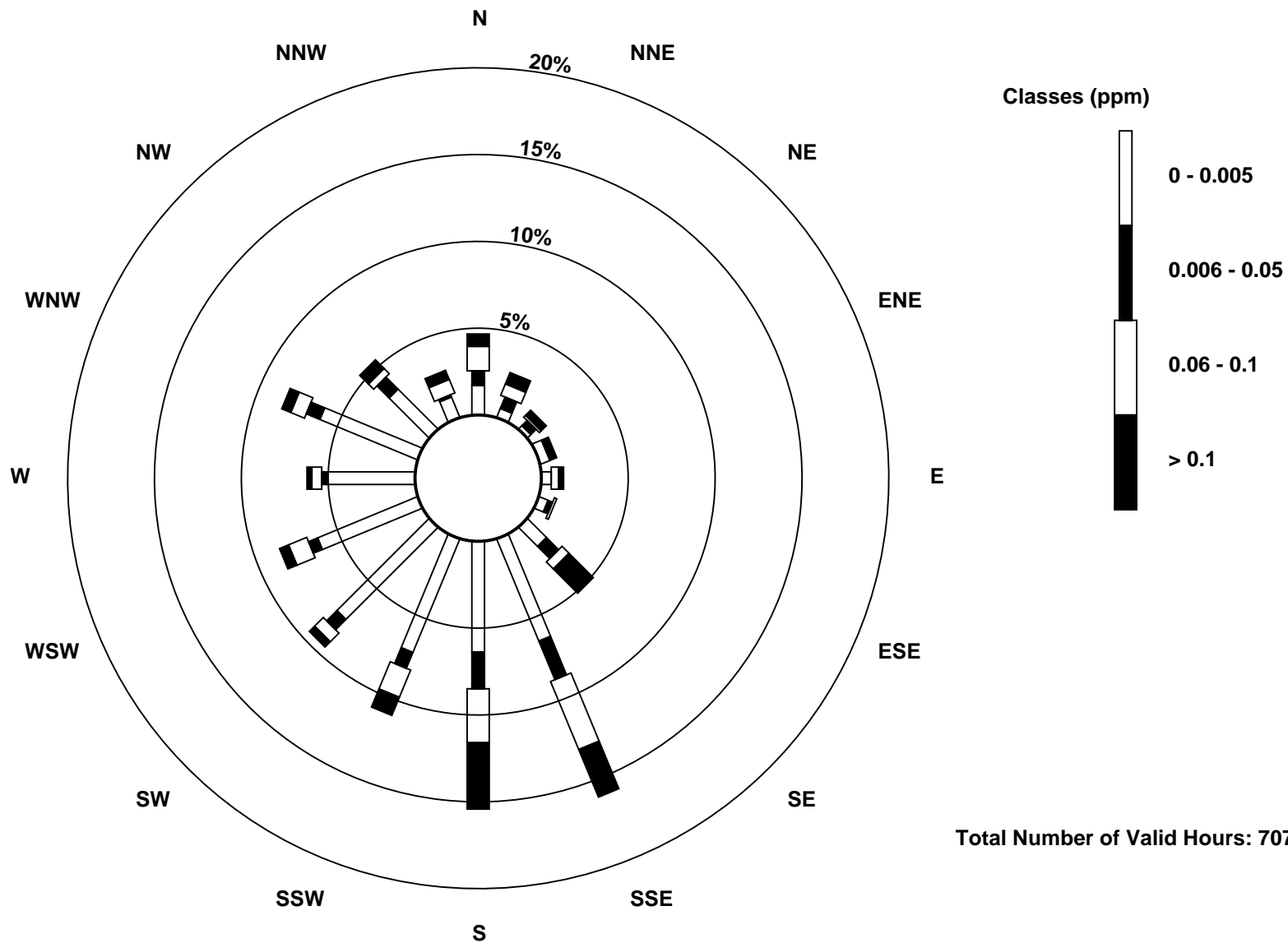
Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Non Methane Hydrocarbons (NMHC) - ppm
Fort McKay - Bertha Ganter (AMS 1)

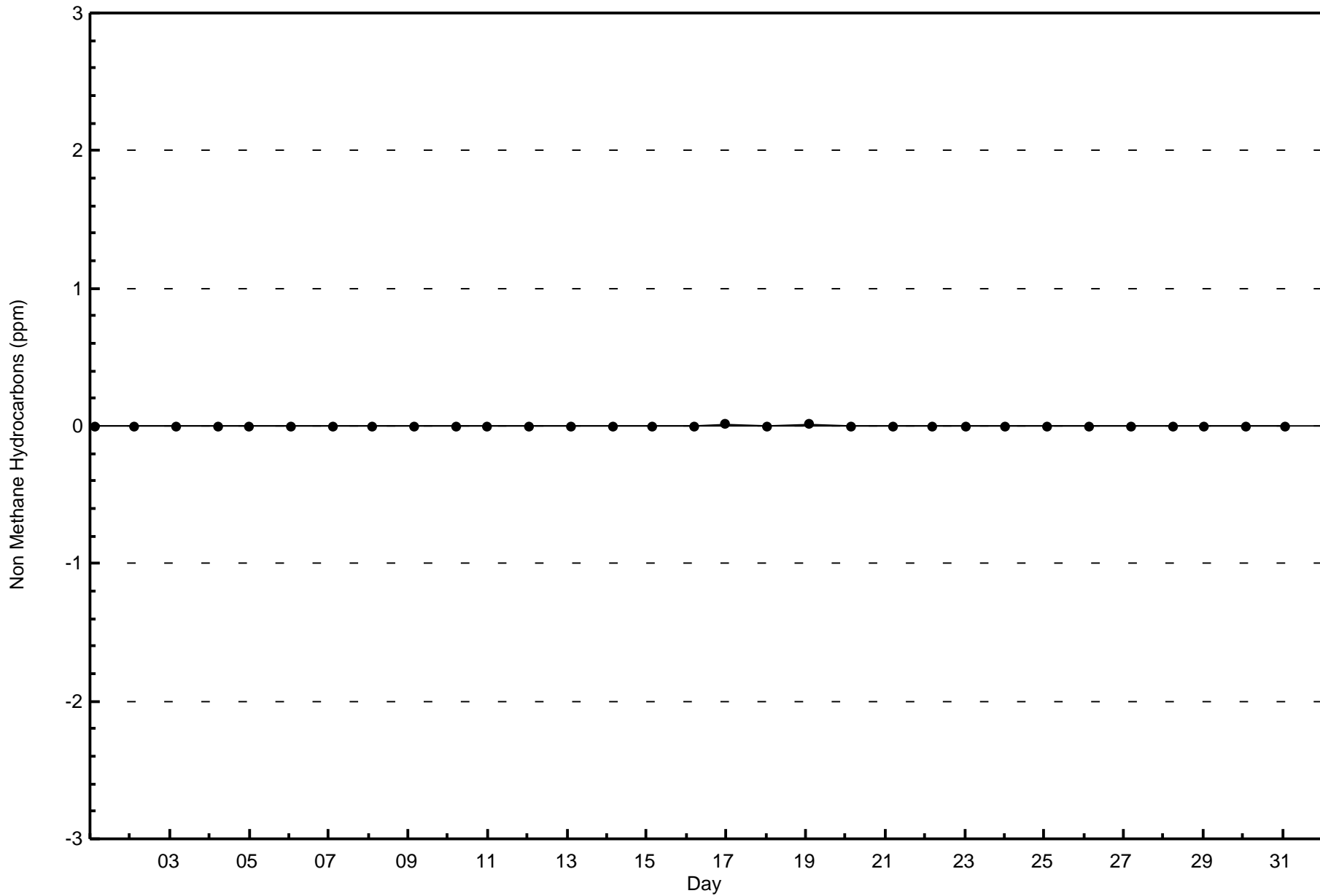


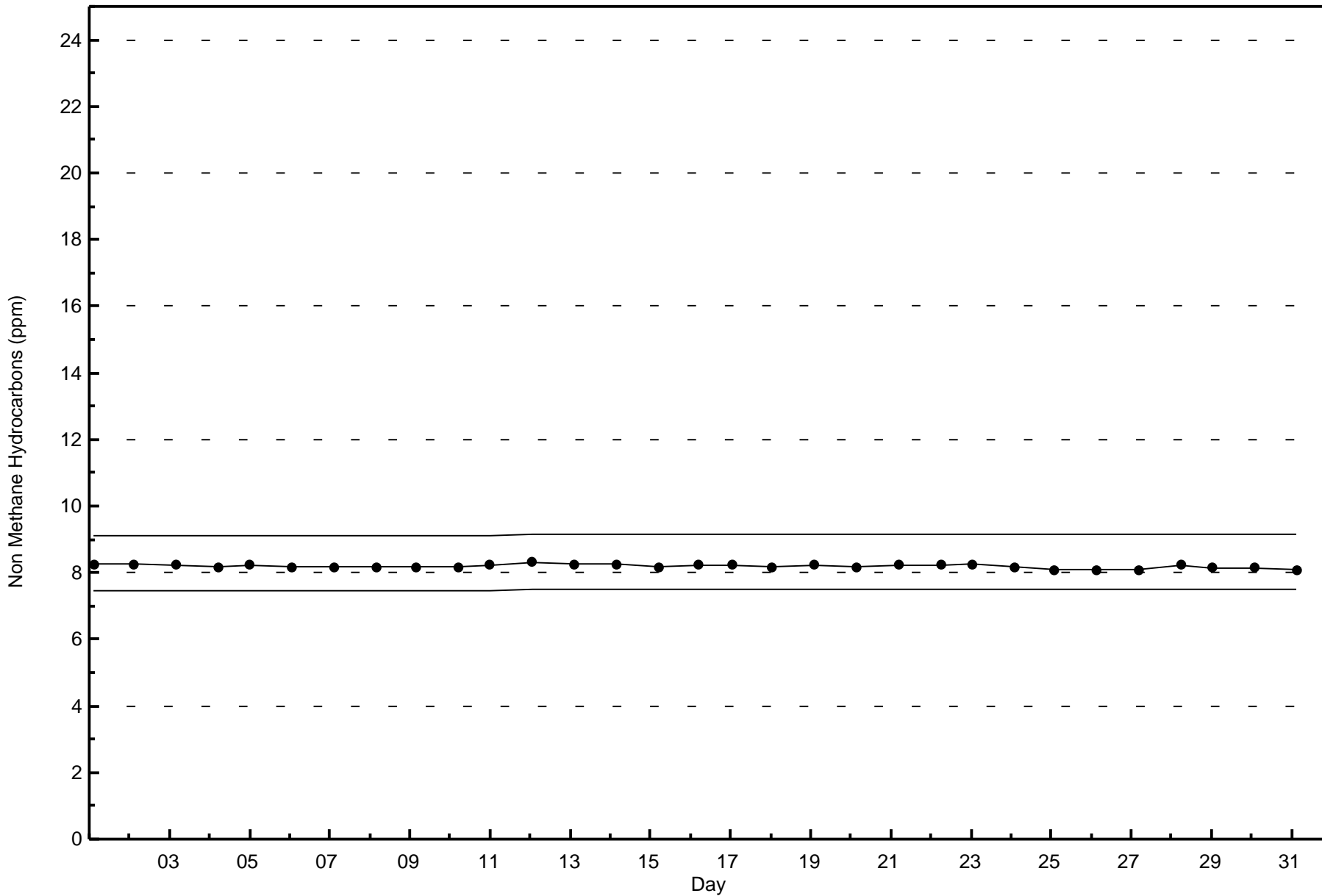
Total Number of Valid Hours: 707



Wood Buffalo Environmental Association
Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm
Fort McKay - Bertha Ganter - August 2017







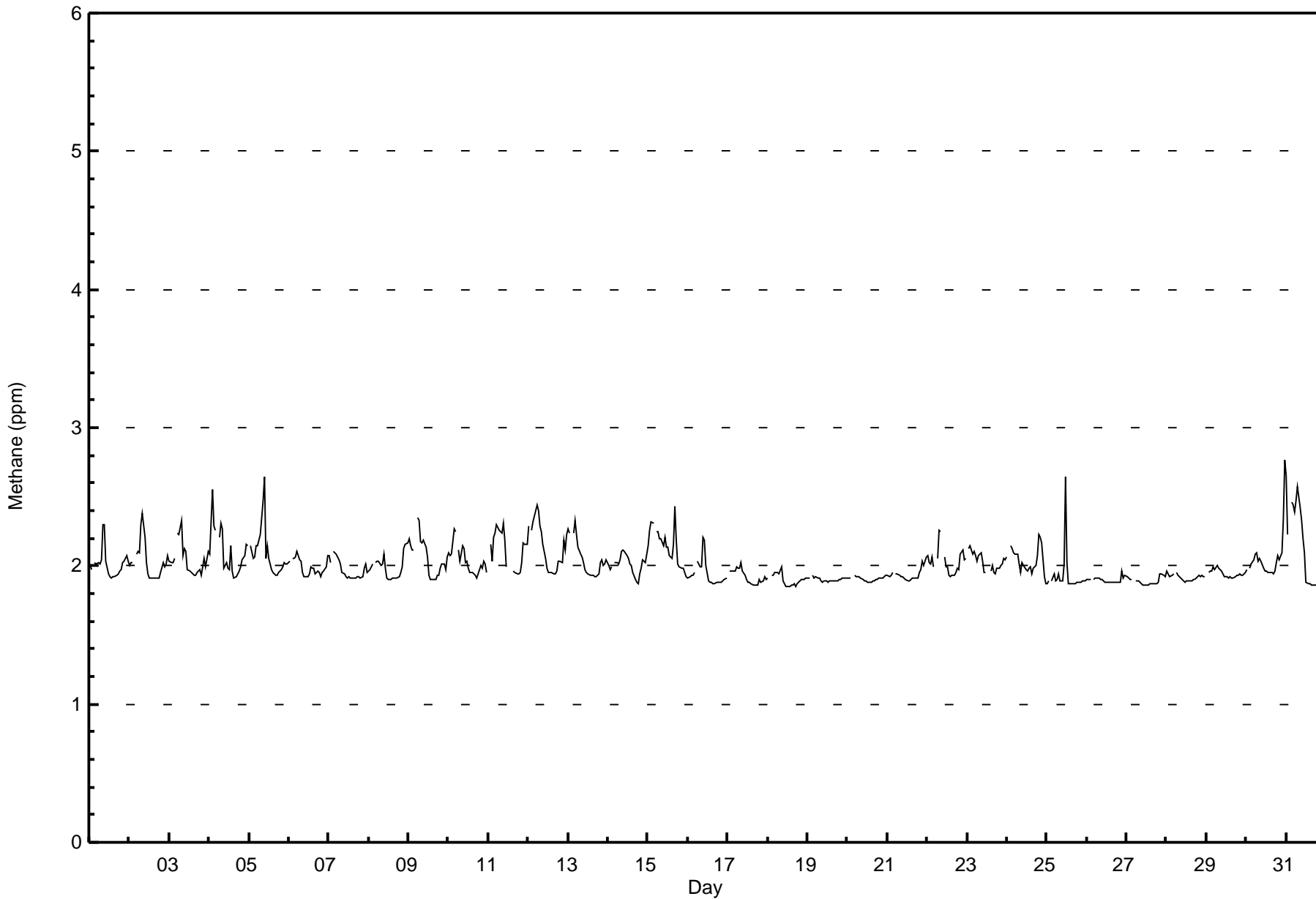
Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH₄) - ppm

Fort McKay - Bertha Ganter - August 2017

| Number of Exceedences (AAAQO): | | 1-hr: 0 | 24-hr: 0 | Hours in Service: 744 | | | | | | | | | | | | | | | | | | Daily Average | | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|--|----------|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--------------------------|-----|--------------------------------|-----|---------------|---------------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|-----------------|--|
| Maximum Value: 2.8 ppm on Aug 31 00:00 | | Maximum Daily Average: 2.1 ppm on Aug 15 | | | | | | | | | | | | | | | | | | Hours of Data: 707 | | Hours of Missing Data: 37 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum Value: 1.9 ppm on Aug 18 14:00 | | Minimum Daily Average: 1.9 ppm on Aug 27 | | | | | | | | | | | | | | | | | | Hours of Calibration: 34 | | Percent Operational Time: 99.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 2.1 ppm at hour 6 | | Minimum Diurnal Average: 1.9 ppm at hour 16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 2.00 ppm | | Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 2.0 Q ₃ = 2.1 P ₉₀ = 2.2 P ₉₉ = 2.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 2.0 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.3 | 2.3 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | 2.0 | 2.3 | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 2.0 | 2.0 | 2.0 | Z | 2.1 | 2.1 | 2.1 | 2.3 | 2.4 | 2.2 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | 2.4 | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 2.0 | 2.0 | 2.0 | 2.1 | Z | 2.2 | 2.2 | 2.3 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 1.9 | 2.0 | 2.1 | 2.0 | 2.1 | 2.0 | 2.3 | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 2.1 | 2.3 | 2.6 | 2.3 | Z | 2.2 | 2.2 | 2.3 | 2.3 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.1 | 2.2 | 2.1 | 2.1 | 2.6 | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.5 | 2.6 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.6 | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 2.0 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 1.9 | 2.0 | 2.0 | 1.9 | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | 2.1 | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 2.1 | 2.0 | Z | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 2.0 | 2.0 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.1 | 2.2 | 2.2 | 2.0 | 2.2 | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 2.2 | 2.1 | 2.1 | 2.1 | Z | 2.4 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.4 | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 2.1 | 2.1 | 2.1 | 2.3 | 2.2 | Z | 2.1 | 2.0 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.3 | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | Z | 2.2 | 2.0 | 2.2 | 2.2 | 2.3 | 2.3 | 2.2 | 2.2 | 2.3 | 2.2 | 2.0 | C | C | C | 2.0 | 2.0 | 1.9 | 1.9 | 2.0 | 2.0 | 2.2 | 2.2 | 2.2 | 2.1 | 2.3 | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 2.3 | Z | 2.3 | 2.3 | 2.4 | 2.4 | 2.4 | 2.3 | 2.2 | 2.2 | 2.1 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.2 | 2.1 | 2.2 | 2.1 | 2.1 | 2.4 | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 2.3 | 2.2 | Z | 2.2 | 2.3 | 2.2 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.3 | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 2.0 | 2.0 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | 2.1 | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 2.1 | 2.3 | 2.3 | 2.3 | Z | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.4 | 2.2 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 2.1 | 2.4 | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.2 | 2.2 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.2 | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 1.9 | Z | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 1.9 | 1.9 | 1.9 | 2.0 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.1 | 1.9 | 2.1 | | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 2.1 | 2.0 | 2.0 | 2.1 | 2.0 | Z | 2.1 | 2.3 | 2.2 | M | 2.1 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.0 | 2.1 | 2.3 | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | M | M | 2.0 | 2.0 | 2.0 | 1.9 | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | 2.1 | 2.0 | 2.1 | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 2.0 | 2.0 | 2.1 | 2.2 | 2.2 | 2.2 | 1.9 | 1.9 | 2.0 | 2.2 | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.6 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.6 | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 1.9 | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | Z | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 2.0 | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.0 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 2.0 | 2.0 | 2.1 | 2.0 | 2.1 | 2.3 | 2.8 | 2.1 | 2.8 | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 2.7 | 2.2 | Z | 2.5 | 2.4 | 2.4 | 2.5 | 2.6 | 2.4 | 2.3 | 2.2 | 2.1 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.1 | 2.7 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 2.7 | 2.3 | 2.6 | 2.5 | 2.4 | 2.4 | 2.5 | 2.6 | 2.5 | 2.6 | 2.2 | 2.6 | 2.1 | 2.1 | 2.1 | 2.2 | 2.4 | 2.2 | 2.1 | 2.2 | 2.2 | 2.2 | 2.3 | 2.8 | Diurnal Maximum | |
| Z - zerospan C - Calibration M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Fort McKay - Bertha Ganter - August 2017

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2.0 | 526 | 74.40 | 74.40 |
| 2.1 - 3.0 | 181 | 25.60 | 100.00 |
| 3.1 - 10.0 | 0 | 0.00 | 100.00 |
| > 10.0 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Methane (CH₄) - ppm
Fort McKay - Bertha Ganter - August 2017

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----------|----------|----------|----------|----------|-----------|------------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2.0 | 24 | 15 | 7 | 5 | 5 | 7 | 20 | 76 | 69 | 61 | 61 | 52 | 37 | 49 | 28 | 10 | 526 |
| 2.1 - 3.0 | 9 | 4 | 2 | 2 | 4 | 0 | 16 | 37 | 40 | 16 | 6 | 8 | 7 | 10 | 10 | 10 | 181 |
| 3.1 - 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 33 | 19 | 9 | 7 | 9 | 7 | 36 | 113 | 109 | 77 | 67 | 60 | 44 | 59 | 38 | 20 | 707 |

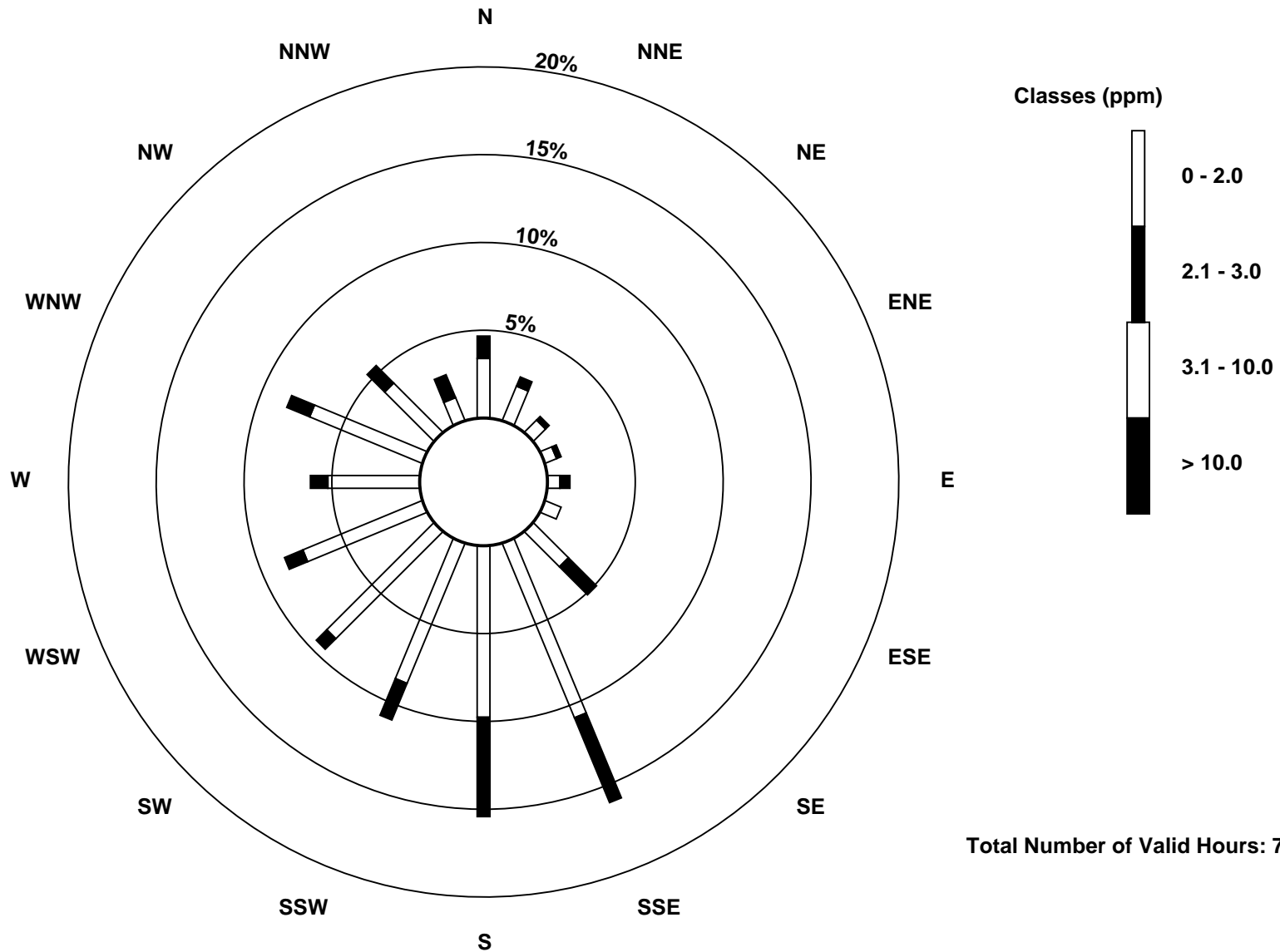
Total Number of Valid Hours: 707

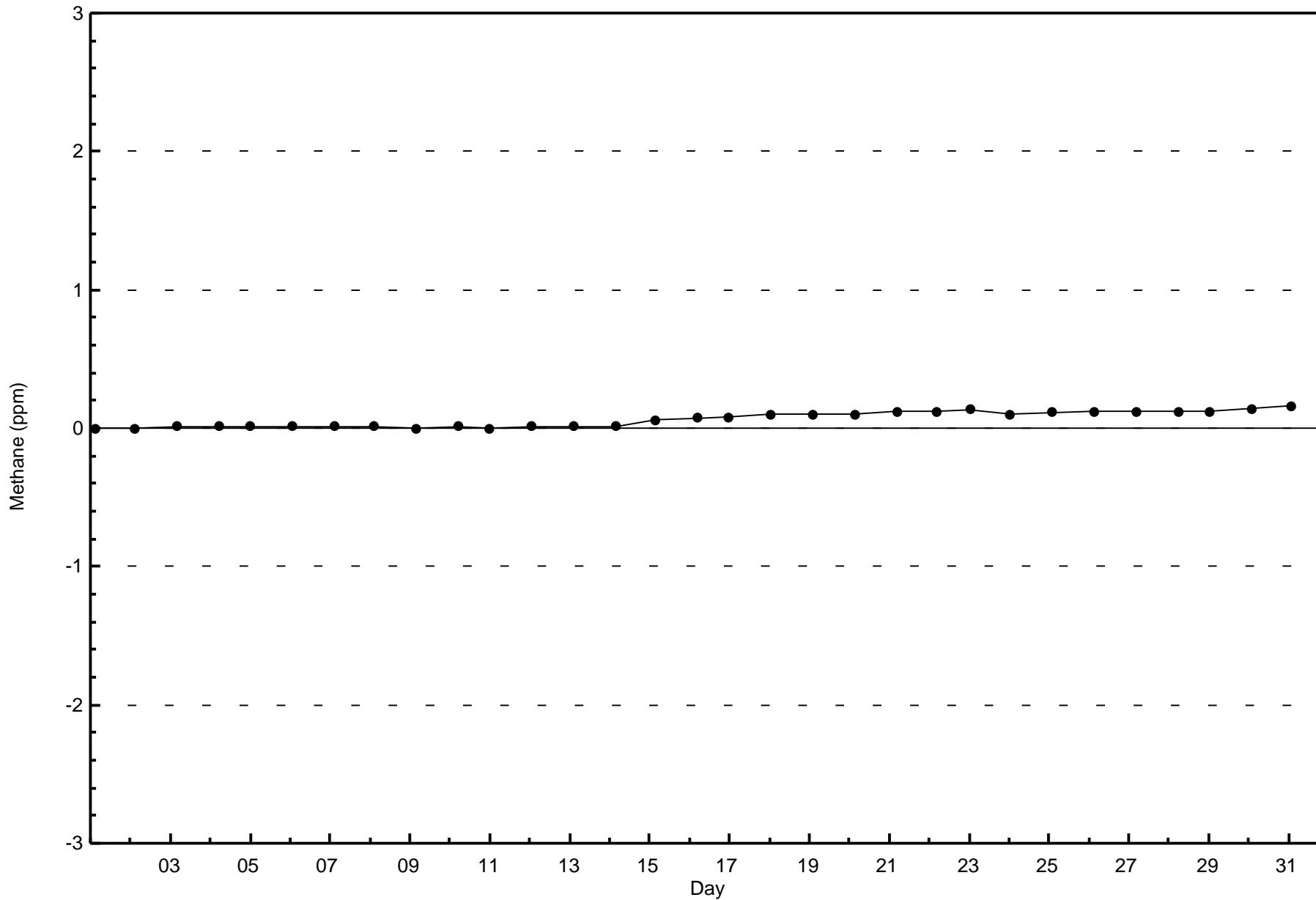
Total Number of Hours: 744

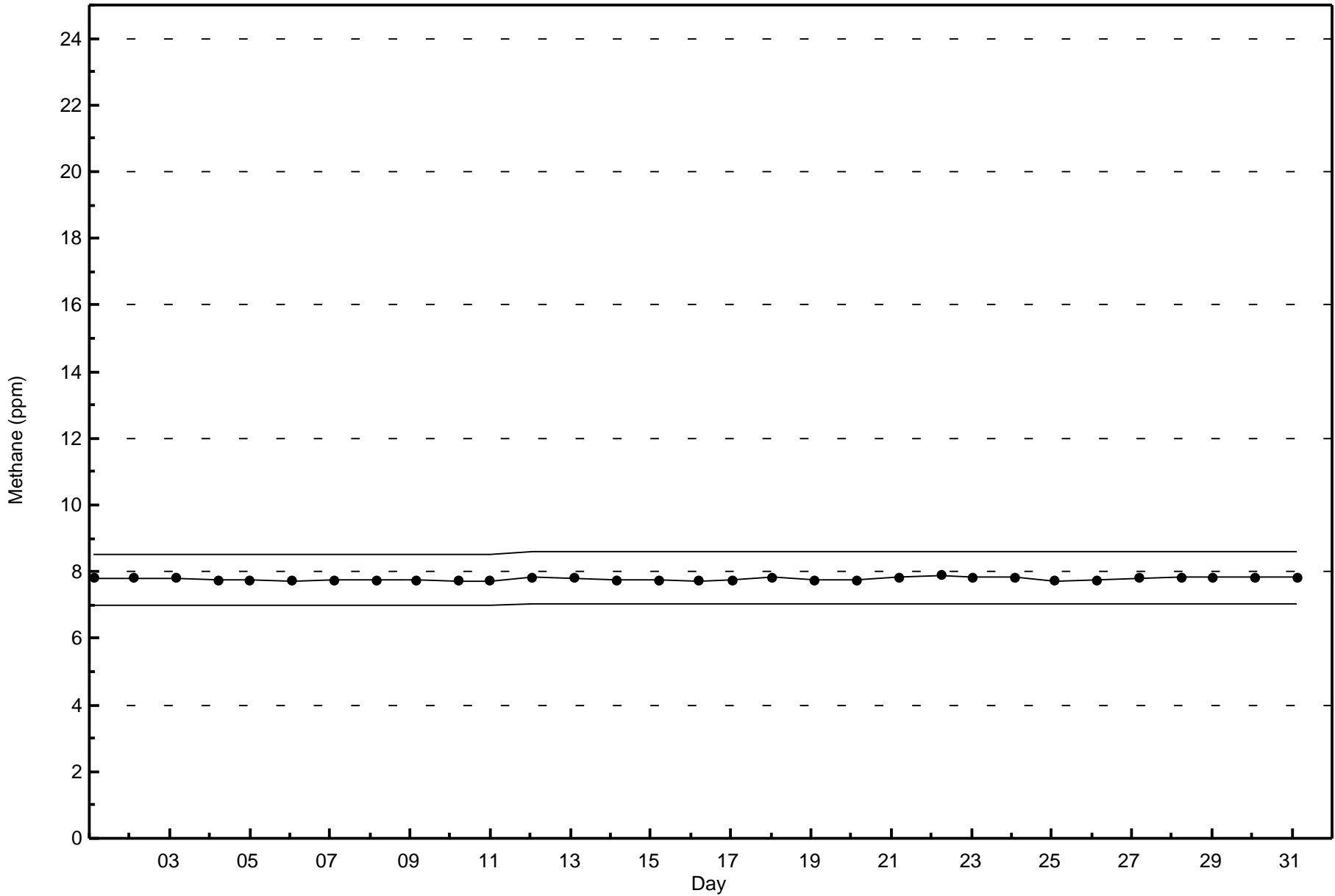


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Methane (CH₄) - ppm
Fort McKay - Bertha Ganter (AMS 1)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

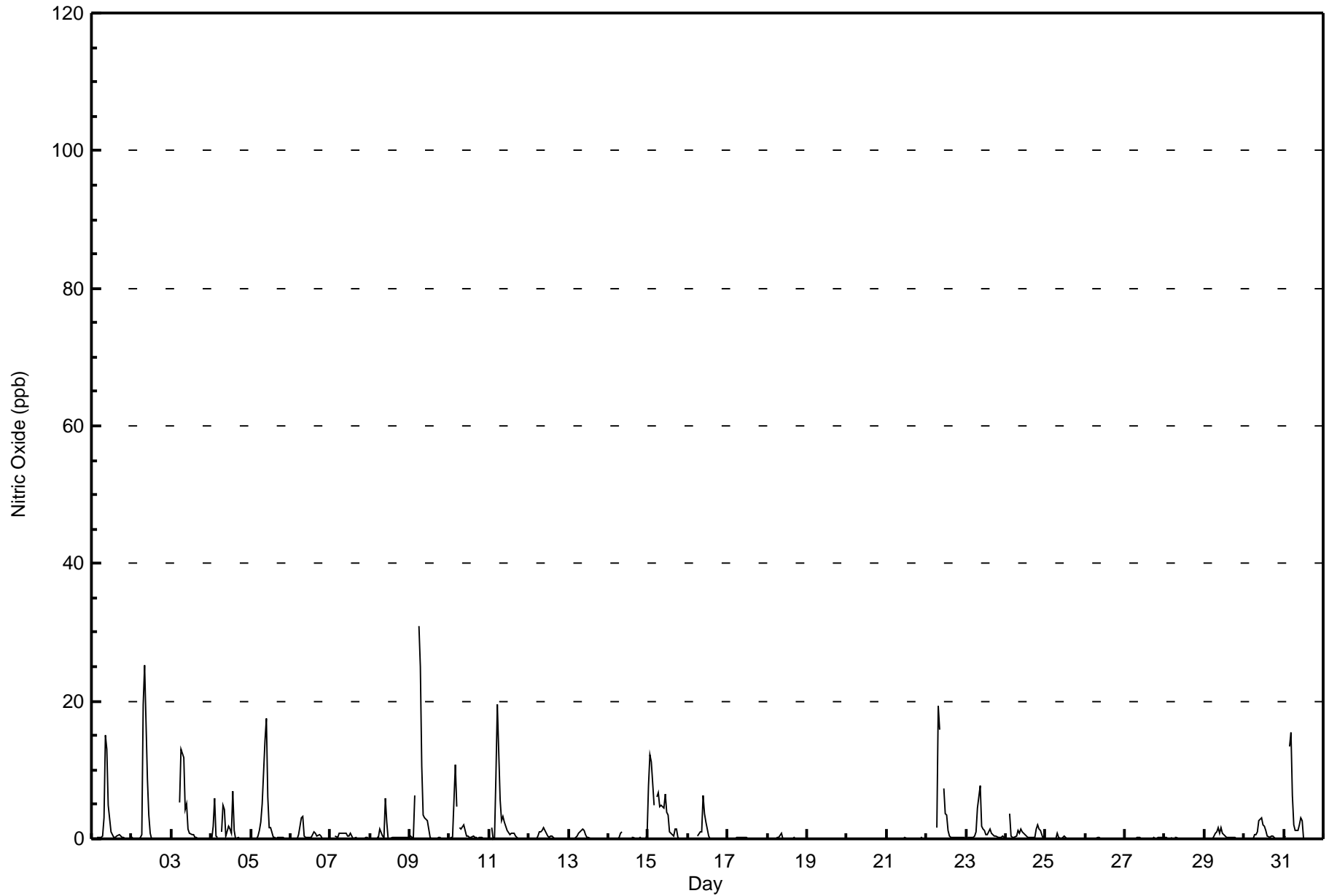
Fort McKay - Bertha Ganter - August 2017

| Maximum Value: 31 ppb on Aug 9 06:00 | | | | | | | | | | | | | | | | | Maximum Daily Average: 3.7 ppb on Aug 9 | | | | | | | | | | | | | | | | | Hours in Service: 744 | |
|---|-------------------------------|----|-----------------|----|----|-----------------|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|-----------------|---------------|---------------|--|--|--|--|--|--|--|--------------------------------|--|
| Minimum Value: 0 ppb on Aug 4 21:00 | | | | | | | | | | | | | | | | | Minimum Daily Average: 0.1 ppb on Aug 20 | | | | | | | | | | | | | | | | | Hours of Data: 707 | |
| Maximum Diurnal Average: 3.6 ppb at hour 9 | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 0.1 ppb at hour 23 | | | | | | | | | | | | | | | | | Hours of Missing Data: 37 | |
| Monthly Average: 1.0 ppb | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 O ₃ = 0 P ₉₀ = 2 P ₉₉ = 16 | | | | | | | | | | | | | | | | | Hours of Calibration: 36 | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 99.9 | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | |
| 1-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 3 | 15 | 13 | 5 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.8 | 15 | | | | | | | | | |
| 2-Aug | 0 | 0 | 0 | Z | 0 | 0 | 1 | 20 | 25 | 9 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.6 | 25 | | | | | | | | | |
| 3-Aug | 0 | 0 | 0 | 0 | Z | 5 | 13 | 12 | 4 | 5 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.9 | 13 | | | | | | | | | | |
| 4-Aug | 0 | 2 | 6 | 0 | 0 | Z | 1 | 5 | 4 | 0 | 2 | 1 | 1 | 7 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.3 | 7 | | | | | | | | | | |
| 5-Aug | Z | 0 | 0 | 0 | 0 | 1 | 2 | 5 | 14 | 17 | 6 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.2 | 17 | | | | | | | | | | |
| 6-Aug | 0 | Z | 0 | 0 | 0 | 1 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0.5 | 3 | | | | | | | | | | |
| 7-Aug | 0 | 0 | Z | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | |
| 8-Aug | 0 | 0 | 0 | Z | 0 | 0 | 1 | 0 | 0 | 6 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 6 | | | | | | | | | | |
| 9-Aug | 0 | 0 | 0 | 6 | Z | 31 | 25 | 11 | 3 | 3 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.7 | 31 | | | | | | | | | | |
| 10-Aug | 0 | 0 | 0 | 11 | 5 | Z | 2 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.1 | 11 | | | | | | | | | | |
| 11-Aug | Z | 2 | 0 | 0 | 9 | 20 | 6 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.2 | 20 | | | | | | | | | | |
| 12-Aug | 0 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 2 | | | | | | | | | | |
| 13-Aug | 0 | 0 | Z | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 2 | | | | | | | | | | |
| 14-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 1 | 1 | C | C | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.2 | 1 | | | | | | | | | | |
| 15-Aug | 8 | 12 | 11 | 5 | Z | 6 | 7 | 5 | 5 | 4 | 6 | 4 | 3 | 1 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 3.6 | 12 | | | | | | | | | | |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 1 | 1 | 6 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 6 | | | | | | | | | | |
| 17-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | |
| 18-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 | | | | | | | | | | |
| 19-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | |
| 20-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | |
| 21-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | |
| 22-Aug | 0 | 0 | 0 | 0 | 0 | Z | 2 | 19 | 16 | M | 7 | 4 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.5 | 19 | | | | | | | | | | |
| 23-Aug | Z | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 8 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1.1 | 8 | | | | | | | | | | |
| 24-Aug | 0 | Z | 4 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 0 | 0.8 | 4 | | | | | | | | | | |
| 25-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 | | | | | | | | | | |
| 26-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | |
| 27-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | |
| 29-Aug | Z | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 2 | | | | | | | | | | |
| 30-Aug | 0 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 3 | 3 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 3 | | | | | | | | | | |
| 31-Aug | 0 | 0 | Z | 13 | 15 | 6 | 2 | 1 | 1 | 2 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.1 | 15 | | | | | | | | | | |
| 0.4 0.7 0.9 1.5 1.2 2.8 2.3 3.3 3.6 2.8 1.8 0.9 0.6 0.5 0.3 0.2 0.2 0.2 0.2 0.1 0.1 0.1 0.1 0.1 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | | | | | | | | |
| 8 12 11 13 15 31 25 20 25 17 7 4 3 7 2 1 2 1 1 2 1 1 0 1 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | | | | | | | |
| Z - zerospan | | | C - Calibration | | | M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Fort McKay - Bertha Ganter - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Fort McKay - Bertha Ganter - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 704 | 99.58 | 99.58 |
| 21 - 40 | 3 | 0.42 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Nitric Oxide (NO) - ppb
Fort McKay - Bertha Ganter - August 2017

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---|-----------------------|-----|----|-----|---|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 33 | 19 | 9 | 7 | 9 | 7 | 35 | 113 | 108 | 76 | 67 | 60 | 44 | 59 | 38 | 20 | 704 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 33 | 19 | 9 | 7 | 9 | 7 | 36 | 113 | 109 | 77 | 67 | 60 | 44 | 59 | 38 | 20 | 707 |

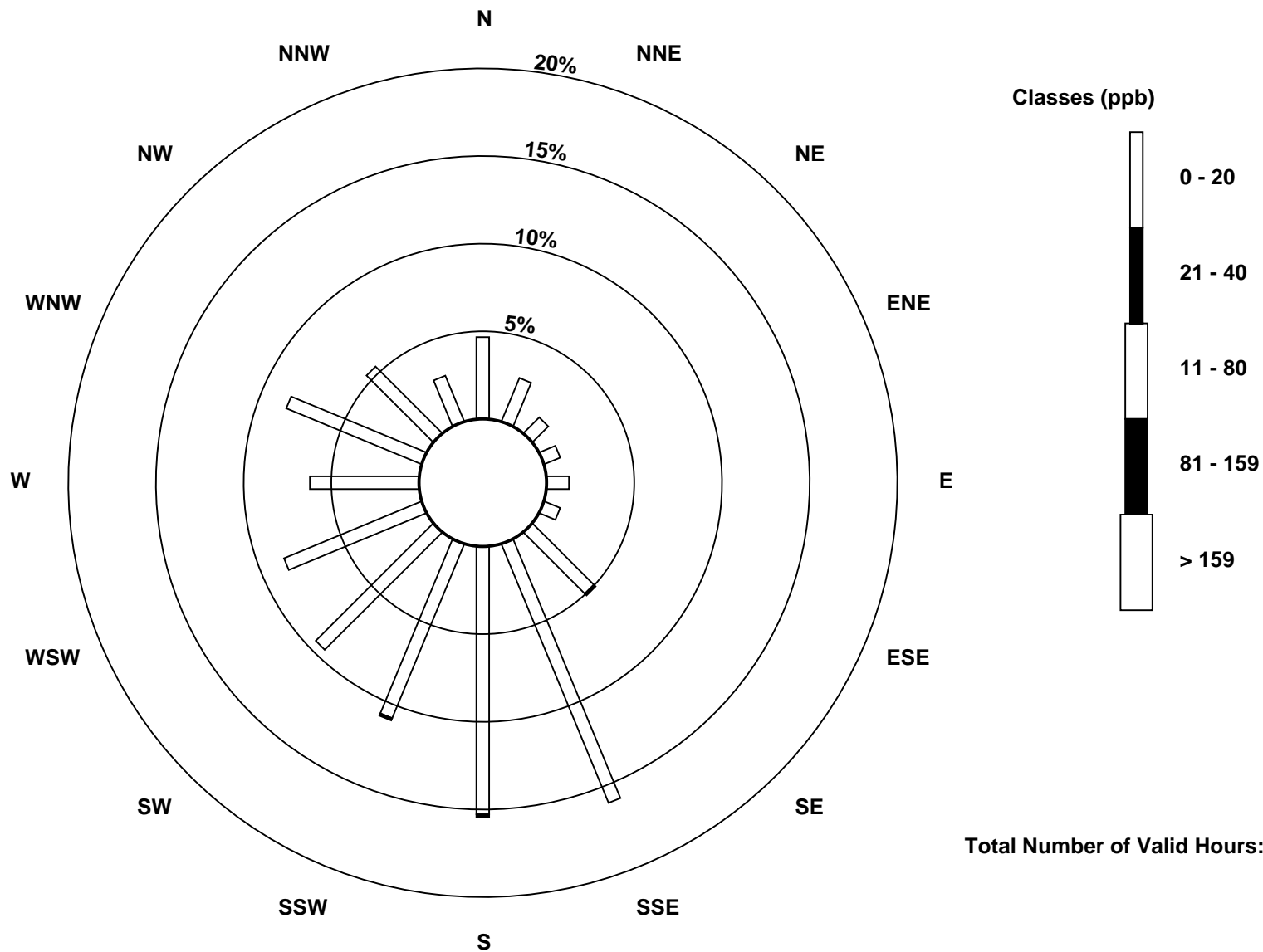
Total Number of Valid Hours: 707

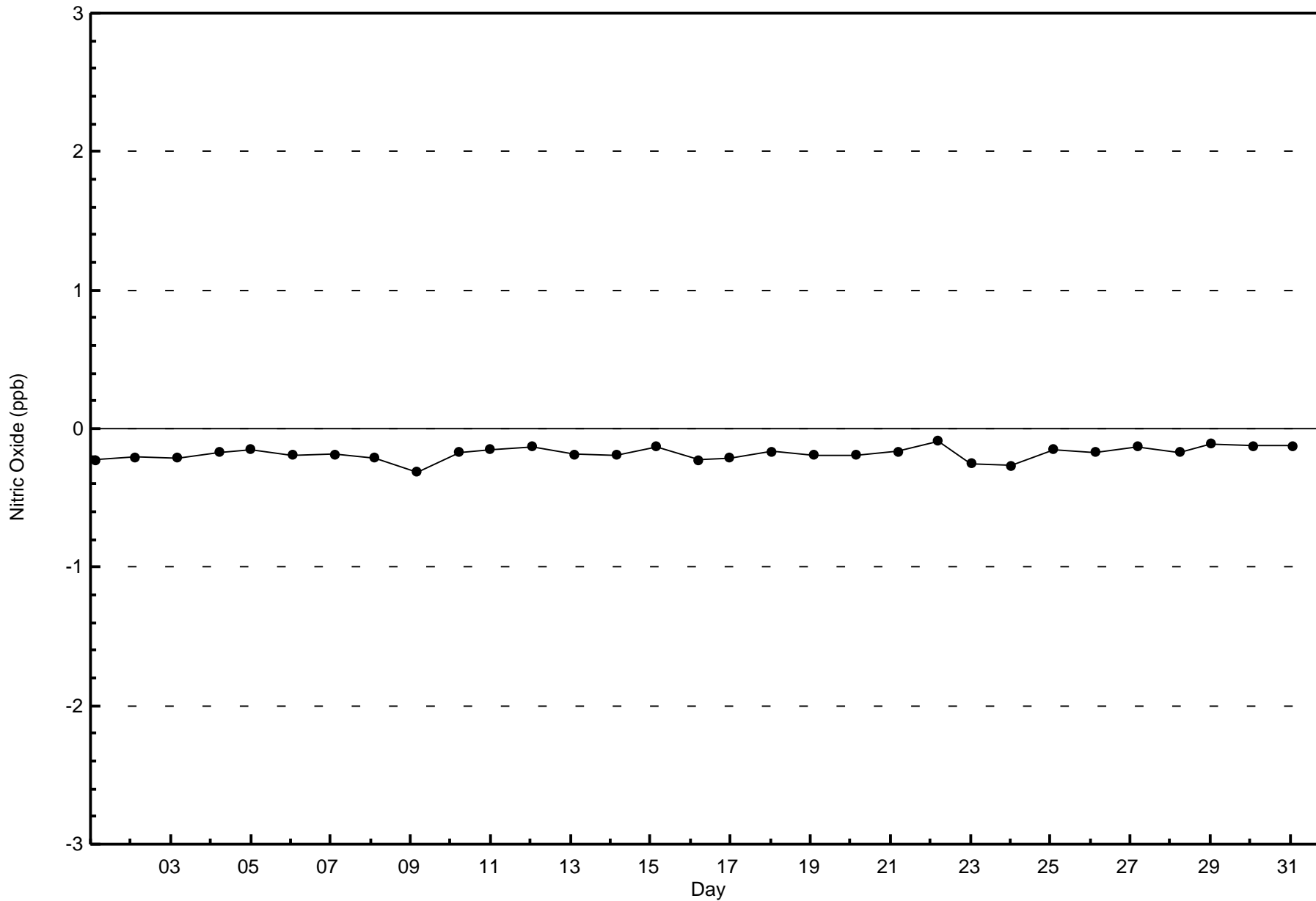
Total Number of Hours: 744

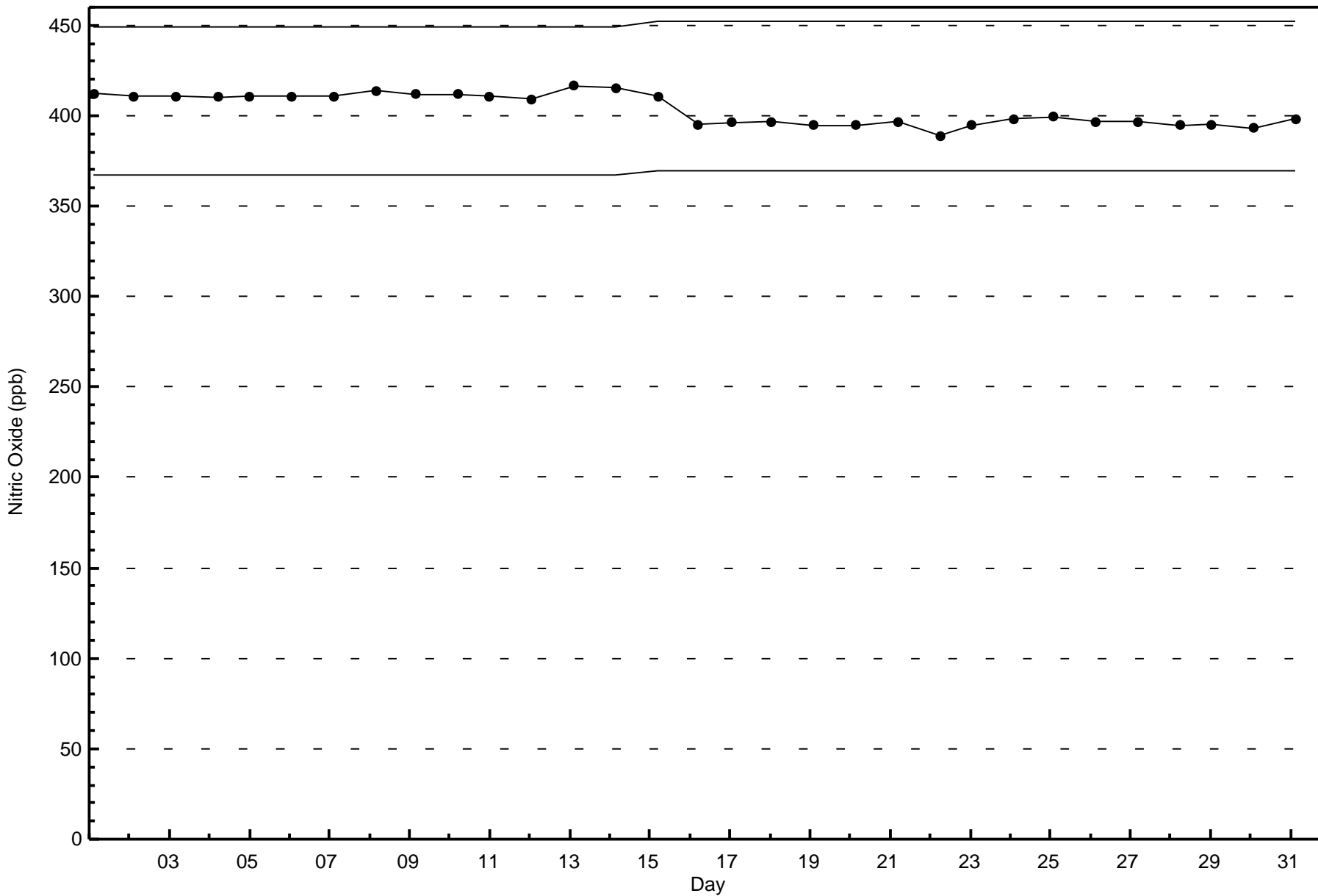


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitric Oxide (NO) - ppb
Fort McKay - Bertha Ganter (AMS 1)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Fort McKay - Bertha Ganter - August 2017

| | | | | |
|--|---|----------|---------------------------|------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 29 ppb on Aug 5 10:00 | Maximum Daily Average: 6.3 ppb on Aug 23 | | Hours of Data: | 707 |
| Minimum Value: 0 ppb on Aug 2 16:00 | Minimum Daily Average: 0.0 ppb on Aug 20 | | Hours of Missing Data: | 37 |
| Maximum Diurnal Average: 5.0 ppb at hour 4 | Minimum Diurnal Average: 1.0 ppb at hour 16 | | Hours of Calibration: | 36 |
| Monthly Average: 2.8 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 O ₃ = 4 P ₉₀ = 8 P ₉₉ = 17 | | Percent Operational Time: | 99.9 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
|--------|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|---------------|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 0 | 0 | Z | 1 | 1 | 0 | 1 | 4 | 13 | 14 | 9 | 3 | 2 | 1 | 1 | 1 | 2 | 2 | 1 | 2 | 3 | 7 | 6 | 3 | 3.2 | 14 | |
| 2-Aug | 2 | 2 | 1 | Z | 1 | 1 | 1 | 8 | 11 | 10 | 6 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 1 | 2.3 | 11 | |
| 3-Aug | 1 | 0 | 0 | 2 | Z | 10 | 10 | 10 | 6 | 9 | 5 | 3 | 3 | 3 | 1 | 1 | 1 | 2 | 2 | 1 | 5 | 4 | 3 | 3 | 3.6 | 10 | |
| 4-Aug | 8 | 11 | 14 | 6 | 3 | Z | 2 | 6 | 8 | 2 | 5 | 4 | 16 | 5 | 0 | 1 | 1 | 2 | 4 | 5 | 7 | 4 | 3 | 3 | 5.2 | 16 | |
| 5-Aug | Z | 3 | 3 | 2 | 5 | 4 | 4 | 6 | 13 | 29 | 13 | 9 | 8 | 2 | 2 | 1 | 2 | 1 | 2 | 3 | 3 | 3 | 3 | 2 | 5.4 | 29 | |
| 6-Aug | 1 | Z | 1 | 1 | 0 | 5 | 8 | 8 | 3 | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 2 | 2 | 2 | 0 | 0 | 0 | 3 | 8 | 2.3 | 8 | |
| 7-Aug | 5 | 3 | Z | 4 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 5 | 4 | 1 | 1.9 | 5 | |
| 8-Aug | 1 | 1 | 1 | Z | 1 | 0 | 1 | 0 | 0 | 5 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 7 | 4 | 4 | 1.4 | 7 | |
| 9-Aug | 11 | 7 | 7 | 13 | Z | 12 | 14 | 10 | 5 | 6 | 6 | 5 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 4.7 | 14 | |
| 10-Aug | 1 | 2 | 1 | 20 | 13 | Z | 3 | 3 | 5 | 4 | 3 | 4 | 3 | 2 | 4 | 3 | 3 | 1 | 3 | 5 | 4 | 3 | 3 | 2 | 4.1 | 20 | |
| 11-Aug | Z | 9 | 2 | 8 | 11 | 11 | 7 | 5 | 6 | 7 | 7 | 5 | 4 | 4 | 4 | 5 | 3 | 1 | 1 | 3 | 4 | 3 | 3 | 4 | 4.9 | 11 | |
| 12-Aug | 5 | Z | 6 | 7 | 7 | 6 | 5 | 5 | 6 | 7 | 4 | 3 | 1 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 2 | 2 | 3.3 | 7 | |
| 13-Aug | 4 | 7 | Z | 13 | 13 | 10 | 5 | 6 | 6 | 6 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 5 | 9 | 10 | 4.7 | 13 | |
| 14-Aug | 7 | 1 | 1 | Z | 2 | 2 | 2 | 4 | 4 | C | C | C | C | C | 2 | 1 | 0 | 0 | 0 | 3 | 3 | 3 | 3 | 5 | 2.4 | 7 | |
| 15-Aug | 11 | 10 | 8 | 5 | Z | 5 | 4 | 4 | 4 | 5 | 6 | 7 | 6 | 3 | 3 | 4 | 16 | 15 | 5 | 3 | 3 | 2 | 1 | 0 | 5.6 | 16 | |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 1 | 1 | 6 | 5 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.9 | 6 | |
| 17-Aug | Z | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 1 | 0 | 0.5 | 2 | |
| 18-Aug | 0 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0.6 | 2 | |
| 19-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | |
| 20-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | |
| 21-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 4 | 7 | 0.7 | 7 |
| 22-Aug | 7 | 3 | 2 | 3 | 2 | Z | 4 | 12 | 14 | M | 10 | 6 | 6 | 3 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 10 | 11 | 8 | 5.4 | 14 | |
| 23-Aug | Z | 8 | 5 | 4 | 4 | 3 | 3 | 7 | 9 | 5 | 5 | 3 | 3 | 4 | 7 | 3 | 4 | 3 | 5 | 6 | 8 | 17 | 19 | 10 | 6.3 | 19 | |
| 24-Aug | 13 | Z | 18 | 16 | 9 | 4 | 4 | 5 | 2 | 3 | 3 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 8 | 14 | 12 | 9 | 2 | 1 | 5.6 | 18 | |
| 25-Aug | 1 | 1 | Z | 1 | 3 | 1 | 1 | 2 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 3 |
| 26-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 0.3 | 2 | |
| 27-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 1 | 0.3 | 2 | |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0.2 | 1 | |
| 29-Aug | Z | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 2 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 3 | 3 | 3 | 5 | 2 | 2 | 1 | 1.6 | 5 | |
| 30-Aug | 1 | Z | 2 | 3 | 2 | 1 | 1 | 2 | 3 | 6 | 8 | 6 | 5 | 4 | 3 | 2 | 3 | 4 | 4 | 5 | 2 | 2 | 2 | 3 | 3.3 | 8 | |
| 31-Aug | 3 | 10 | Z | 21 | 19 | 14 | 10 | 8 | 7 | 8 | 8 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 5.1 | 21 | |

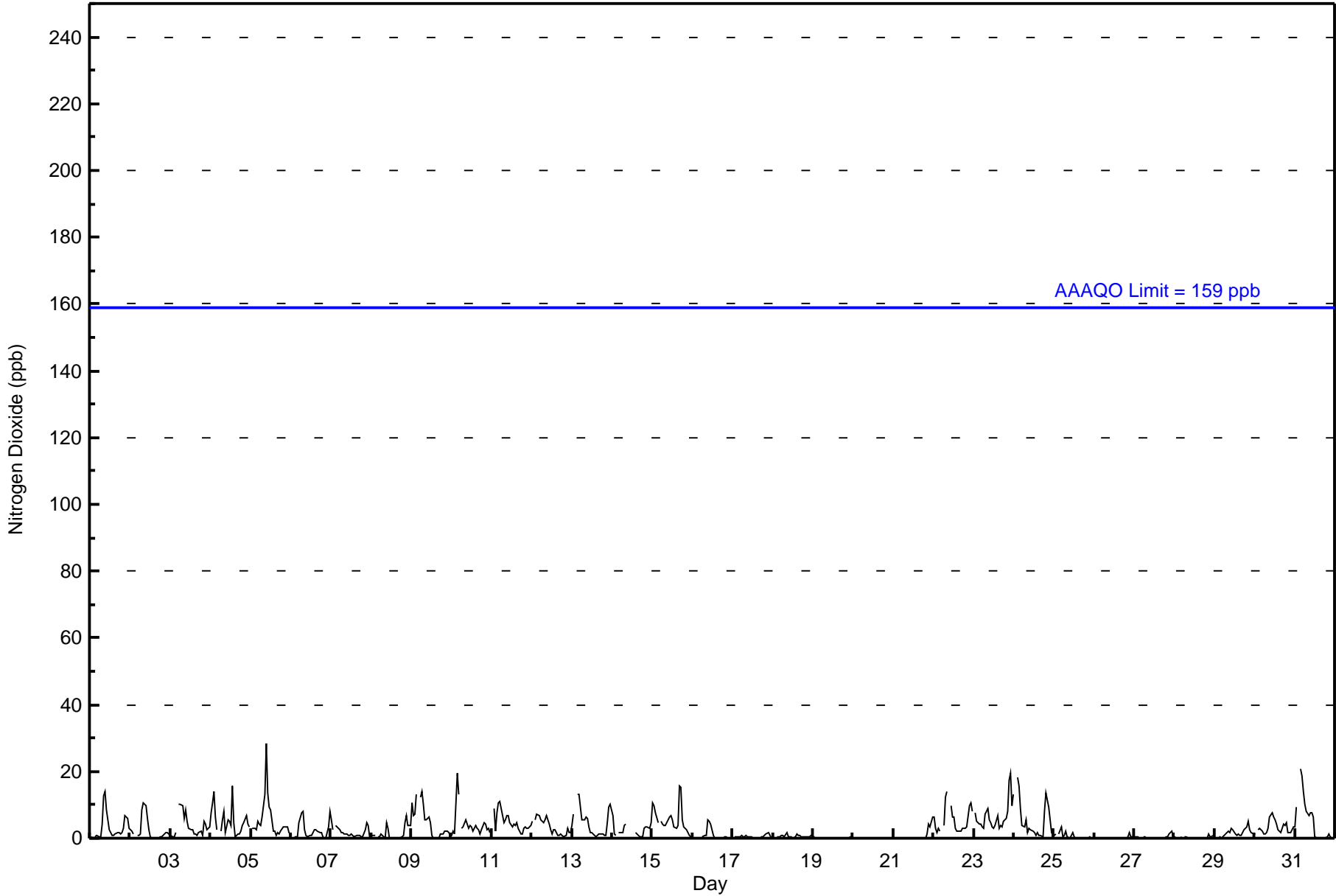
| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|--|
| 3.2 | 3.0 | 3.0 | 5.0 | 3.8 | 3.6 | 3.1 | 3.9 | 4.2 | 4.7 | 3.8 | 2.7 | 1.8 | 1.7 | 1.4 | 1.0 | 1.4 | 1.5 | 1.6 | 2.0 | 2.5 | 3.4 | 3.0 | 2.6 | Diurnal Average | |
| 13 | 11 | 18 | 21 | 19 | 14 | 14 | 12 | 14 | 29 | 13 | 9 | 8 | 16 | 7 | 5 | 16 | 15 | 8 | 14 | 12 | 17 | 19 | 10 | Diurnal Maximum | |

Z - zerospan C - Calibration M - Maintenance
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 705 | 99.72 | 99.72 |
| 21 - 40 | 2 | 0.28 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|------------|-----------|------------|----------|------------|-----------|------------|------------|------------|-----------|------------|-----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 33 | 19 | 9 | 7 | 9 | 7 | 35 | 113 | 108 | 77 | 67 | 60 | 44 | 59 | 38 | 20 | 705 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 33 | 19 | 9 | 7 | 9 | 7 | 36 | 113 | 109 | 77 | 67 | 60 | 44 | 59 | 38 | 20 | 707 |

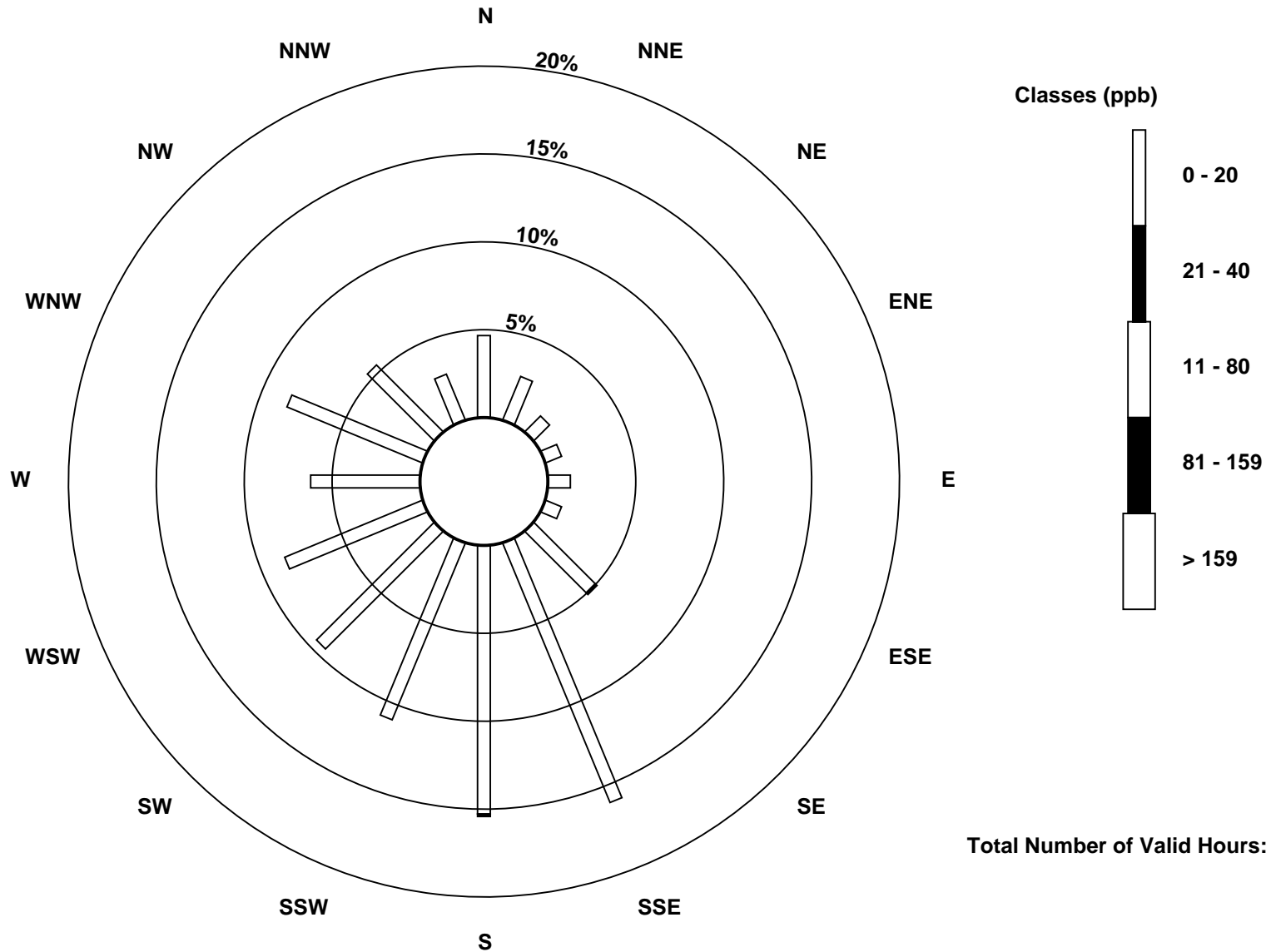
Total Number of Valid Hours: 707

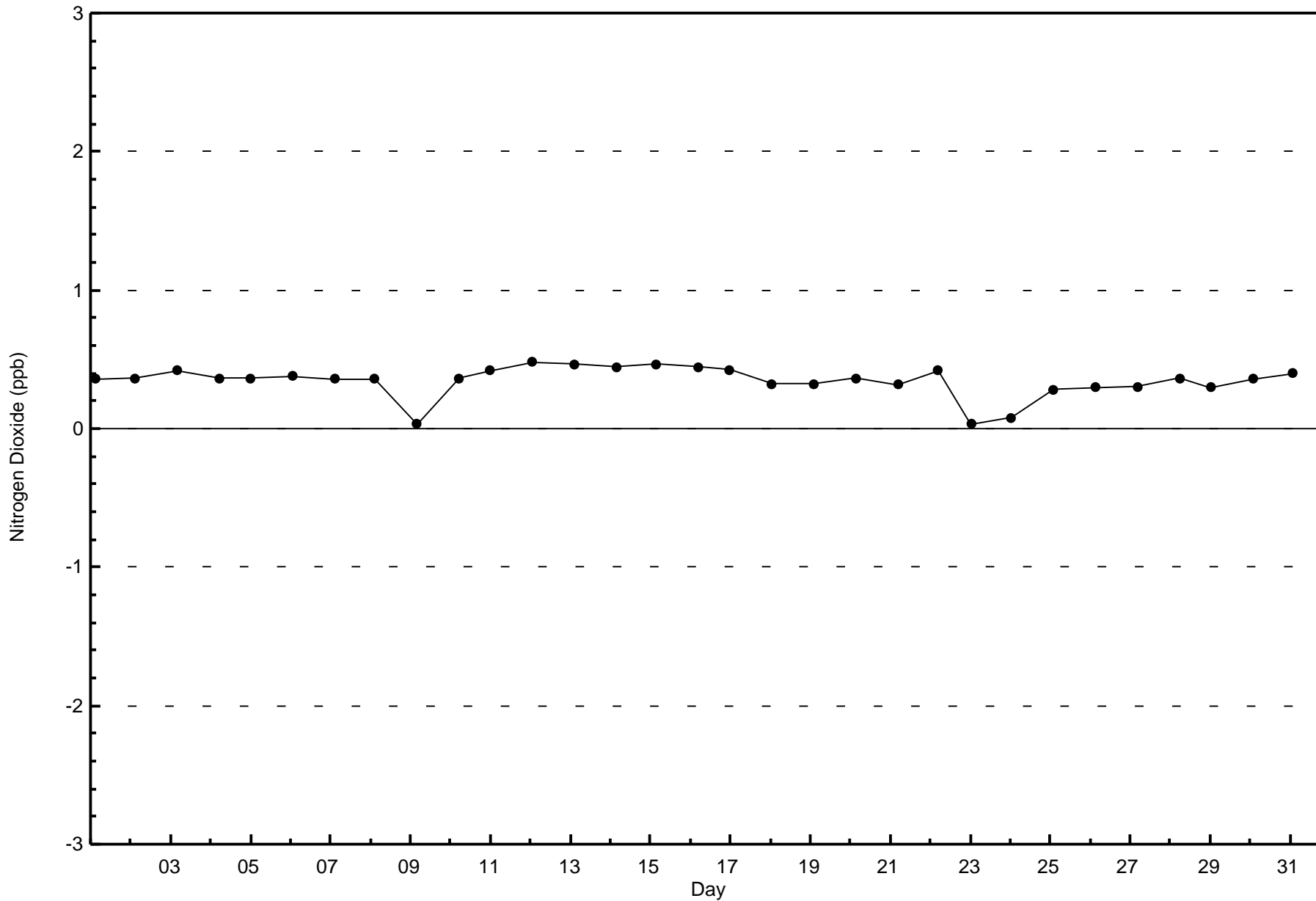
Total Number of Hours: 744

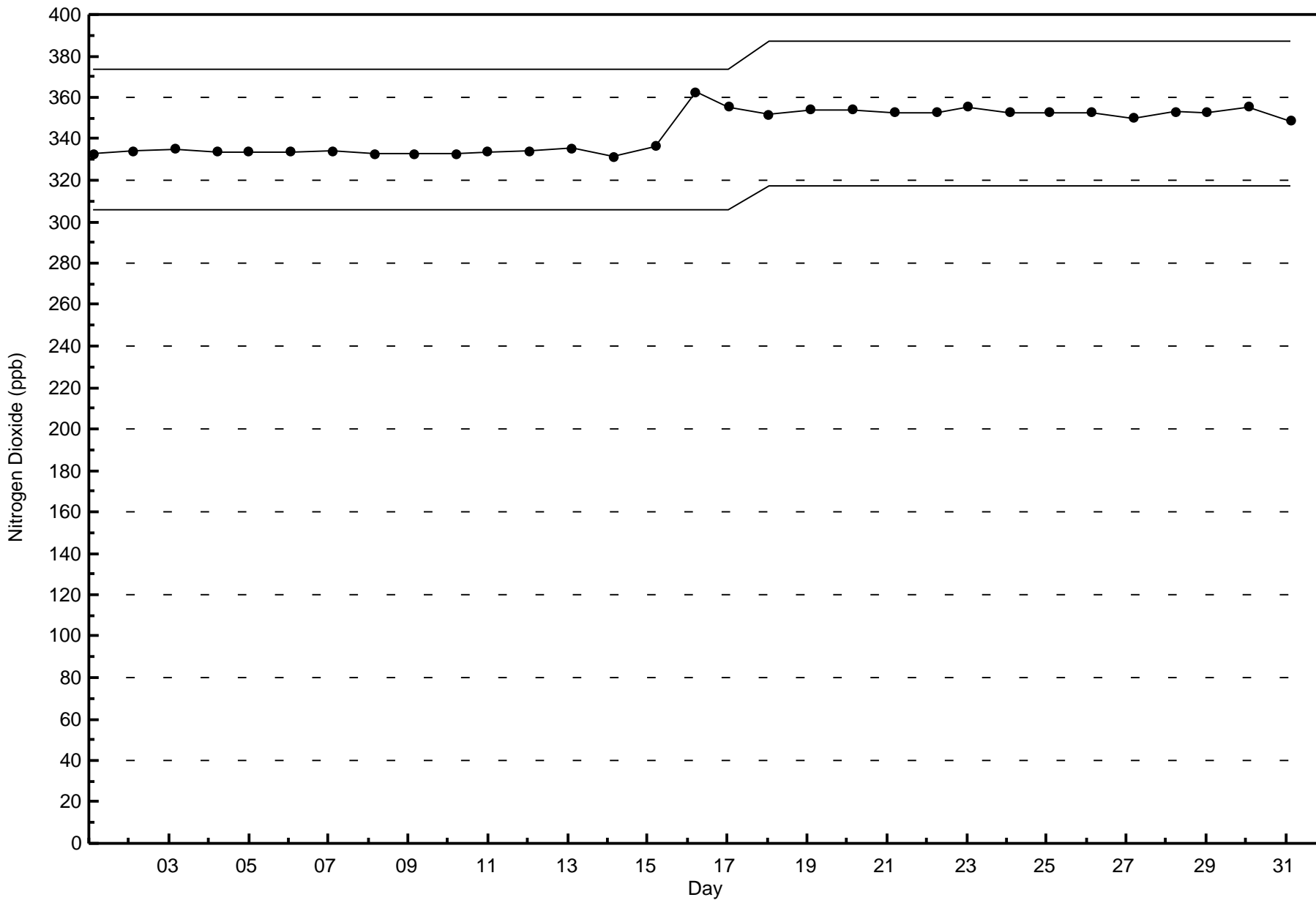


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter (AMS 1)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb

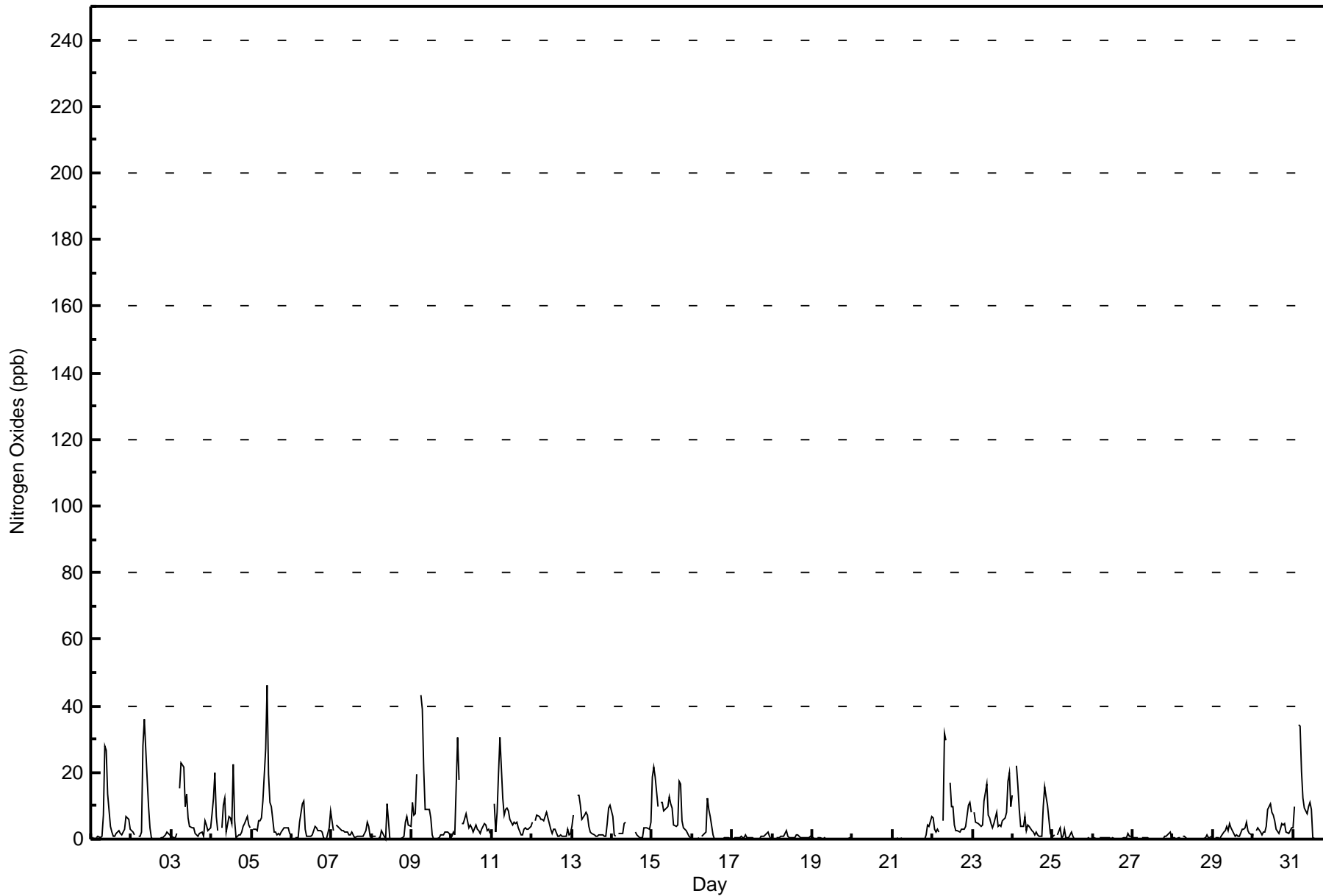
Fort McKay - Bertha Ganter - August 2017

| Maximum Value: 46 ppb on Aug 5 10:00 | | | | | | | | | | | | | | | | | Maximum Daily Average: 9.2 ppb on Aug 15 | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|----|-----------------|----|----|-----------------|----|----|----|----|----|----|----|----|----|----|--|----|----|----|----|----|----|-----|---------------|---------------|---------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|--|
| Minimum Value: 0 ppb on Aug 6 21:00 | | | | | | | | | | | | | | | | | Minimum Daily Average: 0.1 ppb on Aug 20 | | | | | | | | | | Hours of Data: 707 | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 7.9 ppb at hour 9 | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 1.2 ppb at hour 16 | | | | | | | | | | Hours of Missing Data: 37 | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 3.8 ppb | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 2 Q ₃ = 5 P ₉₀ = 10 P ₉₉ = 30 | | | | | | | | | | Hours of Calibration: 36 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | Percent Operational Time: 99.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 0 | 0 | Z | 1 | 1 | 0 | 1 | 7 | 28 | 27 | 14 | 4 | 2 | 1 | 1 | 2 | 2 | 2 | 1 | 2 | 3 | 7 | 6 | 3 | 5.0 | 28 | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 3 | 2 | 1 | Z | 1 | 1 | 2 | 28 | 36 | 18 | 10 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 1 | 4.9 | 36 | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 1 | 0 | 0 | 2 | Z | 15 | 23 | 21 | 10 | 14 | 6 | 4 | 3 | 3 | 2 | 1 | 1 | 2 | 2 | 1 | 5 | 4 | 3 | 3 | 5.5 | 23 | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 8 | 12 | 20 | 7 | 3 | Z | 3 | 10 | 12 | 2 | 7 | 6 | 5 | 23 | 6 | 0 | 1 | 1 | 2 | 4 | 5 | 7 | 4 | 3 | 6.6 | 23 | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | Z | 3 | 3 | 2 | 5 | 6 | 6 | 11 | 27 | 46 | 19 | 11 | 10 | 2 | 2 | 1 | 2 | 1 | 2 | 4 | 3 | 3 | 3 | 2 | 7.7 | 46 | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 1 | Z | 1 | 1 | 0 | 5 | 11 | 11 | 3 | 1 | 1 | 1 | 1 | 2 | 4 | 3 | 2 | 2 | 2 | 1 | 0 | 0 | 3 | 8 | 2.8 | 11 | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 5 | 3 | Z | 4 | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 5 | 4 | 1 | 2.2 | 5 | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 1 | 1 | 1 | Z | 1 | 0 | 3 | 1 | 0 | 11 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 7 | 4 | 4 | 2.0 | 11 | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 11 | 7 | 8 | 20 | Z | 43 | 39 | 21 | 9 | 9 | 9 | 6 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 8.4 | 43 | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 1 | 2 | 1 | 31 | 18 | Z | 5 | 5 | 7 | 5 | 3 | 4 | 4 | 2 | 4 | 3 | 3 | 2 | 3 | 5 | 4 | 3 | 3 | 2 | 5.2 | 31 | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | Z | 11 | 2 | 8 | 20 | 30 | 12 | 7 | 9 | 9 | 9 | 6 | 4 | 5 | 5 | 5 | 3 | 1 | 1 | 3 | 4 | 3 | 3 | 4 | 7.1 | 30 | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 5 | Z | 6 | 7 | 7 | 6 | 6 | 6 | 7 | 8 | 5 | 3 | 2 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 1 | 2 | 3.6 | 8 | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 4 | 7 | Z | 13 | 13 | 10 | 6 | 7 | 8 | 7 | 4 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 5 | 9 | 10 | 5.0 | 13 | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 7 | 1 | 1 | Z | 2 | 2 | 2 | 4 | 5 | C | C | C | C | C | 2 | 1 | 0 | 0 | 0 | 3 | 3 | 3 | 3 | 5 | 2.6 | 7 | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 19 | 22 | 19 | 10 | Z | 11 | 11 | 9 | 9 | 10 | 13 | 11 | 9 | 4 | 4 | 4 | 17 | 17 | 6 | 3 | 3 | 2 | 1 | 0 | 9.2 | 22 | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | Z | 1 | 2 | 2 | 12 | 9 | 7 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.6 | 12 | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | Z | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 1 | 0 | 0.6 | 2 | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 0 | Z | 1 | 0 | 0 | 1 | 1 | 1 | 3 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0.7 | 3 | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 4 | 7 | 0.8 | 7 | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 7 | 3 | 2 | 3 | 2 | Z | 6 | 32 | 30 | M | 17 | 10 | 10 | 4 | 3 | 2 | 2 | 3 | 3 | 3 | 4 | 10 | 11 | 8 | 7.9 | 32 | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | Z | 8 | 5 | 5 | 4 | 4 | 4 | 11 | 16 | 7 | 6 | 5 | 3 | 5 | 8 | 4 | 4 | 4 | 6 | 6 | 8 | 18 | 20 | 10 | 7.5 | 20 | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 13 | Z | 22 | 16 | 9 | 4 | 4 | 7 | 3 | 4 | 4 | 3 | 2 | 1 | 2 | 1 | 1 | 1 | 10 | 16 | 13 | 10 | 2 | 1 | 6.4 | 22 | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 1 | 1 | Z | 1 | 3 | 1 | 1 | 3 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 3 | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 0.3 | 2 | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 1 | 0.4 | 2 | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | Z | 0 | 0 | 0 | 0 | 1 | 2 | 3 | 4 | 2 | 5 | 3 | 2 | 1 | 1 | 1 | 1 | 3 | 3 | 3 | 5 | 2 | 2 | 1 | 2.0 | 5 | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 1 | Z | 2 | 3 | 2 | 1 | 2 | 2 | 4 | 9 | 11 | 8 | 7 | 5 | 3 | 2 | 3 | 5 | 4 | 5 | 2 | 2 | 2 | 3 | 3.9 | 11 | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 3 | 10 | Z | 34 | 34 | 20 | 12 | 9 | 8 | 10 | 11 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 7.1 | 34 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 3.5 | 3.7 | 3.9 | 6.5 | 5.0 | 6.4 | 5.4 | 7.2 | 7.9 | 7.5 | 5.7 | 3.7 | 2.4 | 2.2 | 1.7 | 1.2 | 1.6 | 1.6 | 1.7 | 2.2 | 2.6 | 3.5 | 3.1 | 2.7 | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | | | | | | | 19 | 22 | 22 | 34 | 34 | 43 | 39 | 32 | 36 | 46 | 19 | 11 | 10 | 23 | 8 | 5 | 17 | 17 | 10 | 16 | 13 | 18 | 20 | 10 | Diurnal Maximum | |
| Z - zerospan | | | C - Calibration | | | M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Fort McKay - Bertha Ganter - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort McKay - Bertha Ganter - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 687 | 97.17 | 97.17 |
| 21 - 40 | 18 | 2.55 | 99.72 |
| 41 - 80 | 2 | 0.28 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort McKay - Bertha Ganter - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|------------|-----------|------------|----------|------------|-----------|------------|------------|------------|-----------|------------|-----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 30 | 18 | 9 | 7 | 8 | 7 | 32 | 110 | 103 | 76 | 66 | 60 | 44 | 59 | 38 | 20 | 687 |
| 21 - 40 | 3 | 1 | 0 | 0 | 1 | 0 | 3 | 3 | 6 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 18 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 33 | 19 | 9 | 7 | 9 | 7 | 36 | 113 | 109 | 77 | 67 | 60 | 44 | 59 | 38 | 20 | 707 |

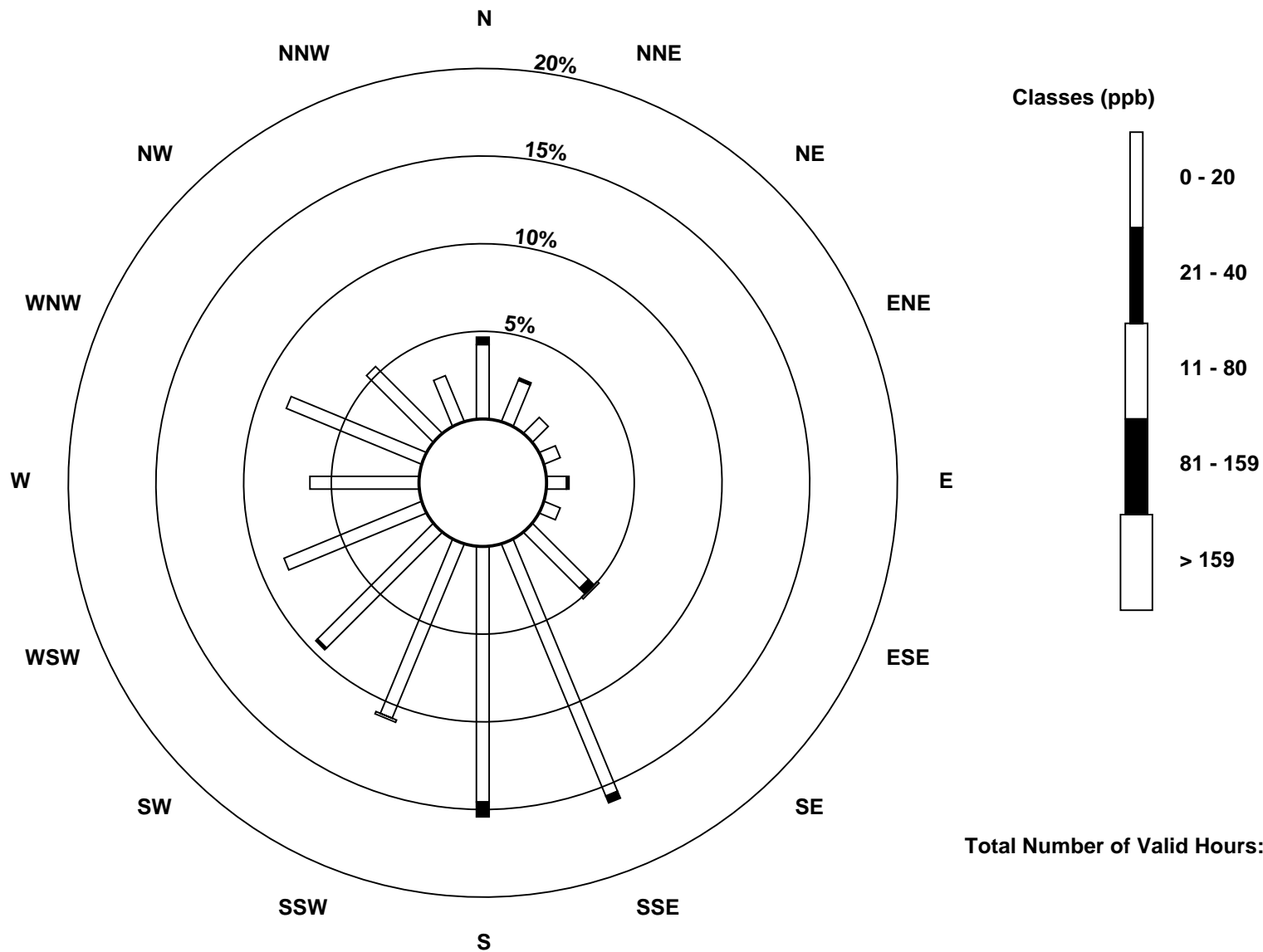
Total Number of Valid Hours: 707

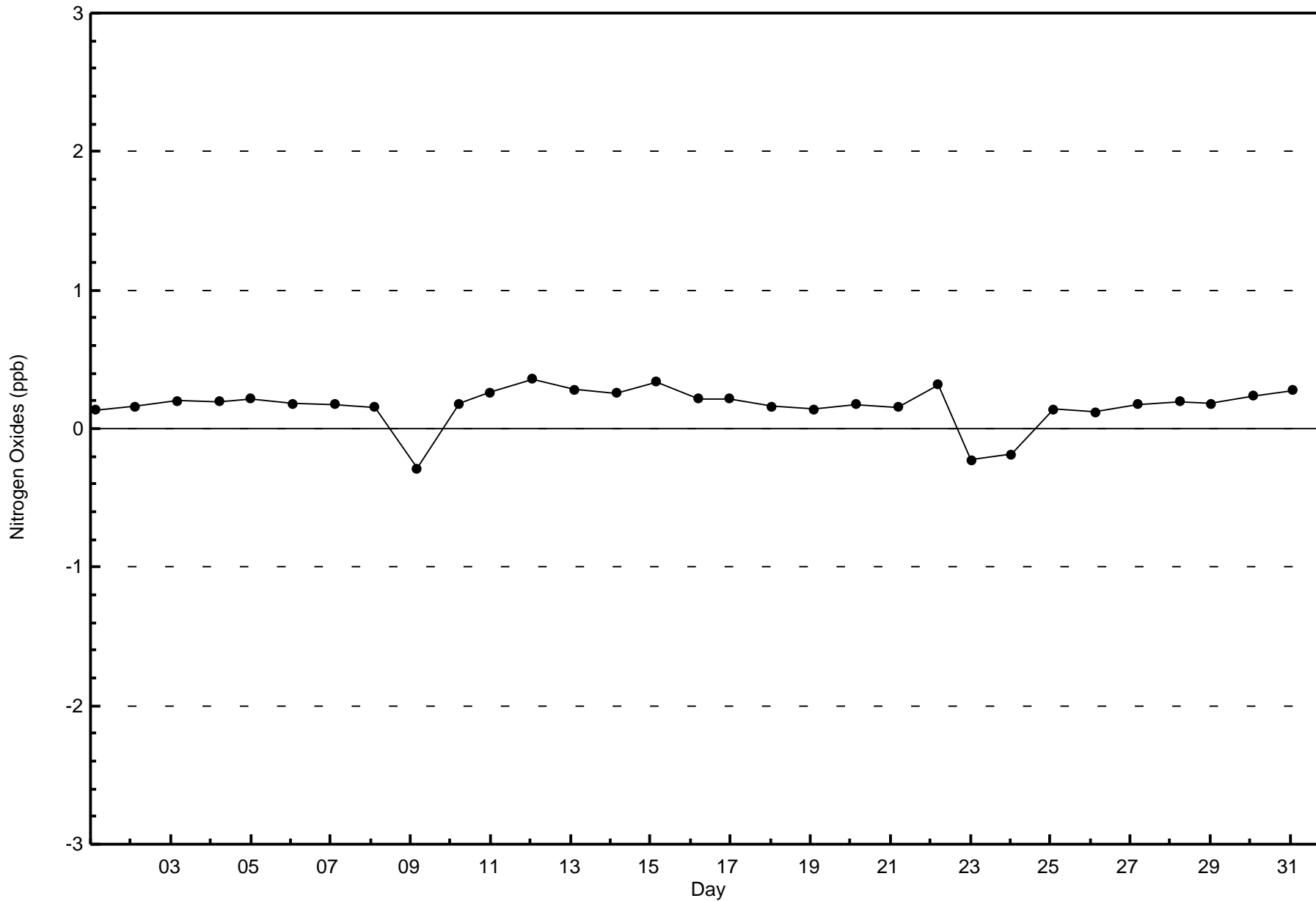
Total Number of Hours: 744

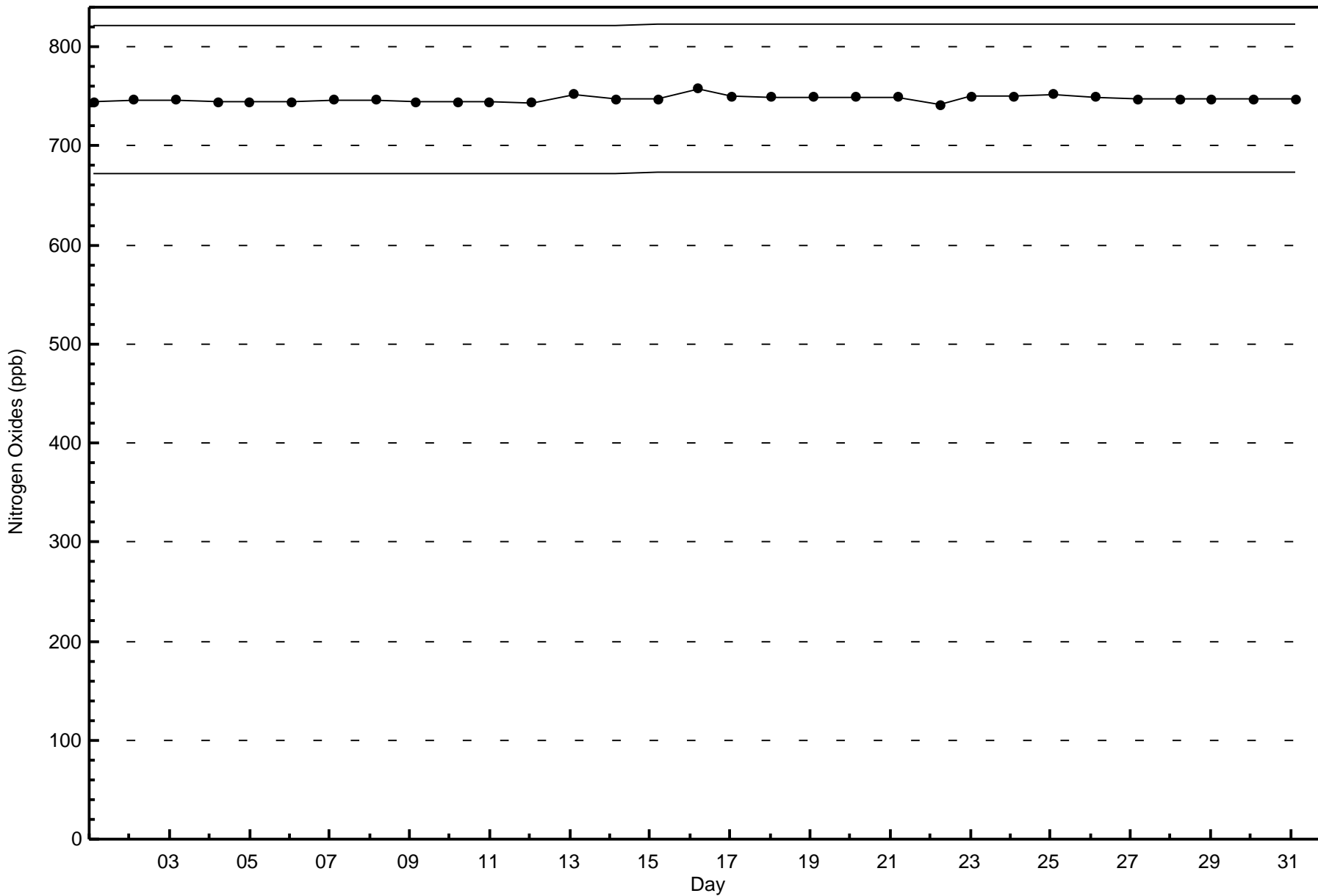


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Oxides (NO_x) - ppb
Fort McKay - Bertha Ganter (AMS 1)









Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Fort McKay - Bertha Ganter - August 2017

| | |
|---|---|
| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | Hours in Service: 744 |
| Maximum Value: 56 ppb on Aug 13 13:00 | Maximum Daily Average: 40.9 ppb on Aug 13 |
| Minimum Value: 0 ppb on Aug 31 05:00 | Hours of Data: 709 |
| Maximum Diurnal Average: 32.4 ppb at hour 16 | Hours of Missing Data: 35 |
| Monthly Average: 21.7 ppb | Hours of Calibration: 34 |
| Minimum Daily Average: 9.3 ppb on Aug 15 | Percent Operational Time: 99.9 |
| Minimum Diurnal Average: 9.2 ppb at hour 5 | |
| Percentiles: P ₁ = 0 P ₁₀ = 7 Q ₁ = 13 Median = 20 Q ₃ = 30 P ₉₀ = 37 P ₉₉ = 54 | |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
|--------|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|---------------|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 10 | 7 | 8 | Z | 5 | 7 | 8 | 12 | 10 | 14 | 23 | 32 | 34 | 34 | 35 | 34 | 34 | 33 | 31 | 29 | 24 | 18 | 13 | 14 | 20.4 | 35 | |
| 2-Aug | 13 | 10 | 9 | 7 | Z | 7 | 11 | 7 | 6 | 15 | 25 | 34 | 35 | 37 | 37 | 37 | 39 | 38 | 35 | 31 | 25 | 18 | 15 | 14 | 22.0 | 39 | |
| 3-Aug | 17 | 19 | 18 | 15 | 8 | Z | 4 | 9 | 16 | 20 | 33 | 34 | 36 | 37 | 38 | 38 | 40 | 38 | 32 | 25 | 20 | 17 | 19 | 10 | 23.5 | 40 | |
| 4-Aug | 6 | 2 | 1 | 4 | 4 | 4 | Z | 4 | 11 | 19 | 20 | 25 | 26 | 20 | 30 | 36 | 37 | 35 | 30 | 24 | 25 | 16 | 14 | 9 | 17.4 | 37 | |
| 5-Aug | 8 | Z | 8 | 6 | 3 | 4 | 5 | 9 | 10 | 18 | 32 | 49 | 47 | 44 | 45 | 44 | 42 | 42 | 41 | 36 | 32 | 27 | 25 | 26 | 26.2 | 49 | |
| 6-Aug | 23 | 19 | Z | 13 | 11 | 9 | 8 | 8 | 12 | 12 | 16 | 18 | 18 | 16 | 14 | 13 | 12 | 16 | 17 | 19 | 15 | 12 | 8 | 3 | 13.6 | 23 | |
| 7-Aug | 5 | 6 | 4 | Z | 4 | 3 | 5 | 7 | 12 | 13 | 18 | 22 | 23 | 26 | 27 | 28 | 30 | 29 | 25 | 21 | 16 | 9 | 11 | 14 | 15.5 | 30 | |
| 8-Aug | 12 | 11 | 9 | 7 | Z | 7 | 7 | 9 | 10 | 12 | C | C | C | 29 | 28 | 27 | 27 | 26 | 27 | 25 | 19 | 13 | 11 | 12 | 16.4 | 29 | |
| 9-Aug | 4 | 8 | 8 | 2 | 1 | Z | 3 | 7 | 15 | 21 | 27 | 34 | 31 | 31 | 31 | 32 | 34 | 36 | 33 | 28 | 22 | 19 | 17 | 14 | 19.9 | 36 | |
| 10-Aug | 13 | 12 | 11 | 2 | 6 | 14 | Z | 16 | 20 | 25 | 37 | 46 | 50 | 49 | 48 | 46 | 43 | 41 | 33 | 30 | 26 | 24 | 18 | 16 | 27.2 | 50 | |
| 11-Aug | 14 | Z | 13 | 4 | 2 | 1 | 5 | 11 | 15 | 23 | 32 | 35 | 41 | 43 | 43 | 45 | 47 | 47 | 47 | 47 | 43 | 38 | 35 | 32 | 26 | 28.0 | 47 |
| 12-Aug | 23 | 16 | Z | 13 | 13 | 13 | 19 | 29 | 34 | 38 | 46 | 51 | 53 | 51 | 50 | 51 | 52 | 53 | 53 | 52 | 50 | 42 | 41 | 37 | 38.2 | 53 | |
| 13-Aug | 33 | 26 | 19 | Z | 12 | 19 | 25 | 32 | 39 | 45 | 52 | 55 | 56 | 55 | 54 | 55 | 55 | 55 | 54 | 51 | 48 | 40 | 32 | 28 | 40.9 | 56 | |
| 14-Aug | 30 | 36 | 33 | Z | Z | 30 | 29 | 30 | 32 | 35 | 34 | 37 | 33 | 31 | 24 | 14 | 17 | 18 | 20 | 13 | 12 | 10 | 9 | 4 | 24.4 | 37 | |
| 15-Aug | 0 | 0 | 0 | 0 | 0 | Z | 1 | 2 | 2 | 4 | 5 | 8 | 11 | 19 | 27 | 30 | 20 | 14 | 17 | 15 | 13 | 8 | 8 | 11 | 9.3 | 30 | |
| 16-Aug | 12 | 10 | 9 | 7 | 4 | 4 | Z | 7 | 10 | 11 | 17 | 24 | 30 | 31 | 32 | 33 | 33 | 32 | 30 | 25 | 21 | 21 | 20 | 19 | 19.3 | 33 | |
| 17-Aug | 17 | Z | 11 | 9 | 11 | 10 | 11 | 12 | 12 | 14 | 16 | 20 | 23 | 23 | 24 | 24 | 24 | 31 | 26 | 20 | 17 | 10 | 11 | 18 | 17.1 | 31 | |
| 18-Aug | 18 | 15 | Z | 15 | 14 | 14 | 15 | 17 | 20 | 21 | 23 | 21 | 23 | 23 | 26 | 23 | 24 | 27 | 25 | 24 | 24 | 26 | 30 | 28 | 21.6 | 30 | |
| 19-Aug | 30 | 30 | 28 | Z | 27 | 24 | 24 | 23 | 24 | 23 | 23 | 24 | 24 | 25 | 26 | 28 | 28 | 26 | 22 | 21 | 20 | 21 | 20 | 17 | 24.2 | 30 | |
| 20-Aug | 16 | 18 | 20 | 19 | Z | 18 | 18 | 19 | 20 | 21 | 23 | 25 | 27 | 27 | 28 | 28 | 28 | 28 | 27 | 26 | 25 | 25 | 24 | 21 | 23.2 | 28 | |
| 21-Aug | 20 | 19 | 18 | 17 | 17 | Z | 16 | 17 | 18 | 20 | 22 | 23 | 28 | 29 | 29 | 29 | 30 | 32 | 30 | 26 | 21 | 18 | 18 | 12 | 22.2 | 32 | |
| 22-Aug | 11 | 11 | 12 | 9 | 9 | 6 | Z | 5 | 8 | M | 16 | 21 | 23 | 29 | 33 | 38 | 40 | 41 | 39 | 24 | 18 | 11 | 10 | 9 | 19.3 | 41 | |
| 23-Aug | 6 | Z | 8 | 8 | 4 | 6 | 7 | 7 | 7 | 18 | 20 | 22 | 21 | 19 | 15 | 25 | 25 | 22 | 19 | 17 | 15 | 6 | 3 | 10 | 13.6 | 25 | |
| 24-Aug | 6 | 2 | Z | 3 | 11 | 10 | 7 | 10 | 15 | 17 | 20 | 23 | 19 | 16 | 17 | 21 | 14 | 13 | 8 | 2 | 0 | 1 | 27 | 26 | 12.5 | 27 | |
| 25-Aug | 22 | 20 | 20 | Z | 15 | 16 | 16 | 16 | 20 | 20 | 19 | 17 | 14 | 20 | 21 | 18 | 17 | 18 | 17 | 13 | 15 | 13 | 12 | 14 | 17.1 | 22 | |
| 26-Aug | 16 | 15 | 16 | 17 | Z | 16 | 15 | 15 | 15 | 17 | 19 | 20 | 22 | 25 | 29 | 29 | 29 | 26 | 26 | 24 | 25 | 24 | 22 | 23 | 22 | 20.7 | 29 |
| 27-Aug | 23 | 23 | 22 | 21 | 19 | Z | 17 | 17 | 16 | 18 | 20 | 22 | 24 | 26 | 29 | 30 | 32 | 35 | 33 | 30 | 20 | 19 | 18 | 19 | 23.1 | 35 | |
| 28-Aug | 18 | 19 | 19 | 18 | 16 | 15 | Z | 17 | 23 | 26 | 34 | 38 | 38 | 38 | 38 | 38 | 38 | 37 | 34 | 30 | 26 | 24 | 25 | 22 | 27.4 | 38 | |
| 29-Aug | 21 | Z | 17 | 15 | 14 | 13 | 10 | 13 | 16 | 20 | 24 | 32 | 33 | 34 | 36 | 37 | 39 | 38 | 37 | 34 | 29 | 28 | 27 | 24 | 25.8 | 39 | |
| 30-Aug | 21 | 17 | Z | 14 | 9 | 7 | 5 | 10 | 18 | 22 | 25 | 30 | 32 | 34 | 34 | 35 | 33 | 28 | 28 | 27 | 29 | 27 | 25 | 21 | 23.0 | 35 | |
| 31-Aug | 20 | 13 | 0 | Z | 0 | 1 | 4 | 6 | 9 | 6 | 11 | 16 | 32 | 36 | 37 | 35 | 33 | 32 | 32 | 31 | 27 | 27 | 27 | 26 | 20.1 | 37 | |

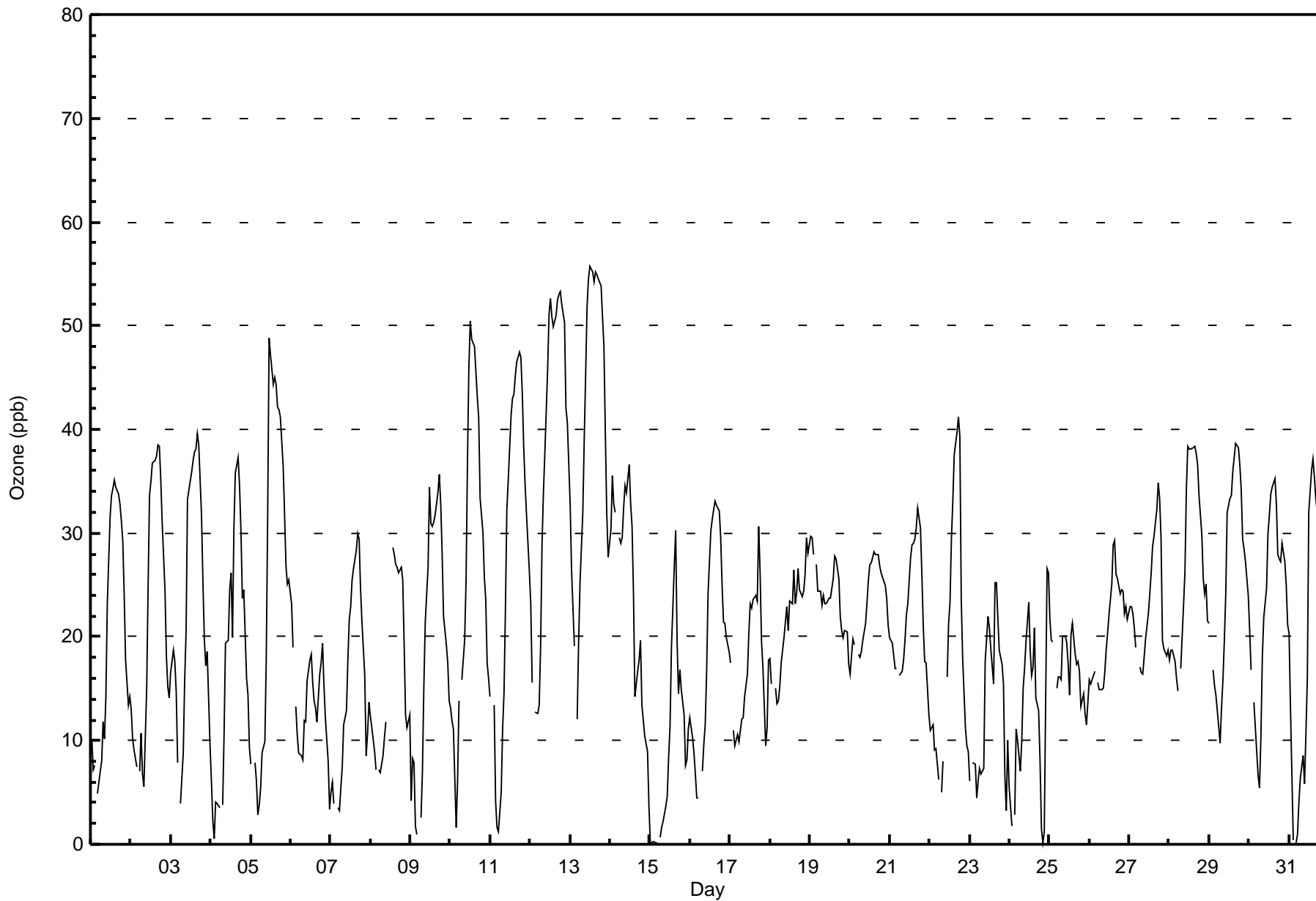
| | | | | | | | | | | | | | | | | | | | | | | | | |
|------|------|------|------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|
| 15.8 | 14.8 | 13.1 | 11.0 | 9.2 | 10.7 | 11.4 | 12.9 | 15.9 | 19.6 | 24.3 | 28.6 | 30.3 | 30.8 | 31.8 | 32.4 | 32.0 | 31.8 | 29.8 | 26.4 | 23.1 | 19.5 | 19.1 | 17.6 | Diurnal Average |
| 33 | 36 | 33 | 32 | 27 | 30 | 29 | 32 | 39 | 45 | 52 | 55 | 56 | 55 | 54 | 55 | 55 | 55 | 54 | 52 | 50 | 42 | 41 | 37 | Diurnal Maximum |

Z - zerospan C - Calibration M - Maintenance
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb



Wood Buffalo Environmental Association
Hourly Averages

Ozone (O₃) - ppb
Fort McKay - Bertha Ganter - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ozone (O₃) - ppb
Fort McKay - Bertha Ganter - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 360 | 50.78 | 50.78 |
| 21 - 50 | 331 | 46.69 | 97.46 |
| 51 - 82 | 18 | 2.54 | 100.00 |
| > 83 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 709

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Ozone (O₃) - ppb
Fort McKay - Bertha Ganter - August 2017

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---|-----------------------|-----|----|-----|---|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 26 | 8 | 3 | 2 | 4 | 1 | 19 | 38 | 55 | 44 | 31 | 37 | 26 | 27 | 25 | 14 | 360 |
| 21 - 50 | 5 | 11 | 7 | 5 | 5 | 6 | 16 | 67 | 47 | 36 | 34 | 22 | 16 | 34 | 15 | 5 | 331 |
| 51 - 82 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 |
| > 83 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 31 | 19 | 10 | 7 | 9 | 7 | 35 | 117 | 108 | 80 | 65 | 59 | 42 | 61 | 40 | 19 | 709 |

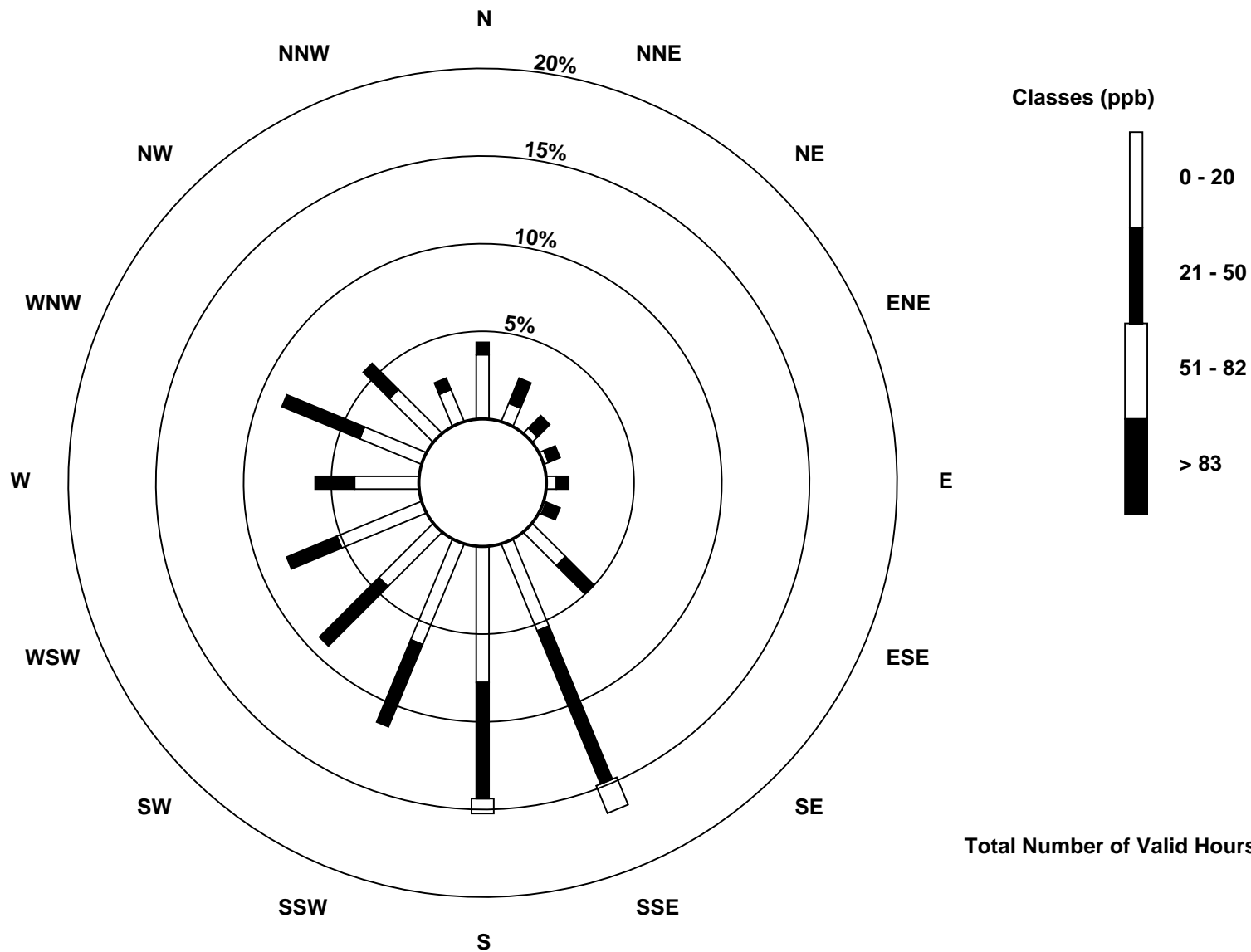
Total Number of Valid Hours: 709

Total Number of Hours: 744

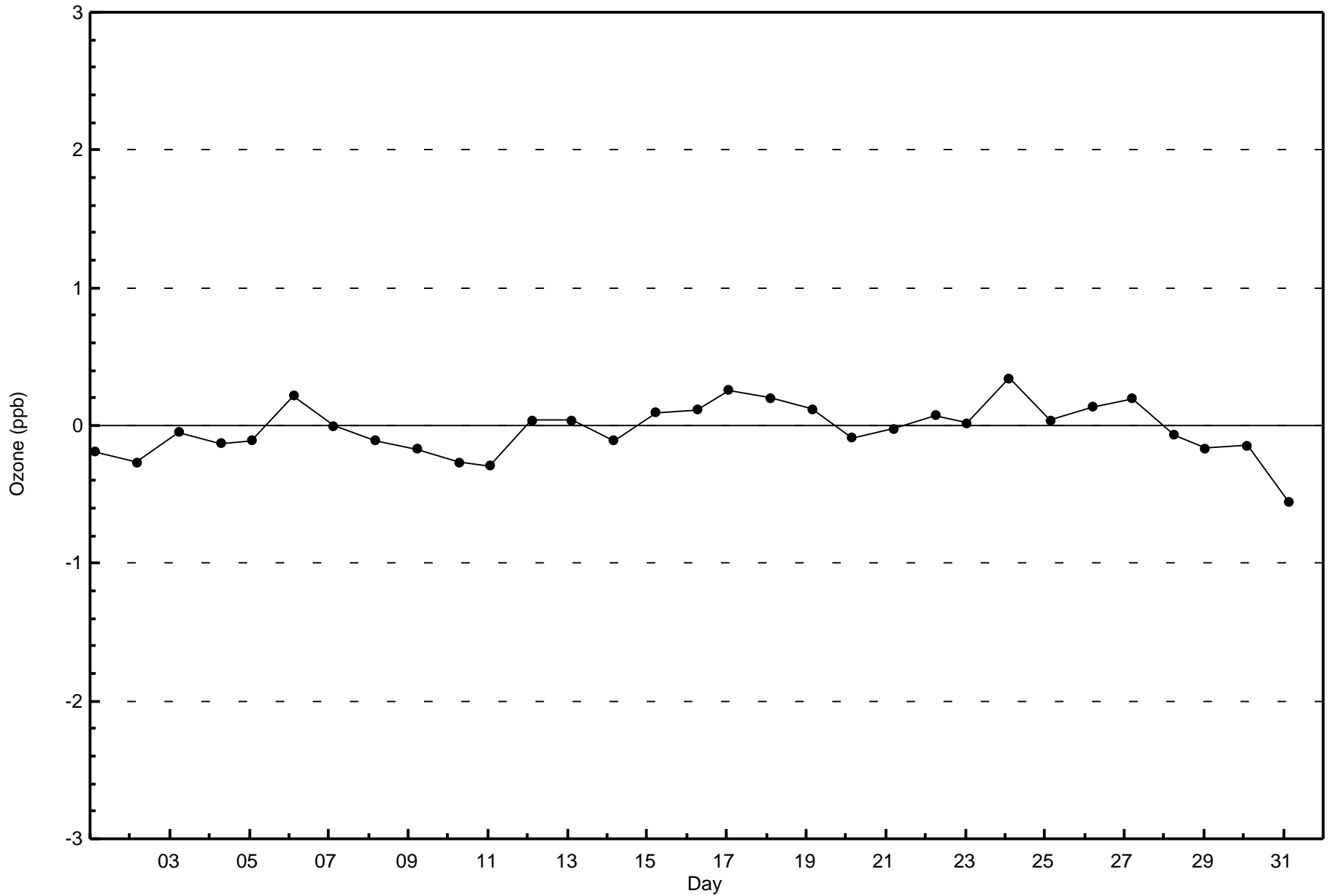


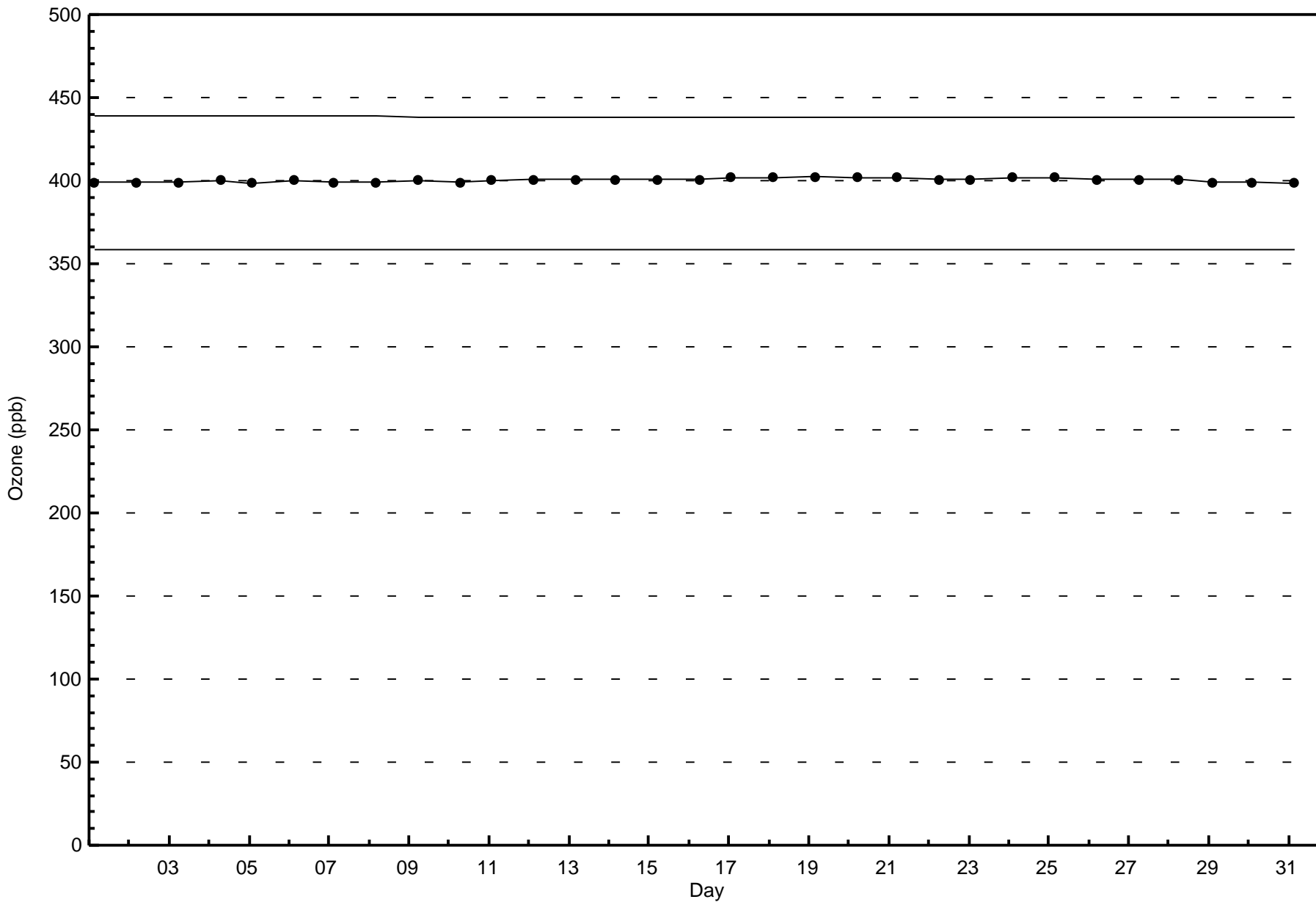
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Ozone (O₃) - ppb
Fort McKay - Bertha Ganter (AMS 1)



Total Number of Valid Hours: 709







Wood Buffalo Environmental Association

Summary of Hour Averages

Particulate Matter 2.5 (PM_{2.5}) - µg/m³

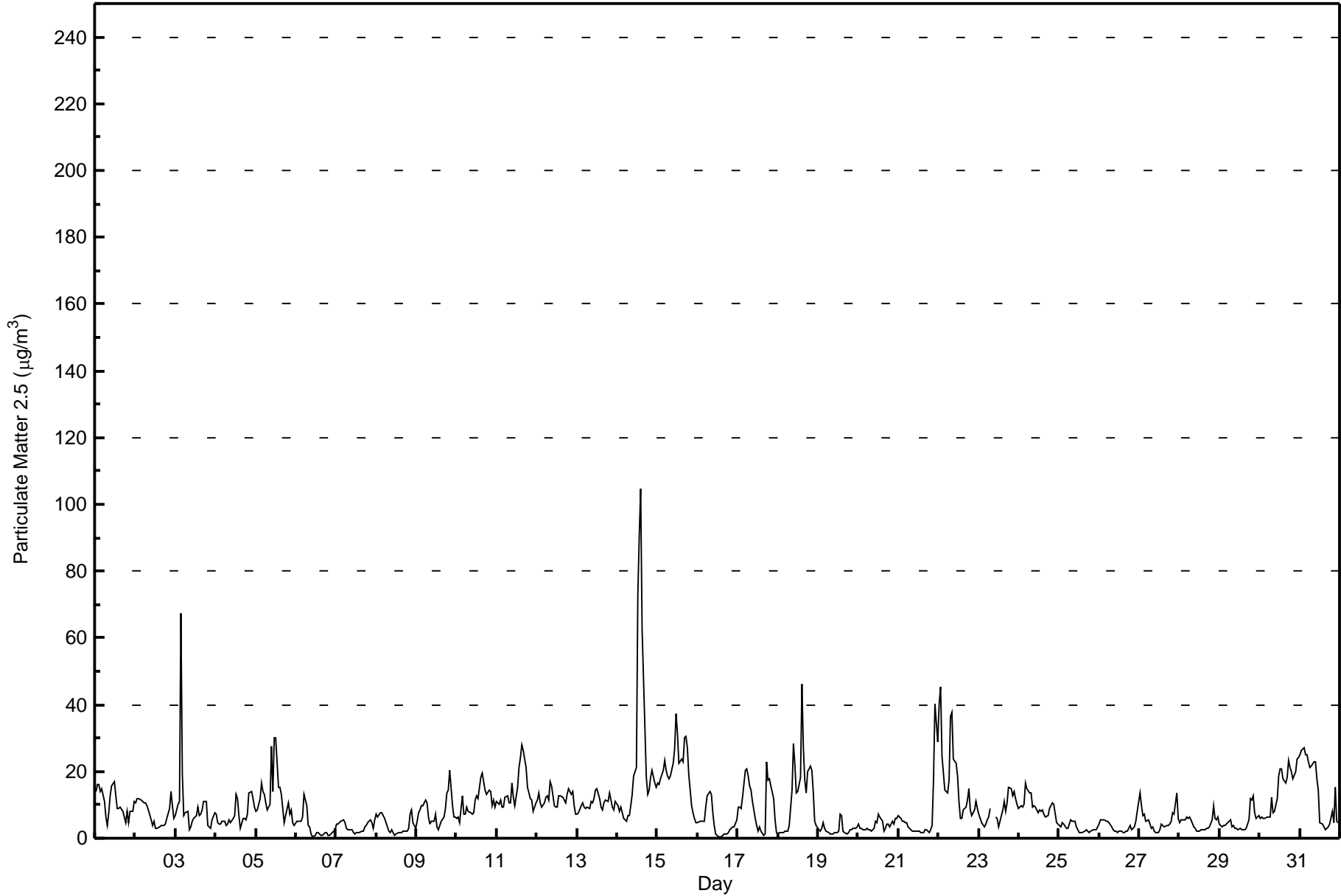
Fort McKay - Bertha Ganter - August 2017

| Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 104.7 µg/m ³ on Aug 14 15:00 Minimum Value: 0.5 µg/m ³ on Aug 6 11:00 Maximum Diurnal Average: 11.6 µg/m ³ at hour 15 Monthly Average: 9.21 µg/m ³ | | Maximum Daily Average: 25.1 µg/m ³ on Aug 14 Minimum Daily Average: 2.6 µg/m ³ on Aug 19 Minimum Diurnal Average: 7.9 µg/m ³ at hour 24 Percentiles: P ₁ = 0.9 P ₁₀ = 2.0 Q ₁ = 3.5 Median = 6.7 Q ₃ = 12.0 P ₉₀ = 18.6 P ₉₉ = 45.0 | | Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 2 Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|---|------|---|------|------|------|------|------|------|------|------|------|------|-------|------|------|------|------|------|------|------|------|-----------------|---------------|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 14.1 | 16.2 | 16.0 | 14.1 | 14.7 | 10.9 | 6.5 | 3.9 | 7.5 | 12.7 | 15.9 | 17.0 | 12.8 | 9.1 | 8.9 | 9.1 | 7.9 | 6.4 | 4.9 | 8.1 | 4.7 | 8.0 | 7.9 | 11.1 | 10.4 | 17.0 |
| 2-Aug | 10.8 | 11.7 | 11.9 | 11.6 | 11.2 | 10.5 | 10.7 | 10.0 | 8.5 | 5.7 | 3.8 | 5.0 | 3.0 | 3.0 | 3.5 | 3.7 | 3.8 | 4.0 | 4.3 | 5.9 | 9.1 | 13.9 | 9.6 | 6.0 | 7.5 | 13.9 |
| 3-Aug | 6.9 | 10.2 | 11.2 | 67.2 | 19.6 | 6.9 | 7.6 | 8.1 | 2.5 | 3.3 | 5.2 | 6.0 | 7.0 | 9.2 | 6.6 | 7.0 | 8.5 | 10.9 | 11.0 | 3.9 | 3.4 | 3.0 | 5.5 | 7.5 | 9.9 | 67.2 |
| 4-Aug | 7.0 | 4.7 | 4.2 | 4.2 | 5.1 | 5.3 | 3.8 | 4.2 | 5.6 | 4.5 | 6.1 | 6.9 | 13.1 | 12.0 | 6.6 | 3.1 | 6.0 | 5.8 | 5.7 | 7.2 | 13.7 | 14.2 | 11.7 | 9.1 | 7.1 | 14.2 |
| 5-Aug | 8.1 | 8.6 | 11.8 | 16.4 | 14.0 | 13.3 | 10.4 | 8.6 | 10.1 | 27.5 | 14.1 | 30.0 | 30.2 | 15.2 | 15.5 | 13.3 | 9.1 | 4.7 | 6.8 | 10.6 | 7.4 | 8.5 | 4.8 | 4.0 | 12.6 | 30.2 |
| 6-Aug | 4.9 | 5.0 | 5.0 | 5.2 | 6.2 | 13.0 | 9.8 | 3.9 | 3.2 | 1.3 | 0.5 | 1.0 | 1.5 | 1.5 | 1.4 | 0.8 | 0.9 | 1.7 | 1.7 | 0.8 | 1.0 | 1.3 | 2.0 | 2.7 | 3.2 | 13.0 |
| 7-Aug | 4.2 | 4.3 | 4.7 | 5.0 | 5.3 | 4.6 | 3.0 | 2.5 | 2.6 | 2.5 | 1.6 | 1.4 | 1.9 | 1.9 | 1.7 | 2.0 | 2.1 | 3.3 | 3.8 | 4.7 | 5.3 | 4.5 | 3.0 | 5.4 | 3.4 | 5.4 |
| 8-Aug | 7.2 | 6.3 | 7.8 | 7.7 | 7.0 | 6.1 | 4.6 | 2.0 | 1.8 | 2.5 | 1.8 | 1.0 | 1.1 | 1.7 | 1.5 | 1.8 | 1.9 | 2.1 | 2.0 | 2.8 | 7.2 | 8.6 | 4.7 | 3.1 | 3.9 | 8.6 |
| 9-Aug | 4.9 | 7.4 | 8.6 | 9.7 | 9.9 | 11.4 | 10.6 | 6.2 | 4.2 | 5.0 | 5.1 | 7.1 | 3.4 | 2.7 | 3.6 | 4.9 | 6.2 | 8.8 | 13.5 | 14.3 | 20.3 | 9.6 | 6.6 | 6.2 | 7.9 | 20.3 |
| 10-Aug | 5.9 | 6.3 | 4.6 | 12.8 | 7.1 | 7.4 | 9.4 | 8.2 | 7.6 | 7.1 | 7.6 | 11.3 | 12.8 | 12.0 | 18.2 | 19.4 | 17.1 | 14.5 | 12.9 | 14.4 | 13.9 | 9.8 | 11.4 | 9.3 | 10.9 | 19.4 |
| 11-Aug | 10.9 | 10.0 | 11.5 | 9.4 | 9.4 | 12.1 | 12.5 | 10.7 | 10.4 | 16.5 | 12.3 | 9.9 | 15.4 | 21.2 | 24.0 | 28.1 | 26.4 | 21.1 | 15.1 | 13.6 | 11.7 | 11.4 | 8.2 | 10.8 | 14.3 | 28.1 |
| 12-Aug | 11.3 | 13.5 | 10.5 | 9.2 | 10.5 | 12.4 | 12.8 | 11.6 | 17.1 | 15.9 | 9.9 | 9.5 | 9.2 | 12.7 | 12.8 | 12.2 | 11.4 | 10.7 | 13.0 | 14.9 | 13.3 | 14.1 | 9.7 | 7.4 | 11.9 | 17.1 |
| 13-Aug | 7.1 | 7.5 | 9.8 | 10.6 | 9.4 | 9.0 | 9.1 | 8.8 | 11.0 | 10.4 | 12.0 | 14.3 | 14.9 | 12.1 | 9.4 | 8.5 | 10.7 | 11.6 | 10.9 | 13.6 | 11.5 | 9.3 | 8.3 | 10.9 | 10.4 | 14.9 |
| 14-Aug | 9.9 | 8.2 | 9.5 | 7.5 | 5.9 | 5.1 | 6.6 | 7.0 | 9.8 | 13.2 | 18.5 | 21.2 | 72.7 | 90.6 | 104.7 | 62.6 | 32.9 | 18.2 | 13.3 | 14.5 | 18.4 | 20.3 | 16.5 | 15.1 | 25.1 | 104.7 |
| 15-Aug | 16.4 | 16.3 | 17.7 | 20.1 | 23.5 | 20.4 | 18.4 | 17.8 | 18.7 | 22.6 | 26.5 | 37.3 | 31.5 | 22.6 | 23.7 | 22.9 | 30.0 | 30.5 | 27.1 | 19.1 | 9.6 | 7.8 | 5.8 | 4.6 | 20.5 | 37.3 |
| 16-Aug | 4.6 | 4.9 | 5.1 | 4.9 | 4.9 | 9.4 | 12.6 | 14.1 | 13.1 | 7.6 | 3.7 | 1.2 | 0.6 | 0.5 | 0.6 | 0.7 | 1.1 | 1.5 | 1.7 | 2.4 | 3.1 | 3.3 | 3.2 | 5.6 | 4.6 | 14.1 |
| 17-Aug | 9.5 | 9.3 | 8.9 | 12.4 | 20.3 | 20.6 | 18.8 | 15.7 | 14.3 | 11.2 | 6.1 | 3.7 | 2.3 | 3.4 | 2.0 | 0.9 | 1.3 | 23.1 | 17.3 | 18.0 | 15.6 | 12.0 | 5.7 | 1.9 | 10.6 | 23.1 |
| 18-Aug | 1.4 | 1.7 | 1.5 | 1.6 | 2.0 | 2.3 | 2.1 | 3.8 | 14.2 | 28.2 | 21.9 | 13.6 | 13.9 | 18.1 | 46.1 | 27.0 | 17.2 | 13.7 | 19.8 | 21.7 | 20.5 | 13.8 | 5.0 | 4.0 | 13.1 | 46.1 |
| 19-Aug | 2.4 | 2.1 | 3.0 | 4.6 | 2.9 | 2.0 | 1.6 | 1.3 | 1.2 | 1.2 | 1.7 | 1.5 | 2.3 | 7.2 | 6.6 | 2.1 | 1.7 | 1.4 | 1.7 | 2.3 | 2.4 | 3.1 | 2.8 | 3.5 | 2.6 | 7.2 |
| 20-Aug | 4.2 | 2.9 | 3.0 | 2.6 | 2.7 | 2.8 | 2.7 | 2.5 | 2.1 | 2.9 | 5.3 | 4.8 | 7.0 | 6.5 | 5.3 | 2.2 | 3.1 | 4.1 | 4.4 | 3.4 | 5.2 | 4.3 | 5.8 | 6.1 | 4.0 | 7.0 |
| 21-Aug | 6.7 | 6.1 | 5.2 | 5.0 | 4.7 | 4.5 | 3.4 | 2.7 | 2.2 | 2.0 | 1.9 | 2.0 | 1.9 | 1.9 | 1.8 | 1.8 | 2.4 | 2.5 | 1.6 | 2.4 | 3.8 | 17.3 | 40.1 | 28.7 | 6.4 | 40.1 |
| 22-Aug | 40.1 | 45.5 | 24.6 | 19.7 | 14.2 | 13.6 | 17.4 | 36.5 | 37.9 | 23.6 | 22.3 | 18.7 | 11.0 | 6.1 | 5.8 | 8.4 | 9.3 | 11.5 | 14.8 | 8.6 | 6.7 | 8.7 | 10.8 | 8.8 | 17.7 | 45.5 |
| 23-Aug | 7.1 | 6.0 | 4.6 | 3.5 | 4.4 | 5.5 | 6.2 | 9.0 | C | C | 6.4 | 5.7 | 3.2 | 5.0 | 8.3 | 11.1 | 8.2 | 10.4 | 15.3 | 14.8 | 12.5 | 14.0 | 11.7 | 10.2 | 8.3 | 15.3 |
| 24-Aug | 9.1 | 9.6 | 9.5 | 10.1 | 16.5 | 14.8 | 13.7 | 13.4 | 9.3 | 9.6 | 9.5 | 7.7 | 8.4 | 8.0 | 8.3 | 7.0 | 6.4 | 6.9 | 8.8 | 9.8 | 10.8 | 10.2 | 4.8 | 4.3 | 9.4 | 16.5 |
| 25-Aug | 4.0 | 3.4 | 4.7 | 4.3 | 3.1 | 3.1 | 4.1 | 5.5 | 5.3 | 4.9 | 3.2 | 2.6 | 1.6 | 1.6 | 1.7 | 2.1 | 2.4 | 2.0 | 1.8 | 2.1 | 2.6 | 2.6 | 2.6 | 3.3 | 3.1 | 5.5 |
| 26-Aug | 4.4 | 5.6 | 5.5 | 5.4 | 5.1 | 5.1 | 4.7 | 3.4 | 2.5 | 2.2 | 2.0 | 1.8 | 2.0 | 2.0 | 1.8 | 1.8 | 2.0 | 2.1 | 3.9 | 2.4 | 3.1 | 3.5 | 5.3 | 7.9 | 3.6 | 7.9 |
| 27-Aug | 13.5 | 9.9 | 6.9 | 7.1 | 5.2 | 5.6 | 4.0 | 2.9 | 3.3 | 1.9 | 1.6 | 1.6 | 2.4 | 4.3 | 3.9 | 3.5 | 3.6 | 3.6 | 4.3 | 5.2 | 7.7 | 7.1 | 13.5 | 5.7 | 5.4 | 13.5 |
| 28-Aug | 4.7 | 5.7 | 5.7 | 5.7 | 6.2 | 6.1 | 6.2 | 5.4 | 3.5 | 2.9 | 2.3 | 2.2 | 2.3 | 2.3 | 2.4 | 2.7 | 2.8 | 2.8 | 3.3 | 5.4 | 9.8 | 6.0 | 5.3 | 6.2 | 4.5 | 9.8 |
| 29-Aug | 4.3 | 3.5 | 3.8 | 3.9 | 4.3 | 4.5 | 5.4 | 3.2 | 3.6 | 3.0 | 3.1 | 2.6 | 2.8 | 2.4 | 2.7 | 2.7 | 2.8 | 5.6 | 11.7 | 11.4 | 12.6 | 7.5 | 5.9 | 6.6 | 5.0 | 12.6 |
| 30-Aug | 5.8 | 6.2 | 6.0 | 6.1 | 6.4 | 6.5 | 6.4 | 12.4 | 7.4 | 7.9 | 11.7 | 18.5 | 20.8 | 20.8 | 17.7 | 16.4 | 18.2 | 23.5 | 21.2 | 20.1 | 17.7 | 19.8 | 23.8 | 24.2 | 14.4 | 24.2 |
| 31-Aug | 24.9 | 26.2 | 26.9 | 25.2 | 25.0 | 22.7 | 21.2 | 21.6 | 22.8 | 23.0 | 17.9 | 14.6 | 4.5 | 4.3 | 3.3 | 2.6 | 3.0 | 3.5 | 4.2 | 7.8 | 4.8 | 15.4 | 4.9 | 4.5 | 14.0 | 26.9 |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| 8.9 9.2 8.7 10.7 9.2 8.9 8.6 8.6 8.8 9.4 8.4 9.1 10.2 10.4 11.6 9.4 8.4 8.8 9.1 9.2 9.3 9.4 8.6 7.9 40.1 45.5 26.9 67.2 25.0 22.7 21.2 36.5 37.9 28.2 26.5 37.3 72.7 90.6 104.7 62.6 32.9 30.5 27.1 21.7 20.5 20.3 40.1 28.7 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³ | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay - Bertha Ganter - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay - Bertha Ganter - August 2017**

| Concentration Ranges ($\mu\text{g}/\text{m}^3$) | Number of Hours | % | Cumulative % |
|---|------------------------|----------|---------------------|
| 1 - 5 | 297 | 40.03 | 40.03 |
| 6 - 15 | 325 | 43.80 | 83.83 |
| 16 - 25 | 80 | 10.78 | 94.61 |
| 26 - 80 | 26 | 3.50 | 98.11 |
| > 81.0 | 2 | 0.27 | 98.38 |

Total Number of Valid Hours: 742

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay - Bertha Ganter - August 2017

| Concentration Ranges ($\mu\text{g}/\text{m}^3$) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|--|----------------|-----|----|-----|---|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 1 - 5 | 13 | 3 | 4 | 0 | 3 | 2 | 9 | 14 | 30 | 37 | 40 | 38 | 38 | 38 | 23 | 5 | 297 |
| 6 - 15 | 10 | 10 | 4 | 5 | 4 | 5 | 23 | 83 | 65 | 32 | 21 | 16 | 8 | 19 | 12 | 8 | 325 |
| 16 - 25 | 4 | 7 | 2 | 0 | 1 | 0 | 2 | 20 | 17 | 9 | 3 | 3 | 1 | 4 | 5 | 2 | 80 |
| 26 - 80 | 2 | 0 | 0 | 2 | 1 | 0 | 2 | 2 | 4 | 3 | 2 | 3 | 1 | 0 | 1 | 3 | 26 |
| > 81.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Totals | 29 | 20 | 10 | 7 | 9 | 7 | 36 | 119 | 117 | 82 | 66 | 60 | 48 | 61 | 41 | 18 | 730 |

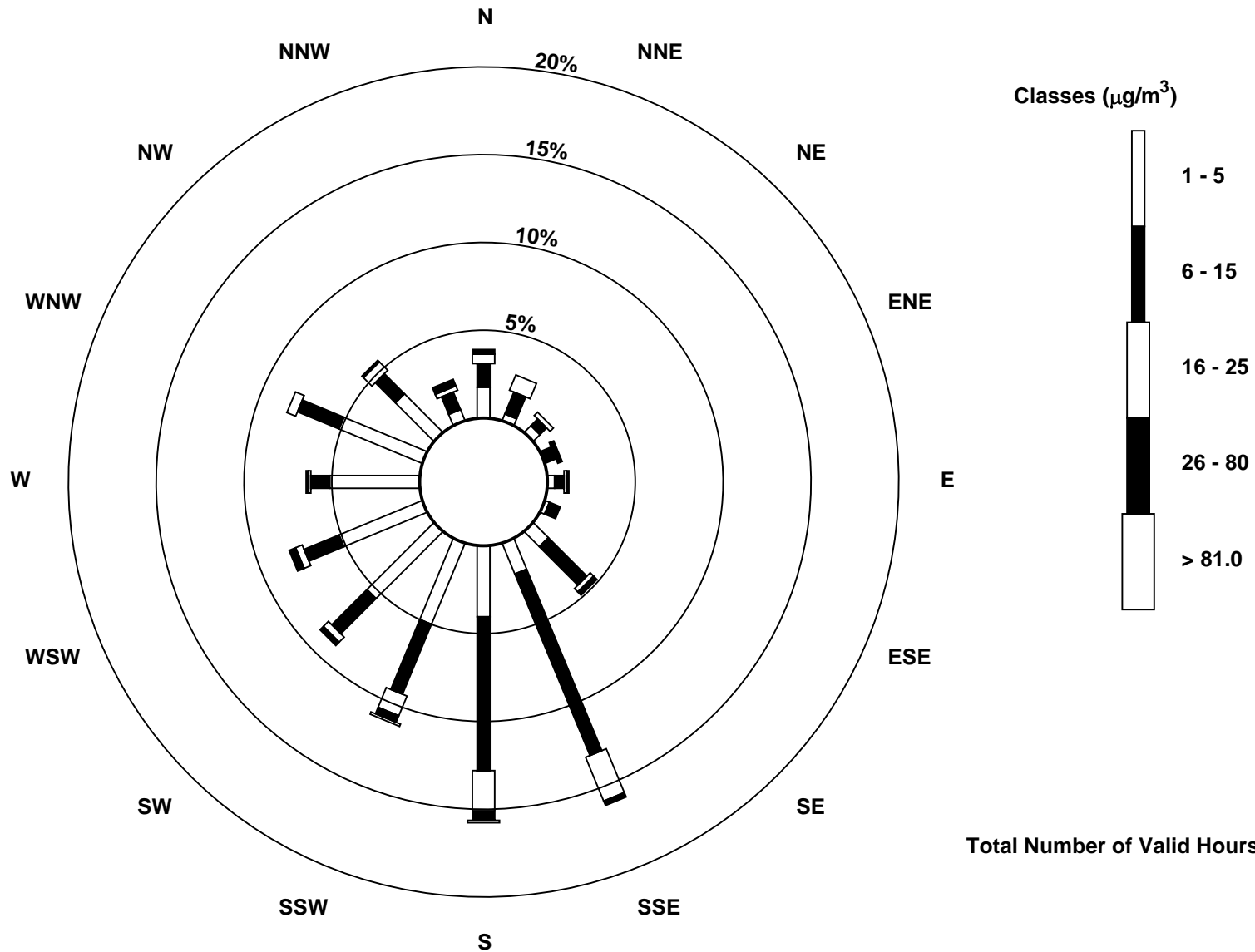
Total Number of Valid Hours: 742

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay - Bertha Ganter (AMS 1)



Total Number of Valid Hours: 742



Wood Buffalo Environmental Association

Summary of Hour Averages

Ammonia (NH₃) - ppb

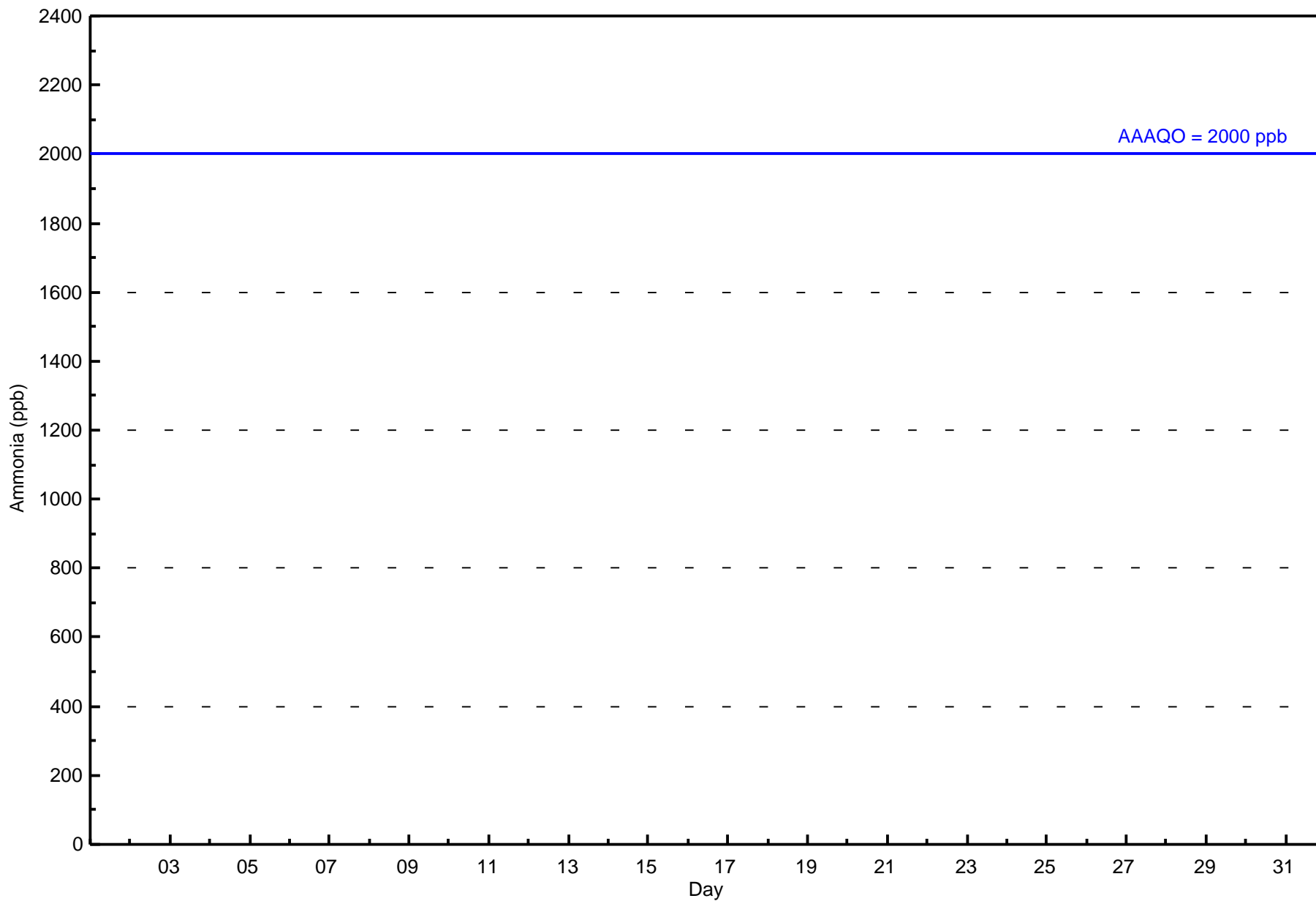
Fort McKay - Bertha Ganter - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|--|----|----|----|----|----|----|----|----|----|----|----|----|----|-----------------|---------------|---------------|----|
| Maximum Value: 0 ppb on Aug 1 01:00 | | | | | | | | | | Maximum Daily Average: 0.0 ppb on Aug 1 | | | | | | | | | | | | | | | | | |
| Minimum Value: 0 ppb on Aug 1 01:00 | | | | | | | | | | Minimum Daily Average: 0.0 ppb on Aug 1 | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 0.0 ppb at hour 1 | | | | | | | | | | Minimum Diurnal Average: 0.0 ppb at hour 1 | | | | | | | | | | | | | | | | | |
| Monthly Average: 0.0 ppb | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 O ₃ = 0 P ₉₀ = 0 P ₉₉ = 0 | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | Hours of Data: 597 | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | Hours of Missing Data: 147 | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | Hours of Calibration: 39 | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | Percent Operational Time: 85.5 | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 0 | 0 | 0 | 0 | 0 | Z | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 2-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | RE | RE | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Z | RE | RE | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 4-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Z | RE | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 5-Aug | 0 | 0 | 0 | Z | RE | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 6-Aug | 0 | 0 | 0 | 0 | Z | RE | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 7-Aug | 0 | 0 | 0 | 0 | 0 | Z | RE | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 8-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 9-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Z | RE | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 10-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Z | RE | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 11-Aug | 0 | 0 | 0 | Z | RE | RE | 0 | 0 | 0 | DF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 12-Aug | 0 | 0 | 0 | 0 | Z | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 13-Aug | 0 | 0 | 0 | 0 | 0 | Z | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 14-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | RE | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 15-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Z | RE | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Z | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 17-Aug | 0 | 0 | 0 | Z | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 18-Aug | 0 | 0 | 0 | 0 | Z | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 19-Aug | 0 | 0 | 0 | 0 | 0 | Z | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 20-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Z | RE | RE | C | C | C | C | C | M | M | M | M | M | M | M | M | M | M | -- | 0 |
| 22-Aug | M | M | M | M | M | M | M | M | M | M | C | C | C | C | C | RE | RE | RE | RE | RE | RE | RE | RE | RE | RE | -- | -- |
| 23-Aug | RE | RE | RE | RE | RE | RE | RE | RE | RE | RE | M | M | M | RE | RE | RE | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -- | 0 |
| 24-Aug | 0 | 0 | 0 | 0 | Z | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 25-Aug | 0 | 0 | 0 | 0 | 0 | Z | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 26-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Z | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Z | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 29-Aug | 0 | 0 | 0 | Z | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 30-Aug | 0 | 0 | 0 | 0 | Z | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 31-Aug | 0 | 0 | 0 | 0 | 0 | Z | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | |
| Z - zerospan C - Calibration M - Maintenance DF - DAS Failure RE - Recovery | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 2000 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Ammonia (NH₃) - ppb
Fort McKay - Bertha Ganter - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ammonia (NH₃) - ppb
Fort McKay - Bertha Ganter - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 5 | 597 | 100.00 | 100.00 |
| 6 - 10 | 0 | 0.00 | 100.00 |
| 11 - 15 | 0 | 0.00 | 100.00 |
| 16 - 20 | 0 | 0.00 | 100.00 |
| 21 - 25 | 0 | 0.00 | 100.00 |
| > 26 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 597

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Ammonia (NH₃) - ppb
Fort McKay - Bertha Ganter - August 2017

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 5 | 18 | 16 | 6 | 4 | 7 | 6 | 27 | 97 | 95 | 74 | 58 | 54 | 42 | 53 | 27 | 13 | 597 |
| 6 - 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 - 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16 - 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21 - 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 26 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 18 | 16 | 6 | 4 | 7 | 6 | 27 | 97 | 95 | 74 | 58 | 54 | 42 | 53 | 27 | 13 | 597 |

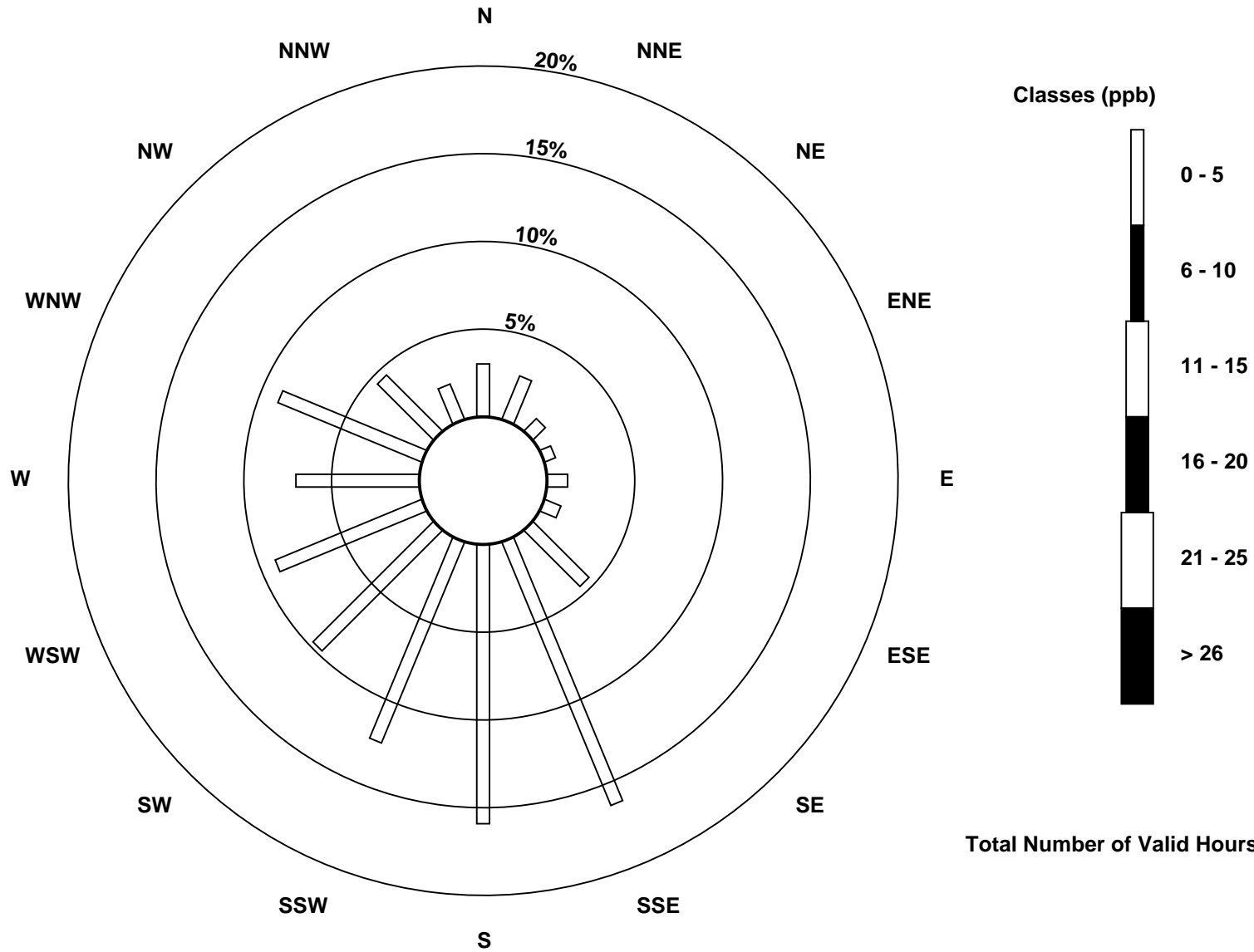
Total Number of Valid Hours: 597

Total Number of Hours: 744

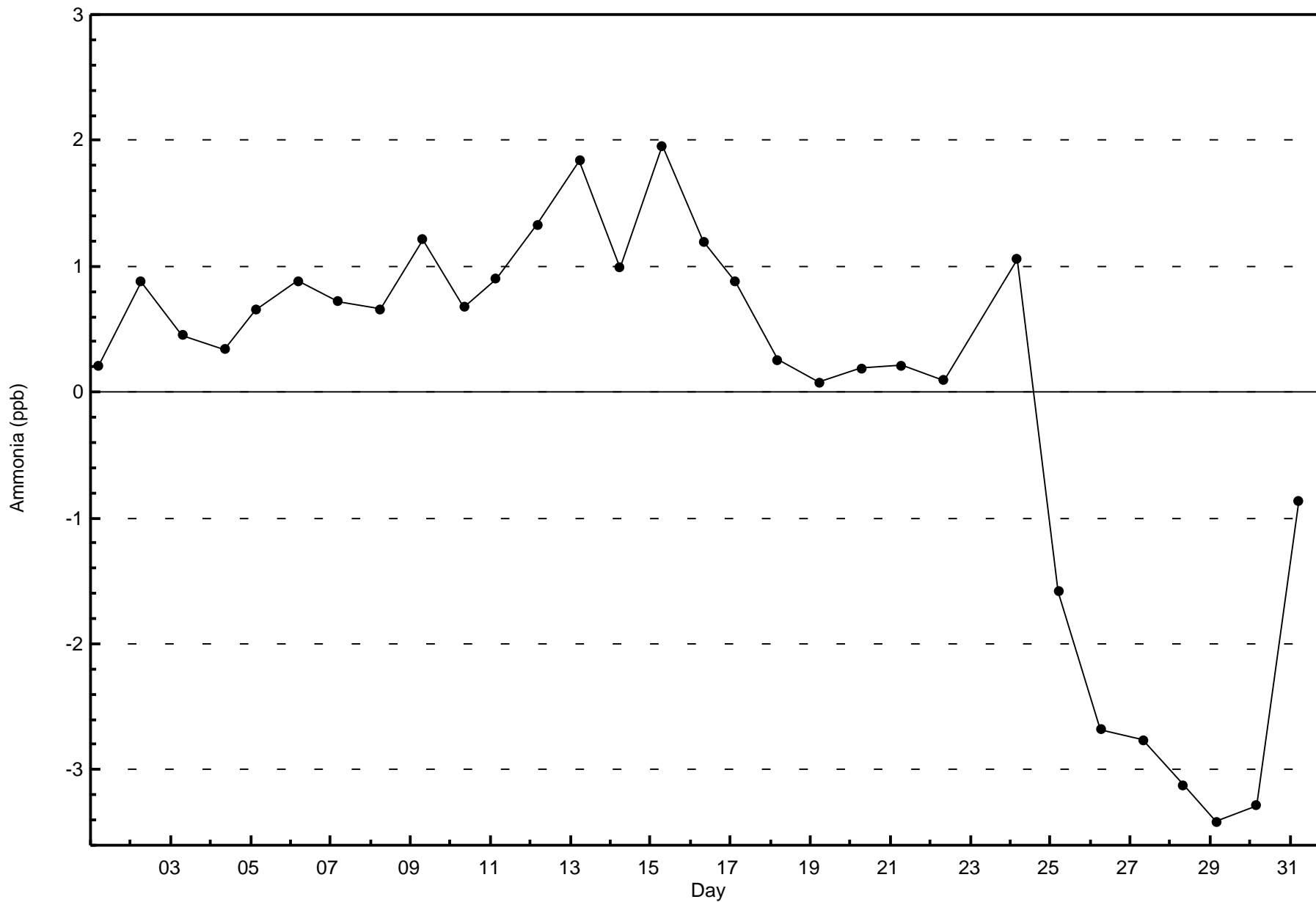


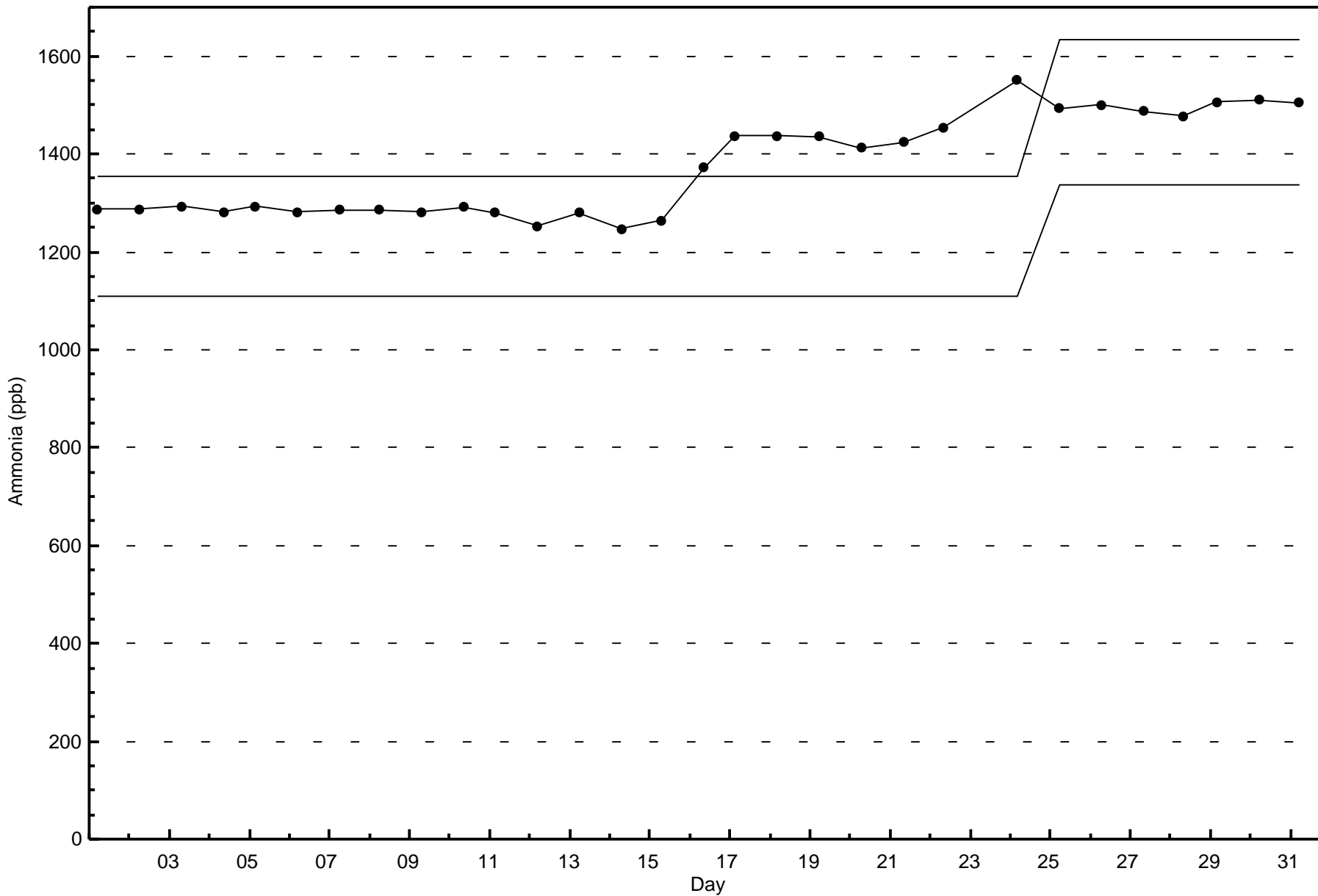
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Ammonia (NH₃) - ppb
Fort McKay - Bertha Ganter (AMS 1)



Total Number of Valid Hours: 597







Wood Buffalo Environmental Association
Summary of Hour Averages

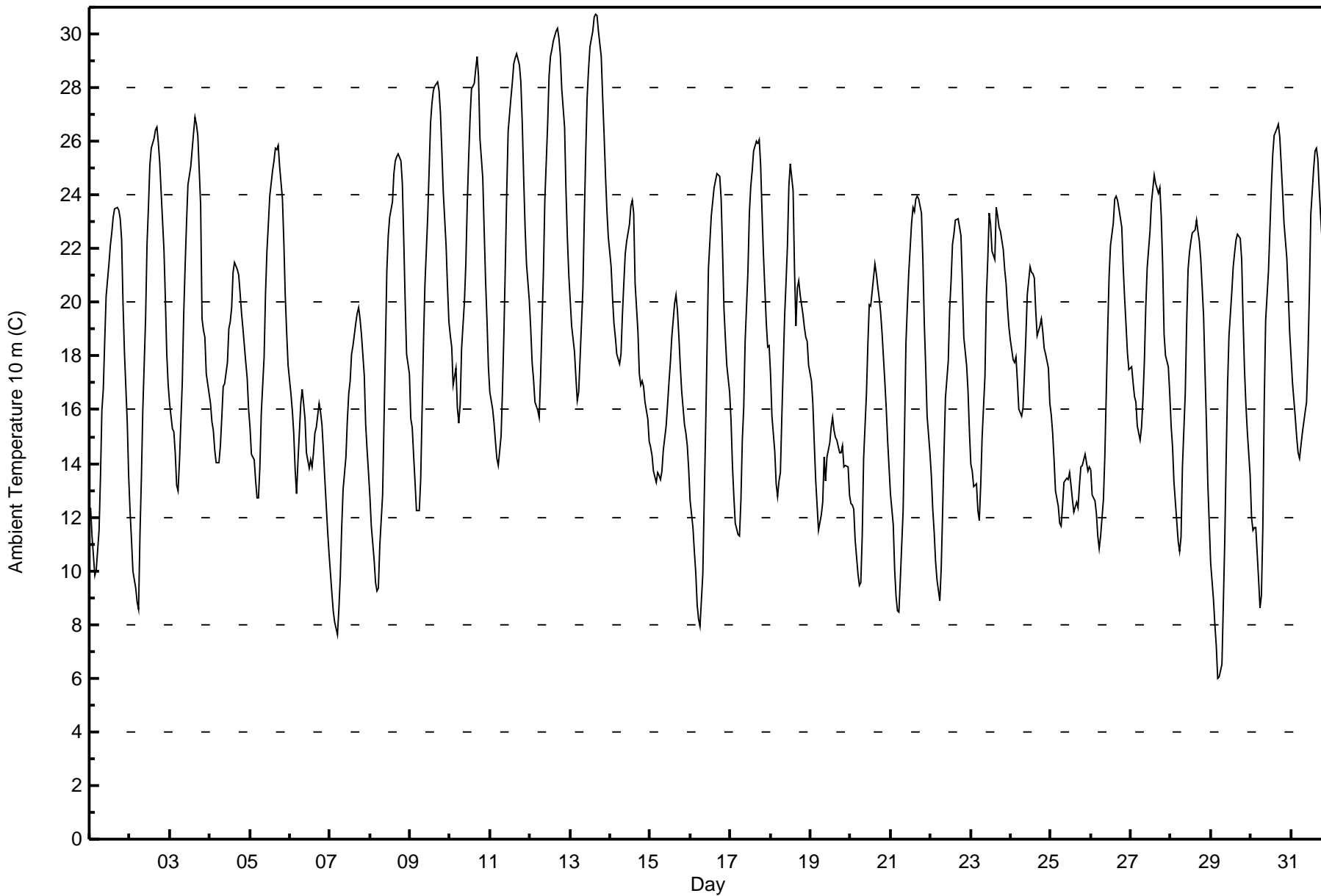
Ambient Temperature 10 m (AT 10m) - C
Fort McKay - Bertha Ganter - August 2017

| Maximum Value: 30.7 C on Aug 13 16:00 Maximum Daily Average: 24.4 C on Aug 13 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: | 744 | | | |
|--|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------------------|-------|------|---------------|---------------|
| Minimum Value: 6.0 C on Aug 29 05:00 Minimum Daily Average: 13.3 C on Aug 25 | | | | | | | | | | | | | | | | | | | | | | Hours of Data: | 744 | | | |
| Maximum Diurnal Average: 23.4 C at hour 16 Minimum Diurnal Average: 12.0 C at hour 6 | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: | 0 | | | |
| Monthly Average: 18.29 C Percentiles: P ₁ = 8.1 P ₁₀ = 11.7 Q ₁ = 14.2 Median = 17.9 Q ₃ = 22.3 P ₉₀ = 25.3 P ₉₉ = 30.1 | | | | | | | | | | | | | | | | | | | | | | Hours of Calibration: | 0 | | | |
| | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: | 100.0 | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 12.3 | 11.3 | 10.5 | 9.8 | 10.0 | 11.5 | 13.5 | 16.0 | 16.8 | 18.6 | 20.2 | 21.4 | 22.1 | 22.6 | 23.2 | 23.5 | 23.5 | 23.5 | 23.1 | 22.3 | 19.9 | 18.1 | 15.5 | 13.5 | 17.6 | 23.5 |
| 2-Aug | 12.2 | 11.1 | 10.0 | 9.4 | 8.8 | 8.6 | 11.3 | 13.4 | 16.0 | 19.5 | 22.2 | 23.5 | 25.1 | 25.7 | 26.1 | 26.4 | 26.5 | 26.0 | 25.2 | 24.1 | 22.0 | 20.1 | 18.1 | 16.9 | 18.7 | 26.5 |
| 3-Aug | 16.2 | 15.3 | 15.2 | 14.4 | 13.2 | 13.0 | 14.1 | 17.0 | 19.5 | 21.3 | 22.9 | 24.4 | 25.1 | 25.7 | 26.3 | 26.9 | 26.7 | 26.2 | 23.6 | 19.4 | 19.0 | 18.7 | 17.4 | 16.6 | 19.9 | 26.9 |
| 4-Aug | 16.2 | 15.5 | 15.2 | 14.5 | 14.0 | 14.0 | 14.7 | 15.7 | 16.9 | 17.0 | 17.7 | 19.0 | 19.3 | 19.8 | 21.1 | 21.5 | 21.2 | 21.0 | 20.3 | 19.6 | 19.0 | 17.8 | 17.2 | 16.0 | 17.7 | 21.5 |
| 5-Aug | 15.3 | 14.4 | 14.1 | 13.3 | 12.7 | 12.7 | 13.9 | 15.8 | 17.9 | 20.3 | 21.9 | 22.9 | 24.0 | 24.9 | 25.3 | 25.7 | 25.7 | 25.8 | 25.1 | 23.9 | 22.2 | 20.2 | 18.9 | 17.7 | 19.8 | 25.8 |
| 6-Aug | 16.6 | 16.0 | 15.1 | 13.8 | 12.9 | 14.1 | 16.2 | 16.7 | 16.3 | 15.6 | 14.4 | 13.8 | 14.1 | 13.9 | 14.4 | 15.1 | 15.3 | 16.2 | 15.9 | 15.4 | 14.5 | 13.4 | 11.5 | 10.7 | 14.7 | 16.7 |
| 7-Aug | 9.9 | 9.2 | 8.5 | 8.1 | 7.6 | 8.6 | 9.8 | 11.6 | 13.0 | 14.2 | 15.6 | 16.6 | 17.1 | 18.1 | 18.4 | 19.2 | 19.6 | 19.8 | 19.4 | 18.8 | 17.3 | 15.5 | 14.5 | 13.7 | 14.3 | 19.8 |
| 8-Aug | 12.8 | 11.7 | 10.4 | 9.5 | 9.2 | 9.3 | 10.9 | 12.8 | 15.6 | 18.4 | 21.2 | 22.5 | 23.2 | 23.7 | 24.8 | 25.3 | 25.4 | 25.6 | 25.3 | 24.4 | 22.3 | 20.0 | 18.1 | 17.3 | 18.3 | 25.6 |
| 9-Aug | 15.6 | 15.4 | 14.3 | 13.3 | 12.2 | 12.3 | 13.4 | 16.0 | 18.6 | 20.7 | 23.2 | 25.0 | 26.7 | 27.4 | 27.9 | 28.1 | 28.2 | 27.9 | 27.0 | 25.7 | 24.1 | 22.1 | 20.6 | 19.3 | 21.0 | 28.2 |
| 10-Aug | 18.7 | 18.3 | 16.9 | 17.5 | 16.1 | 15.5 | 16.2 | 18.3 | 20.0 | 21.4 | 23.6 | 25.4 | 26.8 | 28.0 | 28.2 | 28.7 | 29.2 | 28.4 | 26.1 | 24.6 | 22.7 | 20.8 | 19.3 | 17.6 | 22.0 | 29.2 |
| 11-Aug | 16.7 | 16.0 | 15.5 | 14.8 | 14.2 | 13.9 | 15.0 | 16.7 | 18.8 | 21.4 | 24.1 | 26.4 | 27.6 | 28.2 | 28.9 | 29.1 | 29.3 | 28.8 | 28.2 | 26.7 | 24.6 | 22.8 | 21.5 | 20.1 | 22.1 | 29.3 |
| 12-Aug | 19.0 | 17.8 | 17.1 | 16.3 | 16.0 | 15.7 | 17.2 | 19.2 | 21.1 | 23.8 | 26.7 | 28.4 | 29.2 | 29.4 | 29.8 | 30.1 | 30.2 | 29.9 | 29.2 | 28.0 | 26.5 | 24.2 | 22.4 | 21.0 | 23.7 | 30.2 |
| 13-Aug | 20.1 | 19.1 | 18.2 | 17.3 | 16.4 | 16.6 | 17.9 | 20.5 | 23.2 | 25.6 | 27.7 | 28.7 | 29.5 | 30.1 | 30.6 | 30.7 | 30.7 | 30.1 | 29.2 | 27.6 | 26.3 | 24.8 | 23.5 | 22.4 | 24.4 | 30.7 |
| 14-Aug | 21.4 | 20.2 | 19.2 | 18.7 | 18.1 | 17.7 | 18.0 | 19.6 | 20.7 | 21.8 | 22.3 | 22.9 | 23.6 | 23.8 | 23.4 | 20.7 | 18.9 | 17.4 | 16.9 | 17.1 | 16.9 | 16.3 | 15.6 | 14.8 | 19.4 | 23.8 |
| 15-Aug | 14.6 | 14.3 | 13.7 | 13.3 | 13.7 | 13.6 | 13.4 | 13.7 | 14.5 | 15.4 | 16.2 | 17.0 | 17.7 | 18.7 | 20.0 | 20.3 | 19.7 | 18.8 | 17.6 | 16.7 | 15.5 | 15.2 | 14.7 | 13.8 | 15.9 | 20.3 |
| 16-Aug | 12.6 | 11.6 | 10.7 | 10.0 | 8.7 | 8.2 | 7.9 | 9.9 | 12.7 | 15.3 | 18.3 | 21.3 | 23.2 | 23.7 | 24.3 | 24.6 | 24.8 | 24.7 | 23.8 | 21.9 | 19.7 | 18.6 | 17.7 | 16.7 | 17.1 | 24.8 |
| 17-Aug | 15.6 | 13.9 | 12.8 | 11.8 | 11.4 | 11.3 | 12.6 | 14.8 | 16.1 | 18.5 | 21.2 | 23.3 | 24.3 | 24.9 | 25.6 | 26.0 | 25.9 | 26.0 | 25.1 | 23.3 | 21.8 | 19.2 | 18.3 | 18.4 | 19.3 | 26.0 |
| 18-Aug | 17.3 | 15.7 | 14.4 | 13.2 | 12.8 | 13.3 | 13.7 | 15.7 | 19.5 | 20.8 | 22.1 | 24.3 | 25.2 | 24.2 | 21.2 | 19.1 | 20.5 | 20.8 | 20.3 | 19.5 | 19.1 | 18.7 | 18.6 | 17.7 | 18.7 | 25.2 |
| 19-Aug | 17.1 | 16.2 | 14.8 | 13.4 | 12.5 | 11.5 | 12.1 | 12.6 | 14.2 | 13.4 | 14.3 | 14.7 | 15.4 | 15.7 | 15.2 | 15.0 | 14.9 | 14.4 | 14.4 | 14.7 | 13.9 | 13.9 | 13.9 | 12.8 | 14.2 | 17.1 |
| 20-Aug | 12.5 | 12.5 | 12.3 | 11.2 | 9.9 | 9.5 | 9.6 | 11.3 | 14.2 | 16.6 | 18.4 | 19.9 | 19.8 | 20.4 | 21.4 | 21.1 | 20.6 | 20.2 | 19.7 | 18.9 | 17.1 | 16.1 | 14.9 | 13.9 | 15.9 | 21.4 |
| 21-Aug | 12.9 | 11.7 | 10.0 | 9.0 | 8.5 | 8.5 | 9.7 | 12.2 | 15.3 | 18.5 | 19.8 | 21.1 | 23.0 | 23.5 | 23.4 | 23.9 | 23.9 | 23.9 | 23.3 | 21.6 | 19.2 | 17.6 | 15.8 | 14.4 | 17.1 | 23.9 |
| 22-Aug | 13.5 | 12.3 | 11.5 | 10.4 | 9.6 | 8.9 | 10.1 | 12.2 | 14.5 | 16.5 | 17.8 | 19.8 | 20.8 | 22.2 | 22.5 | 23.1 | 23.1 | 22.8 | 22.5 | 20.8 | 18.7 | 17.6 | 16.7 | 15.2 | 16.8 | 23.1 |
| 23-Aug | 14.0 | 13.7 | 13.1 | 13.2 | 12.2 | 11.9 | 13.2 | 15.0 | 17.2 | 20.2 | 21.6 | 23.3 | 22.9 | 21.9 | 21.6 | 23.5 | 23.2 | 22.8 | 22.6 | 22.0 | 21.2 | 20.7 | 19.8 | 19.0 | 18.8 | 23.5 |
| 24-Aug | 18.6 | 17.8 | 17.7 | 17.9 | 17.1 | 16.0 | 15.8 | 16.1 | 17.3 | 18.7 | 20.3 | 21.3 | 21.1 | 21.1 | 20.9 | 19.7 | 18.7 | 19.1 | 19.4 | 18.9 | 18.3 | 18.1 | 17.5 | 16.2 | 18.5 | 21.3 |
| 25-Aug | 15.8 | 15.2 | 14.2 | 13.0 | 12.4 | 11.8 | 11.6 | 12.4 | 13.3 | 13.4 | 13.4 | 13.7 | 13.2 | 12.7 | 12.2 | 12.6 | 12.4 | 13.2 | 13.9 | 13.9 | 14.3 | 14.0 | 13.7 | 13.9 | 13.3 | 15.8 |
| 26-Aug | 13.8 | 12.8 | 12.6 | 12.1 | 11.3 | 10.8 | 11.3 | 12.7 | 14.3 | 16.6 | 18.9 | 21.0 | 22.1 | 23.0 | 23.9 | 24.0 | 23.8 | 23.5 | 22.8 | 21.3 | 20.2 | 19.2 | 18.1 | 17.5 | 17.8 | 24.0 |
| 27-Aug | 17.6 | 17.0 | 16.5 | 16.3 | 15.4 | 14.9 | 15.3 | 16.4 | 17.8 | 19.8 | 21.3 | 22.6 | 23.7 | 24.2 | 24.8 | 24.4 | 24.1 | 24.3 | 23.2 | 21.4 | 18.8 | 18.0 | 17.6 | 16.6 | 19.7 | 24.8 |
| 28-Aug | 15.4 | 14.6 | 13.3 | 11.8 | 11.1 | 10.7 | 11.3 | 13.9 | 16.6 | 19.2 | 21.2 | 21.9 | 22.3 | 22.6 | 22.7 | 23.0 | 22.6 | 22.3 | 21.6 | 19.5 | 17.4 | 15.5 | 13.2 | 11.7 | 17.3 | 23.0 |
| 29-Aug | 10.3 | 8.9 | 8.0 | 7.2 | 6.0 | 6.1 | 6.5 | 8.8 | 11.1 | 14.2 | 16.9 | 18.7 | 20.4 | 21.4 | 21.9 | 22.3 | 22.5 | 22.4 | 21.6 | 19.4 | 17.5 | 16.2 | 15.2 | 13.5 | 14.9 | 22.5 |
| 30-Aug | 12.0 | 11.5 | 11.6 | 11.6 | 9.7 | 8.6 | 9.1 | 11.6 | 16.3 | 19.4 | 21.2 | 22.7 | 24.2 | 25.5 | 26.2 | 26.5 | 26.6 | 26.2 | 25.2 | 24.1 | 22.9 | 21.7 | 20.4 | 18.9 | 18.9 | 26.6 |
| 31-Aug | 18.0 | 17.0 | 15.7 | 15.0 | 14.4 | 14.2 | 14.7 | 15.1 | 15.9 | 16.3 | 18.0 | 20.4 | 23.3 | 25.0 | 25.7 | 25.7 | 25.3 | 24.2 | 23.2 | 21.4 | 19.2 | 17.7 | 16.6 | 15.5 | 19.1 | 25.7 |
| | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | |
| | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 10 m (AT 10m) - C
Fort McKay - Bertha Ganter - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 10 m (AT 10m) - C
Fort McKay - Bertha Ganter - August 2017**

| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 39 | 5.24 | 5.24 |
| 10 - 20 | 428 | 57.53 | 62.77 |
| > 20 | 277 | 37.23 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature 2m (AT 2m) - C

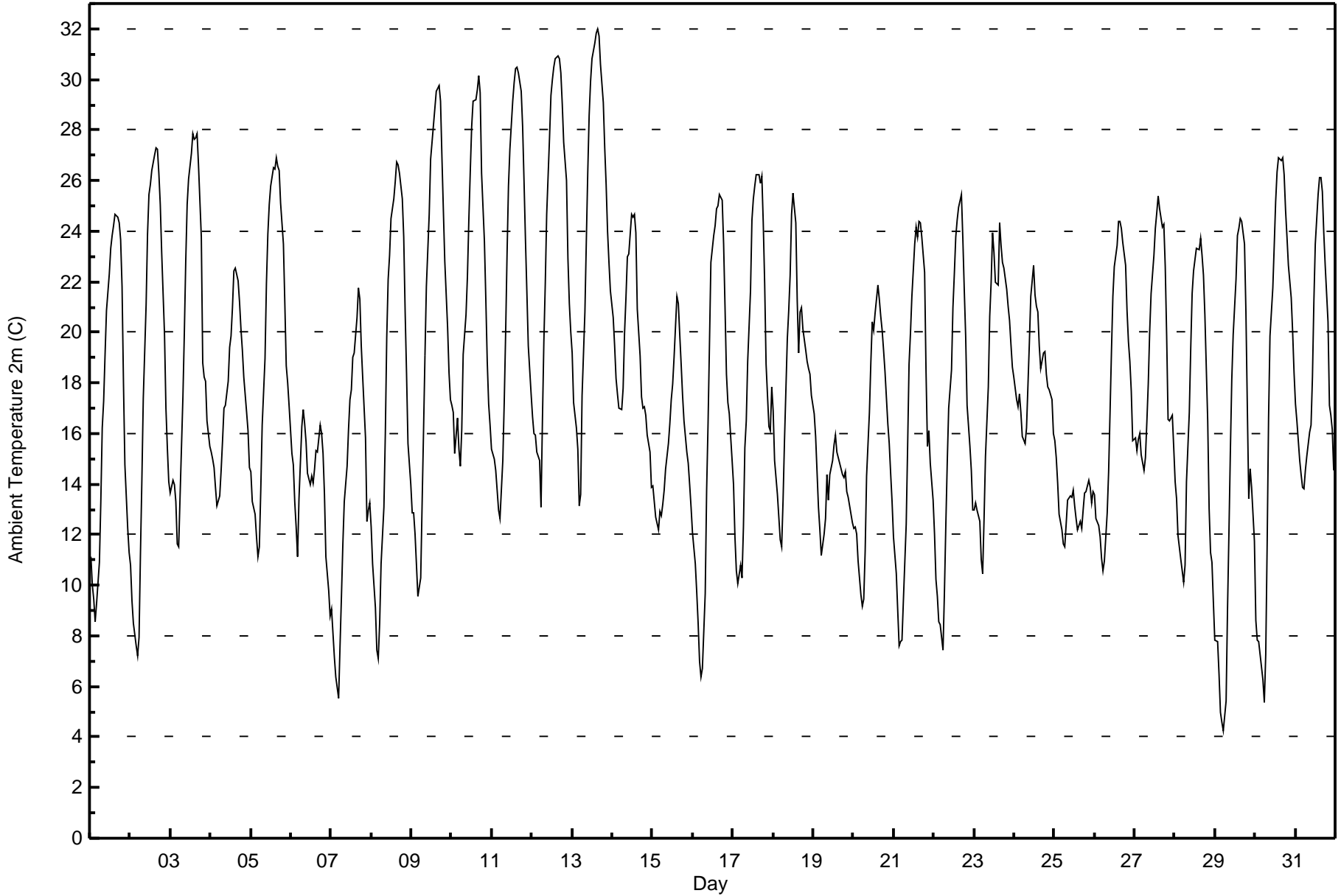
Fort McKay - Bertha Ganter - August 2017

| Maximum Value: 32.0 C on Aug 13 16:00 Maximum Daily Average: 24.2 C on Aug 13 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 | | | | |
|--|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|------|------|---------------|---------------|
| Minimum Value: 4.3 C on Aug 29 06:00 Minimum Daily Average: 13.2 C on Aug 25 Maximum Diurnal Average: 24.2 C at hour 16 Minimum Diurnal Average: 10.9 C at hour 6 Monthly Average: 18.02 C Percentiles: P ₁ = 6.4 P ₁₀ = 10.8 Q ₁ = 13.6 Median = 17.2 Q ₃ = 22.6 P ₉₀ = 26.1 P ₉₉ = 30.8 | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 11.1 | 10.0 | 9.4 | 8.5 | 9.3 | 10.9 | 13.3 | 16.2 | 17.3 | 19.1 | 20.9 | 22.3 | 23.3 | 23.8 | 24.2 | 24.7 | 24.5 | 24.3 | 23.7 | 21.8 | 18.0 | 14.7 | 12.3 | 11.3 | 17.3 | 24.7 |
| 2-Aug | 10.8 | 9.4 | 8.5 | 7.6 | 7.2 | 7.9 | 11.3 | 14.2 | 17.4 | 21.1 | 23.9 | 25.5 | 25.9 | 26.4 | 27.0 | 27.3 | 27.2 | 26.3 | 25.1 | 23.2 | 19.9 | 17.0 | 15.4 | 14.1 | 18.3 | 27.3 |
| 3-Aug | 13.7 | 14.2 | 14.0 | 13.3 | 11.6 | 11.5 | 13.6 | 17.5 | 20.0 | 22.8 | 25.0 | 26.1 | 27.1 | 27.8 | 27.6 | 27.7 | 27.9 | 26.6 | 23.8 | 18.8 | 18.2 | 18.0 | 16.5 | 15.5 | 19.9 | 27.9 |
| 4-Aug | 15.2 | 15.0 | 14.7 | 13.9 | 13.1 | 13.5 | 14.5 | 15.7 | 17.0 | 17.1 | 18.1 | 19.4 | 19.9 | 21.0 | 22.5 | 22.5 | 22.0 | 21.2 | 20.1 | 19.3 | 18.3 | 16.8 | 16.1 | 14.6 | 17.6 | 22.5 |
| 5-Aug | 14.5 | 13.3 | 12.8 | 11.9 | 11.2 | 11.5 | 13.7 | 16.3 | 19.0 | 22.0 | 23.9 | 25.1 | 25.8 | 26.5 | 26.4 | 26.9 | 26.6 | 26.4 | 25.1 | 23.5 | 21.2 | 18.7 | 18.0 | 17.1 | 19.9 | 26.9 |
| 6-Aug | 15.2 | 14.7 | 13.3 | 12.3 | 11.1 | 13.4 | 16.3 | 17.0 | 16.4 | 15.6 | 14.5 | 14.0 | 14.3 | 14.0 | 14.6 | 15.3 | 15.3 | 16.3 | 16.0 | 15.2 | 13.6 | 11.1 | 9.8 | 8.8 | 14.1 | 17.0 |
| 7-Aug | 9.1 | 8.1 | 7.2 | 6.4 | 5.5 | 7.6 | 9.6 | 11.6 | 13.3 | 14.7 | 16.1 | 17.3 | 17.7 | 19.0 | 19.2 | 20.6 | 21.7 | 21.3 | 19.5 | 18.2 | 15.9 | 12.5 | 13.0 | 13.2 | 14.1 | 21.7 |
| 8-Aug | 12.3 | 10.8 | 9.1 | 7.4 | 7.1 | 8.5 | 10.8 | 13.1 | 16.0 | 19.8 | 22.1 | 23.1 | 24.5 | 25.3 | 25.9 | 26.7 | 26.6 | 26.3 | 25.3 | 23.8 | 20.8 | 18.3 | 15.6 | 14.0 | 18.0 | 26.7 |
| 9-Aug | 12.8 | 12.8 | 12.1 | 10.8 | 9.6 | 10.3 | 13.2 | 16.1 | 19.1 | 21.8 | 24.7 | 26.8 | 27.5 | 28.2 | 28.8 | 29.5 | 29.8 | 29.2 | 26.9 | 24.8 | 22.8 | 20.2 | 18.4 | 17.3 | 20.6 | 29.8 |
| 10-Aug | 17.1 | 16.8 | 15.2 | 16.6 | 15.4 | 14.7 | 16.1 | 19.1 | 20.7 | 22.2 | 24.4 | 26.4 | 28.1 | 29.1 | 29.2 | 29.6 | 30.2 | 29.5 | 26.3 | 23.6 | 21.3 | 18.9 | 17.1 | 16.3 | 21.8 | 30.2 |
| 11-Aug | 15.4 | 15.0 | 14.5 | 13.8 | 13.0 | 12.6 | 14.9 | 17.2 | 19.9 | 23.1 | 25.8 | 27.3 | 29.2 | 29.9 | 30.5 | 30.5 | 30.3 | 29.5 | 28.1 | 26.0 | 23.7 | 21.6 | 19.4 | 17.6 | 22.0 | 30.5 |
| 12-Aug | 16.7 | 16.0 | 15.9 | 15.3 | 14.9 | 13.1 | 16.5 | 19.6 | 21.9 | 24.7 | 27.7 | 29.3 | 30.0 | 30.5 | 30.8 | 30.9 | 30.8 | 30.3 | 29.0 | 27.5 | 26.0 | 22.9 | 21.1 | 20.0 | 23.4 | 30.9 |
| 13-Aug | 19.2 | 17.2 | 16.2 | 15.4 | 13.2 | 13.6 | 17.5 | 20.8 | 23.6 | 26.3 | 28.6 | 29.9 | 30.8 | 31.4 | 31.8 | 32.0 | 31.7 | 30.6 | 29.1 | 27.3 | 25.8 | 24.0 | 22.8 | 21.6 | 24.2 | 32.0 |
| 14-Aug | 20.6 | 19.4 | 18.2 | 17.6 | 17.0 | 16.9 | 17.8 | 20.0 | 21.4 | 23.0 | 23.1 | 24.7 | 24.6 | 24.7 | 23.9 | 20.9 | 19.1 | 17.4 | 17.0 | 17.1 | 16.7 | 15.9 | 15.3 | 13.9 | 19.4 | 24.7 |
| 15-Aug | 13.9 | 13.3 | 12.7 | 12.2 | 12.9 | 12.7 | 13.2 | 13.8 | 14.6 | 15.6 | 16.4 | 17.3 | 18.0 | 19.0 | 21.4 | 21.1 | 19.9 | 18.7 | 17.5 | 16.5 | 15.2 | 14.8 | 14.0 | 13.1 | 15.8 | 21.4 |
| 16-Aug | 12.1 | 10.8 | 9.7 | 8.5 | 7.0 | 6.4 | 6.7 | 9.7 | 13.8 | 16.4 | 19.5 | 22.8 | 23.8 | 24.2 | 24.9 | 25.0 | 25.4 | 25.2 | 23.5 | 21.0 | 18.4 | 17.3 | 16.8 | 14.9 | 16.8 | 25.4 |
| 17-Aug | 14.0 | 11.9 | 10.6 | 10.1 | 10.8 | 10.3 | 12.3 | 15.4 | 16.5 | 18.9 | 21.6 | 24.5 | 25.3 | 25.8 | 26.2 | 26.2 | 25.9 | 26.2 | 24.3 | 22.0 | 18.7 | 16.3 | 16.1 | 17.8 | 18.7 | 26.2 |
| 18-Aug | 16.9 | 14.9 | 13.6 | 12.7 | 11.8 | 11.5 | 13.4 | 15.7 | 19.7 | 20.9 | 22.3 | 24.7 | 25.5 | 24.3 | 21.3 | 19.2 | 20.8 | 21.0 | 20.1 | 19.3 | 18.8 | 18.5 | 18.3 | 17.5 | 18.5 | 25.5 |
| 19-Aug | 16.8 | 15.9 | 14.5 | 13.1 | 12.2 | 11.2 | 12.0 | 12.6 | 14.4 | 13.3 | 14.4 | 14.9 | 15.6 | 16.0 | 15.3 | 15.0 | 14.8 | 14.4 | 14.3 | 14.5 | 13.7 | 13.5 | 12.8 | 12.5 | 14.1 | 16.8 |
| 20-Aug | 12.2 | 12.3 | 12.0 | 11.0 | 9.6 | 9.2 | 9.5 | 11.4 | 14.3 | 16.8 | 18.8 | 20.4 | 20.1 | 20.7 | 21.9 | 21.3 | 20.7 | 20.1 | 19.3 | 18.4 | 16.4 | 15.6 | 14.4 | 13.3 | 15.8 | 21.9 |
| 21-Aug | 11.9 | 10.4 | 9.0 | 7.6 | 7.8 | 7.8 | 9.4 | 12.4 | 15.5 | 18.7 | 20.0 | 21.4 | 23.5 | 24.1 | 23.8 | 24.4 | 24.3 | 23.8 | 22.4 | 18.4 | 15.5 | 16.1 | 14.8 | 13.4 | 16.5 | 24.4 |
| 22-Aug | 12.0 | 10.2 | 9.6 | 8.5 | 8.4 | 7.4 | 9.7 | 12.4 | 14.9 | 17.0 | 18.5 | 21.0 | 22.3 | 23.7 | 24.5 | 24.9 | 25.4 | 23.7 | 21.7 | 19.9 | 17.1 | 15.5 | 14.5 | 13.0 | 16.5 | 25.4 |
| 23-Aug | 12.9 | 13.3 | 13.0 | 12.5 | 11.0 | 10.5 | 12.7 | 15.1 | 17.8 | 20.7 | 22.0 | 24.0 | 23.1 | 22.0 | 21.9 | 24.4 | 23.4 | 22.8 | 22.5 | 21.7 | 21.0 | 20.5 | 19.5 | 18.6 | 18.6 | 24.4 |
| 24-Aug | 18.2 | 17.4 | 17.1 | 17.5 | 16.8 | 15.9 | 15.6 | 16.2 | 17.9 | 19.6 | 21.4 | 22.6 | 21.5 | 21.0 | 20.8 | 19.4 | 18.5 | 19.2 | 19.2 | 18.3 | 17.9 | 17.7 | 17.4 | 16.0 | 18.5 | 22.6 |
| 25-Aug | 15.7 | 15.1 | 14.0 | 12.8 | 12.2 | 11.6 | 11.5 | 12.4 | 13.4 | 13.5 | 13.5 | 13.8 | 13.1 | 12.6 | 12.2 | 12.5 | 12.3 | 13.0 | 13.7 | 13.7 | 14.2 | 13.8 | 13.3 | 13.7 | 13.2 | 15.7 |
| 26-Aug | 13.6 | 12.6 | 12.4 | 11.9 | 11.0 | 10.6 | 11.0 | 12.8 | 14.5 | 16.9 | 19.3 | 21.4 | 22.6 | 23.5 | 24.4 | 24.4 | 24.1 | 23.5 | 22.6 | 20.8 | 19.7 | 18.8 | 17.7 | 15.7 | 17.7 | 24.4 |
| 27-Aug | 15.8 | 15.3 | 15.8 | 16.0 | 15.1 | 14.5 | 15.1 | 16.4 | 18.0 | 20.0 | 21.6 | 23.0 | 24.1 | 24.8 | 25.4 | 24.9 | 24.1 | 24.3 | 22.6 | 19.9 | 16.6 | 16.5 | 16.7 | 15.4 | 19.2 | 25.4 |
| 28-Aug | 14.1 | 13.4 | 12.0 | 11.0 | 10.6 | 10.1 | 10.8 | 14.1 | 16.8 | 19.4 | 21.5 | 22.4 | 22.9 | 23.3 | 23.2 | 23.7 | 23.0 | 22.3 | 20.7 | 16.5 | 13.0 | 11.3 | 10.9 | 9.4 | 16.5 | 23.7 |
| 29-Aug | 7.8 | 7.8 | 6.5 | 5.0 | 4.6 | 4.3 | 5.4 | 9.1 | 12.1 | 15.3 | 18.1 | 19.9 | 22.1 | 23.8 | 24.1 | 24.5 | 24.4 | 23.5 | 20.8 | 17.0 | 13.4 | 14.6 | 13.9 | 11.7 | 14.6 | 24.5 |
| 30-Aug | 8.6 | 7.8 | 7.8 | 7.2 | 6.2 | 5.4 | 7.2 | 11.6 | 16.6 | 19.8 | 21.8 | 23.4 | 25.2 | 26.3 | 26.9 | 26.8 | 26.9 | 26.3 | 24.8 | 23.8 | 22.6 | 21.4 | 20.0 | 18.4 | 18.0 | 26.9 |
| 31-Aug | 17.2 | 16.5 | 14.9 | 14.4 | 13.9 | 13.8 | 14.5 | 15.1 | 16.1 | 16.3 | 18.2 | 21.2 | 23.5 | 25.4 | 26.1 | 26.1 | 25.6 | 23.9 | 22.6 | 20.4 | 17.1 | 16.7 | 16.2 | 14.6 | 18.8 | 26.1 |
| Diurnal Average: 14.1 13.3 12.5 11.7 11.0 10.9 12.6 14.9 17.1 19.1 20.9 22.4 23.2 23.8 24.1 24.2 24.0 23.5 22.2 20.4 18.4 17.1 16.1 15.0 | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | |
| Diurnal Maximum: 20.6 19.4 18.2 17.6 17.0 16.9 17.8 20.8 23.6 26.3 28.6 29.9 30.8 31.4 31.8 32.0 31.7 30.6 29.1 27.5 26.0 24.0 22.8 21.6 | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 2m (AT 2m) - C
Fort McKay - Bertha Ganter - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C
Fort McKay - Bertha Ganter - August 2017**

| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 58 | 7.80 | 7.80 |
| 10 - 20 | 414 | 55.65 | 63.44 |
| > 20 | 272 | 36.56 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

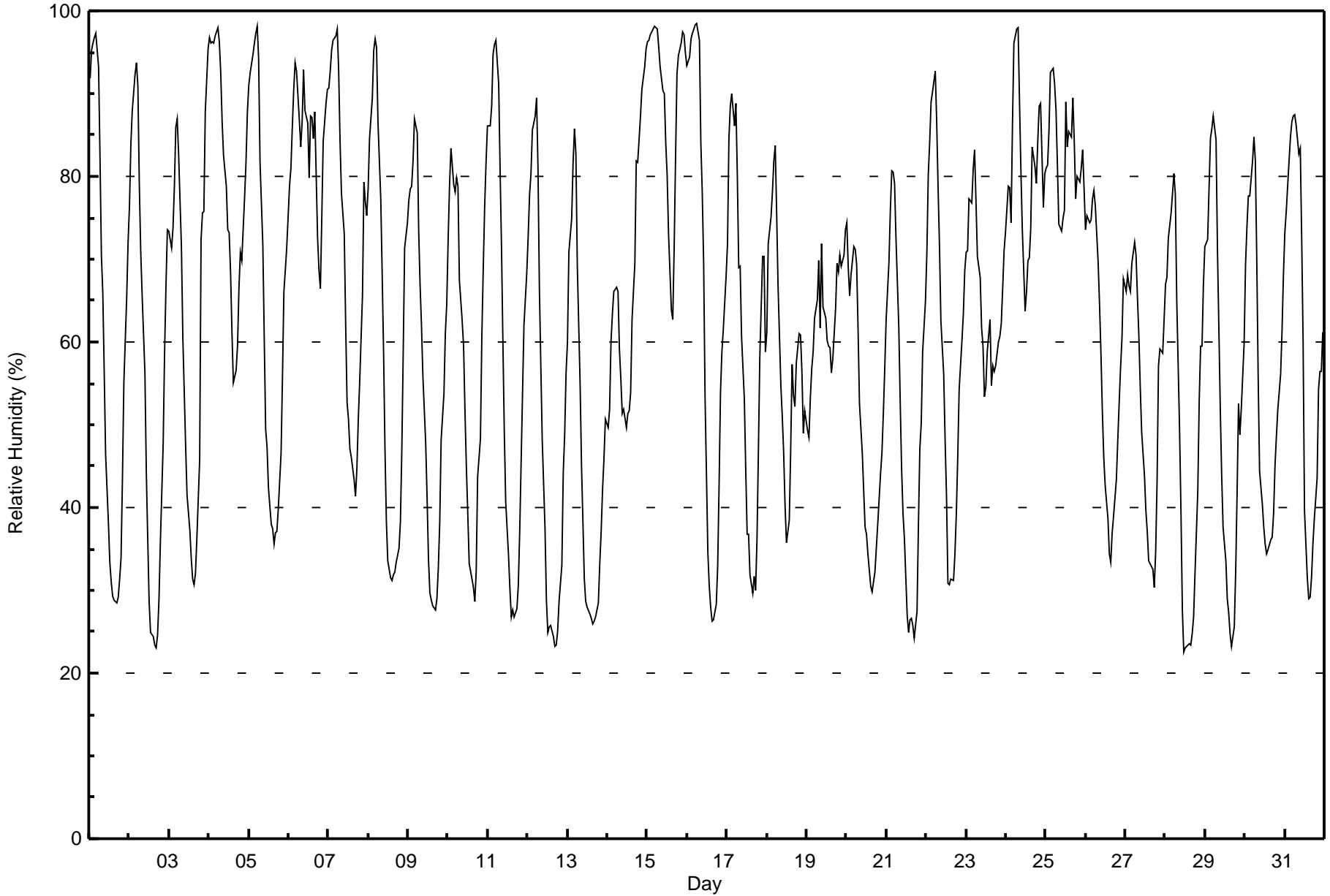
Fort McKay - Bertha Ganter - August 2017

| Maximum Value: 99 % on Aug 16 07:00 Maximum Daily Average: 89.2 % on Aug 15 | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | |
|---|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---|------|------|------|------|------|-----------------|---------------|
| Minimum Value: 22 % on Aug 28 12:00 Minimum Daily Average: 46.7 % on Aug 13 Maximum Diurnal Average: 86.7 % at hour 6 Minimum Diurnal Average: 40.2 % at hour 16 Monthly Average: 62.1 % Percentiles: P ₁ = 23 P ₁₀ = 31 Q ₁ = 44 Median = 64 O ₃ = 80 P ₉₀ = 91 P ₉₉ = 98 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 92 | 95 | 96 | 97 | 97 | 93 | 82 | 71 | 66 | 56 | 47 | 38 | 33 | 31 | 29 | 29 | 28 | 29 | 31 | 34 | 44 | 55 | 65 | 72 | 58.8 | 97 |
| 2-Aug | 77 | 84 | 88 | 92 | 94 | 91 | 79 | 71 | 66 | 56 | 44 | 36 | 29 | 25 | 24 | 23 | 23 | 25 | 29 | 36 | 48 | 59 | 67 | 74 | 55.8 | 94 |
| 3-Aug | 73 | 71 | 74 | 79 | 86 | 87 | 83 | 71 | 61 | 54 | 47 | 42 | 37 | 34 | 31 | 31 | 32 | 36 | 46 | 72 | 76 | 76 | 88 | 95 | 61.8 | 95 |
| 4-Aug | 97 | 96 | 96 | 96 | 97 | 98 | 96 | 93 | 87 | 83 | 79 | 74 | 73 | 68 | 61 | 55 | 57 | 60 | 67 | 71 | 70 | 77 | 82 | 88 | 79.9 | 98 |
| 5-Aug | 91 | 93 | 95 | 96 | 97 | 98 | 94 | 82 | 72 | 61 | 50 | 47 | 42 | 38 | 37 | 36 | 37 | 37 | 40 | 47 | 56 | 66 | 69 | 71 | 64.6 | 98 |
| 6-Aug | 79 | 81 | 86 | 91 | 94 | 93 | 87 | 84 | 87 | 93 | 88 | 86 | 80 | 87 | 87 | 85 | 88 | 73 | 69 | 66 | 75 | 84 | 89 | 91 | 84.2 | 94 |
| 7-Aug | 91 | 93 | 95 | 96 | 97 | 98 | 93 | 84 | 78 | 73 | 62 | 53 | 51 | 47 | 46 | 43 | 41 | 45 | 51 | 55 | 66 | 79 | 77 | 75 | 70.4 | 98 |
| 8-Aug | 78 | 85 | 89 | 95 | 97 | 96 | 87 | 77 | 68 | 59 | 47 | 38 | 34 | 32 | 31 | 32 | 32 | 33 | 35 | 38 | 47 | 59 | 71 | 74 | 59.8 | 97 |
| 9-Aug | 77 | 78 | 79 | 82 | 87 | 85 | 74 | 67 | 62 | 56 | 48 | 41 | 34 | 30 | 29 | 28 | 28 | 29 | 33 | 38 | 48 | 54 | 61 | 65 | 54.6 | 87 |
| 10-Aug | 72 | 79 | 83 | 79 | 78 | 80 | 79 | 67 | 63 | 60 | 52 | 45 | 39 | 33 | 31 | 30 | 29 | 32 | 44 | 48 | 61 | 69 | 76 | 82 | 58.8 | 83 |
| 11-Aug | 86 | 86 | 89 | 95 | 96 | 96 | 91 | 81 | 71 | 60 | 49 | 41 | 34 | 30 | 27 | 28 | 27 | 28 | 31 | 37 | 46 | 54 | 62 | 68 | 58.9 | 96 |
| 12-Aug | 73 | 78 | 80 | 86 | 87 | 89 | 81 | 66 | 57 | 48 | 37 | 29 | 25 | 26 | 26 | 24 | 23 | 23 | 25 | 29 | 33 | 44 | 49 | 56 | 49.8 | 89 |
| 13-Aug | 60 | 71 | 75 | 82 | 86 | 83 | 69 | 55 | 45 | 38 | 31 | 29 | 28 | 27 | 27 | 26 | 26 | 27 | 29 | 33 | 37 | 42 | 46 | 51 | 46.7 | 86 |
| 14-Aug | 50 | 52 | 60 | 63 | 66 | 67 | 66 | 59 | 56 | 51 | 52 | 50 | 51 | 52 | 54 | 63 | 70 | 82 | 82 | 84 | 87 | 91 | 93 | 96 | 66.5 | 96 |
| 15-Aug | 96 | 96 | 97 | 98 | 98 | 98 | 98 | 96 | 93 | 90 | 90 | 84 | 80 | 73 | 64 | 63 | 71 | 82 | 92 | 95 | 96 | 97 | 97 | 95 | 89.2 | 98 |
| 16-Aug | 93 | 94 | 97 | 97 | 98 | 98 | 99 | 97 | 84 | 78 | 70 | 53 | 35 | 30 | 28 | 26 | 26 | 28 | 33 | 43 | 54 | 59 | 61 | 68 | 64.6 | 99 |
| 17-Aug | 72 | 85 | 88 | 90 | 86 | 89 | 80 | 69 | 69 | 61 | 53 | 44 | 37 | 37 | 32 | 30 | 32 | 30 | 36 | 47 | 58 | 70 | 70 | 59 | 59.3 | 90 |
| 18-Aug | 61 | 72 | 75 | 78 | 82 | 84 | 76 | 67 | 55 | 51 | 47 | 40 | 36 | 38 | 47 | 57 | 54 | 52 | 57 | 61 | 61 | 57 | 49 | 52 | 58.6 | 84 |
| 19-Aug | 49 | 49 | 53 | 57 | 59 | 63 | 65 | 70 | 62 | 72 | 64 | 63 | 60 | 59 | 59 | 56 | 58 | 64 | 70 | 69 | 71 | 69 | 71 | 74 | 62.7 | 74 |
| 20-Aug | 74 | 69 | 66 | 68 | 71 | 71 | 69 | 62 | 53 | 47 | 42 | 38 | 37 | 34 | 30 | 30 | 31 | 32 | 35 | 38 | 44 | 47 | 51 | 57 | 49.8 | 74 |
| 21-Aug | 63 | 70 | 76 | 81 | 80 | 79 | 73 | 62 | 53 | 45 | 39 | 36 | 27 | 25 | 26 | 27 | 26 | 24 | 27 | 38 | 47 | 50 | 59 | 65 | 49.9 | 81 |
| 22-Aug | 71 | 80 | 84 | 89 | 90 | 93 | 87 | 79 | 72 | 63 | 56 | 48 | 41 | 31 | 31 | 31 | 31 | 34 | 39 | 46 | 54 | 60 | 63 | 69 | 60.1 | 93 |
| 23-Aug | 71 | 71 | 77 | 77 | 81 | 83 | 77 | 70 | 68 | 62 | 60 | 53 | 55 | 59 | 63 | 55 | 57 | 56 | 57 | 60 | 61 | 62 | 66 | 71 | 65.5 | 83 |
| 24-Aug | 73 | 79 | 79 | 74 | 86 | 96 | 98 | 98 | 89 | 81 | 74 | 64 | 66 | 70 | 70 | 74 | 84 | 81 | 79 | 84 | 89 | 89 | 76 | 80 | 80.5 | 98 |
| 25-Aug | 81 | 81 | 86 | 92 | 93 | 91 | 88 | 81 | 74 | 73 | 75 | 76 | 89 | 83 | 86 | 85 | 89 | 84 | 77 | 80 | 79 | 81 | 83 | 78 | 82.8 | 93 |
| 26-Aug | 73 | 75 | 74 | 75 | 77 | 78 | 76 | 70 | 65 | 59 | 52 | 46 | 43 | 39 | 34 | 33 | 37 | 39 | 43 | 48 | 53 | 57 | 61 | 68 | 57.3 | 78 |
| 27-Aug | 66 | 68 | 67 | 66 | 69 | 72 | 71 | 65 | 61 | 55 | 49 | 44 | 40 | 37 | 34 | 33 | 33 | 30 | 35 | 43 | 57 | 59 | 59 | 63 | 53.1 | 72 |
| 28-Aug | 67 | 68 | 73 | 76 | 78 | 80 | 78 | 65 | 49 | 40 | 28 | 22 | 23 | 23 | 24 | 23 | 25 | 27 | 32 | 42 | 53 | 59 | 60 | 67 | 49.2 | 80 |
| 29-Aug | 72 | 72 | 79 | 85 | 86 | 87 | 84 | 71 | 62 | 52 | 44 | 38 | 34 | 29 | 27 | 25 | 23 | 26 | 32 | 42 | 53 | 49 | 52 | 60 | 53.4 | 87 |
| 30-Aug | 69 | 74 | 78 | 78 | 82 | 85 | 82 | 70 | 56 | 44 | 40 | 38 | 36 | 34 | 35 | 36 | 36 | 39 | 45 | 49 | 52 | 56 | 61 | 68 | 56.0 | 85 |
| 31-Aug | 73 | 76 | 82 | 85 | 87 | 87 | 88 | 86 | 83 | 83 | 73 | 60 | 40 | 32 | 29 | 29 | 31 | 36 | 39 | 44 | 54 | 56 | 56 | 61 | 61.2 | 88 |
| | 74.9 | 78.1 | 81.1 | 83.7 | 85.9 | 86.7 | 82.2 | 74.4 | 67.2 | 61.4 | 54.4 | 48.2 | 44.1 | 41.7 | 40.7 | 40.2 | 41.4 | 42.8 | 46.4 | 52.2 | 58.9 | 64.1 | 67.5 | 71.3 | Diurnal Average | |
| | 97 | 96 | 97 | 98 | 98 | 98 | 99 | 98 | 93 | 93 | 90 | 86 | 89 | 87 | 87 | 85 | 89 | 84 | 92 | 95 | 96 | 97 | 97 | 96 | Diurnal Maximum | |



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Fort McKay - Bertha Ganter - August 2017



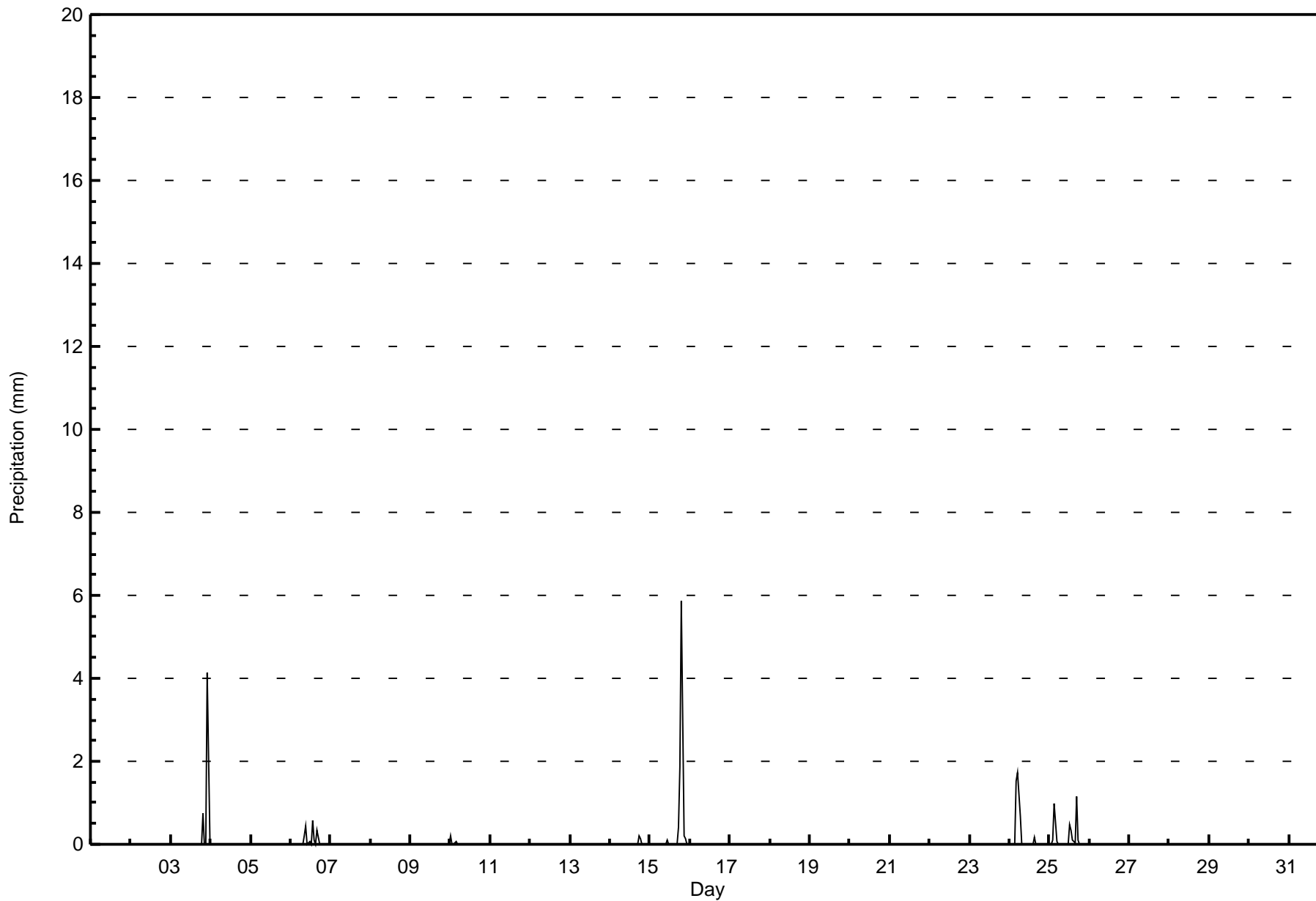


| Maximum Value: 5.9 mm on Aug 15 20:00 Maximum Daily Total: 8.6 mm on Aug 15 | | | | | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 | | | | | | | | | | | |
|--|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|---------------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Minimum Value: 0.0 mm on Aug 1 01:00 Minimum Daily Total: 0.0 mm on Aug 1 Maximum Diurnal Total: 6.6 mm at hour 20 Minimum Diurnal Total: 0.0 mm at hour 2 Monthly Total: 23.31 mm Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.8 | | | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | |
| 1-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| 2-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| 3-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.8 | 0.0 | 0.0 | 4.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.9 | 4.2 | |
| 4-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| 5-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| 6-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.5 | 0.0 | 0.1 | 0.0 | 0.6 | 0.1 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.7 | 0.6 | |
| 7-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| 8-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 9-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 10-Aug | 0.2 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.2 | |
| 11-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 12-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 13-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 14-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 0.2 |
| 15-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 1.9 | 5.9 | 0.2 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 8.6 | 5.9 | |
| 16-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 17-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 18-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 19-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 20-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 21-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 22-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 23-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 24-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 1.5 | 1.7 | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.1 | 1.7 | |
| 25-Aug | 0.0 | 0.0 | 0.1 | 1.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 | 0.3 | 0.1 | 0.1 | 1.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.4 | 1.2 | |
| 26-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 27-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 28-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 29-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 30-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 31-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Fort McKay - Bertha Ganter - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Precipitation (PC) - mm
Fort McKay - Bertha Ganter - August 2017**

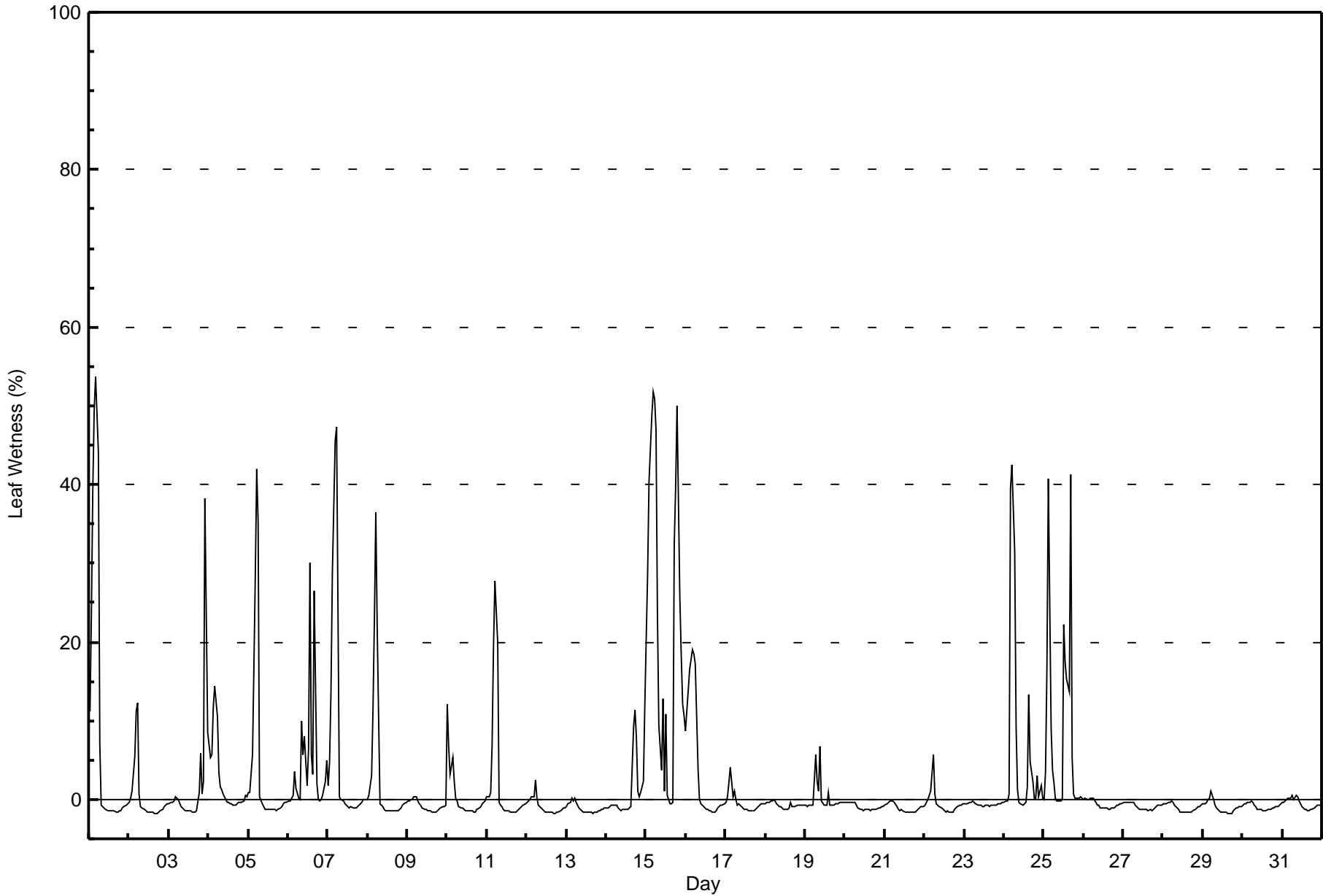
| Concentration Ranges (mm) | Number of Hours | % | Cumulative % |
|----------------------------------|------------------------|----------|---------------------|
| 0 - 0.3 | 731 | 98.25 | 98.25 |
| 0.4 - 0.5 | 3 | 0.40 | 98.66 |
| 0.6 - 0.7 | 2 | 0.27 | 98.92 |
| 0.8 - 1.4 | 3 | 0.40 | 99.33 |
| 1.5 - 10 | 5 | 0.67 | 100.00 |
| > 10 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



| Maximum Value: 54 % on Aug 1 05:00 | | | | | | | | | | | | | | | | | Maximum Daily Average: 22.4 % on Aug 15 | | | | | | | | | | | | | | | | | Hours in Service: 744 | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|---------------|---------------|--|--|--|--|--|--|--|---------------------------------|--|
| Minimum Value: -2 % on Aug 2 17:00 | | | | | | | | | | | | | | | | | Minimum Daily Average: -1.1 % on Aug 13 | | | | | | | | | | | | | | | | | Hours of Data: 744 | |
| Maximum Diurnal Average: 11.2 % at hour 6 | | | | | | | | | | | | | | | | | Minimum Diurnal Average: -1.0 % at hour 12 | | | | | | | | | | | | | | | | | Hours of Missing Data: 0 | |
| Monthly Average: 2.1 % | | | | | | | | | | | | | | | | | Percentiles: P ₁ = -2 P ₁₀ = -2 Q ₁ = -1 Median = -1 Q ₃ = 0 P ₉₀ = 8 P ₉₉ = 46 | | | | | | | | | | | | | | | | | Hours of Calibration: 0 | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | |
| 1-Aug | 11 | 24 | 39 | 49 | 54 | 44 | 7 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -2 | -2 | -2 | -1 | -1 | -1 | -1 | -1 | 8.7 | 54 | | | | | | | | | |
| 2-Aug | 0 | 0 | 1 | 5 | 11 | 12 | 1 | -1 | -1 | -1 | -1 | -2 | -2 | -2 | -2 | -2 | -2 | -2 | -2 | -1 | -1 | -1 | -1 | -1 | 0.3 | 12 | | | | | | | | | |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -2 | -2 | -2 | -2 | -1 | 1 | 6 | 1 | 2 | 38 | 9 | 1.7 | 38 | | | | | | | | | |
| 4-Aug | 7 | 5 | 6 | 12 | 14 | 11 | 3 | 2 | 1 | 1 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | 0 | 0 | 0 | 0 | 0 | 0 | 2.4 | 14 | | | | | | | | | |
| 5-Aug | 1 | 1 | 6 | 17 | 29 | 42 | 35 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | 0 | 0 | 4.7 | 42 | | | | | | | | | |
| 6-Aug | 0 | 0 | 0 | 1 | 3 | 1 | 0 | 0 | 10 | 6 | 8 | 2 | 6 | 30 | 6 | 3 | 27 | 2 | 0 | 0 | 0 | 1 | 2 | 5 | 4.7 | 30 | | | | | | | | | |
| 7-Aug | 2 | 5 | 14 | 29 | 46 | 47 | 24 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | 0 | 0 | 0 | 0 | 6.5 | 47 | | | | | | | | | |
| 8-Aug | 0 | 1 | 3 | 12 | 23 | 36 | 22 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | 0 | 0 | 3.2 | 36 | | | | | | | | | |
| 9-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -2 | -2 | -2 | -2 | -2 | -1 | -1 | -1 | -1 | -1 | -1 | -0.9 | 0 | | | | | | | | | |
| 10-Aug | 12 | 7 | 3 | 5 | 2 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -2 | -2 | -1 | -1 | -1 | -1 | 0 | 0 | 0.4 | 12 | | | | | | | | | |
| 11-Aug | 0 | 0 | 1 | 7 | 19 | 28 | 20 | 0 | -1 | -1 | -1 | -1 | -1 | -2 | -2 | -2 | -2 | -2 | -2 | -1 | -1 | -1 | -1 | -1 | 2.3 | 28 | | | | | | | | | |
| 12-Aug | 0 | 0 | 0 | 0 | 0 | 3 | 0 | -1 | -1 | -1 | -1 | -2 | -2 | -2 | -2 | -2 | -2 | -2 | -2 | -2 | -1 | -1 | -1 | -1 | -0.9 | 3 | | | | | | | | | |
| 13-Aug | -1 | -1 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -2 | -2 | -2 | -2 | -2 | -2 | -2 | -2 | -2 | -2 | -1 | -1 | -1 | -1 | -1.1 | 0 | | | | | | | | | |
| 14-Aug | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | 9 | 11 | 8 | 1 | 0 | 1 | 2 | 12 | 12 | 1.2 | 12 | | | | | | | | | |
| 15-Aug | 21 | 29 | 40 | 49 | 52 | 51 | 47 | 24 | 9 | 4 | 13 | 1 | 11 | 0 | -1 | -1 | 0 | 32 | 40 | 50 | 26 | 18 | 12 | 11 | 22.4 | 52 | | | | | | | | | |
| 16-Aug | 9 | 14 | 17 | 18 | 19 | 18 | 17 | 4 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -2 | -2 | -1 | -1 | -1 | -1 | -1 | -1 | 4.1 | 19 | | | | | | | | | |
| 17-Aug | 0 | 0 | 2 | 4 | 0 | 1 | 0 | -1 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | 0 | -1 | -1 | -0.4 | 4 | | | | | | | | | |
| 18-Aug | -1 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -0.7 | 0 | | | | | | | | | |
| 19-Aug | -1 | -1 | -1 | -1 | -1 | -1 | 6 | 2 | 1 | 7 | 0 | -1 | -1 | -1 | 1 | -1 | -1 | -1 | -1 | -1 | 0 | 0 | 0 | 0 | 0.2 | 7 | | | | | | | | | |
| 20-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1.0 | 0 | | | | | | | | | |
| 21-Aug | -1 | -1 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -2 | -2 | -2 | -2 | -2 | -2 | -2 | -1 | -1 | -1 | -1 | -1 | -1.1 | 0 | | | | | | | | | |
| 22-Aug | -1 | 0 | 0 | 0 | 1 | 6 | 1 | -1 | -1 | -1 | -1 | -1 | -1 | -2 | -2 | -2 | -2 | -2 | -1 | -1 | -1 | -1 | -1 | -1 | -0.5 | 6 | | | | | | | | | |
| 23-Aug | -1 | -1 | -1 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | 0 | 0 | -0.6 | 0 | | | | | | | | | |
| 24-Aug | 0 | 0 | 0 | 1 | 40 | 42 | 32 | 9 | 1 | 0 | -1 | -1 | 0 | 0 | 2 | 13 | 5 | 2 | 0 | 0 | 3 | 0 | 2 | 0 | 6.2 | 42 | | | | | | | | | |
| 25-Aug | 0 | 4 | 17 | 41 | 9 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 22 | 17 | 15 | 14 | 41 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 8.0 | 41 | | | | | | | | | |
| 26-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -0.6 | 0 | | | | | | | | | |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -0.9 | 0 | | | | | | | | | |
| 28-Aug | -1 | -1 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -2 | -2 | -2 | -2 | -2 | -2 | -2 | -2 | -2 | -1 | -1 | -1 | -1 | -1 | -1.1 | 0 | | | | | | | | | |
| 29-Aug | -1 | -1 | 0 | 0 | 0 | 1 | 0 | -1 | -1 | -1 | -2 | -2 | -2 | -2 | -2 | -2 | -2 | -2 | -2 | -1 | -1 | -1 | -1 | -1 | -1.0 | 1 | | | | | | | | | |
| 30-Aug | -1 | -1 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -0.9 | 0 | | | | | | | | | |
| 31-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -0.6 | 0 | | | | | | | | | |
| 1.7 | | | | | | | | | | | | | | | | | 2.6 | | | | | | | | | | | | | | | | | Diurnal Average | |
| 21 | | | | | | | | | | | | | | | | | 29 | | | | | | | | | | | | | | | | | Diurnal Maximum | |





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Leaf Wetness (LW) - %
Fort McKay - Bertha Ganter - August 2017

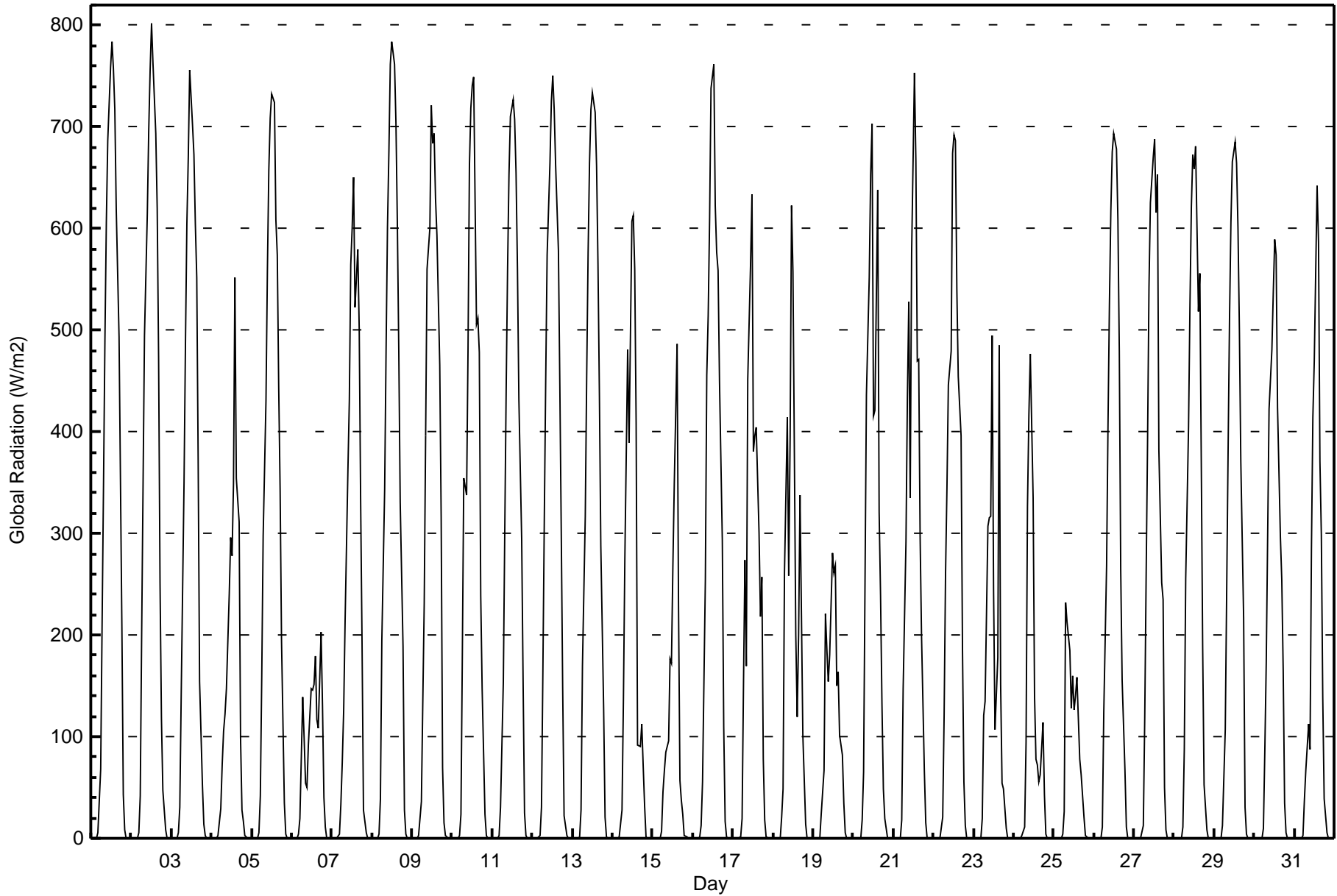
| Concentration Ranges (%) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 0.3 | 46 | 22.12 | 22.12 |
| 0.4 - 0.5 | 17 | 8.17 | 30.29 |
| 0.6 - 0.7 | 7 | 3.37 | 33.65 |
| 0.8 - 1.4 | 15 | 7.21 | 40.87 |
| 1.5 - 10 | 54 | 25.96 | 66.83 |
| > 10 | 68 | 32.69 | 99.52 |

Total Number of Valid Hours: 208

Total Number of Hours: 744



| Maximum Value: 802 W/m2 on Aug 2 13:00 | | | | | | | | | | | | | | | | | | | Maximum Daily Average: 298.3 W/m2 on Aug 1 | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|---|---|---|---|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|----|----|----|----|-----|---------------------------------|---------------|-----|-----|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|-----|-----|-----|-----|-----------------|--|
| Minimum Value: 0 W/m2 on Aug 1 01:00 | | | | | | | | | | | | | | | | | | | Minimum Daily Average: 65.7 W/m2 on Aug 25 | | | | | | Hours of Data: 744 | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 579.8 W/m2 at hour 12 | | | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 0.0 W/m2 at hour 1 | | | | | | Hours of Missing Data: 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 202.5 W/m2 | | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 67 Q ₃ = 389 P ₉₀ = 621 P ₉₉ = 761 | | | | | | Hours of Calibration: 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 0 | 0 | 0 | 0 | 6 | 68 | 211 | 348 | 491 | 606 | 687 | 759 | 784 | 757 | 717 | 620 | 493 | 352 | 209 | 43 | 8 | 0 | 0 | 0 | 298.3 | 784 | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 0 | 0 | 0 | 0 | 6 | 41 | 200 | 348 | 494 | 615 | 696 | 756 | 802 | 763 | 694 | 620 | 472 | 252 | 118 | 47 | 8 | 0 | 0 | 0 | 288.8 | 802 | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 0 | 0 | 0 | 0 | 6 | 30 | 141 | 350 | 487 | 605 | 670 | 756 | 702 | 672 | 605 | 551 | 371 | 154 | 53 | 13 | 3 | 0 | 0 | 0 | 257.1 | 756 | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 0 | 0 | 0 | 0 | 3 | 30 | 72 | 106 | 122 | 147 | 241 | 296 | 278 | 349 | 551 | 355 | 312 | 99 | 28 | 17 | 3 | 0 | 0 | 0 | 125.4 | 551 | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 0 | 0 | 0 | 0 | 5 | 42 | 159 | 297 | 431 | 558 | 657 | 708 | 732 | 724 | 609 | 573 | 444 | 344 | 195 | 34 | 5 | 0 | 0 | 0 | 271.6 | 732 | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 0 | 0 | 0 | 0 | 4 | 20 | 139 | 99 | 54 | 50 | 92 | 147 | 146 | 151 | 179 | 116 | 108 | 203 | 131 | 41 | 11 | 0 | 0 | 0 | 70.4 | 203 | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 0 | 0 | 0 | 0 | 5 | 34 | 76 | 126 | 213 | 362 | 431 | 565 | 601 | 651 | 522 | 580 | 500 | 332 | 192 | 28 | 5 | 0 | 0 | 0 | 217.6 | 651 | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 0 | 0 | 0 | 0 | 4 | 38 | 194 | 344 | 479 | 602 | 676 | 762 | 784 | 761 | 703 | 604 | 479 | 331 | 189 | 27 | 5 | 0 | 0 | 0 | 290.9 | 784 | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 0 | 0 | 0 | 0 | 3 | 36 | 134 | 231 | 396 | 561 | 601 | 721 | 683 | 693 | 629 | 594 | 465 | 316 | 69 | 15 | 2 | 0 | 0 | 0 | 256.3 | 721 | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 0 | 0 | 0 | 0 | 2 | 23 | 184 | 354 | 338 | 479 | 662 | 719 | 741 | 750 | 506 | 512 | 478 | 240 | 147 | 24 | 3 | 0 | 0 | 0 | 256.8 | 750 | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 0 | 0 | 0 | 0 | 2 | 31 | 155 | 300 | 441 | 561 | 653 | 710 | 726 | 707 | 655 | 560 | 433 | 294 | 153 | 25 | 3 | 0 | 0 | 0 | 267.0 | 726 | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 0 | 0 | 0 | 0 | 2 | 31 | 166 | 314 | 452 | 574 | 665 | 725 | 751 | 717 | 663 | 578 | 445 | 302 | 148 | 23 | 2 | 0 | 0 | 0 | 273.2 | 751 | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 0 | 0 | 0 | 0 | 2 | 28 | 169 | 317 | 454 | 575 | 664 | 717 | 734 | 715 | 662 | 564 | 436 | 287 | 128 | 20 | 1 | 0 | 0 | 0 | 269.8 | 734 | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 0 | 0 | 0 | 0 | 2 | 27 | 136 | 273 | 377 | 480 | 389 | 608 | 613 | 560 | 408 | 92 | 91 | 113 | 71 | 32 | 1 | 0 | 0 | 0 | 178.0 | 613 | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 0 | 0 | 0 | 0 | 0 | 7 | 45 | 67 | 85 | 96 | 176 | 173 | 267 | 349 | 487 | 230 | 57 | 37 | 24 | 3 | 1 | 0 | 0 | 0 | 87.6 | 487 | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 0 | 0 | 0 | 0 | 1 | 13 | 55 | 254 | 456 | 515 | 609 | 738 | 761 | 622 | 576 | 559 | 450 | 293 | 110 | 17 | 1 | 0 | 0 | 0 | 251.3 | 761 | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 0 | 0 | 0 | 0 | 1 | 19 | 152 | 274 | 170 | 452 | 566 | 634 | 380 | 396 | 404 | 300 | 218 | 258 | 78 | 18 | 1 | 0 | 0 | 0 | 180.0 | 634 | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 0 | 0 | 0 | 0 | 1 | 21 | 49 | 262 | 414 | 259 | 395 | 623 | 557 | 199 | 120 | 200 | 338 | 221 | 102 | 13 | 0 | 0 | 0 | 0 | 157.3 | 623 | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 0 | 0 | 0 | 0 | 1 | 24 | 67 | 221 | 186 | 154 | 180 | 281 | 261 | 268 | 151 | 164 | 101 | 82 | 35 | 6 | 0 | 0 | 0 | 0 | 90.9 | 281 | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 0 | 0 | 0 | 0 | 0 | 18 | 66 | 251 | 436 | 552 | 654 | 703 | 416 | 421 | 637 | 321 | 240 | 132 | 48 | 20 | 1 | 0 | 0 | 0 | 204.8 | 703 | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | 17 | 148 | 292 | 433 | 528 | 335 | 576 | 753 | 667 | 470 | 471 | 298 | 201 | 66 | 16 | 1 | 0 | 0 | 0 | 219.7 | 753 | | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 0 | 0 | 0 | 0 | 0 | 21 | 121 | 260 | 345 | 446 | 479 | 674 | 692 | 687 | 541 | 455 | 396 | 186 | 55 | 13 | 0 | 0 | 0 | 0 | 223.8 | 692 | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 0 | 0 | 0 | 0 | 0 | 19 | 121 | 135 | 307 | 316 | 317 | 495 | 245 | 106 | 178 | 486 | 152 | 54 | 49 | 10 | 0 | 0 | 0 | 0 | 124.6 | 495 | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 0 | 0 | 0 | 0 | 0 | 2 | 12 | 95 | 326 | 417 | 477 | 335 | 141 | 77 | 72 | 55 | 63 | 114 | 44 | 4 | 0 | 0 | 0 | 0 | 93.1 | 477 | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 0 | 0 | 0 | 0 | 0 | 4 | 27 | 232 | 213 | 185 | 128 | 160 | 126 | 140 | 158 | 78 | 63 | 42 | 22 | 3 | 0 | 0 | 0 | 0 | 65.7 | 232 | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 0 | 0 | 0 | 0 | 0 | 12 | 123 | 269 | 407 | 525 | 617 | 675 | 693 | 678 | 609 | 480 | 264 | 156 | 67 | 11 | 0 | 0 | 0 | 0 | 232.8 | 693 | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | 12 | 118 | 258 | 391 | 543 | 625 | 671 | 688 | 616 | 653 | 383 | 251 | 235 | 50 | 8 | 0 | 0 | 0 | 0 | 229.2 | 688 | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | 11 | 87 | 256 | 404 | 524 | 621 | 672 | 658 | 682 | 518 | 557 | 374 | 189 | 53 | 8 | 0 | 0 | 0 | 0 | 233.9 | 682 | | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 0 | 0 | 0 | 0 | 0 | 13 | 107 | 243 | 381 | 511 | 606 | 665 | 685 | 664 | 600 | 500 | 371 | 218 | 31 | 5 | 0 | 0 | 0 | 0 | 233.3 | 685 | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 0 | 0 | 0 | 0 | 0 | 10 | 86 | 172 | 298 | 422 | 480 | 538 | 589 | 574 | 424 | 297 | 254 | 165 | 35 | 5 | 0 | 0 | 0 | 0 | 181.2 | 589 | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 0 | 0 | 0 | 0 | 0 | 3 | 38 | 67 | 113 | 88 | 285 | 415 | 470 | 642 | 586 | 370 | 299 | 139 | 39 | 5 | 0 | 0 | 0 | 0 | 148.3 | 642 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 1.8 | 22.8 | 114.8 | 239.2 | 341.8 | 429.2 | 494.6 | 579.8 | 563.2 | 540.6 | 493.2 | 413.6 | 313.4 | 204.4 | 88.3 | 17.9 | 2.1 | 0.0 | 0.0 | 0.0 | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0 | 0 | 0 | 0 | 6 | 68 | 211 | 354 | 494 | 615 | 696 | 762 | 802 | 763 | 717 | 620 | 500 | 352 | 209 | 47 | 11 | 0 | 0 | 0 | Diurnal Maximum | |





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Global Radiation (GR) - W/m2
Fort McKay - Bertha Ganter - August 2017

| Concentration Ranges (W/m2) | Number of Hours | % | Cumulative % |
|------------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 316 | 42.47 | 42.47 |
| 21 - 100 | 80 | 10.75 | 53.23 |
| 101 - 300 | 125 | 16.80 | 70.03 |
| 301 - 600 | 130 | 17.47 | 87.50 |
| 601 - 900 | 93 | 12.50 | 100.00 |
| > 900 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744

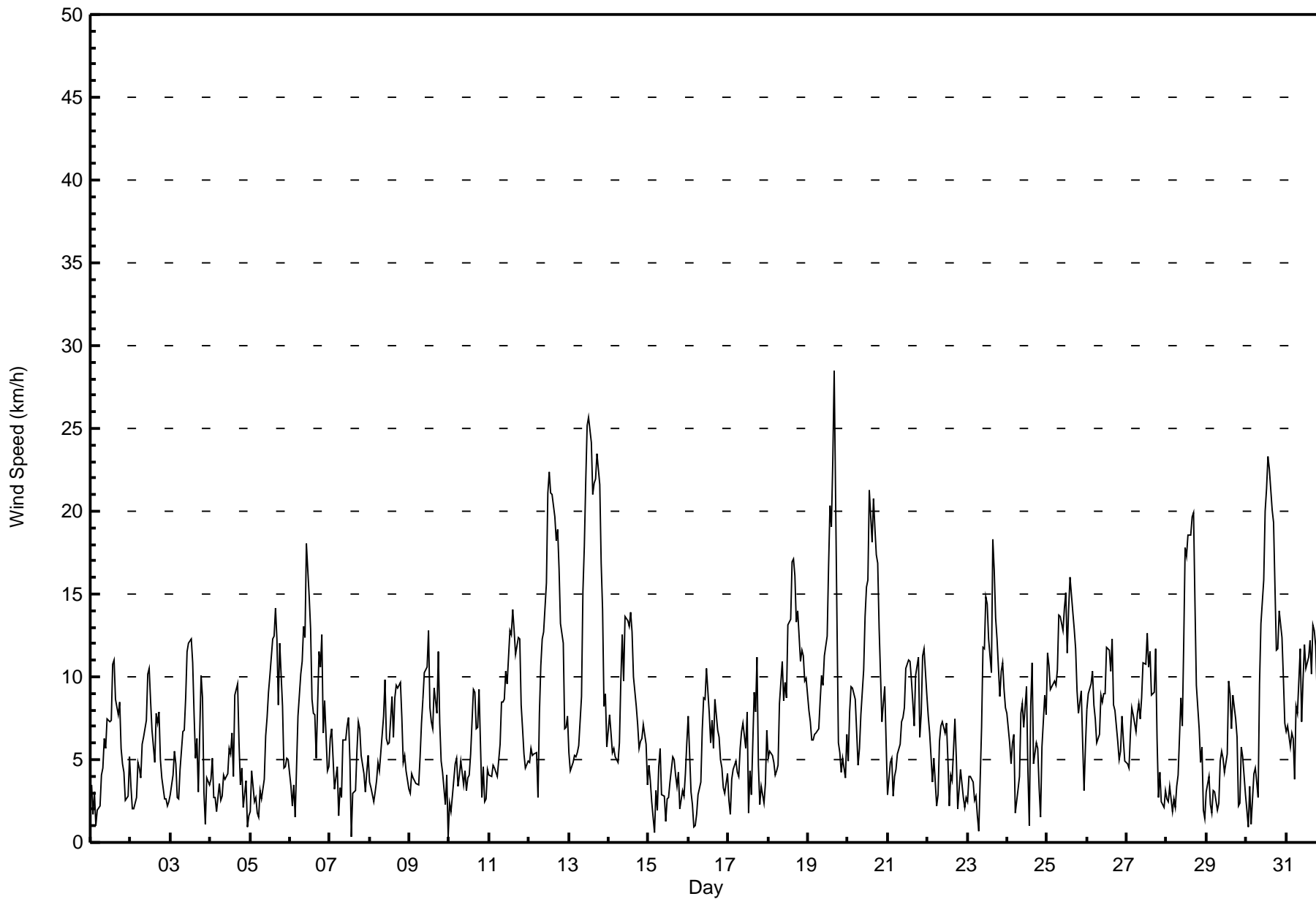


| | | |
|--|---|---------------------------------|
| Maximum Speed: 28 km/h on Aug 19 17:00 | Maximum Daily Speed Average: 14.0 km/h on Aug 13 | Hours in Service: 744 |
| Minimum Speed Value: 0 km/h on Aug 7 14:00 | Minimum Daily Speed Average: 0.2 km/h on Aug 4 | Hours of Data: 744 |
| Maximum Diurnal Speed Average: 5.2 km/h at hour 13 | Minimum Diurnal Speed Average: 2.4 km/h at hour 6 | Hours of Missing Data: 0 |
| Monthly Average Velocity: 3.5 km/h 204.7 deg | Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 4 Median = 6 Q ₃ = 10 P ₉₀ = 13 P ₉₉ = 23 | Percent Operational Time: 100.0 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | WNW4 | W2 | SSW3 | W1 | SSW2 | WNW2 | NW4 | N4 | N6 | NNE6 | NNE7 | NNE7 | NE7 | NNE11 | NNE11 | NNE9 | NNE8 | NNE8 | NE6 | NNE5 | NNW4 | WNW3 | W3 | WNW5 | N4.0 | NNE11 |
| 2-Aug | WNW3 | WSW2 | WSW2 | SSW3 | SW5 | SSW4 | S4 | SSE6 | SE6 | SE7 | SE10 | SE11 | SSW9 | WSW7 | SW5 | SW8 | SW7 | SSW8 | SW5 | SW4 | SW3 | SW3 | S2 | S2 | SSW4.0 | SE11 |
| 3-Aug | SW3 | SW4 | SSW6 | SSW5 | SSW3 | SSW3 | S4 | SSE7 | S7 | SE9 | SE11 | SSE12 | SE12 | SSE11 | S8 | SW5 | SSE6 | S3 | NNW10 | N9 | SE3 | SSW1 | NNE4 | NNW3 | S3.5 | SE12 |
| 4-Aug | WNW4 | WNW5 | W3 | WNW3 | NNW2 | WNW4 | NW3 | WNW3 | NE4 | NE4 | N4 | N6 | ENE5 | E7 | ESE4 | SSE9 | SSE10 | S6 | S3 | S4 | SSW2 | NW4 | SW1 | WSW2 | SSE0.2 | SSE10 |
| 5-Aug | SW2 | NNW4 | SW2 | SW3 | WSW2 | S2 | SSE3 | SE3 | SE4 | SE6 | SE8 | SE9 | SSE10 | SSE12 | SSE12 | SSE14 | S12 | SSW8 | S12 | S8 | SSW5 | S5 | SSW5 | SSW5 | S5.5 | SSE14 |
| 6-Aug | SSW3 | WNW2 | W3 | WSW2 | WNW5 | N8 | N10 | N11 | N13 | N12 | N18 | N15 | N13 | N9 | N8 | N8 | NNW5 | NNE12 | N11 | N13 | NNW7 | NW9 | NW4 | WNW5 | N7.6 | N18 |
| 7-Aug | WNW6 | WNW7 | WNW5 | WSW3 | W5 | W2 | WNW3 | NW3 | N6 | N6 | N7 | NNE8 | NNW5 | NE0 | NW3 | NE3 | ESE6 | S7 | SSW7 | SSW5 | SW4 | SW3 | WSW4 | WSW5 | WNW1.9 | NNE8 |
| 8-Aug | WSW4 | SW3 | SW2 | SSW3 | SW4 | SSW5 | S4 | SSW7 | S8 | SE10 | S6 | WSW6 | S6 | SSE9 | S6 | S9 | S9 | S9 | S10 | S8 | S5 | S5 | S4 | SSW3 | S5.5 | SE10 |
| 9-Aug | WSW3 | SSW4 | SSW4 | SSW4 | SSW4 | SSW4 | S5 | S7 | SSE9 | SSE10 | SSE11 | SE13 | S8 | SSW7 | SSW7 | S9 | SSE8 | SSE12 | S7 | S5 | SSW4 | SSW2 | S4 | WNW0 | S5.8 | SE13 |
| 10-Aug | SSE2 | SSW2 | W3 | SW5 | SSW5 | S3 | SSE4 | SE5 | SE3 | SSE4 | ENE3 | ENE4 | E4 | NNE5 | N9 | N9 | NNE7 | E7 | SSE9 | SSW3 | SSW5 | SW2 | SW3 | S4 | SE1.2 | N9 |
| 11-Aug | S4 | SSW4 | S5 | S4 | SSW4 | S4 | S6 | SSE9 | SSE8 | SE9 | SSE10 | S10 | SSE13 | SSE13 | SSE14 | SSE13 | S11 | SSE12 | SSE12 | SSE8 | S7 | S5 | S4 | S5 | SSE7.9 | SSE14 |
| 12-Aug | SSW5 | S6 | S5 | S5 | S5 | S3 | SSE8 | SSE11 | SSE12 | SSE13 | SSE16 | S21 | S22 | SSE21 | SSE21 | S20 | S18 | S19 | S17 | S13 | S12 | SSE7 | S7 | S8 | S12.1 | S22 |
| 13-Aug | S5 | SSE4 | SSE5 | SSE5 | SE5 | SSE5 | SSE6 | SSE9 | SSE15 | SSE18 | SSE22 | SSE25 | SSE26 | SSE24 | SSE21 | SSE22 | SSE22 | SSE23 | SSE22 | SSE17 | SSE14 | SSE8 | S9 | SSE6 | SSE14.0 | SSE26 |
| 14-Aug | SE8 | SSE7 | SSE5 | SSE6 | SSE5 | S5 | SE6 | SSE10 | SSE13 | SSE10 | SSE14 | SSE13 | S13 | S14 | SSW13 | SW10 | WSW8 | SW7 | SSW6 | SSE6 | SSE6 | SSE6 | SE4 | SE4 | S7.4 | S16 |
| 15-Aug | SSE5 | SE4 | NW2 | NNE1 | SE3 | WNW2 | NW5 | NW6 | NNW3 | NNE3 | WSW1 | WSW3 | W3 | NW4 | E5 | NE5 | ENE4 | ENE3 | E4 | WSW2 | W3 | NW3 | WNW4 | WNW6 | NNW0.9 | WNW6 |
| 16-Aug | WNW8 | NW3 | NNW2 | WSW1 | S1 | S2 | S3 | SSE4 | SE7 | SSE9 | SSE9 | SSE11 | SSW8 | SW6 | SW7 | WSW6 | SSW9 | SW7 | SW6 | SW5 | SW4 | WSW3 | WSW3 | W4 | SSW3.7 | SSE11 |
| 17-Aug | W3 | SE2 | S4 | SSW4 | SSW5 | S4 | S4 | SSE6 | SSE7 | SSW7 | SSW6 | SSE8 | E2 | SE4 | NNW3 | WNW9 | WNW8 | NW11 | WNW5 | WNW2 | WSW3 | WSW2 | WSW4 | W7 | SW2.5 | NW11 |
| 18-Aug | W5 | SSE5 | S5 | S5 | SW4 | S4 | SSW5 | SSW8 | S11 | SW9 | SW10 | WSW9 | SW13 | WSW13 | SSW17 | SSW17 | S16 | SSW13 | SSW14 | SSW11 | SSW12 | SSW11 | SSW10 | SSW10 | SSW9.4 | SSW17 |
| 19-Aug | SW8 | W7 | W6 | W6 | W7 | WSW7 | SW7 | SSW9 | WSW10 | SW10 | WSW11 | W12 | W17 | WNW20 | WNW19 | WNW23 | WNW28 | WNW13 | W6 | WSW5 | SW4 | WNW5 | W4 | WSW7 | W9.5 | WNW28 |
| 20-Aug | W5 | W8 | W9 | W9 | W9 | W7 | WSW5 | WSW6 | W8 | W10 | WNW14 | WNW15 | WNW16 | WNW21 | WNW18 | WNW21 | WNW19 | NW17 | NW17 | WNW13 | WNW7 | WNW8 | WNW9 | NNW6 | WNW11.2 | WNW21 |
| 21-Aug | WSW3 | S5 | SSW5 | SW3 | WSW4 | W4 | WSW5 | SW6 | SSW7 | SW8 | SW8 | SW11 | WSW11 | WSW11 | W10 | WSW8 | W7 | WNW10 | NW11 | WNW6 | NW8 | N11 | NNW12 | NNW9 | W5.1 | NNW12 |
| 22-Aug | NNW8 | NW7 | NNW5 | WNW4 | WNW5 | NW2 | N3 | N6 | N7 | NNE7 | NNE7 | NE7 | ENE5 | ESE2 | SE4 | SSE4 | SSE7 | S5 | S2 | NE3 | NNW4 | N3 | NNE2 | N3 | NNE2.3 | NNW8 |
| 23-Aug | NW2 | N4 | N4 | NW4 | NW3 | W3 | NW2 | E1 | SSE7 | SSE12 | SSE12 | S15 | S14 | S12 | SSE10 | SSE18 | SSE16 | SSE14 | SSE12 | SSE9 | SSE10 | SSE11 | SSE9 | S8 | S7.2 | SSE18 |
| 24-Aug | S8 | SSE6 | SSE5 | S6 | SSW6 | E2 | NNW3 | SE4 | SE8 | SSE8 | SE7 | SE9 | SSE4 | WSW1 | ESE8 | SE11 | NW5 | N6 | NNW6 | NNW3 | SW2 | S6 | SW9 | S8 | SSE3.2 | SE11 |
| 25-Aug | S11 | S11 | SSW9 | S9 | S10 | SSW9 | S10 | S14 | SSW14 | SSW13 | SSW14 | S15 | SSW11 | WSW14 | SW16 | SW14 | SW13 | WSW12 | WSW9 | SSW8 | SW9 | SSW6 | WNW3 | SW6 | SSW10.1 | SW16 |
| 26-Aug | WSW8 | WSW9 | W10 | W10 | W8 | W7 | SW6 | SW6 | SW9 | SW8 | SW9 | SSW9 | SSW12 | SW12 | SW10 | SW12 | SW8 | SW8 | SW6 | SW5 | SSW6 | SSW8 | SSW6 | SSW5 | SW7.7 | SW12 |
| 27-Aug | SW5 | SW4 | WSW7 | WSW8 | WSW8 | SW7 | WSW8 | W8 | SW7 | WSW9 | WSW11 | WSW11 | WSW13 | W11 | W12 | W9 | W9 | WNW12 | WNW6 | W3 | WNW4 | NW2 | SSW2 | NW3 | W7.0 | WSW13 |
| 28-Aug | NW3 | WSW2 | W3 | W2 | S3 | S2 | S3 | SSW4 | WNW9 | W7 | WNW12 | NW18 | WNW17 | WNW19 | NW19 | NW20 | NW20 | NW14 | NW9 | NW7 | WNW5 | WNW6 | W2 | SSW1 | WNW7.6 | NW20 |
| 29-Aug | NW3 | W4 | WSW2 | WNW2 | NW3 | SSW3 | SSW2 | SSE2 | SE5 | SE6 | E5 | E4 | ESE5 | SE10 | SE9 | SSE7 | SSE9 | SE7 | ESE6 | ESE2 | SE2 | SSE6 | S5 | SSE3 | SSE3.3 | SE10 |
| 30-Aug | N2 | NE1 | S3 | WSW1 | NW4 | NW4 | NW4 | NNE3 | SSE10 | SSE13 | SSE16 | SSE20 | SSE21 | SSE23 | SSE23 | SSE20 | SSE19 | SSE15 | S12 | S12 | S14 | S12 | S10 | S7 | SSE9.6 | SSE23 |
| 31-Aug | SSW7 | S7 | S6 | S7 | S6 | S4 | S8 | S8 | S12 | S7 | S10 | SSE12 | SW11 | WSW11 | WSW12 | WSW10 | WNW13 | WNW13 | NW12 | WNW6 | WSW3 | WSW5 | WSW6 | W4 | SW5.4 | WNW13 |

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-------|-------|-------|-------|-------|--------|------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|--|-----------------|
| SW2.8 | SW2.5 | SW2.9 | SW3.0 | SW3.1 | SW2.4 | SSW2.4 | S3.2 | S4.2 | S4.6 | S4.6 | S4.9 | SSW5.2 | SSW4.8 | SSW4.9 | SSW5.2 | SSW4.7 | SSW3.9 | SSW3.6 | SSW3.0 | SSW3.6 | SW2.9 | SW2.8 | SW2.7 | | Diurnal Average |
| S11 | S11 | W10 | W10 | S10 | SSW9 | S10 | S14 | SSE15 | SSE18 | SSE22 | SSE25 | SSE26 | SSE24 | SSE23 | WNW23 | WNW28 | SSE23 | SSE22 | SSE17 | SSE14 | S12 | NNW12 | SSW10 | | Diurnal Maximum |

All monthly, daily, and diurnal averages have been calculated using vector methods





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Fort McKay - Bertha Ganter - August 2017**

| Wind Speed Ranges (km/h) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 5 | 311 | 41.80 | 41.80 |
| 6 - 11 | 301 | 40.46 | 82.26 |
| 12 - 19 | 106 | 14.25 | 96.51 |
| 20 - 28 | 26 | 3.49 | 100.00 |
| 29 - 38 | 0 | 0.00 | 100.00 |
| > 38 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Fort McKay - Bertha Ganter - August 2017**

| Wind Speed Ranges (km/h) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-----------------------------|----------------|-----------|-----------|----------|----------|----------|-----------|------------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 5 | 8 | 7 | 7 | 7 | 7 | 4 | 14 | 19 | 48 | 42 | 30 | 31 | 22 | 27 | 25 | 13 | 311 |
| 6 - 11 | 19 | 12 | 3 | 0 | 2 | 3 | 20 | 53 | 47 | 31 | 32 | 26 | 24 | 15 | 8 | 6 | 301 |
| 12 - 19 | 6 | 1 | 0 | 0 | 0 | 0 | 2 | 32 | 20 | 10 | 6 | 5 | 2 | 15 | 6 | 1 | 106 |
| 20 - 28 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 2 | 0 | 0 | 0 | 0 | 5 | 2 | 0 | 26 |
| 29 - 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 33 | 20 | 10 | 7 | 9 | 7 | 36 | 121 | 117 | 83 | 68 | 62 | 48 | 62 | 41 | 20 | 744 |

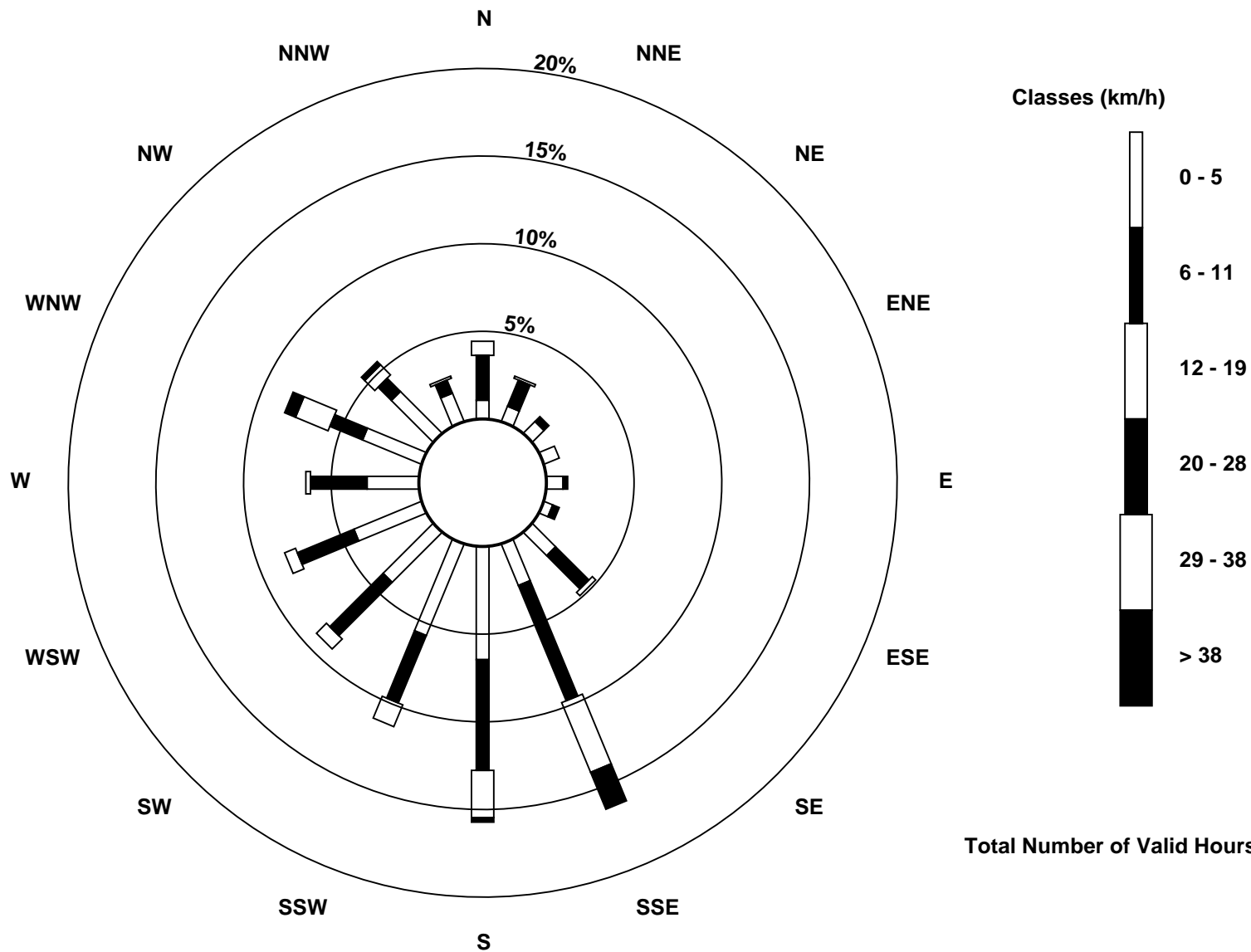
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Wind Speed (WS) - km/h
Fort McKay - Bertha Ganter (AMS 1)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Fort McKay - Bertha Ganter - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on Aug 3 19:00 | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | |
|--|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|---|----|----|----|----|----|----|---------------|----|
| Minimum Value: 0 km/h on Aug 16 07:00 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 7 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | 24 |
| 1-Aug | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 3 | 2 | 3 | 3 | 3 | 5 | 4 | 4 | 3 | 4 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 5 |
| 2-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 3 | 4 | 3 | 3 | 4 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 4 |
| 3-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 4 | 3 | 4 | 3 | 2 | 1 | 11 | 5 | 2 | 2 | 4 | 1 | 11 |
| 4-Aug | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 |
| 5-Aug | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 4 |
| 6-Aug | 2 | 3 | 2 | 1 | 1 | 1 | 2 | 2 | 4 | 2 | 4 | 4 | 3 | 2 | 2 | 2 | 2 | 3 | 4 | 3 | 1 | 1 | 2 | 1 | 4 |
| 7-Aug | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 3 | 4 | 2 | 2 | 3 | 2 | 1 | 1 | 1 | 2 | 2 | 4 |
| 8-Aug | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 4 |
| 9-Aug | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 4 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 4 |
| 10-Aug | 3 | 2 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 4 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 4 |
| 11-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 4 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 4 |
| 12-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 3 | 2 | 3 | 4 | 5 | 6 | 6 | 5 | 6 | 5 | 5 | 4 | 3 | 3 | 1 | 1 | 1 | 6 |
| 13-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 4 | 6 | 5 | 6 | 6 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 2 | 2 | 2 | 6 |
| 14-Aug | 2 | 2 | 1 | 1 | 2 | 1 | 2 | 3 | 3 | 2 | 3 | 3 | 4 | 4 | 4 | 4 | 3 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 4 |
| 15-Aug | 1 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 1 | 2 | 1 | 2 | 2 |
| 16-Aug | 2 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 2 | 2 | 3 | 4 | 3 | 4 | 4 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 4 |
| 17-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 1 | 1 | 2 | 2 | 3 |
| 18-Aug | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 3 | 3 | 4 | 4 | 4 | 5 | 6 | 6 | 5 | 5 | 4 | 4 | 3 | 4 | 4 | 3 | 3 | 6 |
| 19-Aug | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 5 | 4 | 5 | 5 | 7 | 7 | 8 | 9 | 8 | 6 | 3 | 2 | 1 | 2 | 1 | 3 | 9 |
| 20-Aug | 2 | 3 | 4 | 3 | 3 | 3 | 2 | 3 | 3 | 4 | 5 | 6 | 7 | 7 | 7 | 7 | 6 | 6 | 6 | 4 | 2 | 3 | 3 | 2 | 7 |
| 21-Aug | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 5 | 5 | 4 | 4 | 3 | 5 | 3 | 1 | 2 | 1 | 2 | 2 | 5 |
| 22-Aug | 2 | 1 | 1 | 2 | 2 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 3 |
| 23-Aug | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 4 | 3 | 3 | 4 | 4 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 4 |
| 24-Aug | 2 | 1 | 1 | 1 | 4 | 2 | 2 | 1 | 2 | 2 | 3 | 2 | 2 | 1 | 6 | 5 | 1 | 1 | 1 | 1 | 1 | 3 | 5 | 2 | 6 |
| 25-Aug | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 6 | 6 | 6 | 5 | 5 | 5 | 3 | 4 | 3 | 1 | 6 |
| 26-Aug | 3 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 5 | 4 | 5 | 3 | 3 | 3 | 2 | 1 | 2 | 1 | 1 | 5 |
| 27-Aug | 1 | 1 | 3 | 4 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 4 | 4 | 5 | 3 | 1 | 1 | 1 | 2 | 2 | 5 |
| 28-Aug | 2 | 2 | 3 | 2 | 1 | 1 | 1 | 2 | 3 | 3 | 5 | 6 | 7 | 7 | 7 | 6 | 5 | 5 | 2 | 1 | 2 | 2 | 1 | 1 | 7 |
| 29-Aug | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 3 |
| 30-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 4 | 3 | 4 | 4 | 5 | 5 | 5 | 5 | 4 | 4 | 3 | 3 | 3 | 3 | 2 | 2 | 5 |
| 31-Aug | 2 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 5 | 5 | 5 | 6 | 4 | 4 | 3 | 1 | 2 | 2 | 2 | 6 |
| | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | | | | |
| | | | | | | | | | | | | | | | | | 3 4 4 4 4 3 3 4 5 4 6 6 7 7 8 9 8 6 11 5 4 4 5 3 | | | | | | | | |



Wood Buffalo Environmental Association
Summary of Hour Averages

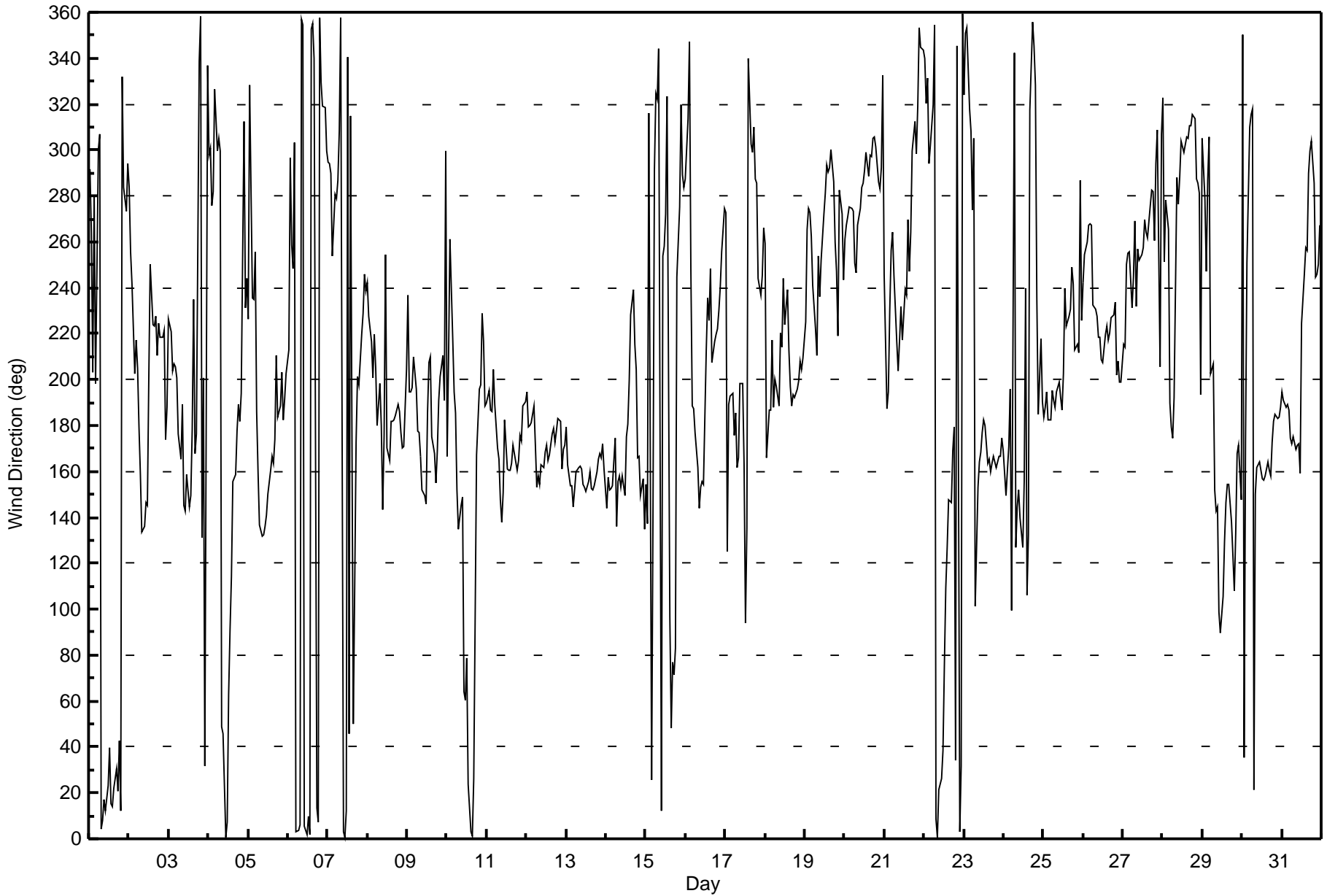
Wind Direction (WD) - deg
Fort McKay - Bertha Ganter - August 2017

| | | | |
|---|--|---------------------------|-------|
| Direction of Maximum Speed: 300 deg on Aug 19 17:00 | | Hours in Service: | 744 |
| Direction of Maximum Daily Speed Average: 157.8 deg on Aug 13 | | Hours of Data: | 744 |
| Direction of Minimum Speed: 46 deg on Aug 7 14:00 | | Hours of Missing Data: | 0 |
| Direction of Minimum Daily Speed Average: 0.2 deg on Aug 4 | | Percent Operational Time: | 100.0 |
| Monthly Average Direction: 232.0 deg | | | |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average |
|--------|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 292 | 264 | 203 | 280 | 198 | 300 | 307 | 4 | 8 | 17 | 12 | 23 | 40 | 16 | 14 | 22 | 30 | 20 | 42 | 12 | 332 | 284 | 273 | 294 | 4.5 |
| 2-Aug | 284 | 255 | 242 | 203 | 217 | 205 | 179 | 158 | 133 | 136 | 146 | 145 | 200 | 250 | 224 | 223 | 228 | 211 | 225 | 219 | 219 | 222 | 174 | 188 | 195.6 |
| 3-Aug | 227 | 221 | 204 | 207 | 206 | 201 | 176 | 166 | 189 | 145 | 143 | 159 | 145 | 150 | 178 | 235 | 168 | 176 | 339 | 358 | 131 | 200 | 32 | 337 | 169.7 |
| 4-Aug | 298 | 301 | 276 | 282 | 327 | 300 | 305 | 299 | 49 | 46 | 1 | 8 | 63 | 91 | 114 | 156 | 159 | 178 | 189 | 182 | 194 | 313 | 231 | 244 | 168.1 |
| 5-Aug | 227 | 328 | 235 | 235 | 256 | 186 | 160 | 137 | 132 | 132 | 136 | 141 | 150 | 160 | 166 | 164 | 174 | 211 | 184 | 189 | 203 | 183 | 192 | 202 | 172.1 |
| 6-Aug | 213 | 296 | 259 | 248 | 303 | 3 | 3 | 6 | 357 | 355 | 6 | 2 | 10 | 2 | 353 | 355 | 340 | 14 | 7 | 357 | 330 | 319 | 318 | 299 | 352.6 |
| 7-Aug | 295 | 294 | 290 | 254 | 281 | 279 | 287 | 308 | 358 | 3 | 1 | 12 | 341 | 46 | 315 | 50 | 109 | 172 | 201 | 198 | 220 | 229 | 246 | 238 | 290.6 |
| 8-Aug | 242 | 228 | 216 | 200 | 220 | 205 | 180 | 198 | 180 | 144 | 176 | 255 | 170 | 165 | 182 | 182 | 183 | 184 | 189 | 186 | 177 | 170 | 171 | 204 | 186.1 |
| 9-Aug | 237 | 195 | 194 | 196 | 210 | 196 | 178 | 177 | 167 | 152 | 150 | 146 | 186 | 208 | 210 | 175 | 168 | 155 | 169 | 191 | 201 | 211 | 191 | 300 | 176.7 |
| 10-Aug | 167 | 209 | 261 | 218 | 195 | 185 | 152 | 135 | 145 | 149 | 64 | 61 | 79 | 24 | 3 | 1 | 26 | 96 | 167 | 196 | 197 | 229 | 216 | 188 | 135.7 |
| 11-Aug | 190 | 196 | 187 | 186 | 204 | 189 | 170 | 166 | 148 | 138 | 150 | 183 | 161 | 160 | 161 | 164 | 171 | 164 | 160 | 165 | 176 | 173 | 188 | 190 | 167.6 |
| 12-Aug | 195 | 179 | 180 | 181 | 189 | 172 | 153 | 158 | 155 | 163 | 162 | 169 | 172 | 165 | 167 | 176 | 179 | 172 | 177 | 183 | 182 | 161 | 170 | 171 | 171.0 |
| 13-Aug | 179 | 163 | 154 | 154 | 144 | 152 | 160 | 162 | 163 | 161 | 155 | 153 | 152 | 156 | 160 | 152 | 152 | 154 | 160 | 165 | 168 | 166 | 172 | 161 | 157.8 |
| 14-Aug | 144 | 157 | 152 | 153 | 154 | 174 | 136 | 155 | 158 | 153 | 158 | 149 | 175 | 181 | 199 | 228 | 239 | 215 | 204 | 166 | 166 | 149 | 157 | 135 | 169.9 |
| 15-Aug | 154 | 138 | 316 | 26 | 146 | 292 | 324 | 322 | 344 | 12 | 254 | 258 | 272 | 324 | 96 | 48 | 77 | 72 | 83 | 244 | 275 | 320 | 290 | 284 | 336.5 |
| 16-Aug | 288 | 314 | 347 | 248 | 189 | 188 | 177 | 162 | 144 | 153 | 155 | 155 | 213 | 236 | 226 | 248 | 207 | 217 | 219 | 222 | 230 | 241 | 256 | 275 | 208.8 |
| 17-Aug | 273 | 125 | 189 | 193 | 194 | 176 | 185 | 162 | 166 | 198 | 198 | 163 | 94 | 136 | 340 | 303 | 299 | 310 | 287 | 286 | 244 | 237 | 245 | 266 | 226.6 |
| 18-Aug | 259 | 166 | 186 | 187 | 217 | 188 | 200 | 197 | 189 | 221 | 214 | 244 | 224 | 239 | 213 | 197 | 188 | 193 | 192 | 196 | 199 | 208 | 204 | 209 | 205.4 |
| 19-Aug | 225 | 265 | 274 | 273 | 262 | 241 | 222 | 210 | 254 | 236 | 252 | 272 | 281 | 294 | 290 | 292 | 300 | 286 | 260 | 247 | 219 | 283 | 272 | 243 | 270.9 |
| 20-Aug | 261 | 267 | 271 | 275 | 274 | 274 | 251 | 246 | 267 | 275 | 284 | 285 | 291 | 299 | 289 | 298 | 297 | 305 | 306 | 301 | 286 | 283 | 292 | 332 | 288.4 |
| 21-Aug | 246 | 188 | 195 | 230 | 256 | 264 | 245 | 217 | 204 | 217 | 232 | 217 | 239 | 237 | 270 | 247 | 264 | 300 | 312 | 298 | 319 | 354 | 345 | 343 | 265.1 |
| 22-Aug | 340 | 320 | 332 | 294 | 302 | 319 | 355 | 9 | 1 | 21 | 26 | 38 | 76 | 110 | 127 | 148 | 147 | 169 | 179 | 34 | 346 | 3 | 32 | 360 | 12.3 |
| 23-Aug | 324 | 351 | 353 | 318 | 308 | 274 | 305 | 101 | 153 | 164 | 168 | 177 | 183 | 180 | 164 | 166 | 160 | 163 | 167 | 161 | 164 | 167 | 167 | 175 | 170.2 |
| 24-Aug | 169 | 149 | 161 | 171 | 196 | 99 | 342 | 127 | 144 | 152 | 140 | 127 | 155 | 240 | 106 | 133 | 317 | 356 | 345 | 328 | 235 | 185 | 218 | 191 | 156.4 |
| 25-Aug | 184 | 188 | 194 | 183 | 182 | 196 | 191 | 188 | 195 | 199 | 192 | 187 | 203 | 240 | 224 | 227 | 231 | 249 | 242 | 213 | 215 | 212 | 287 | 226 | 207.2 |
| 26-Aug | 242 | 254 | 260 | 267 | 268 | 267 | 232 | 231 | 228 | 218 | 219 | 209 | 207 | 220 | 223 | 217 | 220 | 227 | 228 | 234 | 202 | 208 | 199 | 199 | 228.8 |
| 27-Aug | 215 | 214 | 250 | 255 | 256 | 231 | 245 | 269 | 232 | 257 | 252 | 254 | 258 | 270 | 264 | 262 | 276 | 282 | 282 | 260 | 294 | 308 | 206 | 307 | 259.0 |
| 28-Aug | 323 | 251 | 278 | 265 | 190 | 180 | 175 | 192 | 288 | 276 | 288 | 304 | 301 | 299 | 306 | 305 | 310 | 310 | 316 | 313 | 287 | 285 | 281 | 194 | 296.7 |
| 29-Aug | 305 | 279 | 247 | 287 | 306 | 203 | 207 | 152 | 143 | 145 | 99 | 90 | 105 | 129 | 146 | 154 | 154 | 138 | 123 | 108 | 133 | 168 | 171 | 148 | 146.3 |
| 30-Aug | 350 | 36 | 173 | 251 | 310 | 315 | 318 | 22 | 150 | 162 | 164 | 160 | 157 | 156 | 158 | 164 | 161 | 158 | 172 | 182 | 185 | 183 | 184 | 188 | 166.7 |
| 31-Aug | 195 | 191 | 188 | 189 | 187 | 174 | 172 | 175 | 169 | 171 | 172 | 159 | 225 | 246 | 258 | 256 | 290 | 300 | 304 | 285 | 245 | 246 | 250 | 267 | 223.4 |

232.0 227.1 226.3 222.6 228.0 222.6 203.6 184.3 176.2 172.5 176.3 177.0 192.8 206.7 208.5 209.7 211.4 210.7 209.8 212.3 208.3 215.0 215.7 226.7
 Diurnal Average

All monthly, daily, and diurnal averages have been calculated using vector methods





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Fort McKay - Bertha Ganter - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 105 deg on Aug 7 14:00 Minimum Value: 7 deg on Aug 6 22:00 | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|---|----|----|----|----|----|----|----|----|----|----|----|-----|----|----|----|----|----|----|----|----|----|-----|---------------|
| Percentiles: P ₁ = 9 P ₁₀ = 14 Q ₁ = 18 Median = 29 Q ₃ = 48 P ₉₀ = 62 P ₉₉ = 91 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 19 | 53 | 17 | 74 | 42 | 65 | 22 | 37 | 28 | 60 | 40 | 47 | 54 | 35 | 38 | 44 | 40 | 36 | 50 | 38 | 20 | 15 | 22 | 13 | 74 |
| 2-Aug | 29 | 42 | 31 | 25 | 18 | 26 | 29 | 33 | 18 | 21 | 25 | 31 | 44 | 61 | 94 | 56 | 51 | 36 | 37 | 20 | 45 | 40 | 61 | 46 | 94 |
| 3-Aug | 31 | 26 | 24 | 30 | 58 | 23 | 20 | 27 | 31 | 33 | 15 | 26 | 23 | 25 | 56 | 69 | 37 | 58 | 89 | 36 | 67 | 90 | 62 | 32 | 90 |
| 4-Aug | 24 | 16 | 42 | 38 | 62 | 26 | 33 | 34 | 57 | 47 | 34 | 26 | 47 | 37 | 76 | 34 | 17 | 20 | 22 | 19 | 58 | 25 | 81 | 82 | 82 |
| 5-Aug | 71 | 48 | 35 | 39 | 65 | 60 | 30 | 61 | 63 | 24 | 23 | 21 | 20 | 20 | 19 | 18 | 26 | 36 | 18 | 16 | 20 | 20 | 16 | 23 | 71 |
| 6-Aug | 46 | 67 | 43 | 68 | 14 | 14 | 14 | 18 | 16 | 16 | 16 | 16 | 18 | 17 | 17 | 17 | 28 | 20 | 19 | 14 | 11 | 7 | 23 | 26 | 68 |
| 7-Aug | 10 | 10 | 13 | 20 | 23 | 71 | 39 | 33 | 20 | 42 | 32 | 40 | 70 | 105 | 96 | 77 | 50 | 31 | 26 | 16 | 22 | 28 | 44 | 59 | 105 |
| 8-Aug | 73 | 51 | 48 | 23 | 20 | 26 | 28 | 28 | 22 | 18 | 56 | 63 | 71 | 40 | 73 | 42 | 30 | 25 | 19 | 13 | 9 | 14 | 13 | 30 | 73 |
| 9-Aug | 50 | 32 | 26 | 27 | 21 | 20 | 13 | 15 | 19 | 16 | 16 | 18 | 53 | 57 | 63 | 40 | 33 | 14 | 18 | 21 | 35 | 55 | 24 | 100 | 100 |
| 10-Aug | 82 | 94 | 66 | 42 | 17 | 54 | 33 | 26 | 48 | 35 | 85 | 68 | 66 | 64 | 35 | 32 | 51 | 40 | 21 | 62 | 40 | 54 | 49 | 26 | 94 |
| 11-Aug | 21 | 42 | 14 | 15 | 14 | 22 | 16 | 17 | 17 | 15 | 23 | 32 | 22 | 35 | 18 | 20 | 23 | 15 | 14 | 15 | 13 | 10 | 13 | 9 | 42 |
| 12-Aug | 11 | 10 | 11 | 11 | 13 | 18 | 15 | 17 | 15 | 17 | 17 | 16 | 18 | 17 | 17 | 20 | 19 | 15 | 16 | 15 | 14 | 11 | 10 | 11 | 20 |
| 13-Aug | 13 | 15 | 9 | 9 | 9 | 11 | 14 | 17 | 15 | 16 | 16 | 16 | 15 | 17 | 16 | 16 | 15 | 15 | 14 | 13 | 13 | 13 | 13 | 16 | 17 |
| 14-Aug | 16 | 12 | 15 | 14 | 18 | 17 | 17 | 19 | 17 | 22 | 17 | 16 | 22 | 24 | 27 | 45 | 46 | 34 | 41 | 13 | 17 | 13 | 17 | 18 | 46 |
| 15-Aug | 16 | 21 | 50 | 89 | 46 | 66 | 34 | 18 | 56 | 38 | 72 | 67 | 66 | 56 | 59 | 40 | 44 | 55 | 43 | 85 | 29 | 38 | 23 | 21 | 89 |
| 16-Aug | 20 | 32 | 35 | 65 | 70 | 37 | 24 | 29 | 16 | 17 | 22 | 26 | 52 | 64 | 57 | 59 | 42 | 42 | 34 | 23 | 29 | 57 | 56 | 37 | 70 |
| 17-Aug | 64 | 62 | 22 | 24 | 18 | 15 | 24 | 24 | 23 | 29 | 44 | 36 | 92 | 63 | 95 | 37 | 23 | 19 | 41 | 54 | 40 | 40 | 44 | 50 | 95 |
| 18-Aug | 57 | 20 | 14 | 20 | 26 | 18 | 18 | 22 | 22 | 41 | 37 | 51 | 44 | 49 | 37 | 23 | 19 | 23 | 20 | 21 | 22 | 26 | 24 | 25 | 57 |
| 19-Aug | 38 | 43 | 41 | 44 | 52 | 50 | 42 | 35 | 54 | 53 | 53 | 47 | 38 | 27 | 26 | 25 | 19 | 37 | 52 | 46 | 38 | 40 | 26 | 42 | 54 |
| 20-Aug | 47 | 50 | 48 | 42 | 41 | 49 | 48 | 60 | 46 | 48 | 36 | 35 | 34 | 20 | 35 | 22 | 21 | 23 | 15 | 18 | 25 | 26 | 25 | 34 | 60 |
| 21-Aug | 47 | 15 | 13 | 39 | 55 | 53 | 58 | 42 | 29 | 47 | 50 | 37 | 51 | 51 | 44 | 53 | 52 | 28 | 10 | 11 | 28 | 12 | 11 | 13 | 58 |
| 22-Aug | 14 | 8 | 13 | 17 | 17 | 41 | 54 | 18 | 22 | 40 | 48 | 49 | 56 | 89 | 77 | 79 | 28 | 27 | 72 | 60 | 16 | 29 | 56 | 32 | 89 |
| 23-Aug | 65 | 16 | 18 | 22 | 32 | 30 | 50 | 91 | 26 | 16 | 16 | 21 | 18 | 18 | 17 | 14 | 14 | 13 | 14 | 14 | 13 | 12 | 12 | 12 | 91 |
| 24-Aug | 13 | 12 | 13 | 15 | 55 | 78 | 61 | 20 | 16 | 17 | 37 | 18 | 37 | 85 | 60 | 47 | 26 | 13 | 16 | 44 | 92 | 34 | 44 | 19 | 92 |
| 25-Aug | 18 | 18 | 19 | 14 | 15 | 19 | 17 | 18 | 20 | 23 | 22 | 18 | 30 | 48 | 38 | 48 | 47 | 54 | 54 | 32 | 37 | 54 | 49 | 43 | 54 |
| 26-Aug | 46 | 51 | 52 | 47 | 55 | 56 | 63 | 61 | 41 | 40 | 43 | 44 | 39 | 44 | 51 | 38 | 46 | 46 | 47 | 41 | 16 | 20 | 15 | 16 | 63 |
| 27-Aug | 25 | 24 | 47 | 56 | 52 | 52 | 48 | 51 | 60 | 60 | 51 | 53 | 49 | 47 | 51 | 49 | 40 | 38 | 30 | 29 | 24 | 46 | 52 | 50 | 60 |
| 28-Aug | 59 | 65 | 64 | 86 | 62 | 76 | 30 | 52 | 28 | 46 | 40 | 27 | 28 | 29 | 25 | 21 | 16 | 18 | 13 | 13 | 17 | 19 | 60 | 48 | 86 |
| 29-Aug | 56 | 44 | 60 | 80 | 54 | 70 | 81 | 79 | 29 | 26 | 52 | 68 | 70 | 28 | 31 | 32 | 16 | 24 | 17 | 59 | 39 | 17 | 22 | 47 | 81 |
| 30-Aug | 49 | 82 | 51 | 66 | 9 | 10 | 22 | 49 | 22 | 15 | 16 | 16 | 16 | 15 | 16 | 14 | 13 | 14 | 14 | 15 | 15 | 14 | 15 | 15 | 82 |
| 31-Aug | 16 | 14 | 15 | 13 | 15 | 79 | 20 | 25 | 21 | 36 | 16 | 21 | 37 | 53 | 51 | 53 | 32 | 19 | 19 | 26 | 32 | 48 | 55 | 40 | 79 |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association

SO₂ Calibration Report

Version-03-2017

Station Information

Station Name: Fort McKay - Bertha Ganter Station number: AMS 01
 Calibration Date: August 11, 2017 Last Cal Date: July 14, 2017
 Start time (MST): 11:46 End time (MST): 14:45
 Reason: Routine

Calibration Standards

Cal Gas Concentration 49.3 ppm Cal Gas Exp Date November 4, 2019
 Cal Gas Cylinder # EY0000683
 Calibrator Make/Model API T700 Serial Number 2464
 ZAG Make/Model API 701H Serial Number 587

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: JC1501301448

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|----------------------|--------------|---------------|--------------|--------------|---------------|
| Analyzer Range | 0 - 1000 ppb | | PMT voltage | -614 | -614 |
| Calculated slope | 0.999248 | 0.998457 | Lamp voltage | 812 | 812 |
| Calculated intercept | 1.899776 | 1.525435 | Pressure | 690.4 | 689.5 |
| Analyzer Background | 14.3 | 14.3 | Flow | 0.505 | 0.505 |
| Analyzer Coefficient | 0.911 | 0.911 | Intensity | 91 | 91 |

SO₂ Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|-----------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5998 | 0.0 | 0.0 | 0.1 | ---- |
| as found span | 5416 | 82.9 | 743.2 | 739.4 | 1.005 |
| calibrator zero | 5998 | 0.0 | 0.0 | 0.3 | ---- |
| high point | 5417 | 83.0 | 744.0 | 744.6 | 0.999 |
| second point | 5453 | 46.4 | 416.0 | 414.3 | 1.004 |
| third point | 5474 | 23.3 | 209.0 | 205.7 | 1.016 |
| as left zero | 5998 | 0.0 | 0.0 | 0.4 | ---- |
| as left span | 5417 | 83.0 | 744.0 | 740.9 | 1.004 |

| Average Correction Factor | | | | 1.006 |
|---------------------------|--------|-------------------|--------|---|
| Corrected As found | 739.30 | Previous response | 741.89 | *% change * = > +/-5% change initiates investigation |

Notes: No adjustments made.

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

SO₂ Calibration Summary

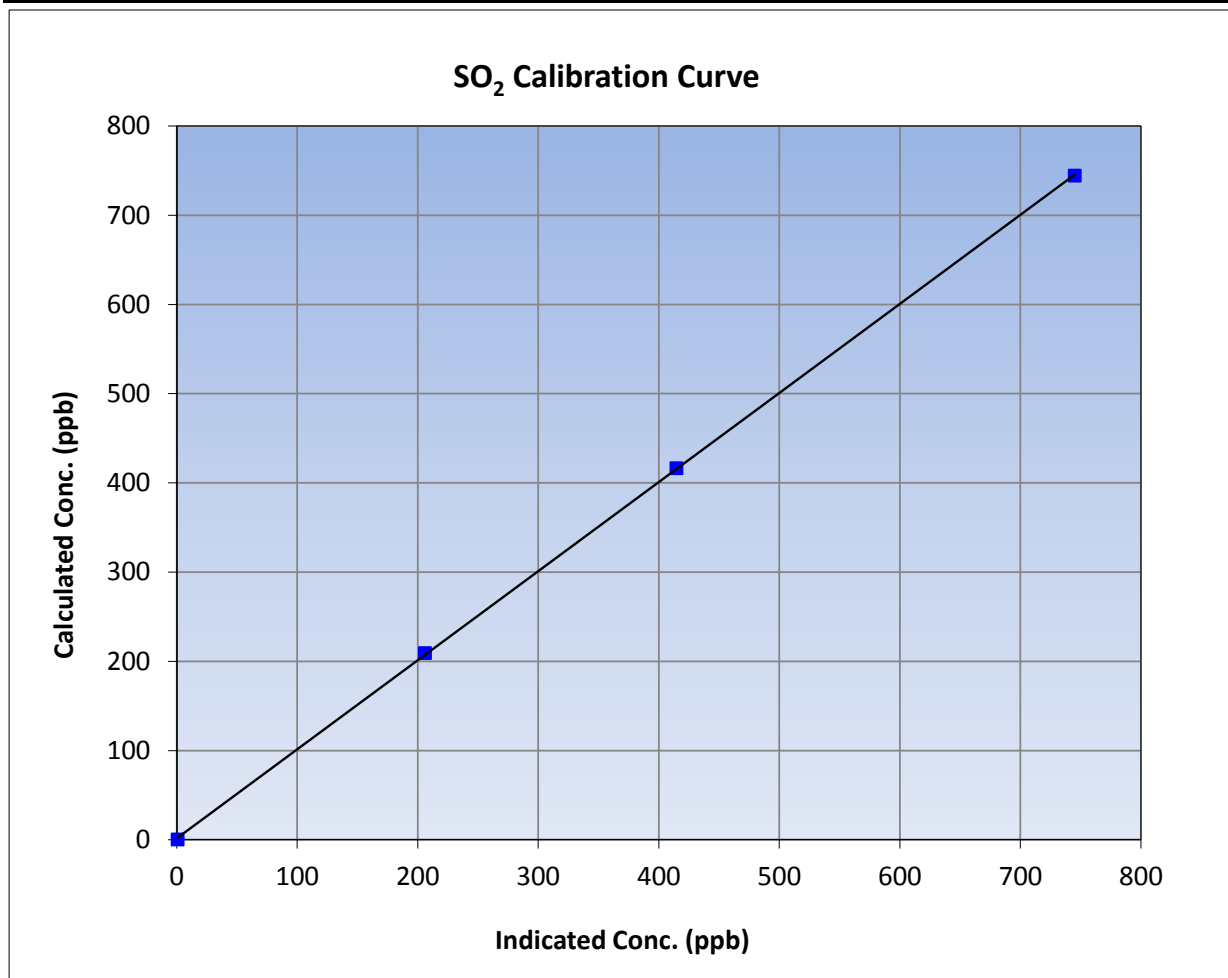
Version-03-2017

Station Information

| | | | |
|------------------|----------------------------|----------------------|---------------|
| Calibration Date | August 11, 2017 | Previous Calibration | July 14, 2017 |
| Station Name | Fort McKay - Bertha Ganter | Station Number | AMS 01 |
| Start Time (MST) | 11:46 | End Time (MST) | 14:45 |
| Analyzer make | Thermo 43i | Analyzer serial # | JC1501301448 |

Calibration Data

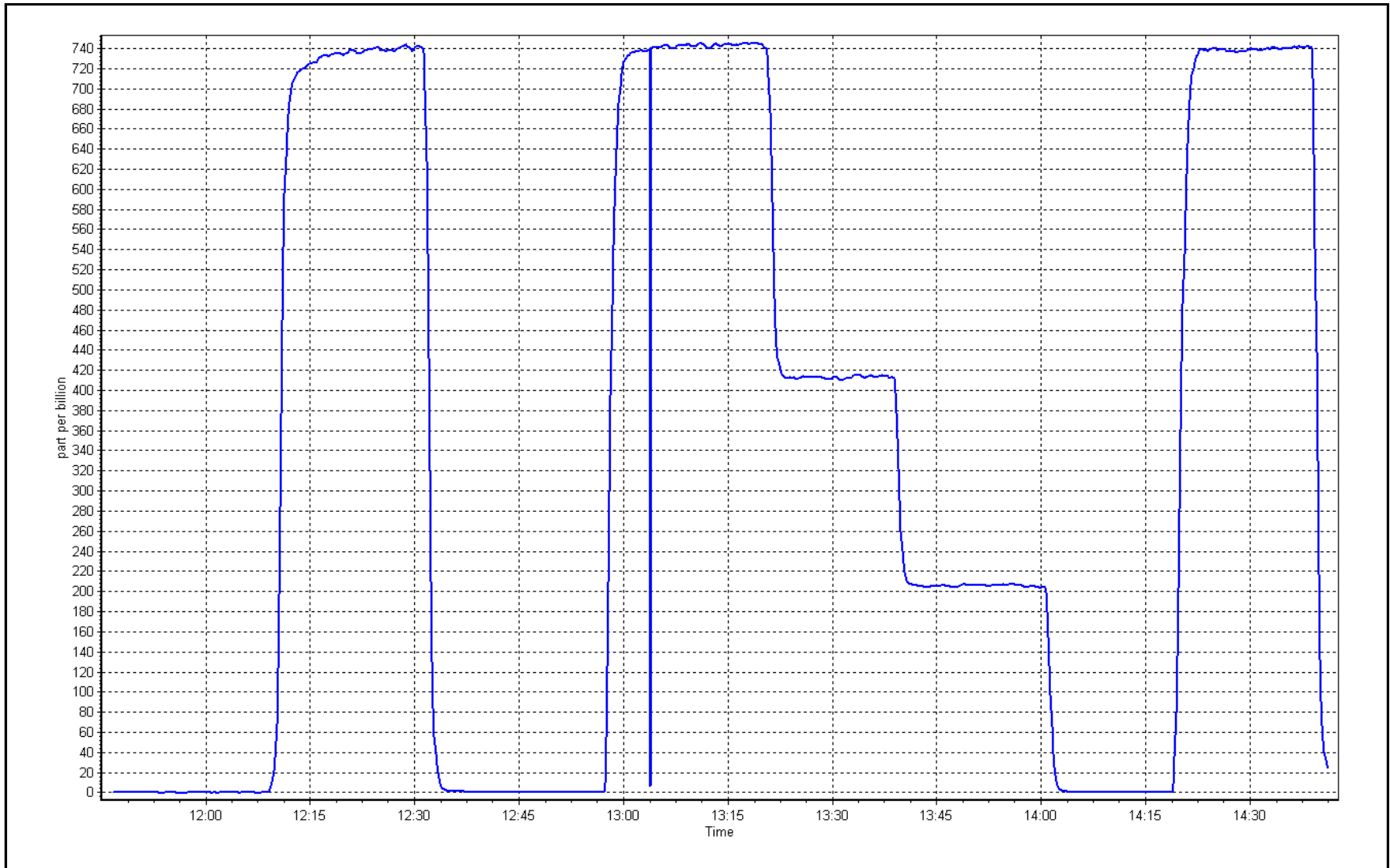
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|-------------|
| 0.0 | 0.3 | ---- | Correlation Coefficient | 0.999970 | ≥0.995 |
| 744.0 | 744.6 | 0.9992 | | | |
| 416.0 | 414.3 | 1.0040 | Slope | 0.998457 | 0.90 - 1.10 |
| 209.0 | 205.7 | 1.0158 | | | |
| | | | Intercept | 1.525435 | +/-30 |



SO2 Calibration Plot

Date: August 11, 2017

Location: Fort McKay - Bertha Ganter





Wood Buffalo Environmental Association

TRS Calibration Report

Version-03-2017

Station Information

Station Name: Fort McKay - Bertha Ganter Station number: AMS 01
 Calibration Date: August 11, 2017 Last Cal Date: July 10, 2017
 Start time (MST): 8:50 End time (MST): 11:45
 Reason: Routine

Calibration Standards

Cal Gas Concentration 4.94 ppm Cal Gas Exp Date February 12, 2019
 Cal Gas Cylinder # ET0005004
 Calibrator Make/Model API T700 Serial Number 2464
 ZAG Make/Model API 701H Serial Number 587

Analyzer Information

Analyzer make: Thermo 43i-TLE Analyzer serial #: 1218153461

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|----------------------|--------------|---------------|--------------|--------------|---------------|
| Analyzer Range | 0 - 100 ppb | | PMT voltage | -860 | -860 |
| Calculated slope | 0.999589 | 1.001837 | Lamp voltage | 1124 | 1125 |
| Calculated intercept | -0.055049 | -0.156147 | Pressure | 671.8 | 674.2 |
| Analyzer Background | 1.7 | 1.7 | Flow | 0.441 | 0.443 |
| Analyzer Coefficient | 0.919 | 0.919 | Intensity | 80 | 80 |

TRS Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|-----------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5005 | 0.0 | 0.0 | 0.1 | ---- |
| as found span | 4933 | 76.0 | 75.0 | 74.4 | 1.007 |
| calibrator zero | 5005 | 0.0 | 0.0 | 0.2 | ---- |
| high point | 4933 | 76.0 | 75.0 | 75.0 | 0.999 |
| second point | 4967 | 40.6 | 40.1 | 40.1 | 0.999 |
| third point | 4989 | 20.3 | 20.0 | 20.1 | 0.996 |
| as left zero | 5005 | 0.0 | 0.0 | 0.2 | ---- |
| as left span | 4933 | 76.0 | 75.0 | 75.3 | 0.995 |

SO2 Scrubber Check

| | | | | |
|---------------------------|--|--|--|-------|
| Average Correction Factor | | | | 0.998 |
|---------------------------|--|--|--|-------|

| | | | | | |
|--------------------|-------|-------------------|-------|-----------|------|
| Corrected As found | 74.30 | Previous response | 75.04 | *% change | 1.0% |
|--------------------|-------|-------------------|-------|-----------|------|

* = > +/-5% change initiates investigation

Notes:

No adjustments made.

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

TRS Calibration Summary

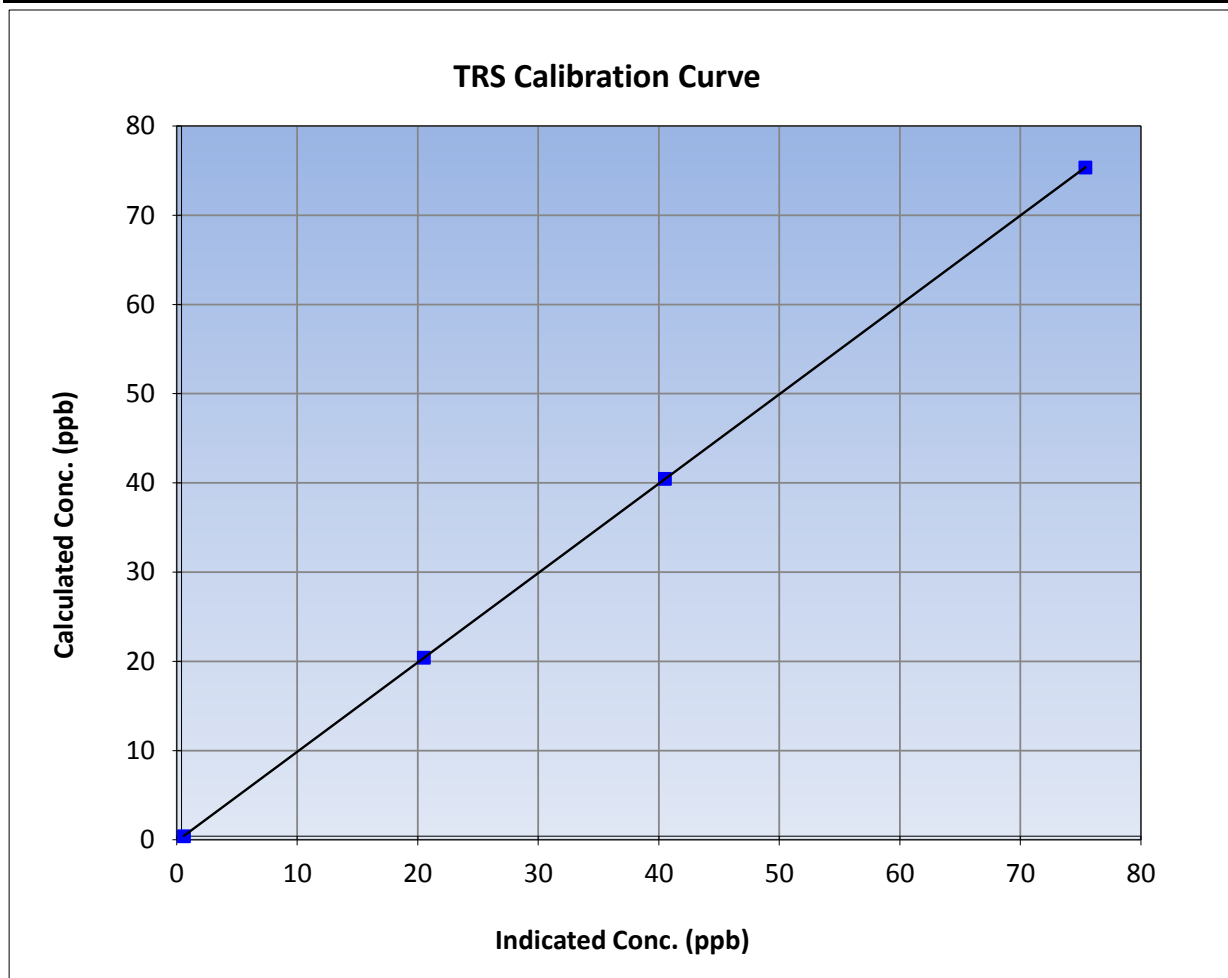
Version-03-2017

Station Information

| | | | |
|------------------|----------------------------|----------------------|---------------|
| Calibration Date | August 11, 2017 | Previous Calibration | July 10, 2017 |
| Station Name | Fort McKay - Bertha Ganter | Station Number | AMS 01 |
| Start Time (MST) | 8:50 | End Time (MST) | 11:45 |
| Analyzer make | Thermo 43i-TLE | Analyzer serial # | 1218153461 |

Calibration Data

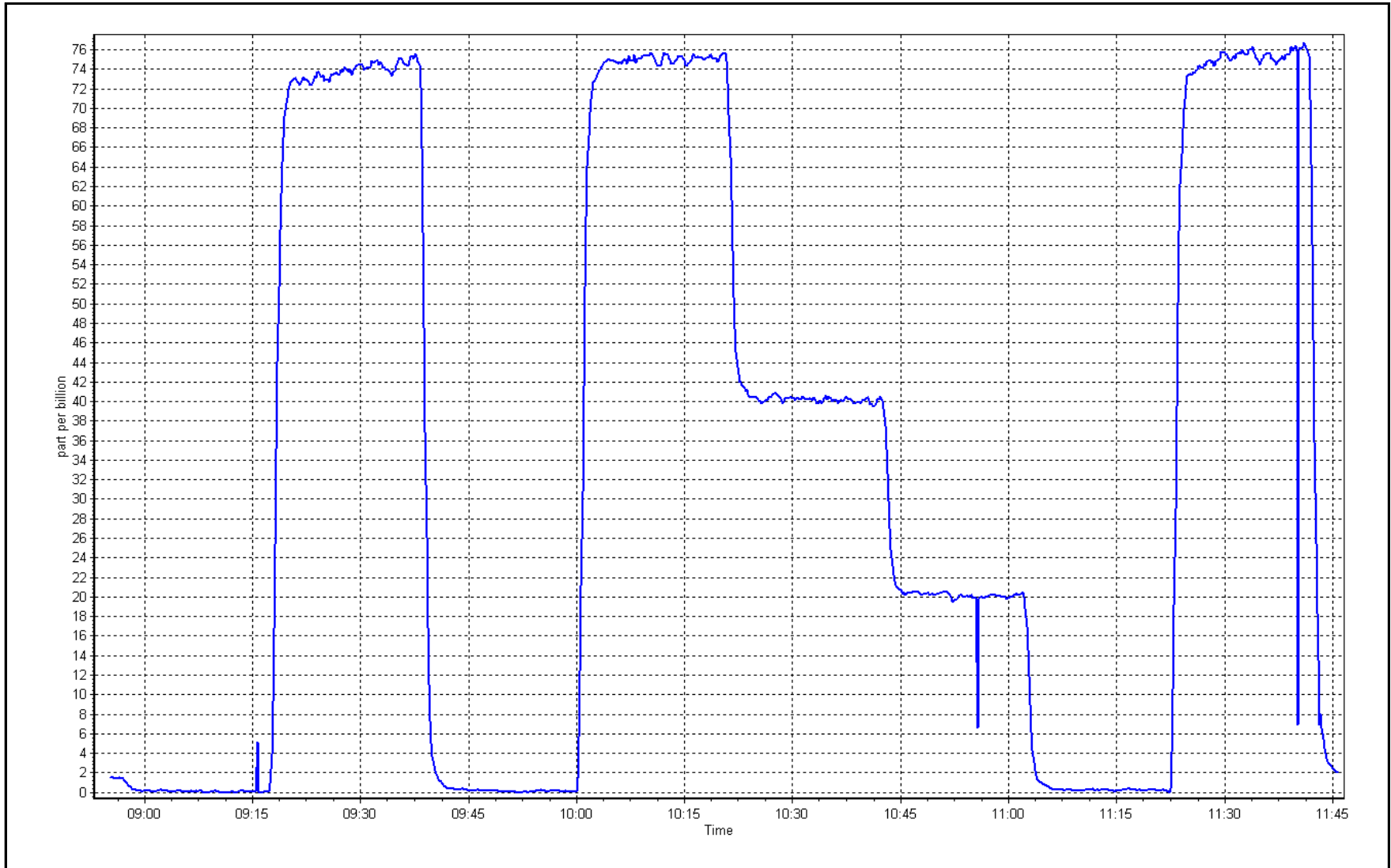
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|-------------|
| 0.0 | 0.2 | ---- | Correlation Coefficient | 0.999998 | ≥0.995 |
| 75.0 | 75.0 | 0.9994 | | | |
| 40.1 | 40.1 | 0.9988 | Slope | 1.001837 | 0.90 - 1.10 |
| 20.0 | 20.1 | 0.9960 | | | |
| | | | Intercept | -0.156147 | +/-3 |



TRS Calibration Plot

Date: August 11, 2017

Location: Fort McKay - Bertha Ganter





Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Version-03-2017

Station Information

Station Name: Fort McKay - Bertha Ganter Station number: AMS 01
Calibration Date: August 11, 2017 Last Cal Date: July 14, 2017
Start time (MST): 11:46 End time (MST): 14:45
Reason: Routine

Calibration Standards

Gas Cert Reference EY0000683 Cal Gas Expiry Date November-04-19
CH4 Cal Gas Conc. 515.0 ppm CH4 Equiv Conc. 1062.3 ppm
C3H8 Cal Gas Conc. 199.0 ppm Station temp. 21 Deg C
Calibrator Model API T700 Serial Number 2464
ZAG make/model API 701H Serial Number 587

Analyzer Information

Analyzer make: Thermo 55i

Analyzer serial #: 1152430012

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|--------------------|--------------|---------------|------------------|--------------|---------------|
| THC Range (ppm) | 0 - 50 ppm | | Column Temp | 75.1 | 75.1 |
| NMHC Range (ppm) | 0 - 25 ppm | | Detector Temp | 175.0 | 175.0 |
| CH4 SP Ratio | 1.72E-04 | 1.74E-04 | Flame Temp | 405.0 | 405.0 |
| CH4 Retention time | 12.2 | 12.2 | Carrier Pressure | 36.7 | 36.7 |
| NMHC SP Ratio | 3.90E-05 | 3.96E-05 | Fuel Pressure | 47.7 | 47.7 |
| NMHC Peak Area | 211657 | 208609 | Air Pressure | 39.0 | 39.0 |

Calibration Statistics

| | <u>Start</u> | <u>Finish</u> |
|-----------------|--------------|---------------|
| THC Cal Slope | 0.999194 | 0.998565 |
| THC Cal Offset | 0.044437 | 0.021592 |
| CH4 Cal Slope | 0.999365 | 1.000578 |
| CH4 Cal Offset | 0.037702 | 0.021901 |
| NMHC Cal Slope | 0.999074 | 0.996076 |
| NMHC Cal Offset | 0.007088 | 0.000535 |

Notes:

Span adjusted.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Version-02-2017

THC Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|--|
| as found zero | 5998 | 0.0 | 0.00 | 0.02 | ---- |
| as found span | 5417 | 83.0 | 16.03 | 15.83 | 1.013 |
| calibrator zero | 5998 | 0.0 | 0.00 | 0.01 | ---- |
| high point | 5417 | 83.0 | 16.03 | 16.06 | 0.998 |
| second point | 5453 | 46.4 | 8.96 | 8.92 | 1.005 |
| third point | 5474 | 23.3 | 4.50 | 4.47 | 1.008 |
| as left zero | 5998 | 0.0 | 0.00 | 0.00 | ---- |
| as left span | 5417 | 83.0 | 16.03 | 16.11 | 0.995 |
| Average Correction Factor | | | | | 1.004 |
| Corrected As found | 15.81 | Prev response | 16.00 | *% change | 1.2% |

NMHC Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|--|
| as found zero | 5998 | 0 | 0.00 | 0.00 | ---- |
| as found span | 5417 | 83 | 8.26 | 8.12 | 1.017 |
| calibrator zero | 5998 | 0 | 0.00 | 0.00 | ---- |
| high point | 5417 | 83 | 8.26 | 8.29 | 0.996 |
| second point | 5453 | 46.4 | 4.62 | 4.63 | 0.997 |
| third point | 5474 | 23.3 | 2.32 | 2.33 | 0.995 |
| as left zero | 5998 | 0 | 0.00 | 0.00 | ---- |
| as left span | 5417 | 83 | 8.26 | 8.30 | 0.996 |
| Average Correction Factor | | | | | 0.996 |
| Corrected As found | 8.12 | Prev response | 8.26 | *% change | 1.7% |

CH4 Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|--|
| as found zero | 5998 | 0.0 | 0.00 | 0.02 | ---- |
| as found span | 5417 | 83.0 | 7.77 | 7.71 | 1.009 |
| calibrator zero | 5998 | 0.0 | 0.00 | 0.01 | ---- |
| high point | 5417 | 83.0 | 7.77 | 7.77 | 1.000 |
| second point | 5453 | 46.4 | 4.35 | 4.29 | 1.013 |
| third point | 5474 | 23.3 | 2.18 | 2.14 | 1.022 |
| as left zero | 5998 | 0.0 | 0.00 | 0.00 | ---- |
| as left span | 5417 | 83.0 | 7.77 | 7.82 | 0.994 |
| Average Correction Factor | | | | | 1.012 |
| Corrected As found | 7.69 | Prev response | 7.74 | *% change | 0.7% |

* = > +/-5% change initiates investigation



Wood Buffalo Environmental Association

THC Calibration Summary

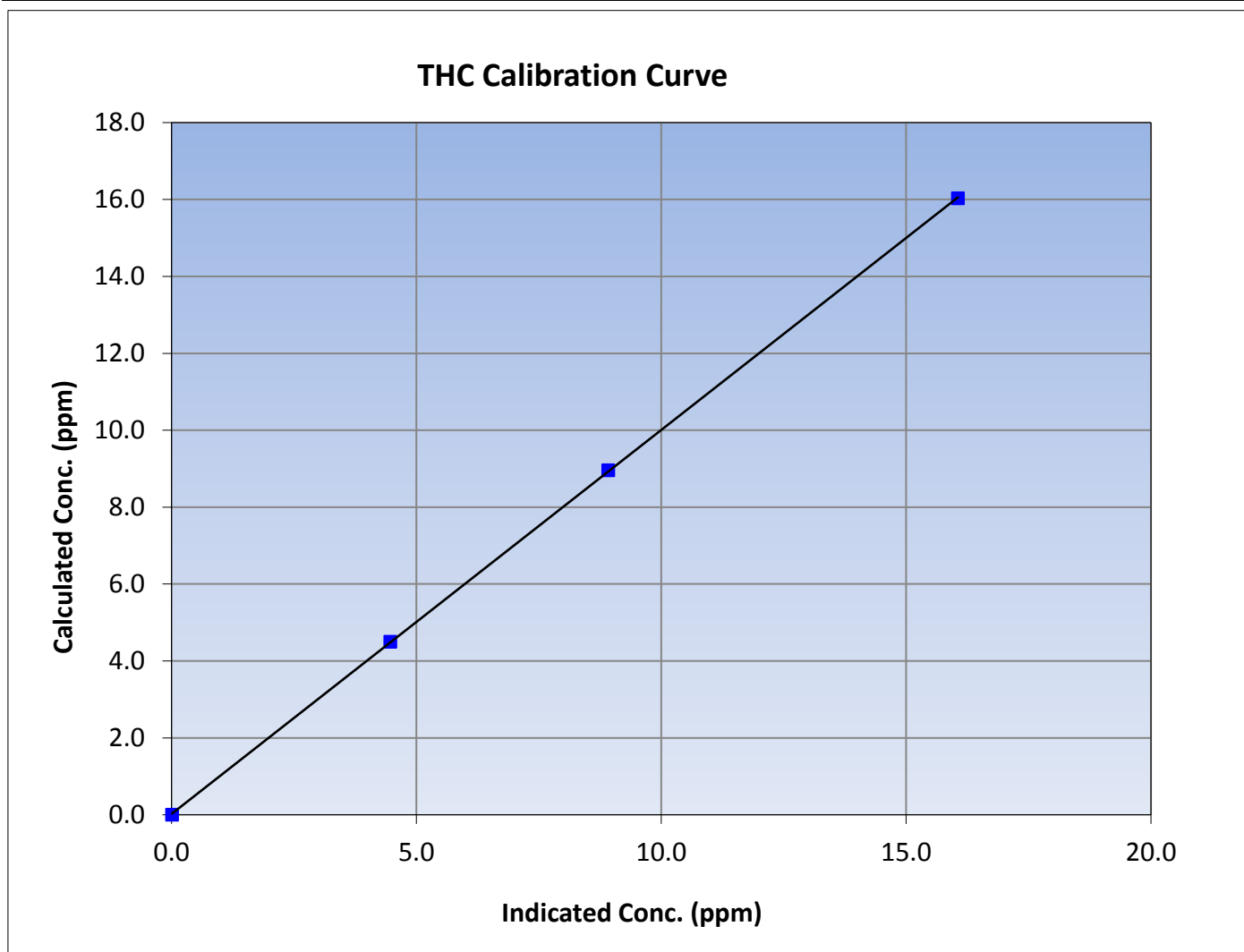
Version-02-2017

Station Information

| | | | |
|------------------|----------------------------|----------------------|---------------|
| Calibration Date | August 11, 2017 | Previous Calibration | July 14, 2017 |
| Station Name | Fort McKay - Bertha Ganter | Station Number | AMS 01 |
| Start Time (MST) | 11:46 | End Time (MST) | 14:45 |
| Analyzer make | Thermo 55i | Analyzer serial # | 1152430012 |

Calibration Data

| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> | | | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|---------------|-------|----------|-------------|
| 0.00 | 0.01 | ---- | Correlation Coefficient | 0.999975 | ≥ 0.995 | | | |
| 16.03 | 16.06 | 0.9983 | | | | | | |
| 8.96 | 8.92 | 1.0051 | | | | Slope | 0.998565 | 0.90 - 1.10 |
| 4.50 | 4.47 | 1.0081 | | | | | | |
| | | | Intercept | 0.021592 | ± 0.5 | | | |





Wood Buffalo Environmental Association

CH₄ Calibration Summary

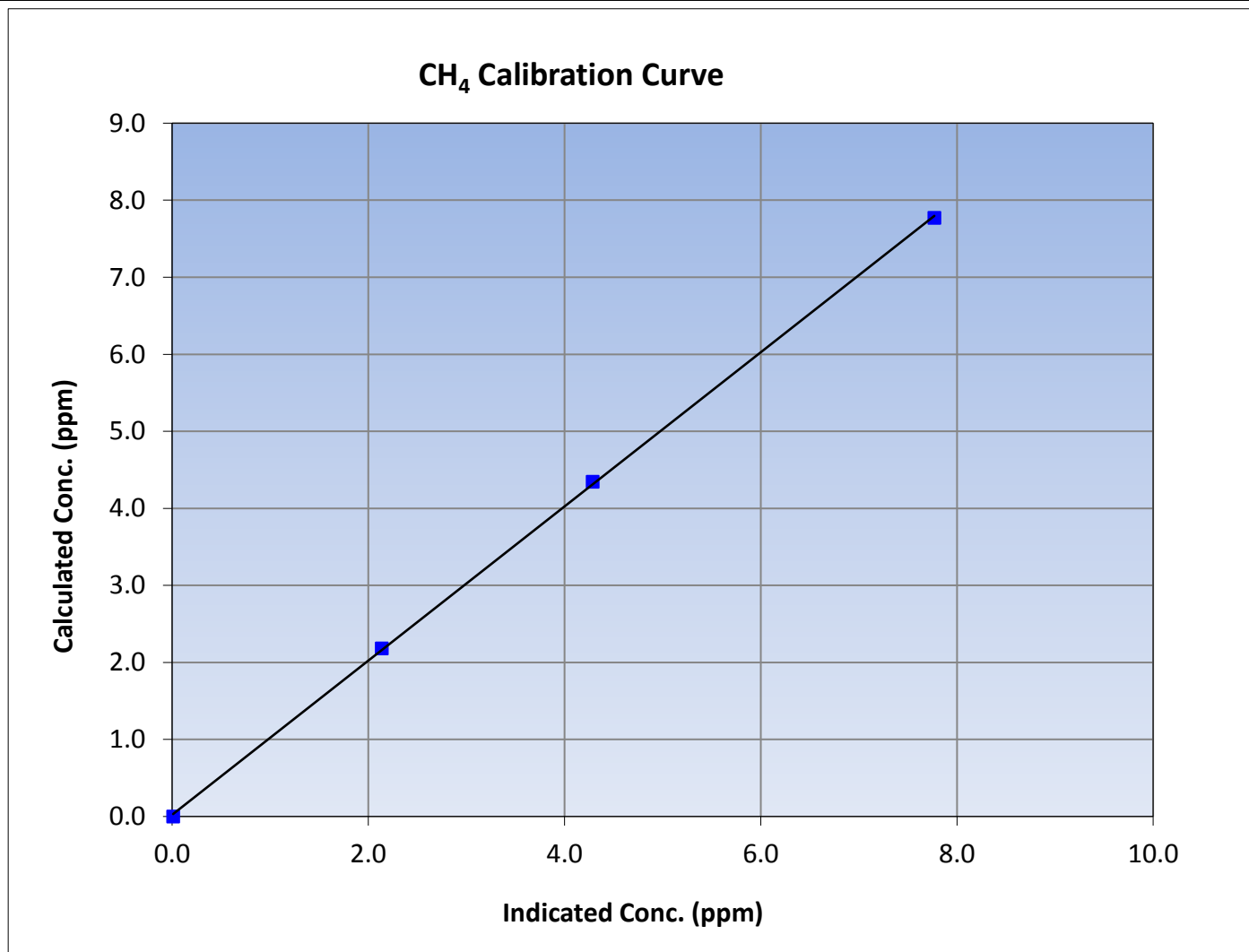
Version-02-2017

Station Information

| | | | |
|------------------|----------------------------|----------------------|---------------|
| Calibration Date | August 11, 2017 | Previous Calibration | July 14, 2017 |
| Station Name | Fort McKay - Bertha Ganter | Station Number | AMS 01 |
| Start Time (MST) | 11:46 | End Time (MST) | 14:45 |
| Analyzer make | Thermo 55i | Analyzer serial # | 1152430012 |

Calibration Data

| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> | | | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|---------------|-------|----------|-------------|
| 0.00 | 0.01 | ---- | Correlation Coefficient | 0.999901 | ≥ 0.995 | | | |
| 7.77 | 7.77 | 1.0002 | | | | | | |
| 4.35 | 4.29 | 1.0133 | | | | Slope | 1.000578 | 0.90 - 1.10 |
| 2.18 | 2.14 | 1.0219 | | | | | | |
| | | | Intercept | 0.021901 | ± 0.5 | | | |





Wood Buffalo Environmental Association

NMHC Calibration Summary

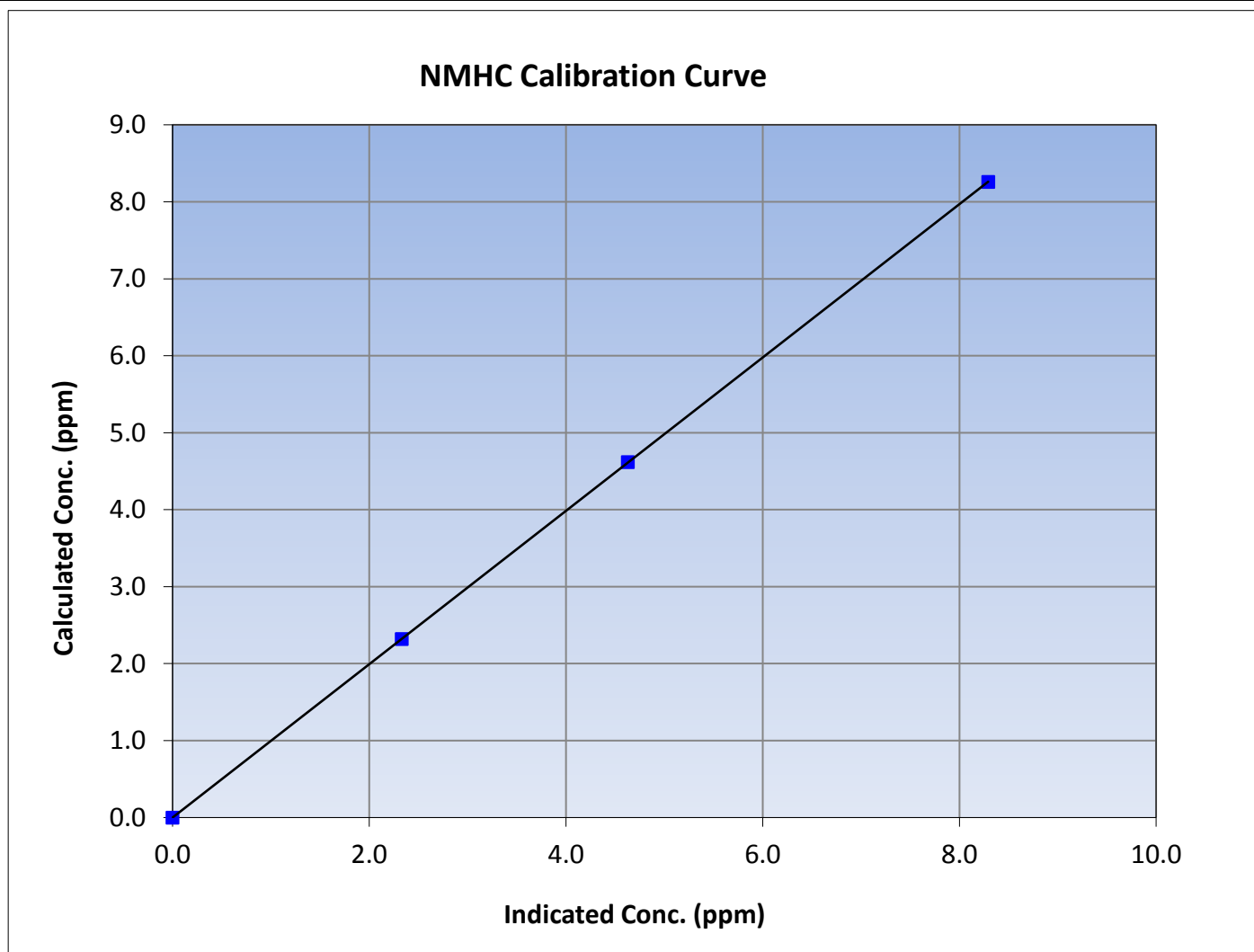
Version-02-2017

Station Information

| | | | |
|------------------|----------------------------|----------------------|---------------|
| Calibration Date | August 11, 2017 | Previous Calibration | July 14, 2017 |
| Station Name | Fort McKay - Bertha Ganter | Station Number | AMS 01 |
| Start Time (MST) | 11:46 | End Time (MST) | 14:45 |
| Analyzer make | Thermo 55i | Analyzer serial # | 1152430012 |

Calibration Data

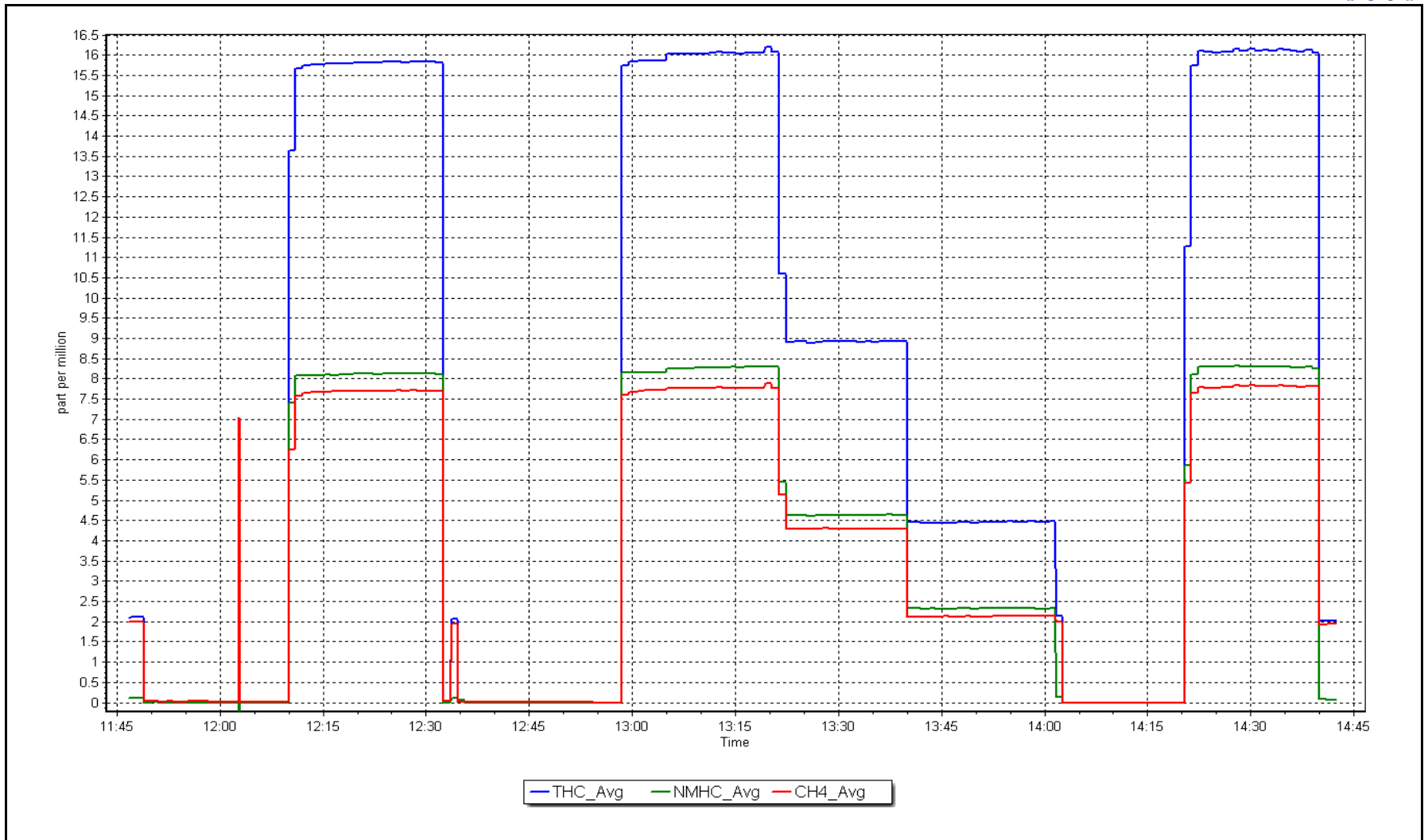
| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> | | | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|---------------|-------|----------|-------------|
| 0.00 | 0.00 | ---- | Correlation Coefficient | 0.999999 | ≥ 0.995 | | | |
| 8.26 | 8.29 | 0.9958 | | | | | | |
| 4.62 | 4.63 | 0.9975 | | | | Slope | 0.996076 | 0.90 - 1.10 |
| 2.32 | 2.33 | 0.9951 | | | | | | |
| | | | Intercept | 0.000535 | ± 0.5 | | | |



NMHC Calibration Plot

Date: August 11, 2017

Location: Fort McKay - Bertha Ganter





Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|----------------------------|-----------------|-----------------|
| Station Name: | Fort McKay - Bertha Ganter | Station number: | AMS 01 |
| Calibration Date: | August 23, 2017 | Last Cal Date: | August 11, 2017 |
| Start time (MST): | 11:55 | End time (MST): | 14:00 |
| Reason: | Maintenance | | |

Calibration Standards

| | | | |
|--------------------|------------------|---------------------|----------------|
| Gas Cert Reference | EY0000683 | Cal Gas Expiry Date | November-04-19 |
| CH4 Cal Gas Conc. | <u>515.0</u> ppm | CH4 Equiv Conc. | 1062.3 ppm |
| C3H8 Cal Gas Conc. | <u>199.0</u> ppm | Station temp. | 21 Deg C |
| Calibrator Model | API T700 | Serial Number | 2464 |
| ZAG make/model | API 701H | Serial Number | 587 |

Analyzer Information

Analyzer make: Thermo 55i

Analyzer serial #: 1152430012

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|--------------------|--------------|---------------|------------------|--------------|---------------|
| THC Range (ppm) | 0 - 50 ppm | | Column Temp | 75.0 | 74.8 |
| NMHC Range (ppm) | 0 - 25 ppm | | Detector Temp | 175.0 | 175.0 |
| CH4 SP Ratio | 1.74E-04 | 1.74E-04 | Flame Temp | 405.0 | 405.0 |
| CH4 Retention time | 12.2 | 12.2 | Carrier Pressure | 36.7 | 36.7 |
| NMHC SP Ratio | 3.96E-05 | 3.96E-05 | Fuel Pressure | 47.7 | 47.7 |
| NMHC Peak Area | 208609 | 208609 | Air Pressure | 39.0 | 39.0 |

Calibration Statistics

| | <u>Start</u> | <u>Finish</u> |
|-----------------|--------------|---------------|
| THC Cal Slope | 0.998565 | 1.005603 |
| THC Cal Offset | 0.021592 | -0.040224 |
| CH4 Cal Slope | 1.000578 | 1.001523 |
| CH4 Cal Offset | 0.021901 | -0.040061 |
| NMHC Cal Slope | 0.996076 | 1.009226 |
| NMHC Cal Offset | 0.000535 | 0.000000 |

Notes: Baseline correction using zero chromatogram.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Version-02-2017

THC Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|--|
| as found zero | 5998 | 0.0 | 0.00 | 0.08 | ---- |
| as found span | 5417 | 83.0 | 16.03 | 15.96 | 1.004 |
| calibrator zero | 5998 | 0.0 | 0.00 | 0.04 | ---- |
| high point | 5417 | 83.0 | 16.03 | 15.98 | 1.003 |
| second point | | | | | |
| third point | | | | | |
| as left zero | | | | | |
| as left span | | | | | |
| Average Correction Factor | | | | | 1.003 |
| Corrected As found | 15.88 | Prev response | 16.03 | *% change | 1.0% |

NMHC Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|--|
| as found zero | 5998 | 0 | 0.00 | 0.00 | ---- |
| as found span | 5417 | 83 | 8.26 | 8.19 | 1.008 |
| calibrator zero | 5998 | 0 | 0.00 | 0.00 | ---- |
| high point | 5417 | 83 | 8.26 | 8.18 | 1.009 |
| second point | | | | | |
| third point | | | | | |
| as left zero | | | | | |
| as left span | | | | | |
| Average Correction Factor | | | | | 1.009 |
| Corrected As found | 8.19 | Prev response | 8.29 | *% change | 1.2% |

CH4 Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|--|
| as found zero | 5998 | 0.0 | 0.00 | 0.08 | ---- |
| as found span | 5417 | 83.0 | 7.77 | 7.76 | 1.002 |
| calibrator zero | 5998 | 0.0 | 0.00 | 0.04 | ---- |
| high point | 5417 | 83.0 | 7.77 | 7.80 | 0.996 |
| second point | | | | | |
| third point | | | | | |
| as left zero | | | | | |
| as left span | | | | | |
| Average Correction Factor | | | | | 0.996 |
| Corrected As found | 7.68 | Prev response | 7.75 | *% change | 0.9% |

* = > +/-5% change initiates investigation



Wood Buffalo Environmental Association

THC Calibration Summary

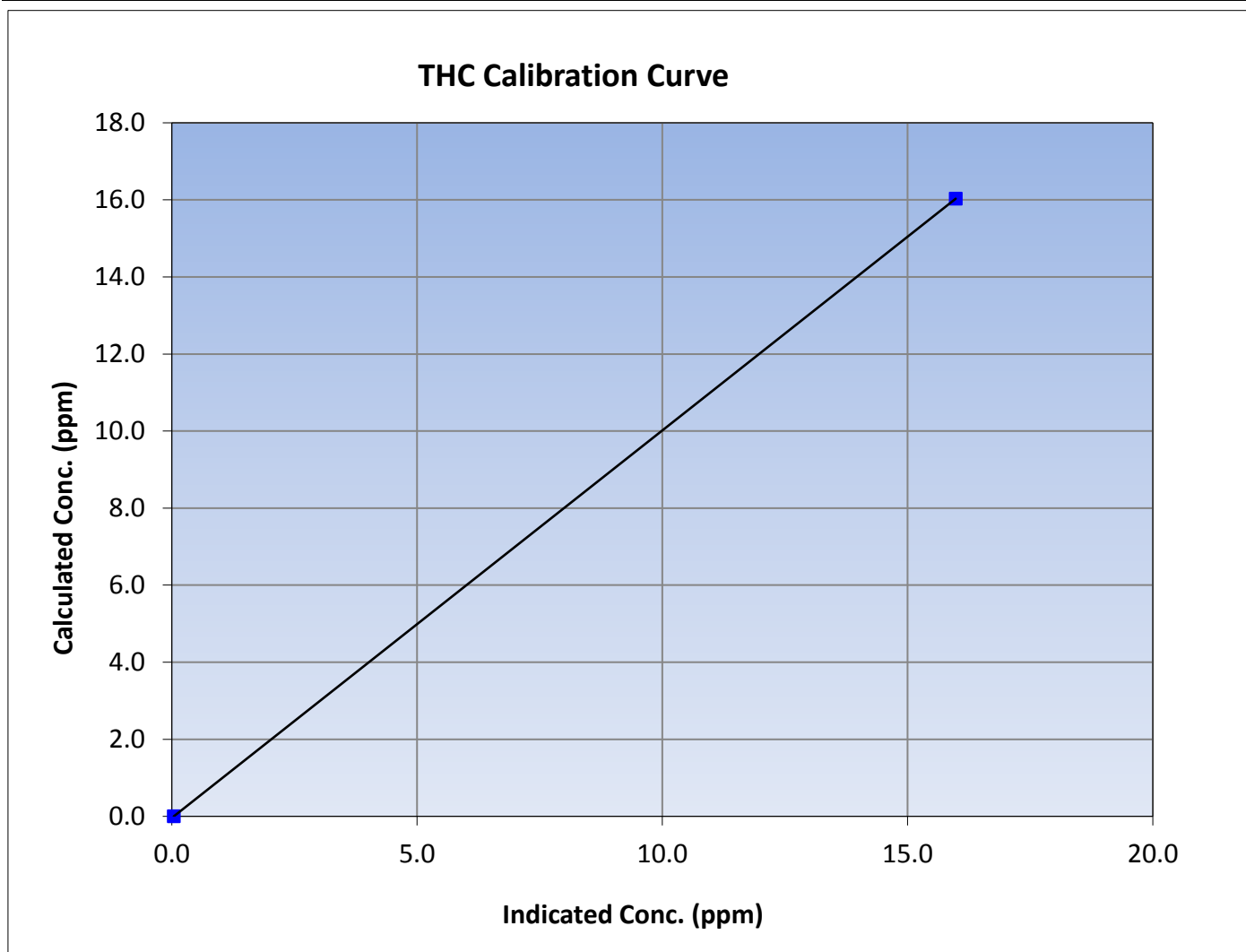
Version-02-2017

Station Information

| | | | |
|------------------|----------------------------|----------------------|-----------------|
| Calibration Date | August 23, 2017 | Previous Calibration | August 11, 2017 |
| Station Name | Fort McKay - Bertha Ganter | Station Number | AMS 01 |
| Start Time (MST) | 11:55 | End Time (MST) | 14:00 |
| Analyzer make | Thermo 55i | Analyzer serial # | 1152430012 |

Calibration Data

| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|---------------|
| 0.00 | 0.04 | ---- | Correlation Coefficient | 1.000000 | ≥ 0.995 |
| 16.03 | 15.98 | 1.0031 | | | |
| | | | | | |
| | | | Slope | 1.005603 | 0.90 - 1.10 |
| | | | Intercept | -0.040224 | +/-0.5 |





Wood Buffalo Environmental Association

CH₄ Calibration Summary

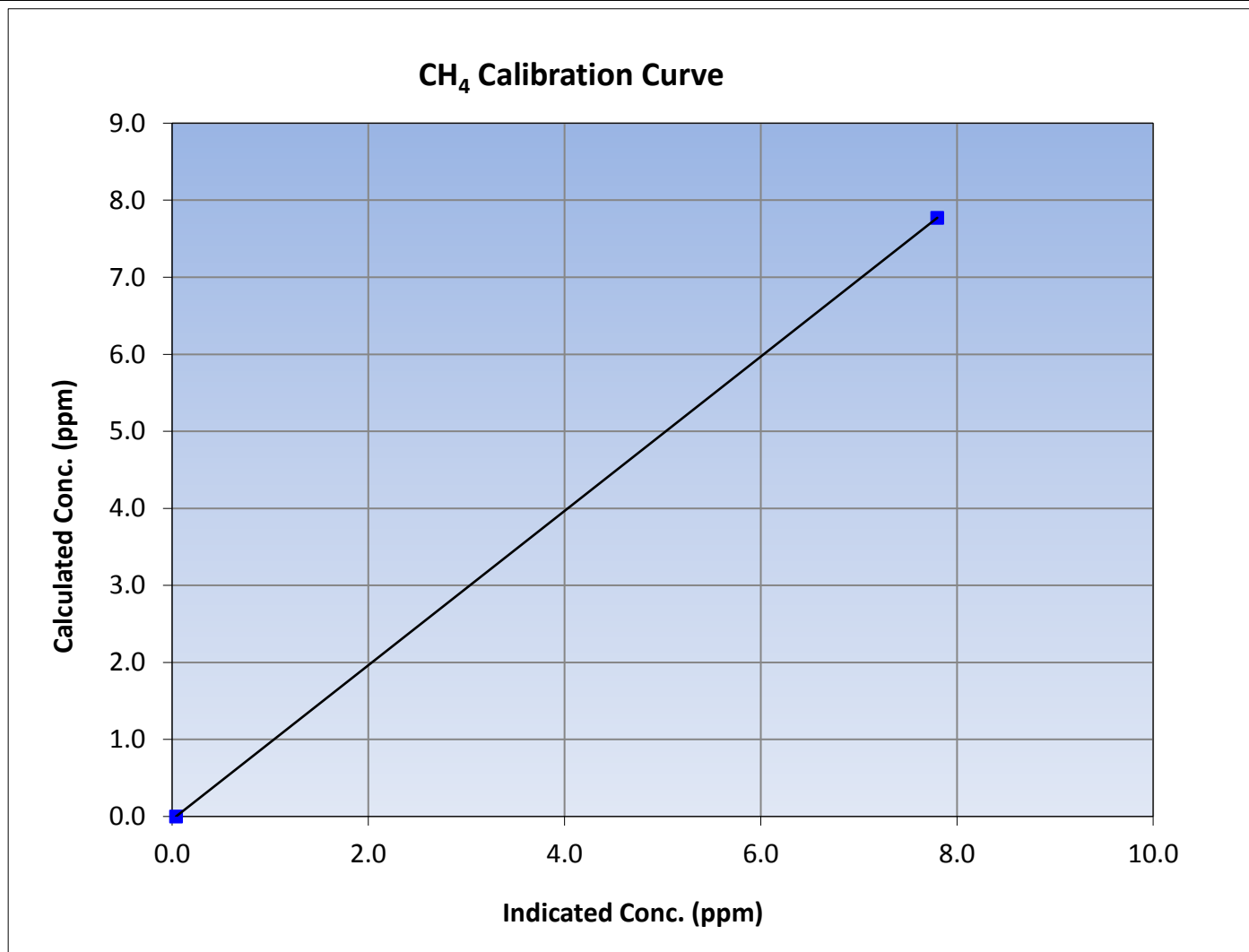
Version-02-2017

Station Information

| | | | |
|------------------|----------------------------|----------------------|-----------------|
| Calibration Date | August 23, 2017 | Previous Calibration | August 11, 2017 |
| Station Name | Fort McKay - Bertha Ganter | Station Number | AMS 01 |
| Start Time (MST) | 11:55 | End Time (MST) | 14:00 |
| Analyzer make | Thermo 55i | Analyzer serial # | 1152430012 |

Calibration Data

| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|---------------|
| 0.00 | 0.04 | ---- | Correlation Coefficient | 1.000000 | ≥0.995 |
| 7.77 | 7.80 | 0.9964 | | | |
| | | | | | |
| | | | Slope | 1.001523 | 0.90 - 1.10 |
| | | | Intercept | -0.040061 | +/-0.5 |





Wood Buffalo Environmental Association

NMHC Calibration Summary

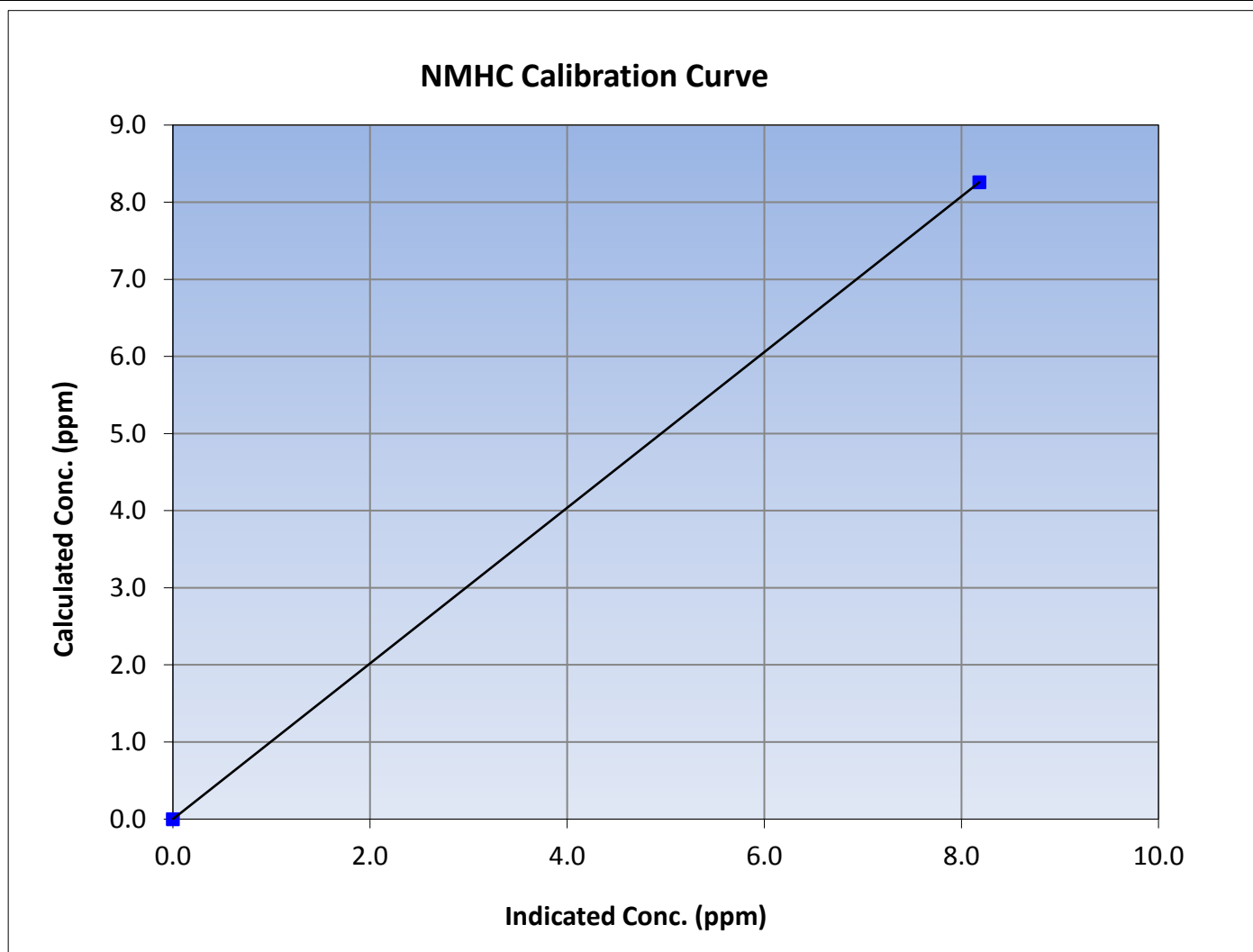
Version-02-2017

Station Information

| | | | |
|------------------|----------------------------|----------------------|-----------------|
| Calibration Date | August 23, 2017 | Previous Calibration | August 11, 2017 |
| Station Name | Fort McKay - Bertha Ganter | Station Number | AMS 01 |
| Start Time (MST) | 11:55 | End Time (MST) | 14:00 |
| Analyzer make | Thermo 55i | Analyzer serial # | 1152430012 |

Calibration Data

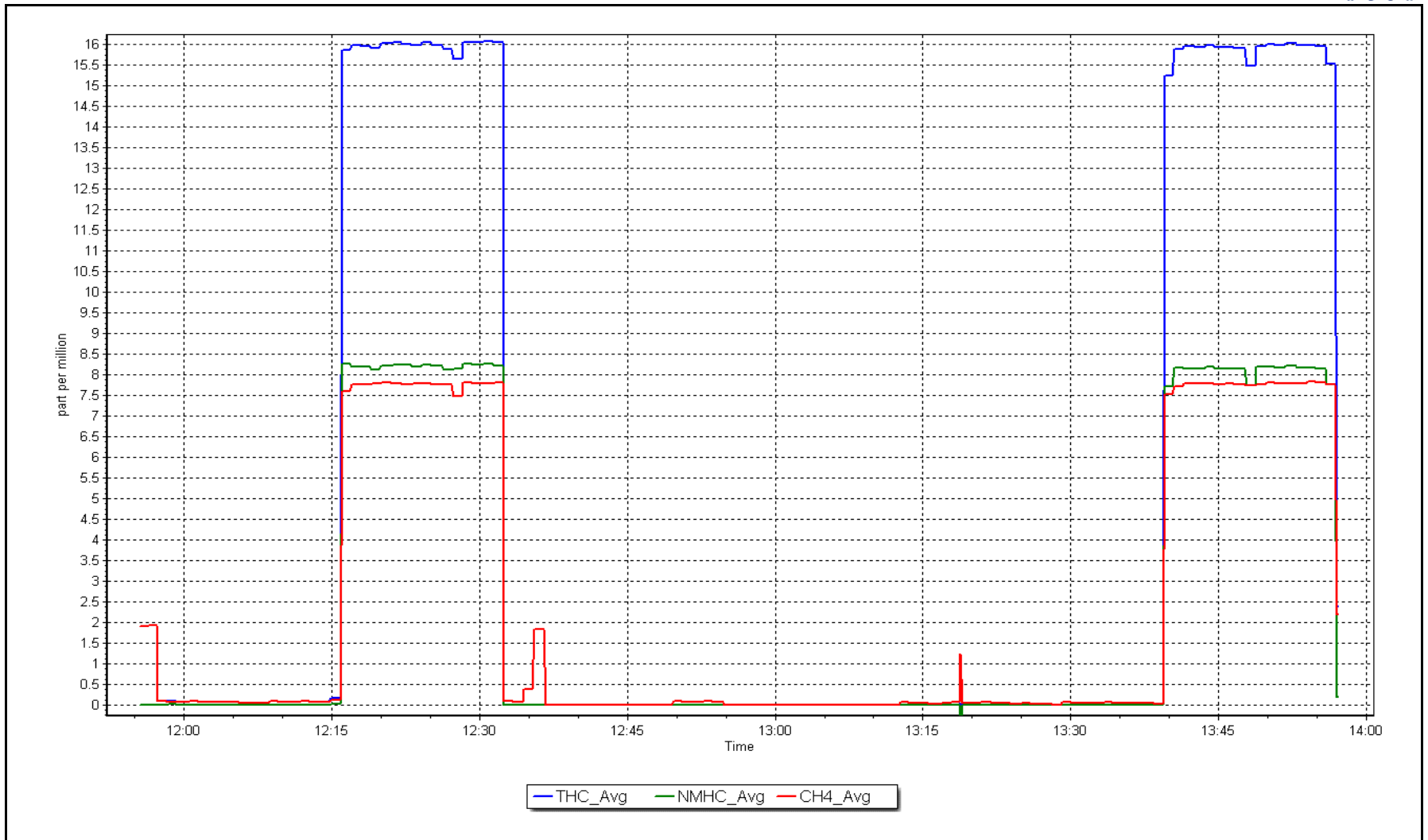
| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.00 | 0.00 | ---- | Correlation Coefficient | ≥ 0.995 | |
| 8.26 | 8.18 | 1.0092 | | | |
| | | | | | |
| | | | Slope | 1.009226 | 0.90 - 1.10 |
| | | | Intercept | 0.000000 | +/-0.5 |



NMHC Calibration Plot

Date: August 23, 2017

Location: Fort McKay - Bertha Ganter





Wood Buffalo Environmental Association

O₃ Calibration Report

Version-03-2017

Station Information

Station Name: Fort McKay - Bertha Ganter Station number: AMS 01
 Calibration Date: August 8, 2017 Last Cal Date: July 21, 2017
 Start time (MST): 9:50 End time (MST): 12:50
 Reason: Routine

Calibration Standards

O₃ generation mode: Photometer O₃ reference Date: Photometer
 Calibrator Make/Model: API T700 Serial Number: 2464
 ZAG Make/Model: API 701H Serial Number: 587

Analyzer Information

Analyzer make: API T400 Analyzer serial #: 1107

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|----------------------|--------------|---------------|----------------------------|--------------|---------------|
| Analyzer Range | 0 - 500 ppb | | Pressure | 26.9 | 27.0 |
| Calculated slope | 0.998168 | 1.000484 | Flow cell A | 784.0 | 784.0 |
| Calculated intercept | -0.378173 | -0.459848 | Flow cell B | 780.0 | 780.0 |
| Analyzer Background | 0.4 | 0.4 | O ₃ Measurement | 3935.5 | 3917.9 |
| Analyzer Coefficient | 1.007 | 1.007 | O ₃ Reference | 3935.5 | 3933.8 |

O₃ Calibration Data

| Set Point | Total air flow rate (sccm) | Calibrator Lamp Voltage Drive | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|-----------------|----------------------------|-------------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5000 | 0.00 | 0.0 | -0.2 | ---- |
| as found span | 4893 | 933.00 | 400.0 | 400.6 | 0.999 |
| calibrator zero | 5996 | 0.00 | 0.0 | 0.2 | ---- |
| high point | 5000 | 933.00 | 400.0 | 400.1 | 1.000 |
| second point | 5001 | 774.50 | 200.0 | 200.6 | 0.997 |
| third point | 4999 | 0.34 | 100.0 | 100.6 | 0.994 |
| as left zero | 5996 | 0.0 | 0.0 | -0.2 | ---- |
| as left span | 5000 | 933.0 | 400.0 | 400.6 | 0.999 |

Average Correction Factor | 0.997

Corrected As found 400.80 Previous response 401.11 *% change 0.1%

** = > +/--8% change initiates investigation*

Notes: No adjustments made.

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

O₃ Calibration Summary

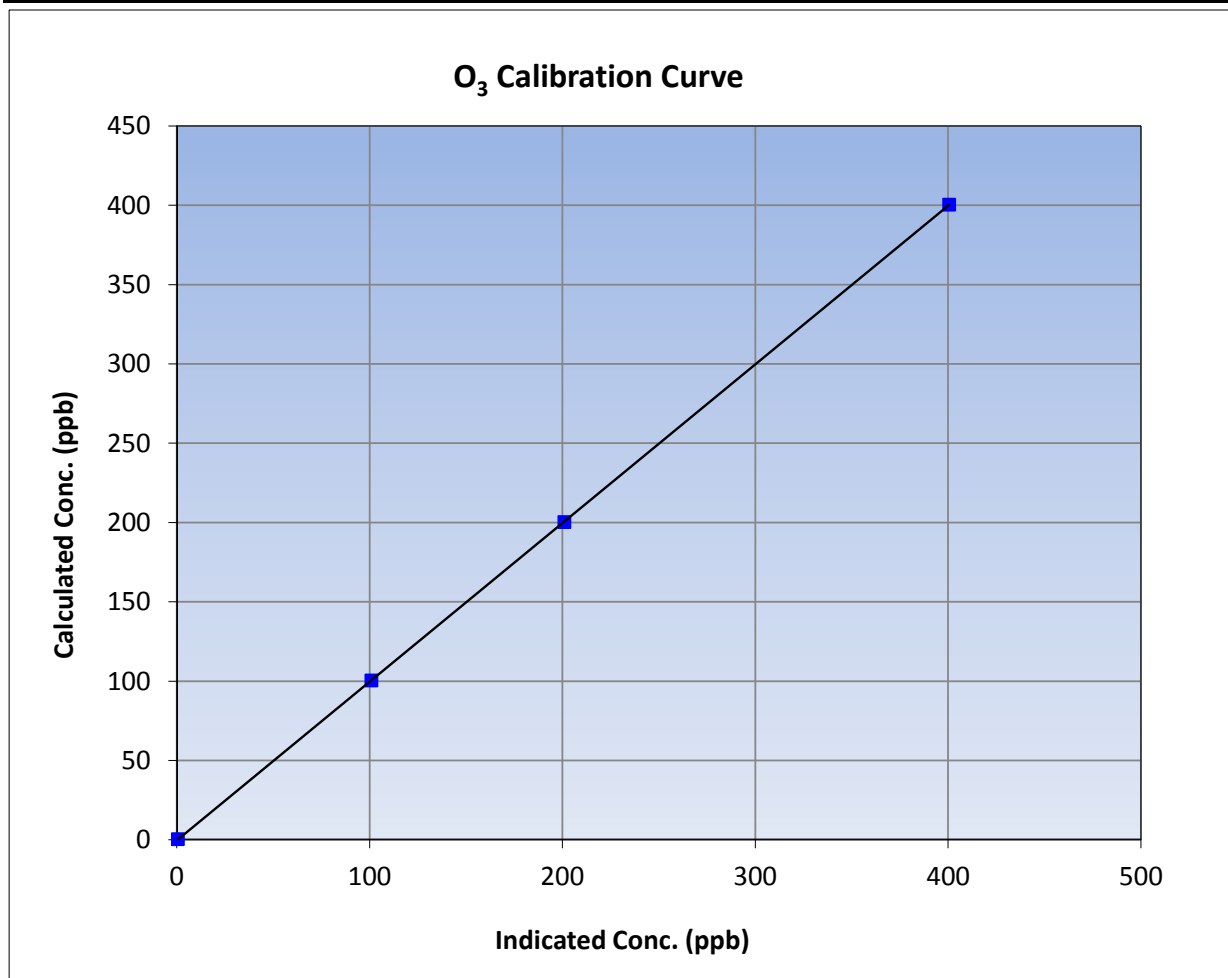
Version-03-2017

Station Information

| | | | |
|------------------|----------------------------|----------------------|---------------|
| Calibration Date | August 8, 2017 | Previous Calibration | July 21, 2017 |
| Station Name | Fort McKay - Bertha Ganter | Station Number | AMS 01 |
| Start Time (MST) | 9:50 | End Time (MST) | 12:50 |
| Analyzer make | API T400 | Analyzer serial # | 1107 |

Calibration Data

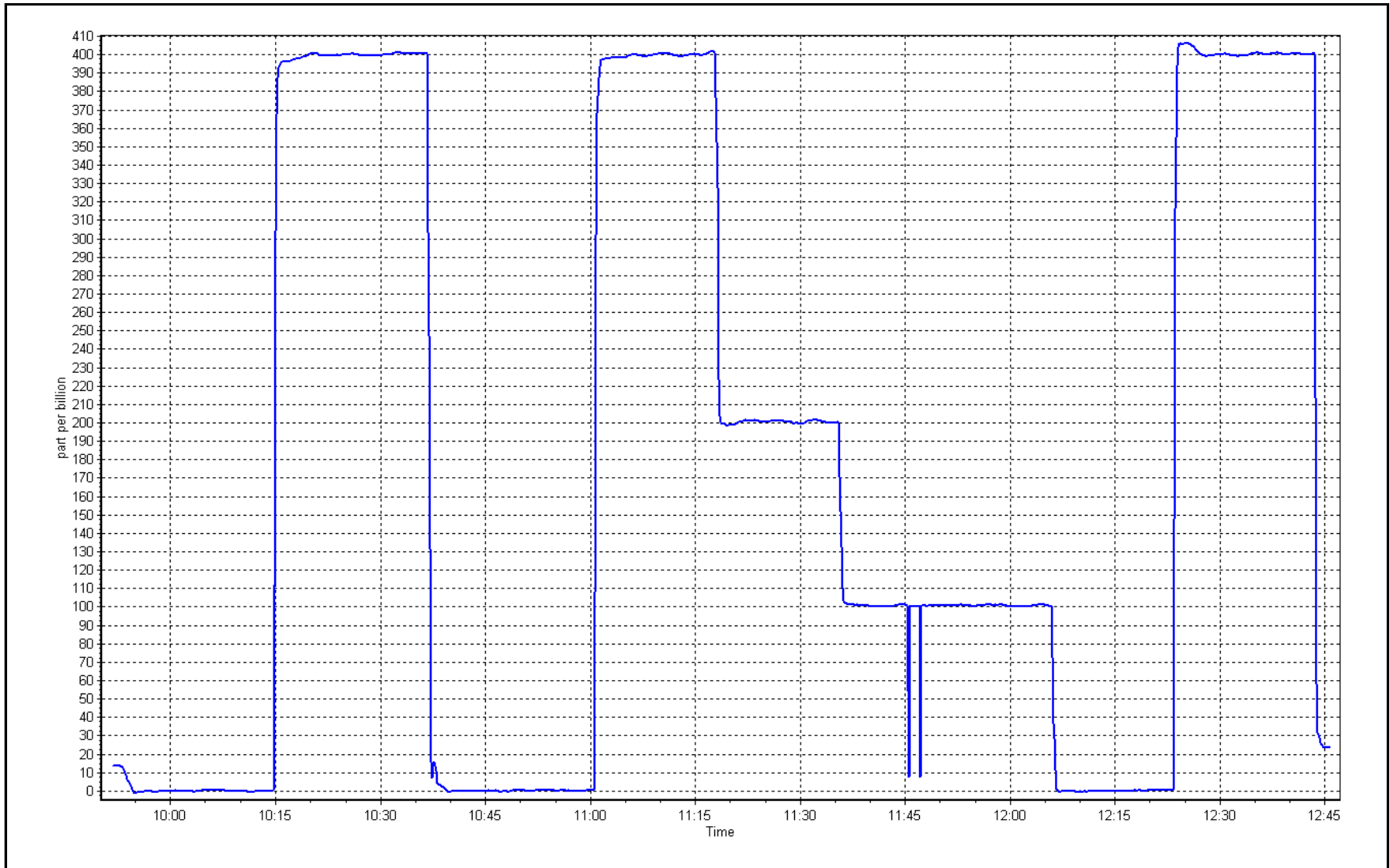
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.2 | ---- | Correlation Coefficient | 0.999998 | |
| 400.0 | 400.1 | 0.9998 | | | ≥0.995 |
| 200.0 | 200.6 | 0.9970 | Slope | 1.000484 | |
| 100.0 | 100.6 | 0.9940 | | | 0.90 - 1.10 |
| | | | Intercept | -0.459848 | +/- 10 |



O₃ Calibration Plot

Date: August 8, 2017

Location: Fort McKay - Bertha Ganter





Wood Buffalo Environmental Association

NO_x - NO - NO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|----------------------------|-----------------|---------------|
| Station Name: | Fort McKay - Bertha Ganter | Station number: | AMS 01 |
| Calibration Date: | August 14, 2017 | Last Cal Date: | July 17, 2017 |
| Start time (MST): | 9:15 | End time (MST): | 13:55 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|-------------------|-----------------|---------------------|-----------------|
| NO Gas Cylinder # | EY0000683 | Cal Gas Expiry Date | November-04-19 |
| NOX Cal Gas Conc. | <u>49.7</u> ppm | NO Cal Gas Conc. | <u>49.7</u> ppb |
| Calibrator Model | API T700 | Serial Number | 2464 |
| ZAG make/model | API 701H | Serial Number | 587 |

Analyzer Information

| | | | | | |
|---------------------------|--------------|---------------|-------------------------------|--------------|---------------|
| Analyzer make: Thermo 42i | | | Analyzer serial #: 1218153357 | | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| NO coefficient | 1.160 | 1.167 | NOX Range (ppb) | 0 - 1000 ppb | |
| NOX coefficient | 0.999 | 0.999 | hamber Temperature | 50.1 | 50.2 |
| NO2 coefficient | 1.000 | 1.000 | Reaction cell Press | 171.7 | 171.1 |
| NO bkgrnd | 5.8 | 5.9 | Sample Flow | 0.580 | 0.582 |
| NOX bkgrnd | 6.0 | 6.0 | PMT Voltage | -791.1 | -792.2 |

Calibration Statistics

| | | |
|----------------------------|--------------|---------------|
| | <u>Start</u> | <u>Finish</u> |
| NO _x Cal Slope | 0.997894 | 0.999464 |
| NO _x Cal Offset | 1.207635 | 1.091241 |
| NO Cal Slope | 0.997254 | 0.999022 |
| NO Cal Offset | 1.552978 | 1.393319 |
| NO ₂ Cal Slope | 0.998042 | 1.003906 |
| NO ₂ Cal Offset | 0.066658 | 0.521479 |



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Version-03-2017

Dilution Calibration Data

| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|----------------------------------|---------------------------|-----------------------------|---|--|---|--|---------------------------------------|--|---|--|
| as found zero | 5997 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | -0.2 | 0.3 | ---- | ---- |
| as found span | 5415 | 83.0 | 750.3 | 750.3 | 0.0 | 746.1 | 745.0 | 1.1 | 1.0056 | 1.0071 |
| calibrator zero | 5997 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | -0.2 | 0.2 | ---- | ---- |
| high point | 5415 | 83.0 | 750.3 | 750.3 | 0.0 | 750.3 | 750.4 | -0.1 | 1.0000 | 0.9999 |
| second point | 5451 | 46.4 | 419.5 | 419.5 | 0.0 | 417.8 | 417.7 | 0.1 | 1.0040 | 1.0043 |
| third point | 5474 | 23.3 | 210.7 | 210.7 | 0.0 | 208.8 | 208.3 | 0.5 | 1.0089 | 1.0113 |
| as left zero | 5997 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.2 | 0.2 | ---- | ---- |
| as left span | 5415 | 83.0 | 750.3 | 351.1 | 399.2 | 747.7 | 419.1 | 328.5 | 1.0035 | 0.8377 |
| Average Correction Factor | | | | | | | | | 1.0043 | 1.0051 |

| | | | | |
|--------------------|-----------------------------|----------------|-----------------|------------------------|
| Corrected As found | NO _x = 746.0 ppb | NO = 745.2 ppb | *Percent Change | NO _x = 0.6% |
| Previous Response | NO _x = 750.7 ppb | NO = 750.8 ppb | *Percent Change | NO = 0.8% |

* = > +/-5% change initiates investigation

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO drop conc (ppb) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | Converter Efficiency <i>Limit = 96-104%</i> |
|----------------------------------|------------------------------|---|--|---------------------------------------|--|---|--|---|--|
| 1st NO ref point | | 0.0 | 751.3 | 750.2 | 1.1 | 0.9987 | 1.0001 | ---- | ---- |
| 1st NO2 (400 ppb O3) | 351.1 | 399.1 | 748.1 | 351.1 | 397.1 | 1.0029 | ---- | 1.0050 | 99.5% |
| 2nd NO2 (200 ppb O3) | 566.1 | 184.1 | 749.4 | 566.1 | 183.3 | 1.0012 | ---- | 1.0044 | 99.6% |
| 3rd NO2 (100 ppb O3) | 659.5 | 90.7 | 748.1 | 659.5 | 88.6 | 1.0029 | ---- | 1.0237 | 97.7% |
| 2nd NO ref point | ---- | 0.0 | 747.0 | 746.4 | 0.7 | 1.0044 | 1.0052 | ---- | ---- |
| Average Correction Factor | | | | | | 1.0029 | 1.0027 | 1.0110 | 98.9% |

Notes: Span adjusted. See doc-it note about as left span NO correction factor.

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

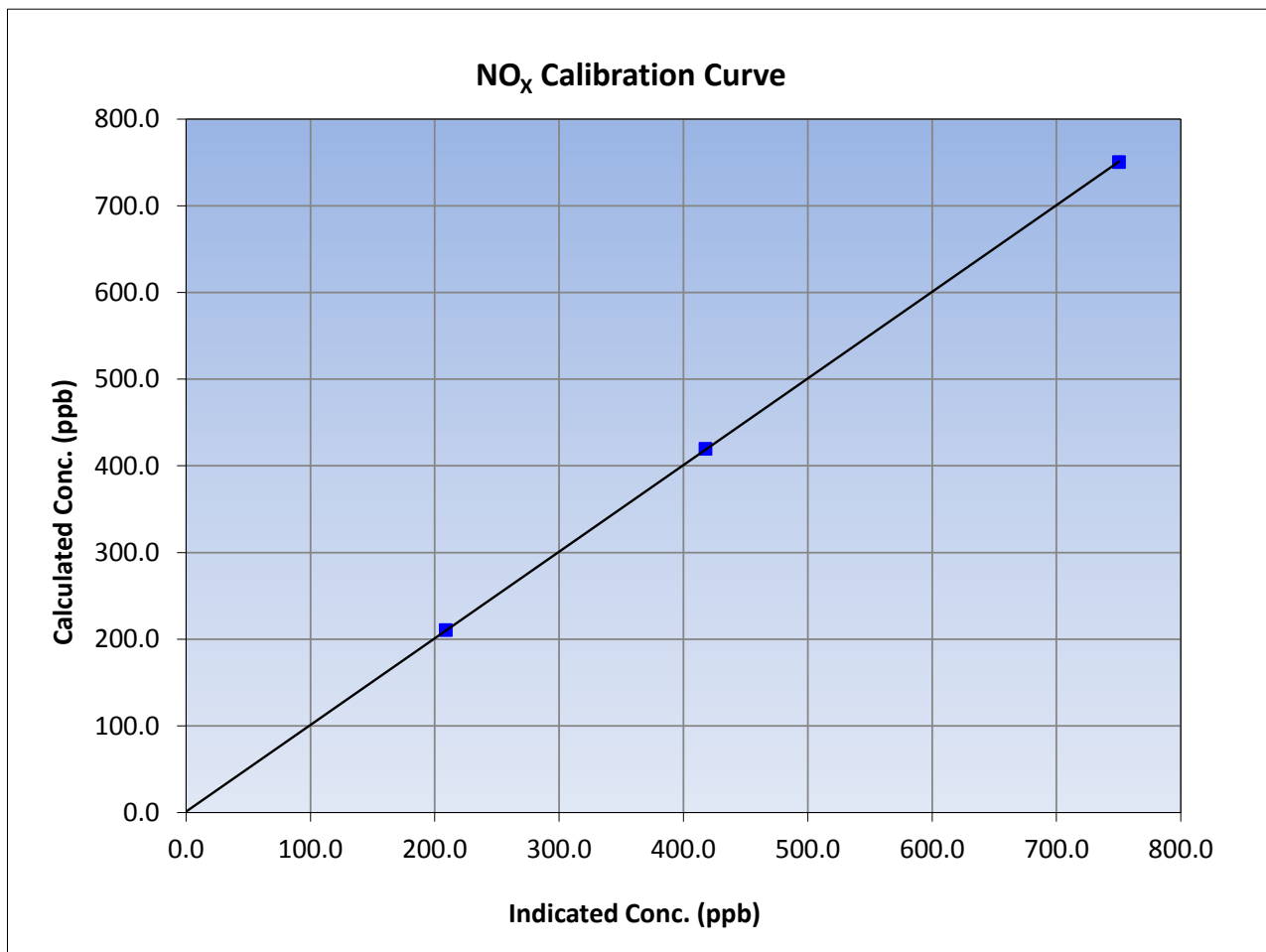
Version-03-2017

Station Information

| | | | |
|------------------|----------------------------|----------------------|---------------|
| Calibration Date | August 14, 2017 | Previous Calibration | July 17, 2017 |
| Station Name | Fort McKay - Bertha Ganter | Station Number | AMS 01 |
| Start Time (MST) | 9:15 | End Time (MST) | 13:55 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1218153357 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | -0.1 | ---- | Correlation Coefficient | ≥0.995 | |
| 750.3 | 750.3 | 1.0000 | | | |
| 419.5 | 417.8 | 1.0040 | | | |
| 210.7 | 208.8 | 1.0089 | | | |
| | | | Slope | 0.999464 | 0.90 - 1.10 |
| | | | Intercept | 1.091241 | +/-20 |





Wood Buffalo Environmental Association

NO Calibration Summary

Version-03-2017

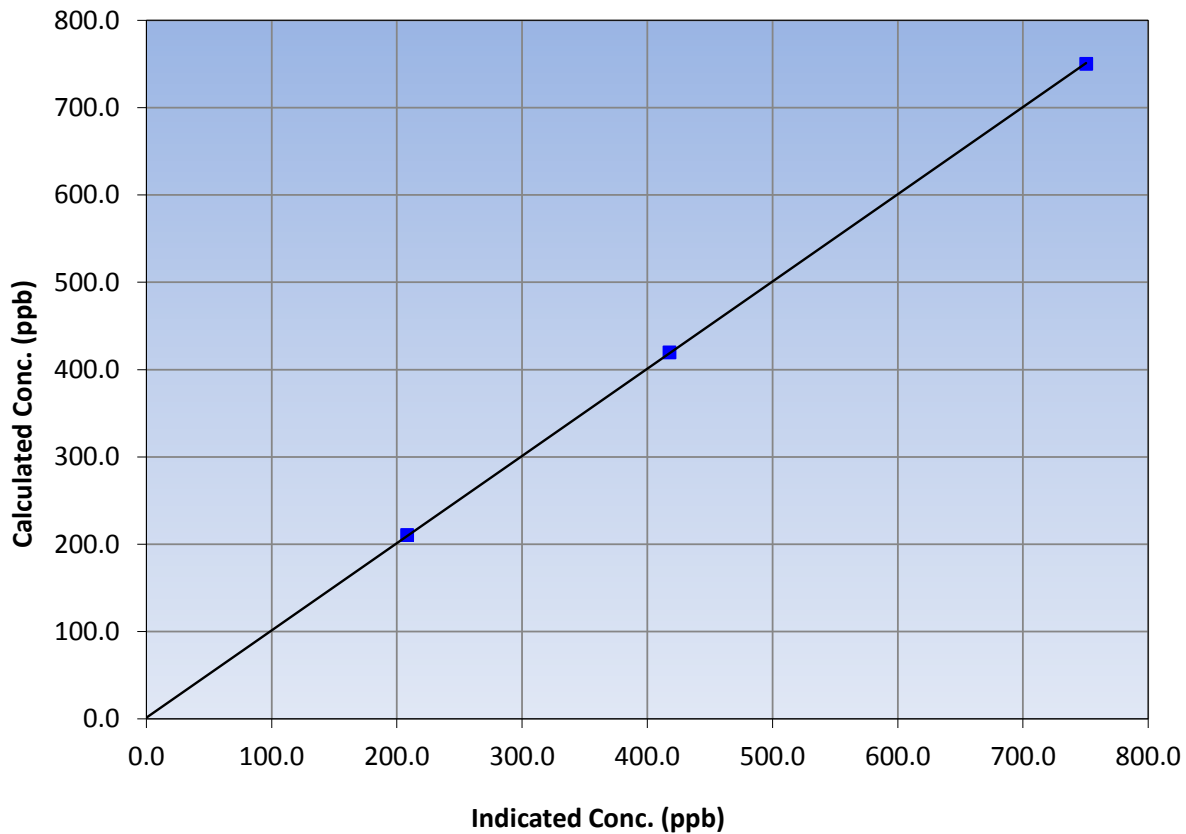
Station Information

| | | | |
|------------------|----------------------------|----------------------|---------------|
| Calibration Date | August 14, 2017 | Previous Calibration | July 17, 2017 |
| Station Name | Fort McKay - Bertha Ganter | Station Number | AMS 01 |
| Start Time (MST) | 9:15 | End Time (MST) | 13:55 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1218153357 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|
| 0.0 | -0.2 | ---- | Correlation Coefficient | ≥0.995 |
| 750.3 | 750.4 | 0.9999 | | |
| 419.5 | 417.7 | 1.0043 | Slope | 0.90 - 1.10 |
| 210.7 | 208.3 | 1.0113 | | |
| | | | Intercept | +/-20 |

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

Version-03-2017

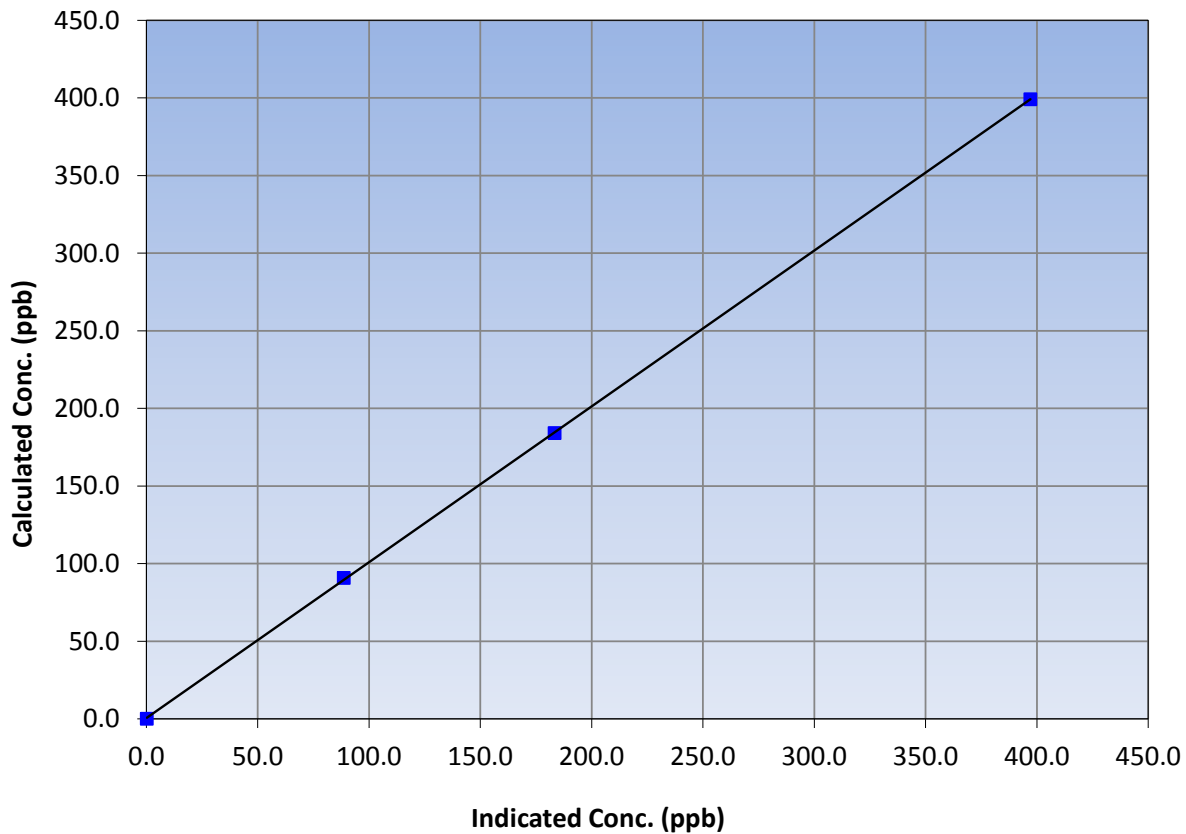
Station Information

| | | | |
|------------------|----------------------------|----------------------|---------------|
| Calibration Date | August 14, 2017 | Previous Calibration | July 17, 2017 |
| Station Name | Fort McKay - Bertha Ganter | Station Number | AMS 01 |
| Start Time (MST) | 9:15 | End Time (MST) | 13:55 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1218153357 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.2 | ---- | Correlation Coefficient | ≥0.995 | |
| 399.1 | 397.1 | 1.0050 | | | |
| 184.1 | 183.3 | 1.0044 | | | |
| 90.7 | 88.6 | 1.0237 | | | |
| | | | Slope | 1.003906 | 0.90 - 1.10 |
| | | | Intercept | 0.521479 | +/-20 |

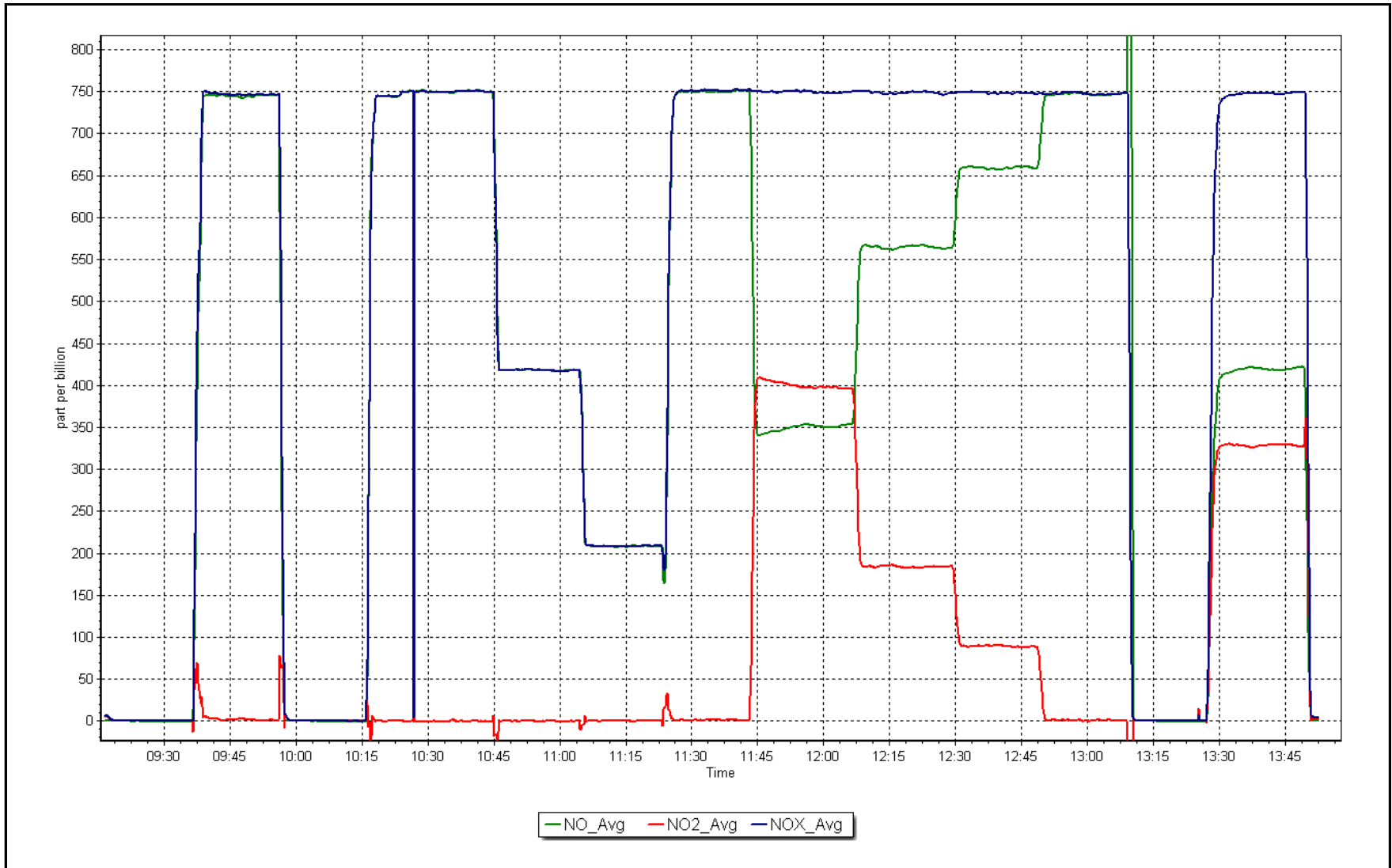
NO₂ Calibration Curve



NO_x Calibration Plot

Date: August 14, 2017

Location: Fort McKay - Bertha Ganter





Wood Buffalo Environmental Association

TN - NO_x - NH₃ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|----------------------------|-----------------|---------------|
| Station Name: | Fort McKay - Bertha Ganter | Station number: | AMS 01 |
| NOX Cal Date: | August 21, 2017 | Last Cal Date: | July 17, 2017 |
| Start time (MST): | 9:30 | End time (MST): | 14:15 |
| NH3 Cal Date: | August 22, 2017 | Last Cal Date: | July 18, 2017 |
| Start time (MST): | 9:10 | End time (MST): | 12:30 |
| Reason: | Routine | | |

Calibration Standards

| | | | | |
|-------------------|-------------|-----|--------------------|----------------|
| NOX Cal Gas Conc. | <u>49.7</u> | ppm | NO Gas Cylinder # | EY0000683 |
| NO Cal Gas Conc. | <u>49.7</u> | ppm | NO Cal Gas Expiry | November-04-19 |
| NH3 Cal Gas Conc. | <u>95.5</u> | ppm | NH3 Gas Cylinder # | LL23123 |
| | | | NH3 Cal Gas Expiry | May-24-17 |
| Calibrator Model | API T700 | | Serial Number | 2464 |
| ZAG make/model | API 701H | | Serial Number | 587 |

Analyzer Information

| | | | | |
|-----------------|--------------|--------------------|---------------------|----------------------------|
| Analyzer make: | API T201 | Analyzer serial #: | 152 | |
| | <u>Start</u> | <u>Finish</u> | | |
| NO coefficient | 1.096 | 1.098 | NH3 Range (ppb) | <u>Start</u> 0 - 1000 ppb |
| NOX coefficient | 1.235 | 1.237 | NOX Range (ppb) | <u>Finish</u> 0 - 1000 ppb |
| NO2 coefficient | 1.000 | 1.000 | PMT Temperature | 7.0 7.0 |
| NH3 coefficient | 0.937 | 0.937 | Reaction cell Press | 7.8 7.8 |
| TN coefficient | 1.253 | 1.257 | Sample Flow | 521 521 |
| NO bkgrnd | -0.2 | 0.1 | PMT Voltage | 645.0 645.0 |
| NOX bkgrnd | -0.2 | -0.1 | Moly Temperature | 315.4 315.8 |
| TN bkgrnd | -0.1 | 0.2 | NH3 Conv Temp | 825 825 |

Calibration Statistics

| | | |
|----------------------------|--------------|---------------|
| | <u>Start</u> | <u>Finish</u> |
| NO _x Cal Slope | 0.996887 | 0.997046 |
| NO _x Cal Offset | 0.158825 | 1.649227 |
| NO Cal Slope | 0.998909 | 0.995934 |
| NO Cal Offset | 0.433231 | 3.152819 |
| NO ₂ Cal Slope | 1.002863 | 1.001959 |
| NO ₂ Cal Offset | -3.008252 | -0.165962 |
| NH3 Cal Slope | 0.995159 | 1.007053 |
| NH3 Cal Offset | 2.940434 | 2.818891 |
| TN Cal Slope | 0.979743 | 0.989165 |
| TN Cal Offset | 1.094635 | 2.112240 |



Wood Buffalo Environmental Association

TN - NOX - NH₃ Calibration Report

Version-03-2017

Dilution Calibration Data

| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated TN concentration (ppb) (Cc) | Calculated NOX concentration (ppb) (Cc) | Calculated NH3 concentration (ppb) (Cc) | Indicated TN concentration (ppb) (Ic) | Indicated NOX concentration (ppb) (Ic) | Indicated NH3 concentration (ppb) (Ic) | TN Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NH3 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|----------------------------------|---------------------------|-----------------------------|--|---|---|---------------------------------------|--|--|--|---|
| as found zero | 5997 | 0.0 | 0.0 | 0.0 | 0.0 | 4.5 | -0.8 | 5.3 | ---- | ---- |
| as found NO | 5415 | 83.0 | 750.3 | 750.3 | ---- | 753.1 | 737.1 | 16.0 | 0.996 | ---- |
| calibrator zero | 5997 | 0.0 | 0.0 | 0.0 | 0.0 | -0.5 | 0.5 | -1.0 | ---- | ---- |
| high NO point | 5415 | 83.0 | 750.3 | 750.3 | ---- | 753.6 | 752.4 | 1.2 | 0.996 | ---- |
| NO/O3 point | 5415 | 83.0 | 750.3 | 750.3 | ---- | 759.0 | 749.6 | 9.4 | 0.989 | ---- |
| as found NH3 | 4916 | 94.3 | 1797.4 | NA | 1797.4 | 1813.5 | ---- | 1781.2 | 0.991 | 1.009 |
| first NH3 | 4916 | 94.3 | 1797.4 | NA | 1797.4 | 1813.5 | ---- | 1781.2 | 0.991 | 1.009 |
| second NH3 | 4948 | 52.4 | 1000.8 | NA | 1000.8 | 1015.0 | ---- | 994.9 | 0.986 | 1.006 |
| third NH3 | 4932 | 26.3 | 506.6 | NA | 506.6 | 504.4 | ---- | 495.3 | 1.004 | 1.023 |
| Average Correction Factor | | | | | | | | | 0.9921 | 1.0126 |

Corrected As found TN = 748.6 ppb NO_x = 737.9 ppb NH3 = 1775.9 ppb

Previous Response TN = 764.7 ppb NO_x = 752.5 ppb NH3 = 1803.2 ppb

NH3 Previous Converter Efficiency = 93.7 %

NH3 Current Converter Efficiency = 93.7 %

*Percent Change TN = 2.2%

*Percent Change NO_x = 2.0%

*Percent Change NH3 = 1.5%

* = > +/-5% change initiates investigation



Wood Buffalo Environmental Association

NO_x - NO - NO₂ Calibration Report

Version-03-2017

Dilution Calibration Data

| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NO _x concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated TN concentration (ppb) (Cc) | Indicated NO _x concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated TN concentration (ppb) (Ic) | NO _x Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|----------------------------------|---------------------------|-----------------------------|---|--|--|--|---------------------------------------|---------------------------------------|---|--|
| as found zero | 5997 | 0.0 | 0.0 | 0.0 | 0.0 | 1.2 | 1.3 | 3.2 | ---- | ---- |
| as found span | 5415 | 83.0 | 750.3 | 750.3 | 750.3 | 748.0 | 748.0 | 756.2 | 1.0031 | 1.0031 |
| calibrator zero | 5997 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 | -0.1 | -0.5 | ---- | ---- |
| high point | 5415 | 83.0 | 750.3 | 750.3 | 750.3 | 752.4 | 752.2 | 753.6 | 0.9972 | 0.9975 |
| second point | 5451 | 46.4 | 419.5 | 419.5 | 419.5 | 417.2 | 415.8 | 419.2 | 1.0055 | 1.0089 |
| third point | 5474 | 23.3 | 210.7 | 210.7 | 210.7 | 207.8 | 205.5 | 208.4 | 1.0137 | 1.0251 |
| Average Correction Factor | | | | | | | | | 1.0055 | 1.0105 |

Corrected As found TN = 753 ppb NO_x = 746.8 ppb NO = 746.7 ppb
 Previous Response TN = 764.7 ppb NO_x = 752.5 ppb NO = 750.7 ppb

*Percent Change TN = 1.6%
 *Percent Change NO_x = 0.8%
 *Percent Change NO = 0.5%
 * = > +/-5% change initiates investigation

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO drop conc (ppb) | Calculated NO ₂ concentration (ppb) (Cc) | Indicated NO _x concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO ₂ concentration (ppb) (Ic) | NO _x Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO ₂ Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | Converter Efficiency <i>Limit = 96-104%</i> |
|---|------------------------------|---|--|---------------------------------------|--|---|--|---|--|
| 1st NO ref point | ---- | 0.0 | 749.6 | 751.0 | -1.5 | 1.0009 | 0.9991 | ---- | ---- |
| 1st NO ₂ (400 ppb O ₃) | 342.7 | 408.3 | 750.0 | 342.7 | 407.3 | 1.0004 | ---- | 1.0025 | 99.8% |
| 2nd NO ₂ (200 ppb O ₃) | 556.5 | 194.5 | 751.2 | 556.5 | 194.8 | 0.9988 | ---- | 0.9985 | 100.2% |
| 3rd NO ₂ (100 ppb O ₃) | 656.9 | 94.1 | 751.5 | 656.9 | 94.6 | 0.9984 | ---- | 0.9947 | 100.5% |
| 2nd NO ref point | ---- | 0.0 | 753.1 | 747.1 | 6.0 | 0.9963 | 1.0043 | ---- | ---- |
| Average Correction Factor | | | | | | 0.9985 | 1.0017 | 0.9985 | 100.1% |

Notes:

NO_x/NO/NT Zero adjusted. NH₃ response was unstable. Converter core was replaced after calibration.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

TN Calibration Summary

Version-03-2017

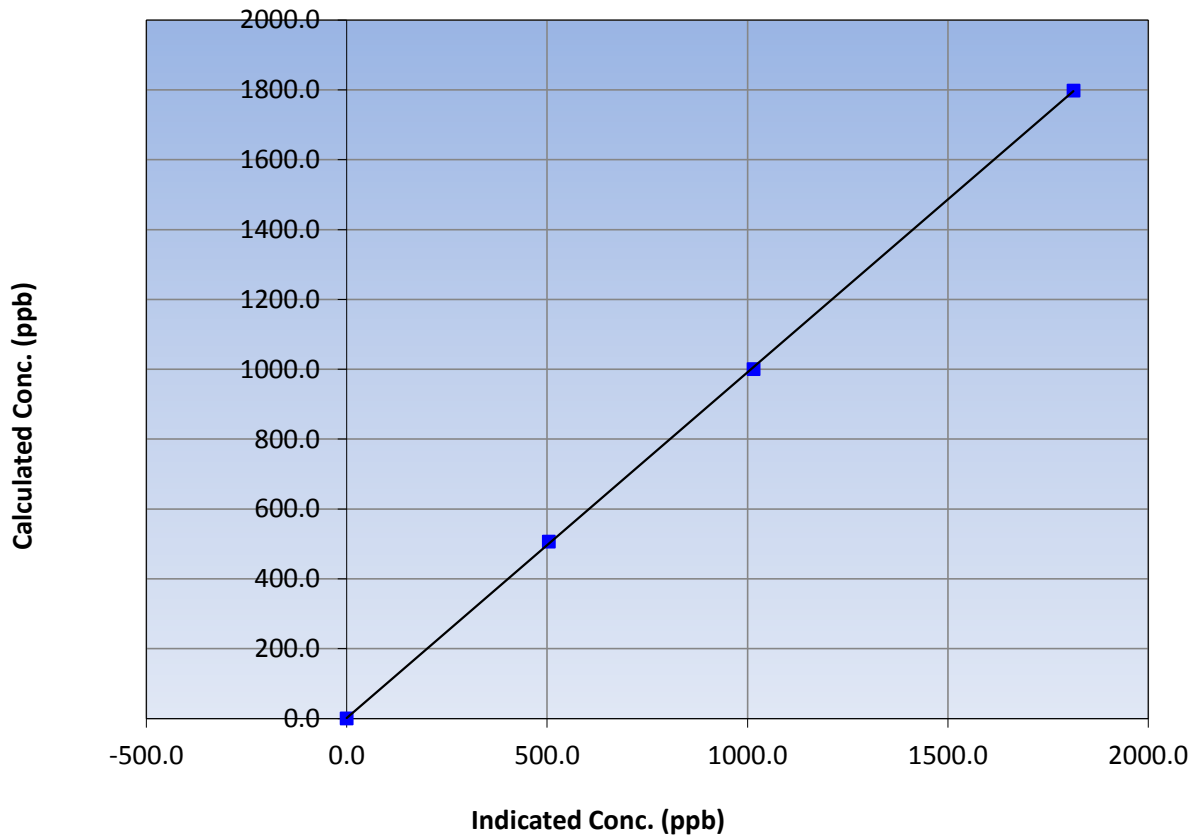
Station Information

| | | | |
|------------------|----------------------------|----------------------|---------------|
| Calibration Date | August 21, 2017 | Previous Calibration | July 17, 2017 |
| Station Name | Fort McKay - Bertha Ganter | Station Number | AMS 01 |
| Start Time (MST) | 9:30 | End Time (MST) | 14:15 |
| Analyzer make | API T201 | Analyzer serial # | 152 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|-------------|
| 0.0 | -0.5 | ---- | Correlation Coefficient | ≥0.995 | |
| 1797.4 | 1813.5 | 0.9911 | | | |
| 1000.8 | 1015.0 | 0.9860 | | | |
| 506.6 | 504.4 | 1.0043 | | | |
| | | | Slope | 0.989165 | 0.90 - 1.10 |
| | | | Intercept | 2.112240 | +/-20 |

TN Calibration Curve





Wood Buffalo Environmental Association

NH₃ Calibration Summary

Version-03-2017

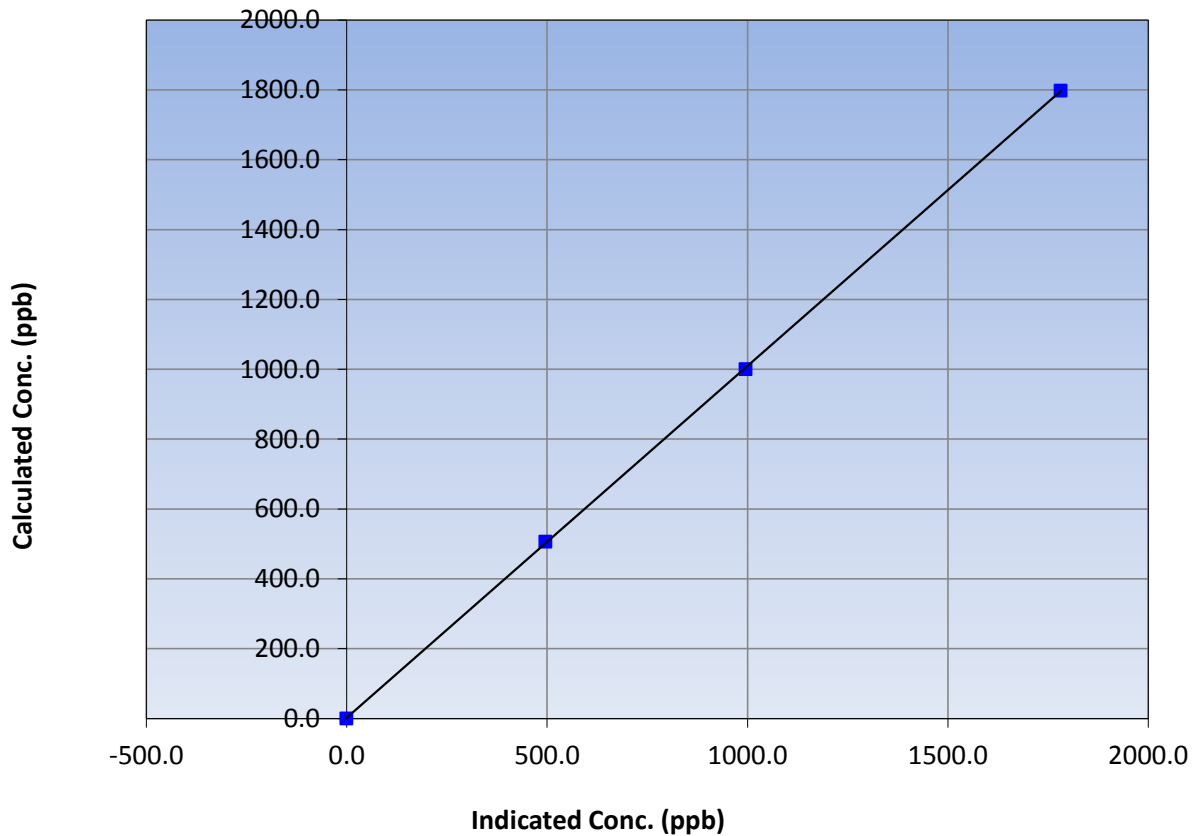
Station Information

| | | | |
|------------------|----------------------------|----------------------|---------------|
| Calibration Date | August 21, 2017 | Previous Calibration | July 17, 2017 |
| Station Name | Fort McKay - Bertha Ganter | Station Number | AMS 01 |
| Start Time (MST) | 9:30 | End Time (MST) | 14:15 |
| Analyzer make | API T201 | Analyzer serial # | 152 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | -1.0 | ---- | Correlation Coefficient | ≥0.995 | |
| 1797.4 | 1781.2 | 1.0091 | | | |
| 1000.8 | 994.9 | 1.0059 | | | |
| 506.6 | 495.3 | 1.0227 | | | |
| | | | Slope | 1.007053 | 0.90 - 1.10 |
| | | | Intercept | 2.818891 | +/-20 |

NH₃ Calibration Curve





Wood Buffalo Environmental Association

NO_x Calibration Summary

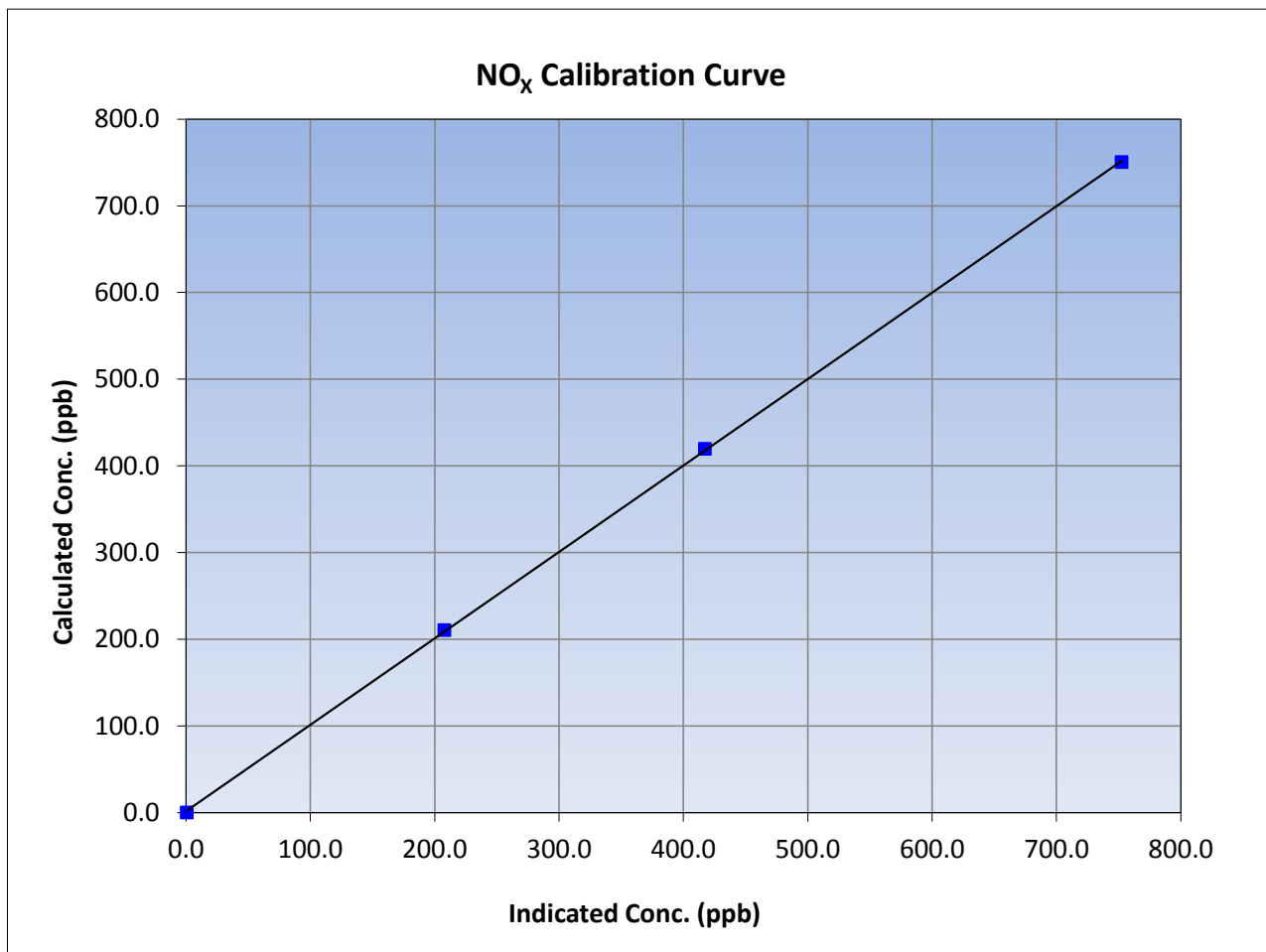
Version-03-2017

Station Information

| | | | |
|------------------|----------------------------|----------------------|---------------|
| Calibration Date | August 21, 2017 | Previous Calibration | July 17, 2017 |
| Station Name | Fort McKay - Bertha Ganter | Station Number | AMS 01 |
| Start Time (MST) | 9:30 | End Time (MST) | 14:15 |
| Analyzer make | API T201 | Analyzer serial # | 152 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|-------------|
| 0.0 | 0.5 | ---- | Correlation Coefficient | ≥0.995 | |
| 750.3 | 752.4 | 0.9972 | | | |
| 419.5 | 417.2 | 1.0055 | | | |
| 210.7 | 207.8 | 1.0137 | | | |
| | | | Slope | 0.997046 | 0.90 - 1.10 |
| | | | Intercept | 1.649227 | +/-20 |





Wood Buffalo Environmental Association

NO Calibration Summary

Version-03-2017

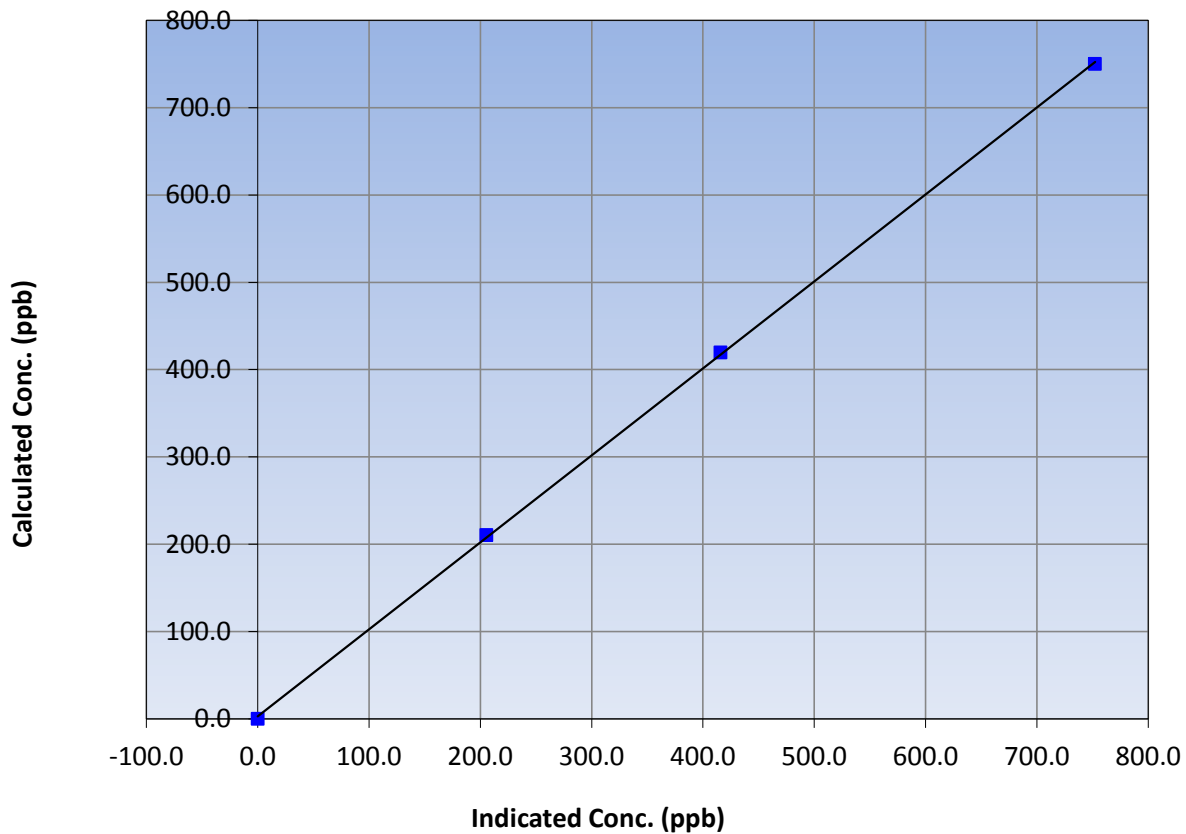
Station Information

| | | | |
|------------------|----------------------------|----------------------|---------------|
| Calibration Date | August 21, 2017 | Previous Calibration | July 17, 2017 |
| Station Name | Fort McKay - Bertha Ganter | Station Number | AMS 01 |
| Start Time (MST) | 9:30 | End Time (MST) | 14:15 |
| Analyzer make | API T201 | Analyzer serial # | 152 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | -0.1 | ---- | Correlation Coefficient | ≥0.995 | |
| 750.3 | 752.2 | 0.9975 | | | |
| 419.5 | 415.8 | 1.0089 | | | |
| 210.7 | 205.5 | 1.0251 | | | |
| | | | Slope | 0.995934 | 0.90 - 1.10 |
| | | | Intercept | 3.152819 | +/-20 |

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

Version-03-2017

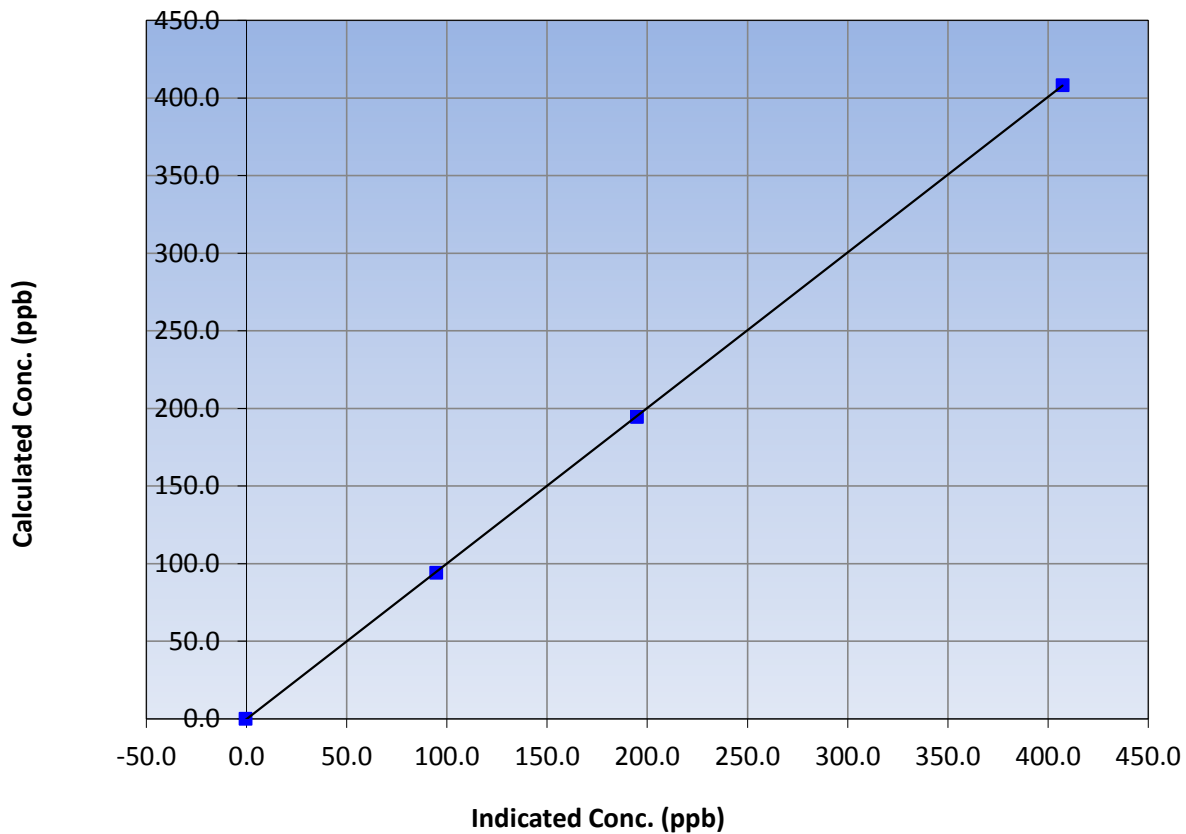
Station Information

| | | | |
|------------------|----------------------------|----------------------|---------------|
| Calibration Date | August 21, 2017 | Previous Calibration | July 17, 2017 |
| Station Name | Fort McKay - Bertha Ganter | Station Number | AMS 01 |
| Start Time (MST) | 9:30 | End Time (MST) | 14:15 |
| Analyzer make | API T201 | Analyzer serial # | 152 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> |
|-------------------------------------|------------------------------------|---------------------------|---|--------------------------------|
| 0.0 | -0.5 | ---- | Correlation Coefficient Slope Intercept | ≥0.995 0.90 - 1.10 +/-20 |
| 408.3 | 407.3 | 1.0025 | | |
| 194.5 | 194.8 | 0.9985 | | |
| 94.1 | 94.6 | 0.9947 | | |
| | | | | |

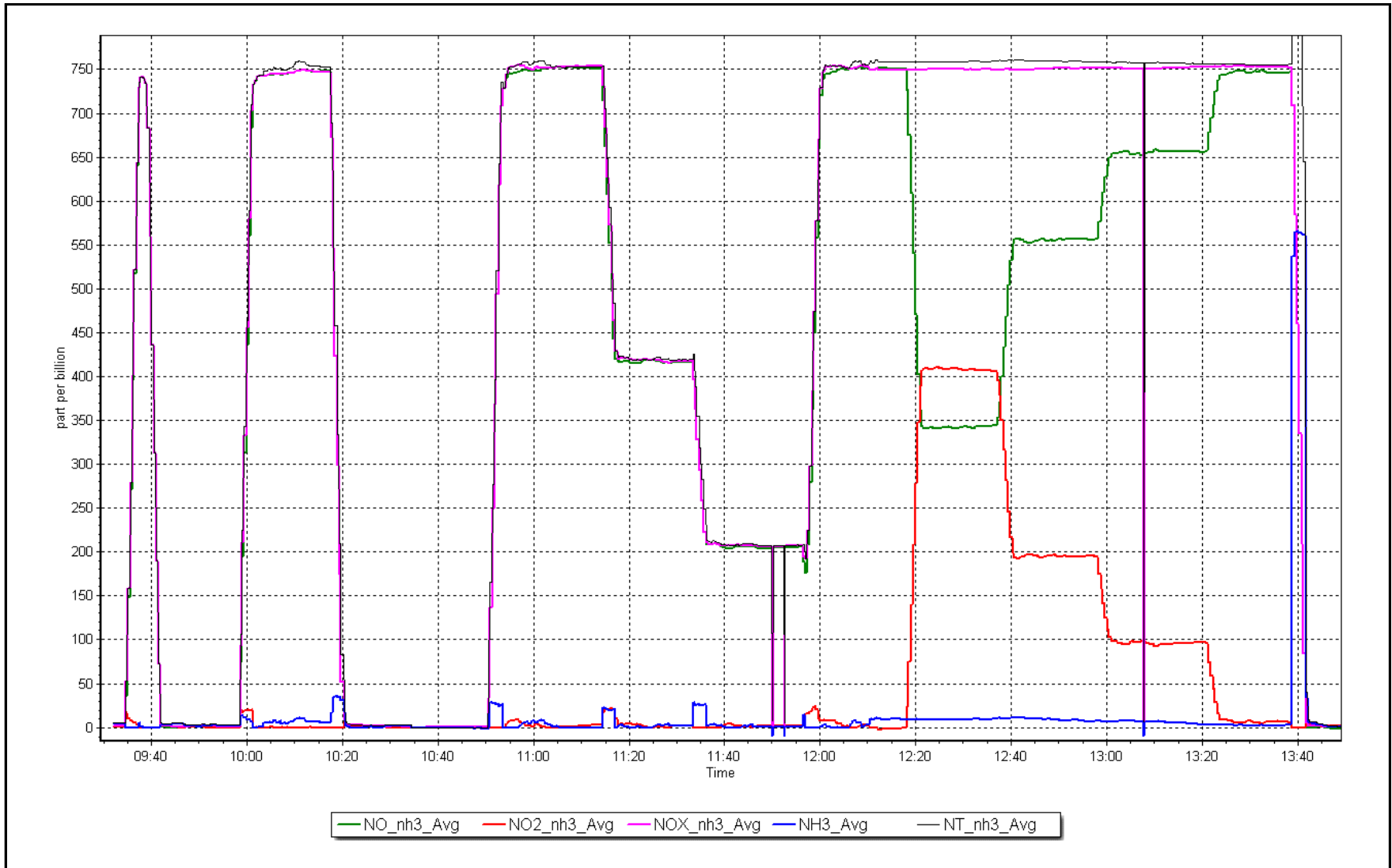
NO₂ Calibration Curve



NO_x Calibration Plot

Date: August 21, 2017

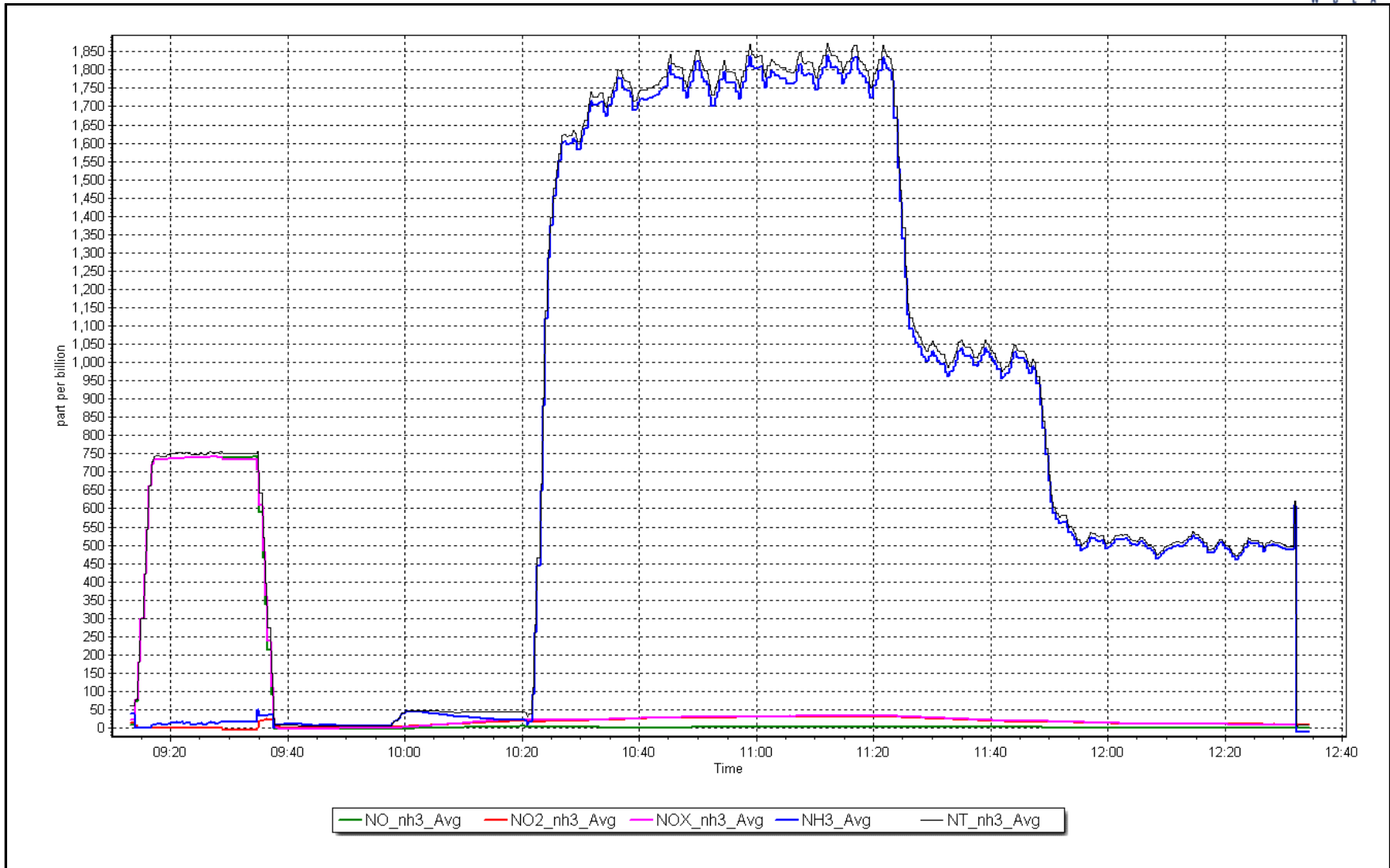
Location: Fort McKay - Bertha Ganter



NH₃ Calibration Plot

Date: August 22, 2017

Location: Fort McKay - Bertha Ganter





Wood Buffalo Environmental Association

TN - NO_x - NH₃ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|----------------------------|-----------------|-----------------|
| Station Name: | Fort McKay - Bertha Ganter | Station number: | AMS 01 |
| NOX Cal Date: | August 21, 2017 | Last Cal Date: | July 17, 2017 |
| Start time (MST): | 9:30 | End time (MST): | 14:15 |
| NH3 Cal Date: | August 23, 2017 | Last Cal Date: | August 22, 2017 |
| Start time (MST): | 8:05 | End time (MST): | 11:55 |
| Reason: | Maintenance | | |

Calibration Standards

| | | | | |
|-------------------|-------------|-----|--------------------|----------------|
| NOX Cal Gas Conc. | <u>49.7</u> | ppm | NO Gas Cylinder # | EY0000683 |
| NO Cal Gas Conc. | <u>49.7</u> | ppm | NO Cal Gas Expiry | November-04-19 |
| NH3 Cal Gas Conc. | <u>95.5</u> | ppm | NH3 Gas Cylinder # | LL23123 |
| | | | NH3 Cal Gas Expiry | May-24-17 |
| Calibrator Model | API T700 | | Serial Number | 2464 |
| ZAG make/model | API 701H | | Serial Number | 587 |

Analyzer Information

| | | | | |
|-----------------|--------------|--------------------|---------------------|----------------------------|
| Analyzer make: | API T201 | Analyzer serial #: | 152 | |
| | <u>Start</u> | <u>Finish</u> | | |
| NO coefficient | 1.098 | 1.098 | NH3 Range (ppb) | <u>Start</u> 0 - 1000 ppb |
| NOX coefficient | 1.237 | 1.237 | NOX Range (ppb) | <u>Finish</u> 0 - 1000 ppb |
| NO2 coefficient | 1.000 | 1.000 | PMT Temperature | 7.0 7.0 |
| NH3 coefficient | 0.987 | 0.957 | Reaction cell Press | 7.8 7.8 |
| TN coefficient | 1.257 | 1.257 | Sample Flow | 522 522 |
| NO bkgrnd | 0.1 | 0.1 | PMT Voltage | 645.0 645.0 |
| NOX bkgrnd | -0.1 | -0.1 | Moly Temperature | 315.8 315.8 |
| TN bkgrnd | 0.2 | 0.2 | NH3 Conv Temp | 825 825 |

Calibration Statistics

| | | |
|----------------------------|--------------|---------------|
| | <u>Start</u> | <u>Finish</u> |
| NO _x Cal Slope | 0.997046 | 1.023869 |
| NO _x Cal Offset | 1.649227 | 0.102387 |
| NO Cal Slope | 0.995934 | 1.023171 |
| NO Cal Offset | 3.152819 | 1.432439 |
| NO ₂ Cal Slope | 1.001959 | |
| NO ₂ Cal Offset | -0.165962 | |
| NH3 Cal Slope | 1.022507 | 0.998783 |
| NH3 Cal Offset | -29.005593 | 2.014696 |
| TN Cal Slope | 0.993587 | 0.982884 |
| TN Cal Offset | -12.501245 | 1.349260 |



Wood Buffalo Environmental Association

TN - NOX - NH₃ Calibration Report

Version-03-2017

Dilution Calibration Data

| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated TN concentration (ppb) (Cc) | Calculated NOX concentration (ppb) (Cc) | Calculated NH3 concentration (ppb) (Cc) | Indicated TN concentration (ppb) (Ic) | Indicated NOX concentration (ppb) (Ic) | Indicated NH3 concentration (ppb) (Ic) | TN Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NH3 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|----------------------------------|---------------------------|-----------------------------|--|---|---|---------------------------------------|--|--|--|---|
| as found zero | 5997 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | -1.5 | 4.0 | ---- | ---- |
| as found NO | 5415 | 83.0 | 750.3 | 750.3 | ---- | 738.3 | 732.7 | 5.6 | 1.016 | ---- |
| calibrator zero | 5997 | 0.0 | 0.0 | 0.0 | 0.0 | 1.2 | -0.1 | 1.3 | ---- | ---- |
| high NO point | 5415 | 83.0 | 750.3 | 750.3 | ---- | 738.3 | 732.7 | 5.6 | 1.016 | ---- |
| NO/O3 point | 5415 | 83.0 | 750.3 | 750.3 | ---- | | | | | |
| as found NH3 | 4916 | 94.3 | 1797.4 | NA | 1797.4 | 1754.6 | ---- | 1726.8 | 1.024 | 1.041 |
| first NH3 | 4916 | 94.3 | 1797.4 | NA | 1797.4 | 1825.8 | ---- | 1796.5 | 0.984 | 1.001 |
| second NH3 | 4948 | 52.4 | 1000.8 | NA | 1000.8 | 1023.3 | ---- | 1006.0 | 0.978 | 0.995 |
| third NH3 | 4932 | 26.3 | 506.6 | NA | 506.6 | 506.5 | ---- | 496.9 | 1.000 | 1.019 |
| Average Correction Factor | | | | | | | | | 1.0162 | 1.0049 |

Corrected As found TN = 735.3 ppb NO_x = 734.2 ppb NH3 = 1722.8 ppb

Previous Response TN = 767.6 ppb NO_x = 750.9 ppb NH3 = 1786.9 ppb

NH3 Previous Converter Efficiency = 98.7 %

NH3 Current Converter Efficiency = 95.7 %

*Percent Change TN = 4.4%

*Percent Change NO_x = 2.3%

*Percent Change NH3 = 3.7%

* = > +/-5% change initiates investigation



Wood Buffalo Environmental Association

NO_x - NO - NO₂ Calibration Report

Version-03-2017

Dilution Calibration Data

| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NO _x concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated TN concentration (ppb) (Cc) | Indicated NO _x concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated TN concentration (ppb) (Ic) | NO _x Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|-----------------|---------------------------|-----------------------------|---|--|--|--|---------------------------------------|---------------------------------------|---|--|
| as found zero | 5997 | 0.0 | 0.0 | 0.0 | 0.0 | -1.5 | -2.8 | 3.0 | ---- | ---- |
| as found span | 5415 | 83.0 | 750.3 | 750.3 | 750.3 | 732.7 | 731.9 | 738.3 | 1.0240 | 1.0251 |
| calibrator zero | 5997 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | -1.4 | 1.2 | ---- | ---- |
| high point | 5415 | 83.0 | 750.3 | 750.3 | 750.3 | 732.7 | 731.9 | 738.3 | 1.0240 | 1.0251 |
| second point | | | | | | | | | | |
| third point | | | | | | | | | | |

| | | | | | | | | Average Correction Factor | 1.0240 | 1.0251 |
|--|----------------|-----------------------------|----------------|--|--|--|--|---------------------------|------------------------|--------|
| Corrected As found | TN = 735.3 ppb | NO _x = 734.2 ppb | NO = 734.7 ppb | | | | | *Percent Change | TN = 4.4% | |
| Previous Response | TN = 767.6 ppb | NO _x = 750.9 ppb | NO = 750.2 ppb | | | | | *Percent Change | NO _x = 2.3% | |
| | | | | | | | | *Percent Change | NO = 2.1% | |
| * = > +/-5% change initiates investigation | | | | | | | | | | |

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO drop conc (ppb) | Calculated NO ₂ concentration (ppb) (Cc) | Indicated NO _x concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO ₂ concentration (ppb) (Ic) | NO _x Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO ₂ Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | Converter Efficiency <i>Limit = 96-104%</i> |
|---|------------------------------|---|--|---------------------------------------|--|---|--|---|--|
| 1st NO ref point | | | | | | | | | |
| 1st NO ₂ (400 ppb O ₃) | | | | | | | | | |
| 2nd NO ₂ (200 ppb O ₃) | | | | | | | | | |
| 3rd NO ₂ (100 ppb O ₃) | | | | | | | | | |
| 2nd NO ref point | | | | | | | | | |
| | | | | | | Average Correction Factor | | | |

Notes:

Readjustment of NT zero and NH₃ span after maintenance yesterday.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

TN Calibration Summary

Version-03-2017

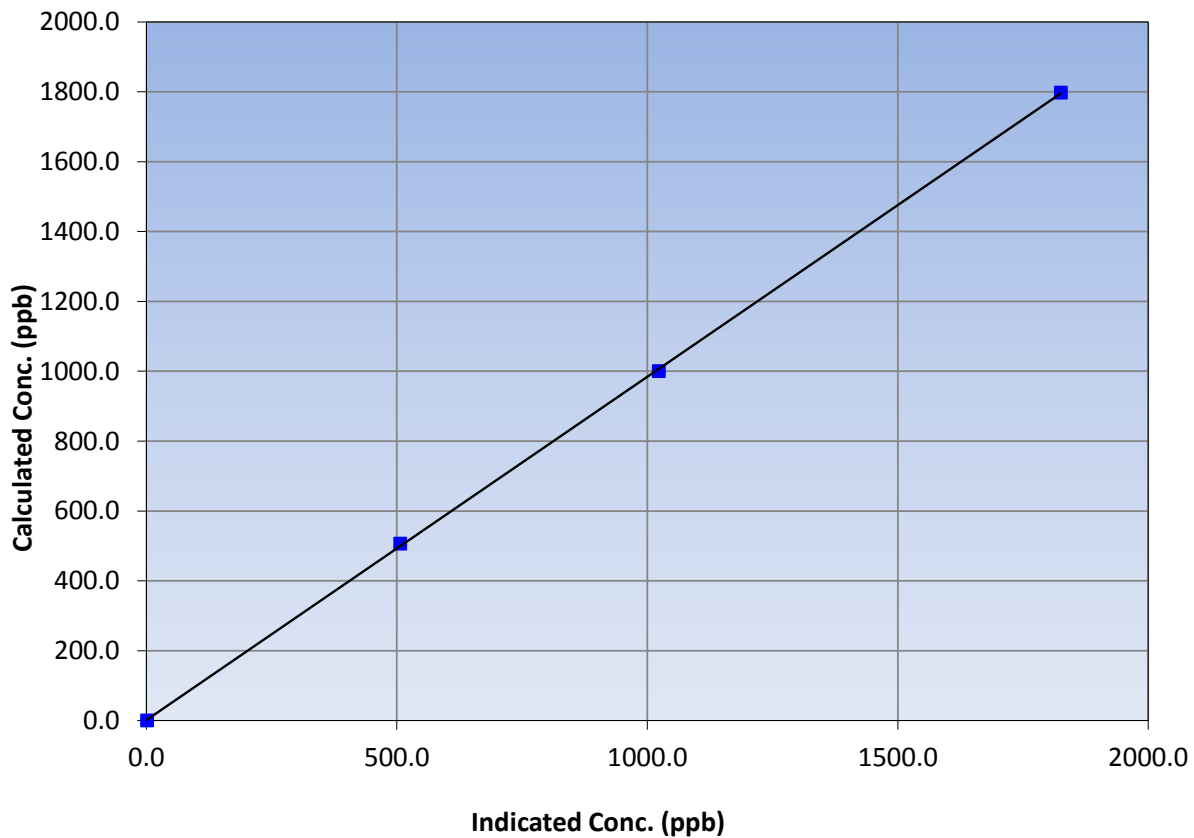
Station Information

| | | | |
|------------------|----------------------------|----------------------|-----------------|
| Calibration Date | August 23, 2017 | Previous Calibration | August 22, 2017 |
| Station Name | Fort McKay - Bertha Ganter | Station Number | AMS 01 |
| Start Time (MST) | 8:05 | End Time (MST) | 11:55 |
| Analyzer make | API T201 | Analyzer serial # | 152 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 1.2 | ---- | Correlation Coefficient | ≥0.995 | |
| 1797.4 | 1825.8 | 0.9845 | | | |
| 1000.8 | 1023.3 | 0.9780 | | | |
| 506.6 | 506.5 | 1.0001 | | | |
| | | | Slope | 0.982884 | 0.90 - 1.10 |
| | | | Intercept | 1.349260 | +/-20 |

TN Calibration Curve





Wood Buffalo Environmental Association

NH₃ Calibration Summary

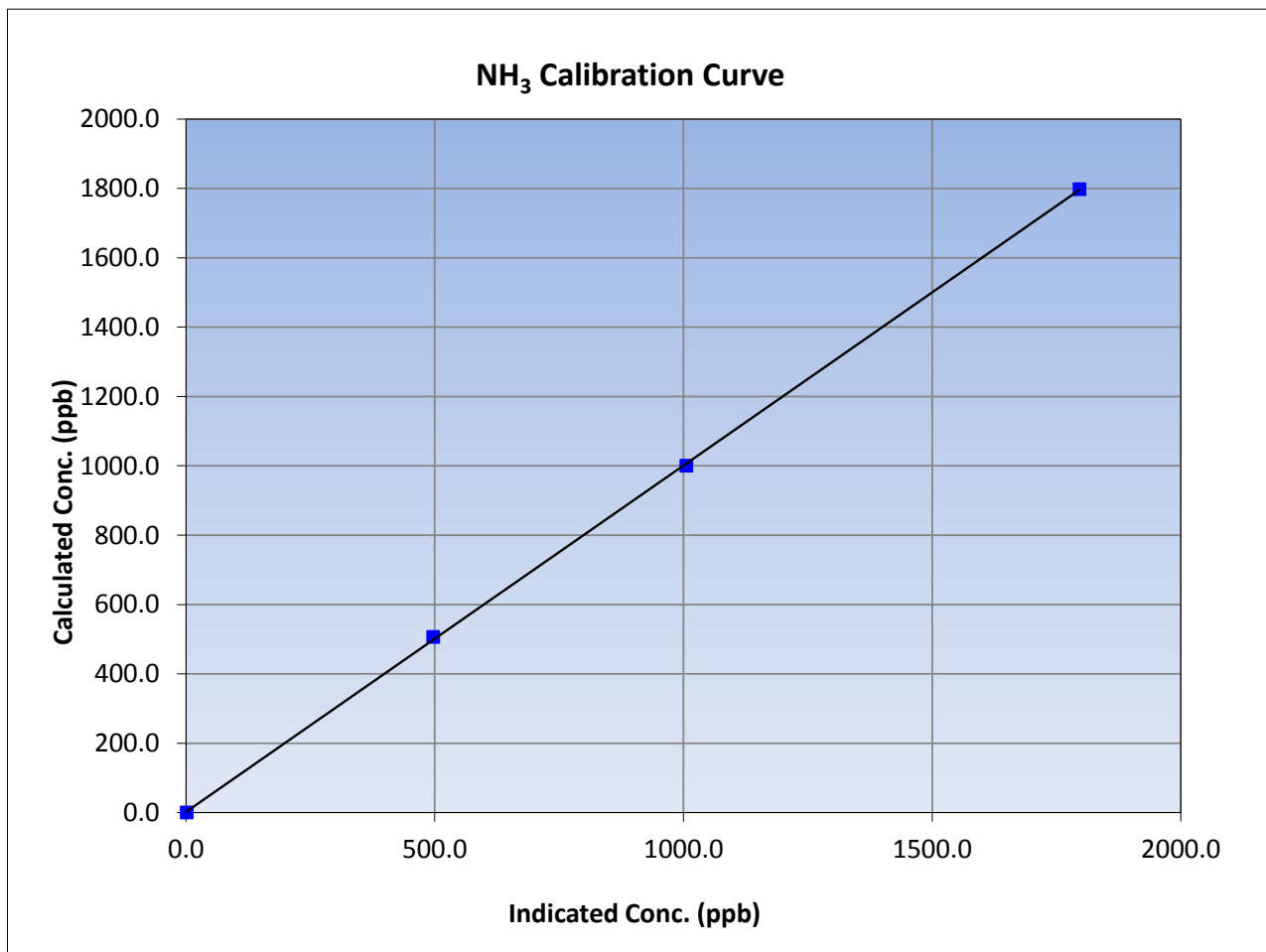
Version-03-2017

Station Information

| | | | |
|------------------|----------------------------|----------------------|-----------------|
| Calibration Date | August 23, 2017 | Previous Calibration | August 22, 2017 |
| Station Name | Fort McKay - Bertha Ganter | Station Number | AMS 01 |
| Start Time (MST) | 8:05 | End Time (MST) | 11:55 |
| Analyzer make | API T201 | Analyzer serial # | 152 |

Calibration Data

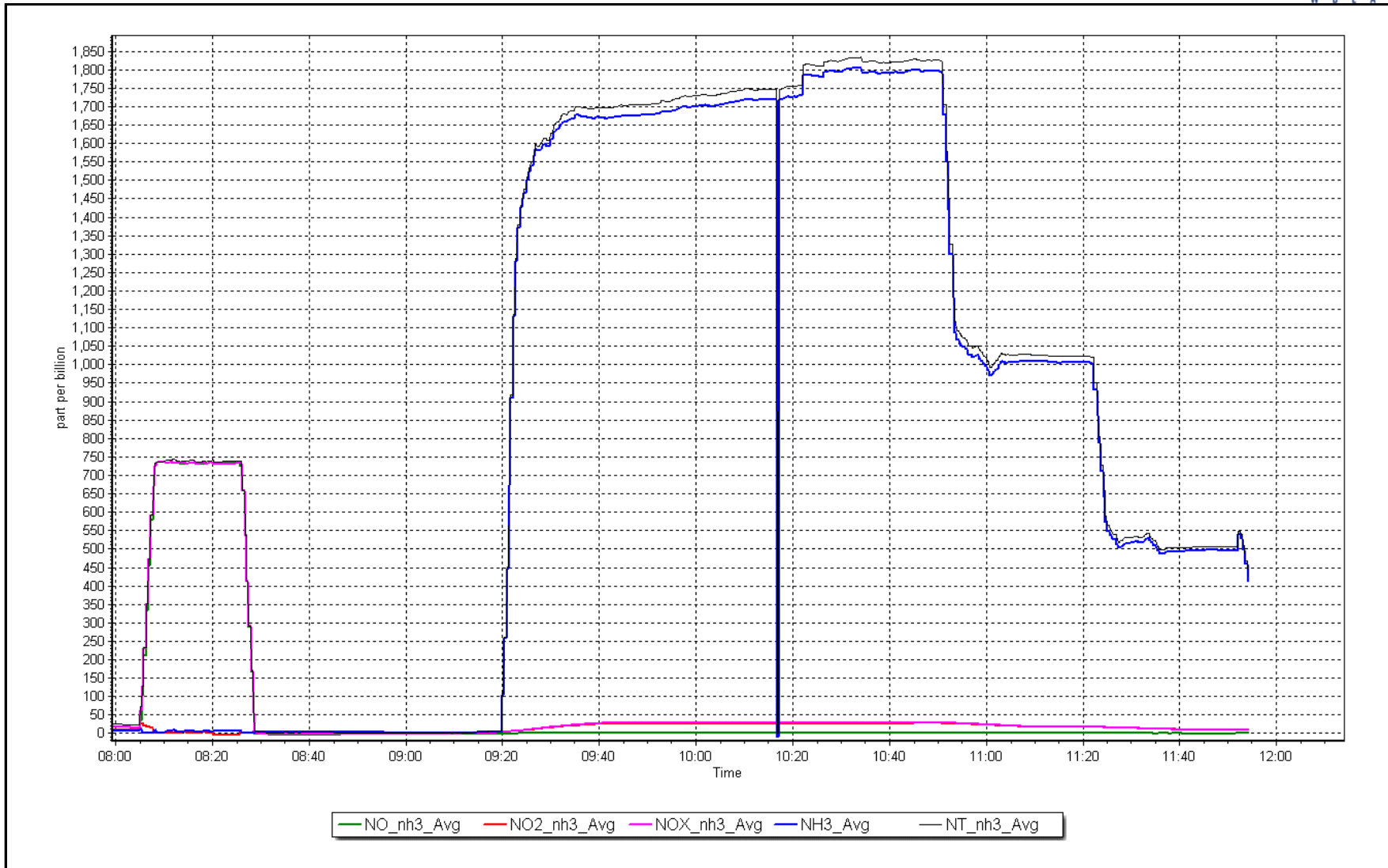
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 1.3 | ---- | Correlation Coefficient | ≥0.995 | |
| 1797.4 | 1796.5 | 1.0005 | | | |
| 1000.8 | 1006.0 | 0.9948 | | | |
| 506.6 | 496.9 | 1.0194 | | | |
| | | | Slope | 0.998783 | 0.90 - 1.10 |
| | | | Intercept | 2.014696 | +/-20 |



NH₃ Calibration Plot

Date: August 23, 2017

Location: Fort McKay - Bertha Ganter





Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-02-2017

Station Information

| | | | |
|------------------------|----------------------------|-----------------|---------------|
| Station Name: | Fort McKay - Bertha Ganter | Station number: | AMS 01 |
| Calibration Date: | August 23, 2017 | Last Cal Date: | July 18, 2017 |
| Start time (MST): | 8:40 | End time (MST): | 10:00 |
| Sharp Model: | Thermo 5030 SHARP | S/N: | E-1486 |
| Particulate Fraction: | PM2.5 | C14 Source S/N: | 5691 |
| Flow Meter Make/Model: | Delta-Cal | S/N: | 1451 |
| Temp/RH standard: | Delta-Cal | S/N: | 1451 |

Monthly Calibration Test

| <u>Parameter</u> | <u>As found</u> | <u>Measured</u> | <u>As left</u> | <u>Adjusted</u> | (Limits) |
|-----------------------------|--|-----------------|---|-------------------------------------|-----------------|
| T1 (°C) | 18 | 17.9 | 18 | <input type="checkbox"/> | +/- 2 °C |
| P3 (hPa) | 979 | 978.52 | 979 | <input type="checkbox"/> | +/- 13 hPa |
| flow (LPH) | 1000 | 978 | 1000 | <input checked="" type="checkbox"/> | +/- 50 LPH |
| Nephelometer zero | 0 | ----- | 0 | <input type="checkbox"/> | +/- 0.5 ug/m3 |
| Instrument Clock: | Verified <input checked="" type="checkbox"/> | | | | |
| Cyclone cleaning : | PM10 Cyclone <input checked="" type="checkbox"/> | | PM2.5 Cyclone <input checked="" type="checkbox"/> | | |
| Date Filter Tape Installed: | | | | | |

Quarterly Calibration Test

Leak Test: Date of check: _____ Last Cal Date: April 26, 2017
 Flow w/o adaptor: _____ Flow w/ adaptor: _____

(Limit) 0.4 LPM

| <u>Adjusted</u> | <u>Current Test</u> | <u>Previous Test</u> | <u>% Change</u> |
|-----------------------------------|--------------------------|---|-----------------|
| <input type="checkbox"/> | Foil S/N: _____ | Foil S/N: _____ | |
| Foil Calibration | Foil Mass: _____ | Foil Mass: _____ | |
| | Calibration Date: _____ | Calibration Date: <u>April 26, 2017</u> | |
| (Limit) +/- 5% of previous | Correction Factor: _____ | Correction Factor: _____ | --- |

Annual Calibration Test

| <u>Parameter</u> | <u>As found</u> | <u>Measured</u> | <u>As left</u> | <u>Adjusted</u> | (Limits) |
|-----------------------------|-----------------|-----------------|----------------|--------------------------|-----------------|
| T2 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| T3 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| T4 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| RH (%) | | | | <input type="checkbox"/> | +/- 10% |
| Date Sample Tube Cleaned: | | | | | |
| Date Pump Rebuilt/Replaced: | | | | | |

Notes: Cyclone head replaced with clean head. No adjustments made to T1, P3. Flow was adjusted.
 Nephelometer adjusted.

Calibration by: Devin Russell



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT

AMS 2 MILDRED LAKE AUGUST 2017

Operations, Data Collection,
QA/QC, Data Validation and Reporting by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

September 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS 2)
AUGUST 2017

MONTHLY SUMMARY for
AMD SECTION III.B.1(c)

| Parameter | Hours of Data | Hours of Calibration | Hours without Data | Operational Time | Maximum 1-Hour Value | 1-Hour Exceedances | Maximum 24-Hour Value | 24-Hour Exceedances |
|-----------------------------------|---------------|----------------------|--------------------|------------------|----------------------|--------------------|-----------------------|---------------------|
| SO2 (ppb) Average | 709 | 34 | 35 | 99.87 | 44 | 0 | 12 | 0 |
| H2S (ppb) Average | 709 | 34 | 35 | 99.87 | 7 | 0 | 2 | 0 |
| THC (ppm) Average | 709 | 34 | 35 | 99.87 | 4.7 | - | 2.9 | - |
| Temperature (C) Average | 744 | 0 | 0 | 100 | 30.7 | - | 24.9 | - |
| Relative Humidity (%) Average | 744 | 0 | 0 | 100 | 99 | - | 87 | - |
| Wind Speed 10 m (km/h) Average | 744 | 0 | 0 | 100 | 26 | - | 18 | - |
| Wind Direction 10 m (deg) Average | 744 | 0 | 0 | 100 | - | - | - | - |

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS 2)
AUGUST 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

| Parameter | Number | Mean | StnDev | Total | Percentile | | | | | | |
|-----------------------------------|--------|-------|--------|-------|------------|------|------|--------|------|------|------|
| | | | | | Min | P10 | Q1 | Median | Q3 | P90 | Max |
| SO2 (ppb) Average | 709 | 2.9 | 6 | - | 0 | 0 | 0 | 1 | 2 | 8 | 44 |
| H2S (ppb) Average | 709 | 0.6 | 1 | - | 0 | 0 | 0 | 0 | 1 | 1 | 7 |
| THC (ppm) Average | 709 | 2.47 | 0.4 | - | 2.1 | 2.1 | 2.2 | 2.3 | 2.6 | 3 | 4.7 |
| Temperature 2 m (C) Average | 744 | 18.44 | 5.1 | - | 5.4 | 12.2 | 14.5 | 18 | 22.4 | 25.5 | 30.7 |
| Relative Humidity (%) Average | 744 | 61.2 | 20 | - | 24 | 33 | 44 | 62 | 77 | 89 | 99 |
| Wind Speed 10 m (km/h) Average | 744 | 9.1 | 5 | - | 0 | 3 | 5 | 8 | 12 | 16 | 26 |
| Wind Direction 10 m (deg) Average | 744 | - | - | - | - | - | - | - | - | - | - |

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS 2)
AUGUST 2017

OPERATIONAL NOTES

| Parameter | Period Start | Period End | Duration (Hours) | Notes |
|---------------|-------------------|-------------------|------------------|-----------------------|
| H2S, SO2, THC | 15 Aug 2017 18:00 | 15 Aug 2017 18:00 | 1 | Station power failure |



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

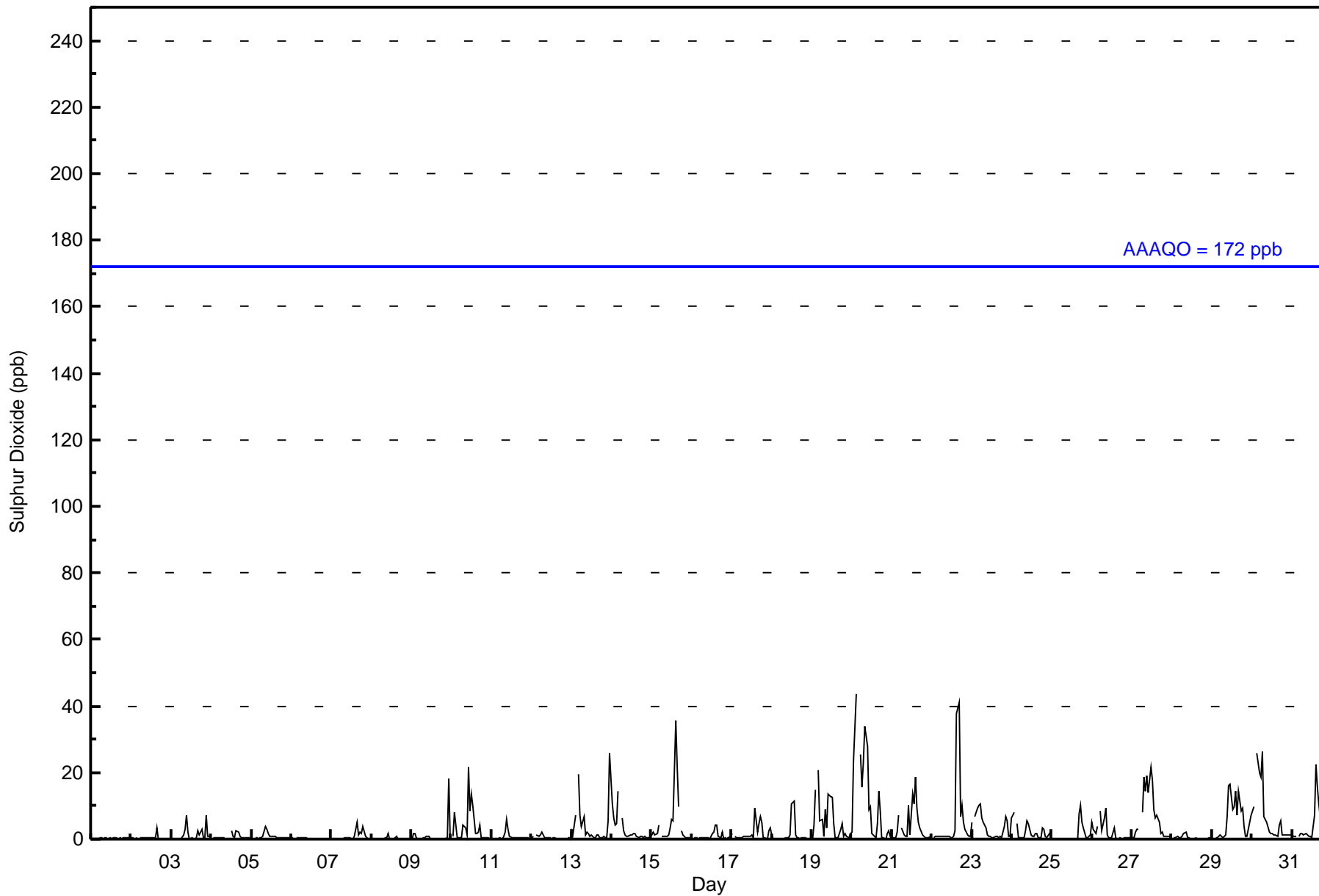
Mildred Lake - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 44 ppb on Aug 20 04:00 Maximum Daily Average: 12.3 ppb on Aug 20 | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 709 Hours of Missing Data: 35 Hours of Calibration: 34 Percent Operational Time: 99.9 | | | | | | | | | |
|--|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|----|----|----|----|----|----|-----------------|---------------|---------------|
| Minimum Value: 0 ppb on Aug 1 02:00 Minimum Daily Average: 0.2 ppb on Aug 6 Maximum Diurnal Average: 4.2 ppb at hour 16 Minimum Diurnal Average: 1.0 ppb at hour 22 Monthly Average: 2.9 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 2 P ₉₀ = 8 P ₉₉ = 25 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 2-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 3 |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 1 | 3 | 7 | 2 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 3 | 1 | 1 | 7 | 1 | 1 | 1.4 | 7 |
| 4-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | C | C | C | 3 | 1 | 0 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0.7 | 3 |
| 5-Aug | 0 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 4 | 3 | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.8 | 4 |
| 6-Aug | 0 | 0 | Z | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 7-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 1 | 2 | 2 | 4 | 1 | 0 | 0 | 0 | 0.8 | 5 |
| 8-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 2 |
| 9-Aug | 0 | 2 | 2 | 0 | 0 | Z | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 1 | 1.1 | 18 |
| 10-Aug | Z | 1 | 8 | 1 | 0 | 0 | 0 | 4 | 3 | 1 | 22 | 8 | 14 | 10 | 2 | 2 | 2 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 3.7 | 22 |
| 11-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 6 | 3 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0.8 | 6 |
| 12-Aug | 0 | 1 | Z | 1 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 2 |
| 13-Aug | 3 | 1 | 7 | Z | 20 | 7 | 4 | 7 | 1 | 2 | 2 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 5 | 26 | 4.0 | 26 |
| 14-Aug | 10 | 6 | 4 | 5 | 14 | Z | 6 | 3 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2.8 | 14 |
| 15-Aug | 1 | 2 | 1 | 2 | 4 | Z | 1 | 1 | 1 | 1 | 1 | 3 | 6 | 5 | 36 | 22 | 10 | PF | 3 | 1 | 0 | 0 | 0 | 0 | 4.7 | 36 |
| 16-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 4 | 4 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0.9 | 4 |
| 17-Aug | 2 | Z | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 9 | 2 | 5 | 7 | 5 | 1 | 0 | 0 | 2 | 3 | 2.0 | 9 |
| 18-Aug | 1 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 11 | 12 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.3 | 12 |
| 19-Aug | 0 | 4 | 15 | Z | 21 | 6 | 6 | 1 | 9 | 3 | 14 | 13 | 13 | 4 | 1 | 0 | 0 | 3 | 5 | 1 | 2 | 1 | 0 | 2 | 5.3 | 21 |
| 20-Aug | 2 | 23 | 33 | 44 | Z | 26 | 16 | 23 | 34 | 28 | 9 | 10 | 2 | 1 | 0 | 5 | 14 | 8 | 0 | 0 | 0 | 2 | 3 | 1 | 12.3 | 44 |
| 21-Aug | 0 | 0 | 1 | 2 | 7 | Z | 3 | 1 | 1 | 1 | 10 | 1 | 13 | 10 | 19 | 9 | 5 | 3 | 1 | 1 | 1 | 0 | 0 | 1 | 4.0 | 19 |
| 22-Aug | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 38 | 41 | 7 | 10 | 5 | 3 | 1 | 1 | 1 | 5.2 | 41 |
| 23-Aug | 5 | Z | 7 | 9 | 10 | 11 | 6 | 5 | 4 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 4 | 7 | 6 | 1 | 1 | 3.6 | 11 |
| 24-Aug | 7 | 8 | Z | 5 | 1 | 0 | 0 | 0 | 3 | 5 | 5 | 1 | 1 | 1 | 2 | 2 | 0 | 0 | 3 | 3 | 1 | 0 | 2 | 0 | 2.2 | 8 |
| 25-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 10 | 5 | 3 | 0 | 0 | 1 | 1 | 1.3 | 10 |
| 26-Aug | 5 | 3 | 2 | 4 | Z | 8 | 3 | 6 | 9 | 1 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2.1 | 9 |
| 27-Aug | 0 | 0 | 2 | 3 | 3 | Z | 8 | 19 | 15 | 19 | 14 | 22 | 18 | 9 | 6 | 7 | 5 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 6.8 | 22 |
| 28-Aug | Z | 0 | 0 | 1 | 0 | 0 | 1 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 2 |
| 29-Aug | 0 | Z | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 7 | 16 | 16 | 9 | 10 | 14 | 7 | 15 | 8 | 9 | 4 | 1 | 1 | 3 | 7 | 5.8 | 16 |
| 30-Aug | 9 | 10 | Z | 26 | 20 | 19 | 26 | 7 | 6 | 5 | 2 | 2 | 2 | 1 | 1 | 1 | 4 | 6 | 1 | 1 | 1 | 1 | 1 | 1 | 6.7 | 26 |
| 31-Aug | 1 | 1 | 1 | Z | 1 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 0 | 7 | 22 | 16 | 11 | 7 | 5 | 19 | 10 | 4 | 8 | 20 | 6.2 | 22 |
| 1.9 2.5 3.3 4.2 3.9 3.4 2.9 2.8 3.4 3.3 3.7 2.9 3.2 2.7 4.1 4.2 4.2 2.5 2.0 1.7 1.1 1.0 1.7 2.3 Diurnal Average | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| 10 23 33 44 21 26 26 23 34 28 22 22 18 12 36 38 41 10 10 19 10 7 18 26 Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| Z - zerospan C - Calibration PF - Power Failure Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Mildred Lake - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Mildred Lake - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 10 | 661 | 93.23 | 93.23 |
| 11 - 20 | 30 | 4.23 | 97.46 |
| 21 - 60 | 18 | 2.54 | 100.00 |
| 61 - 110 | 0 | 0.00 | 100.00 |
| 111 - 172 | 0 | 0.00 | 100.00 |
| > 172 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Mildred Lake - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 10 | 33 | 36 | 9 | 9 | 10 | 15 | 28 | 78 | 81 | 93 | 70 | 81 | 31 | 37 | 26 | 24 | 661 |
| 11 - 20 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 2 | 0 | 1 | 2 | 4 | 11 | 5 | 0 | 0 | 30 |
| 21 - 60 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 1 | 0 | 1 | 1 | 1 | 10 | 0 | 0 | 0 | 18 |
| 61 - 110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 111 - 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 33 | 36 | 9 | 9 | 12 | 16 | 34 | 81 | 81 | 95 | 73 | 86 | 52 | 42 | 26 | 24 | 709 |

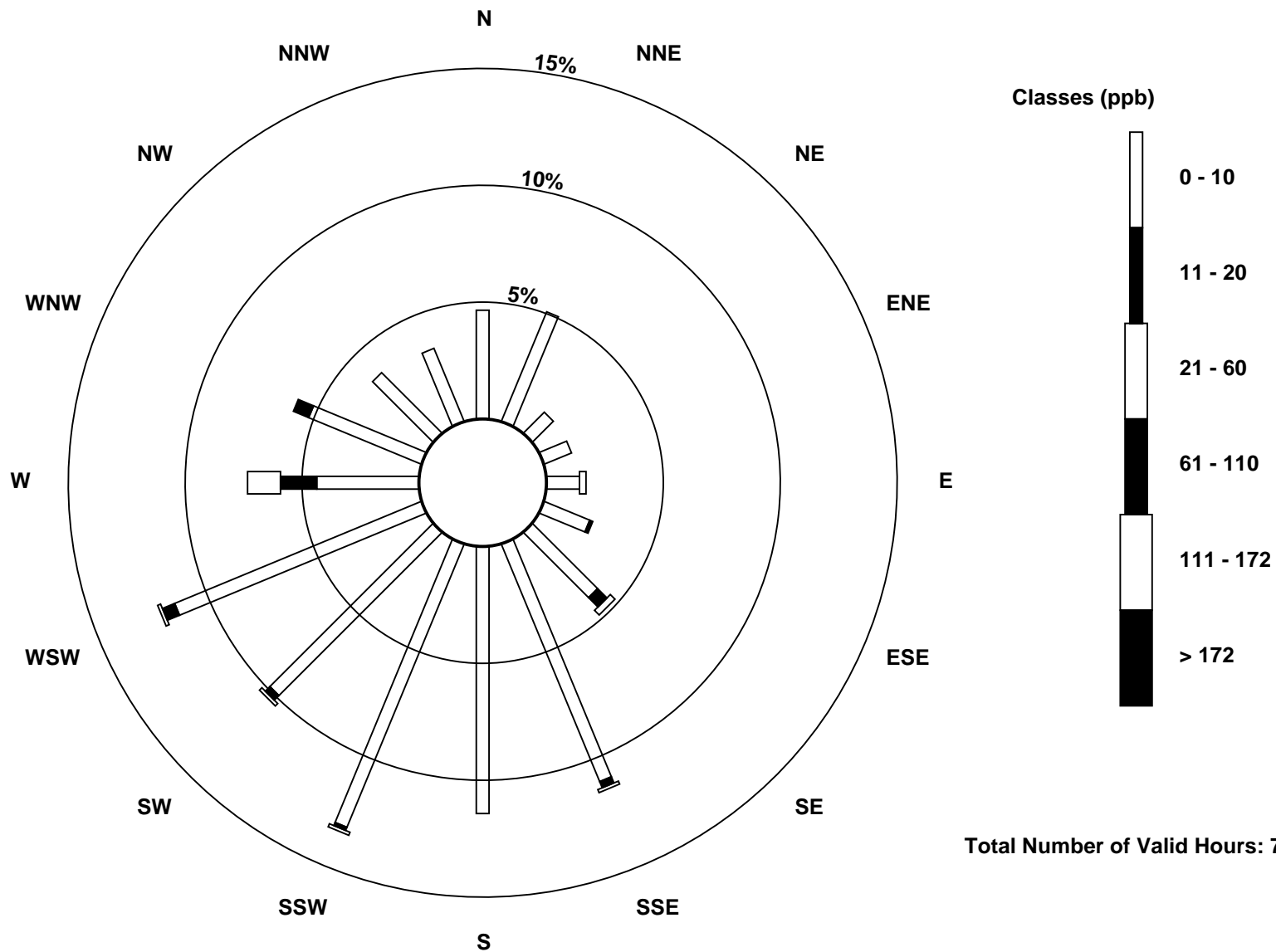
Total Number of Valid Hours: 709

Total Number of Hours: 744

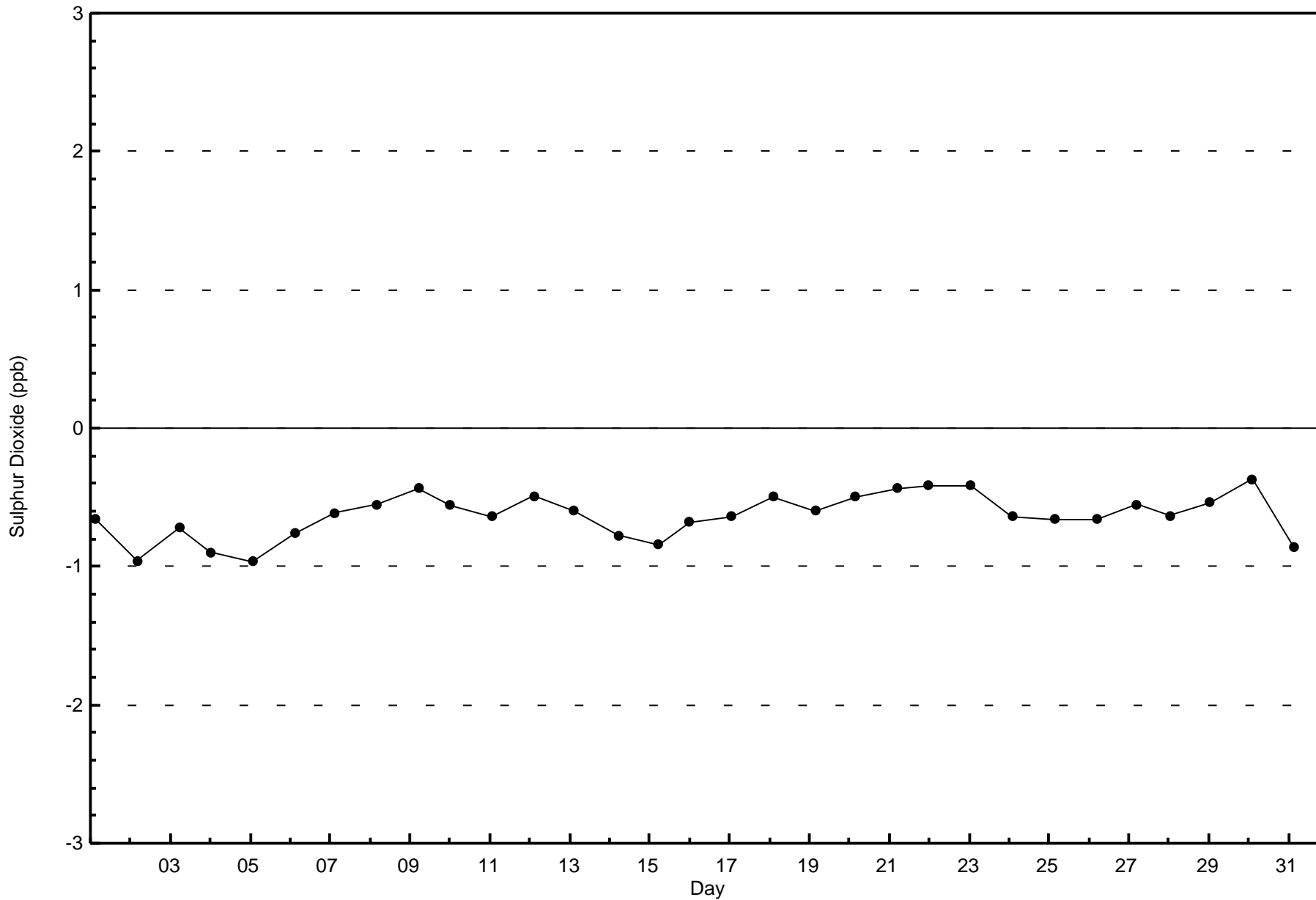


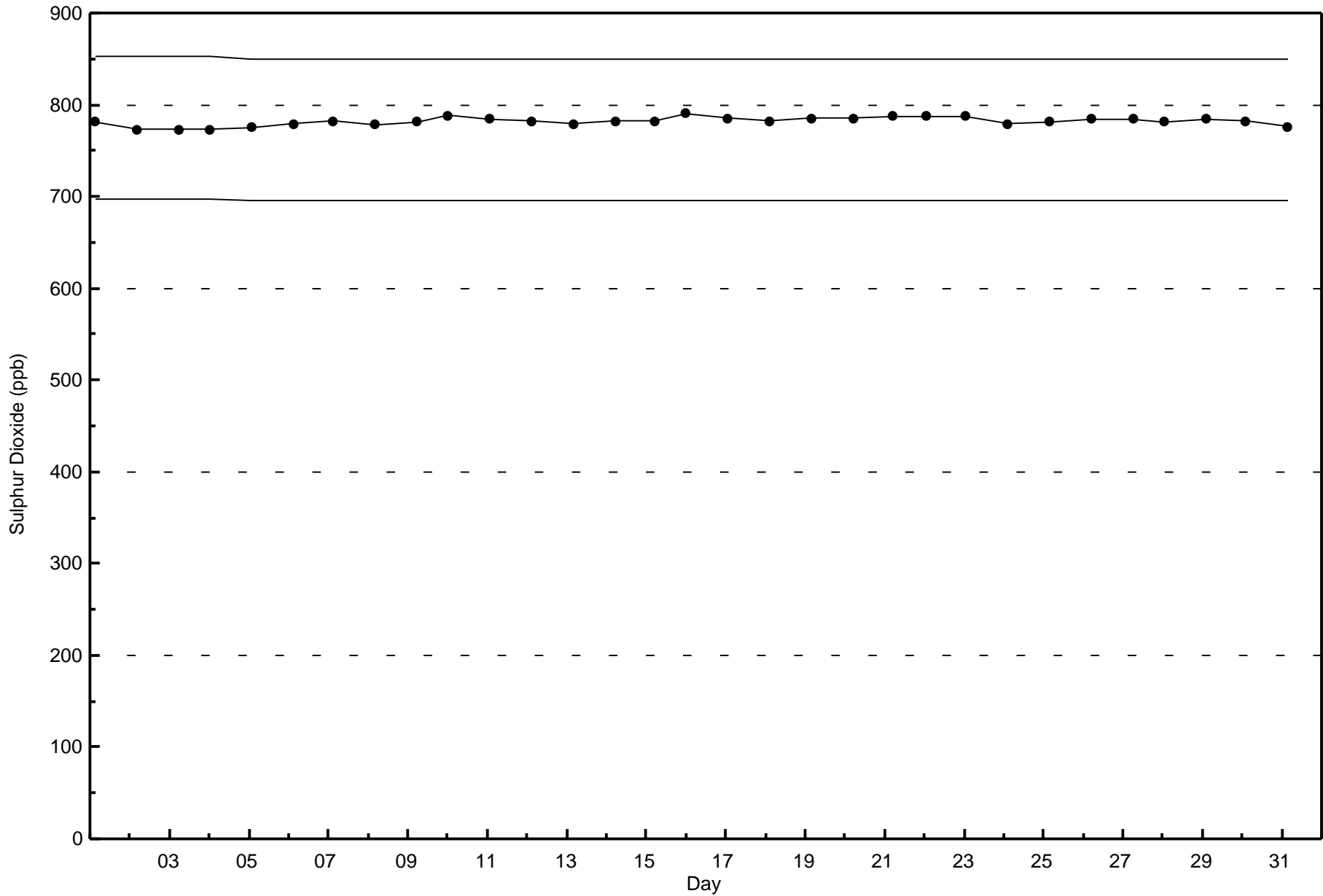
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Sulphur Dioxide (SO₂) - ppb
Mildred Lake (AMS 2)



Total Number of Valid Hours: 709







Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H₂S) - ppb

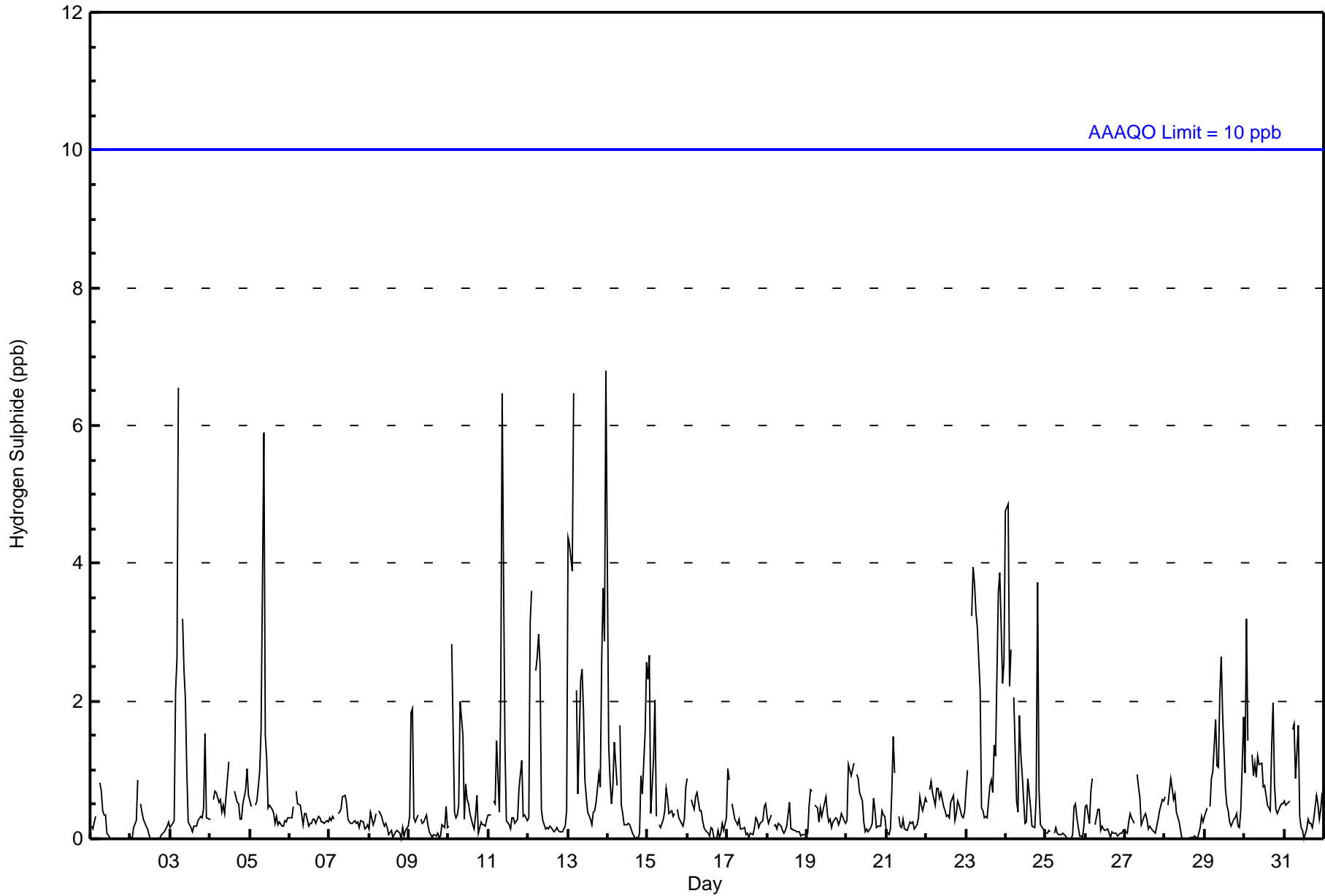
Mildred Lake - August 2017

| | | | | |
|--|--|----------|---------------------------|------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 7 ppb on Aug 14 00:00 | Maximum Daily Average: 2.2 ppb on Aug 13 | | Hours of Data: | 709 |
| Minimum Value: 0 ppb on Aug 1 13:00 | Minimum Daily Average: 0.1 ppb on Aug 25 | | Hours of Missing Data: | 35 |
| Maximum Diurnal Average: 1.1 ppb at hour 6 | Minimum Diurnal Average: 0.2 ppb at hour 15 | | Hours of Calibration: | 34 |
| Monthly Average: 0.6 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 5 | | Percent Operational Time: | 99.9 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0 | 0 | 0 | 0 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 2-Aug | 0 | 0 | 0 | 0 | 1 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 3-Aug | 0 | 0 | 0 | 2 | 3 | 7 | Z | 3 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1.1 | 7 |
| 4-Aug | 0 | Z | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | C | C | C | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 0.6 | 1 |
| 5-Aug | 1 | 0 | Z | 0 | 1 | 1 | 1 | 2 | 6 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.8 | 6 |
| 6-Aug | 0 | 0 | 0 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 7-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 8-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 9-Aug | 0 | 2 | 2 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 2 |
| 10-Aug | 0 | Z | 3 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0.6 | 3 |
| 11-Aug | 0 | 0 | Z | 1 | 1 | 1 | 0 | 2 | 6 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1.0 | 6 |
| 12-Aug | 0 | 3 | 4 | Z | 2 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.9 | 4 |
| 13-Aug | 4 | 4 | 4 | 6 | Z | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 3 | 4 | 3 | 7 | 2.2 | 7 |
| 14-Aug | 1 | 1 | 1 | 1 | 1 | 1 | Z | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 3 | 0.7 | 3 |
| 15-Aug | 2 | 3 | 0 | 1 | 2 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | PF | 0 | 0 | 0 | 0 | 1 | 0.7 | 3 |
| 16-Aug | 1 | Z | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 17-Aug | 1 | 1 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.3 | 1 |
| 18-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 19-Aug | 0 | 0 | 1 | 1 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 20-Aug | 0 | 1 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 1 |
| 21-Aug | 0 | 0 | 0 | 1 | 1 | 1 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0.4 | 1 |
| 22-Aug | 1 | Z | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0.5 | 1 |
| 23-Aug | 1 | 1 | Z | 3 | 4 | 4 | 3 | 3 | 2 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 4 | 4 | 3 | 2 | 3 | 1.9 | 4 |
| 24-Aug | 5 | 5 | 2 | 3 | Z | 2 | 1 | 0 | 2 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 4 | 1 | 0 | 0 | 0 | 1.3 | 5 |
| 25-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 |
| 26-Aug | 0 | 0 | 0 | 1 | 1 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.3 | 1 |
| 28-Aug | 1 | Z | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 29-Aug | 0 | 0 | Z | 0 | 1 | 1 | 2 | 1 | 1 | 2 | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0.8 | 3 |
| 30-Aug | 1 | 3 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 1 | 1 | 1.0 | 3 |
| 31-Aug | 1 | 0 | 1 | 1 | Z | 2 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0.5 | 2 |

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|
| 0.7 | 1.1 | 0.9 | 1.0 | 1.0 | 1.1 | 0.8 | 0.9 | 1.1 | 0.7 | 0.5 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.5 | 0.5 | 0.5 | 0.5 | 0.7 | Diurnal Average |
| 5 | 5 | 4 | 6 | 4 | 7 | 3 | 3 | 6 | 4 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 4 | 4 | 4 | 3 | 7 | Diurnal Maximum |

Z - zerospan C - Calibration PF - Power Failure
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Mildred Lake - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2 | 672 | 94.78 | 94.78 |
| 3 - 4 | 30 | 4.23 | 99.01 |
| 5 - 7 | 7 | 0.99 | 100.00 |
| 8 - 11 | 0 | 0.00 | 100.00 |
| > 11 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Mildred Lake - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2 | 33 | 37 | 10 | 10 | 10 | 13 | 36 | 51 | 75 | 93 | 72 | 86 | 52 | 42 | 27 | 25 | 672 |
| 3 - 4 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 25 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 30 |
| 5 - 7 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| 8 - 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 33 | 37 | 10 | 10 | 10 | 13 | 40 | 80 | 78 | 93 | 73 | 86 | 52 | 42 | 27 | 25 | 709 |

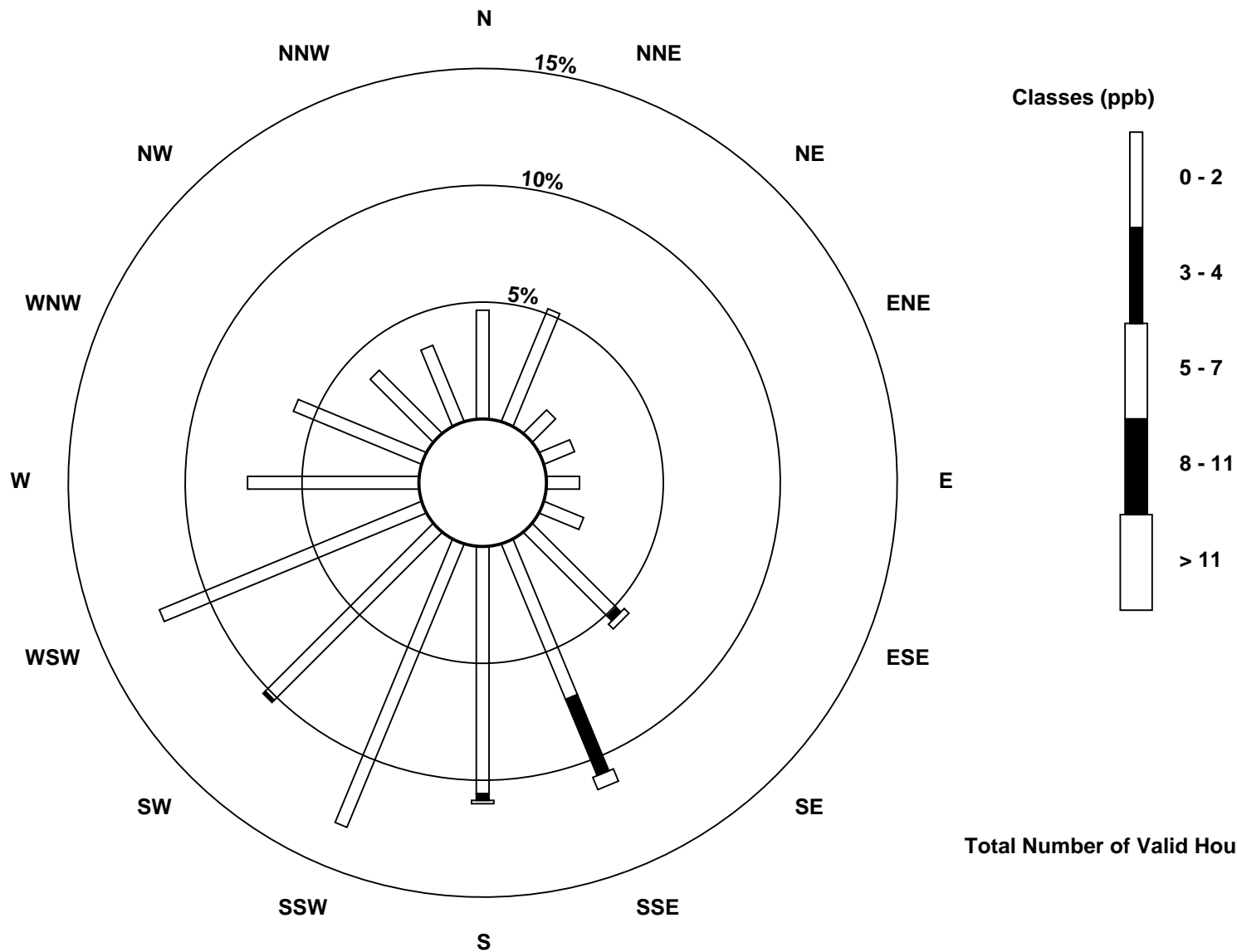
Total Number of Valid Hours: 709

Total Number of Hours: 744

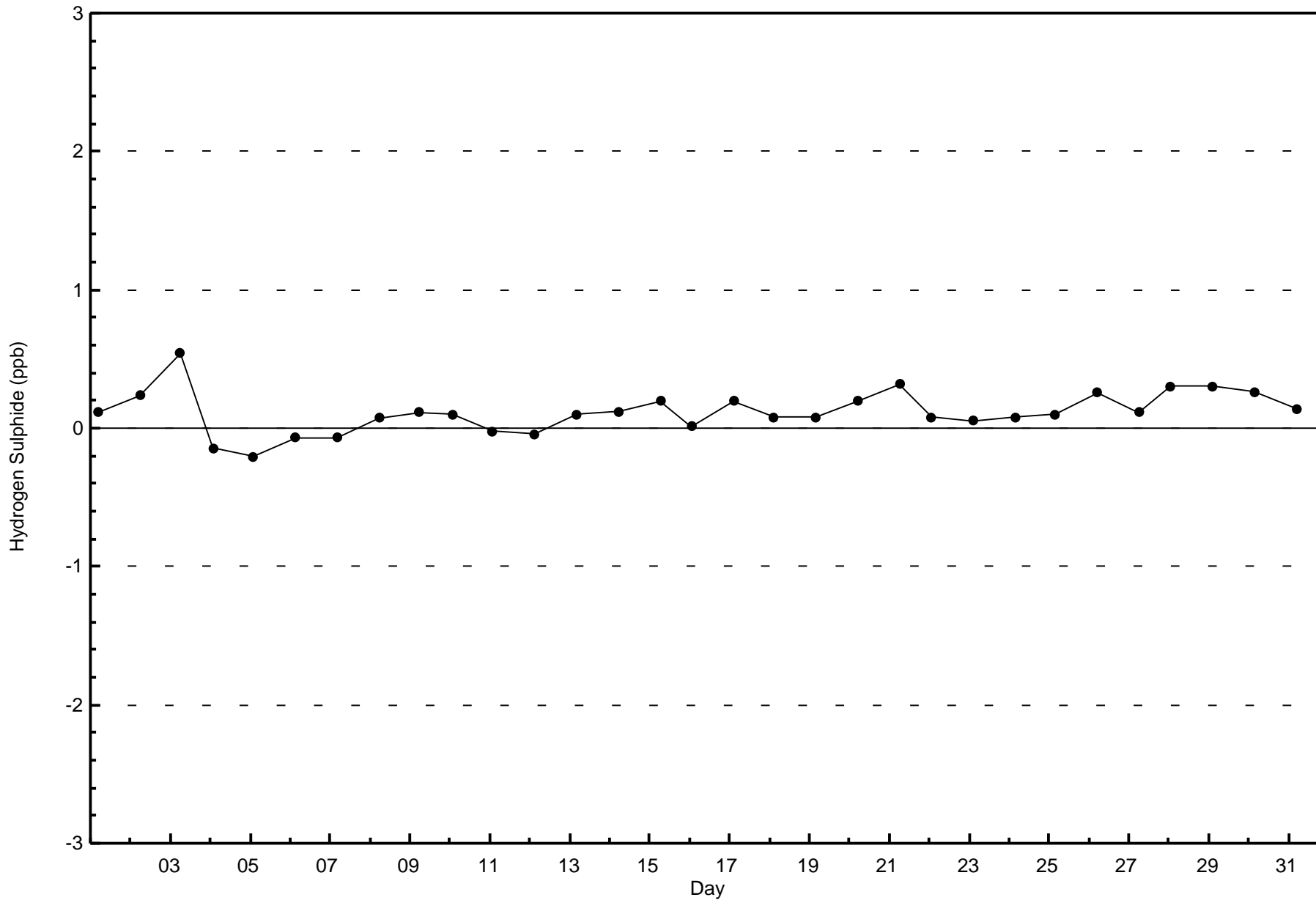


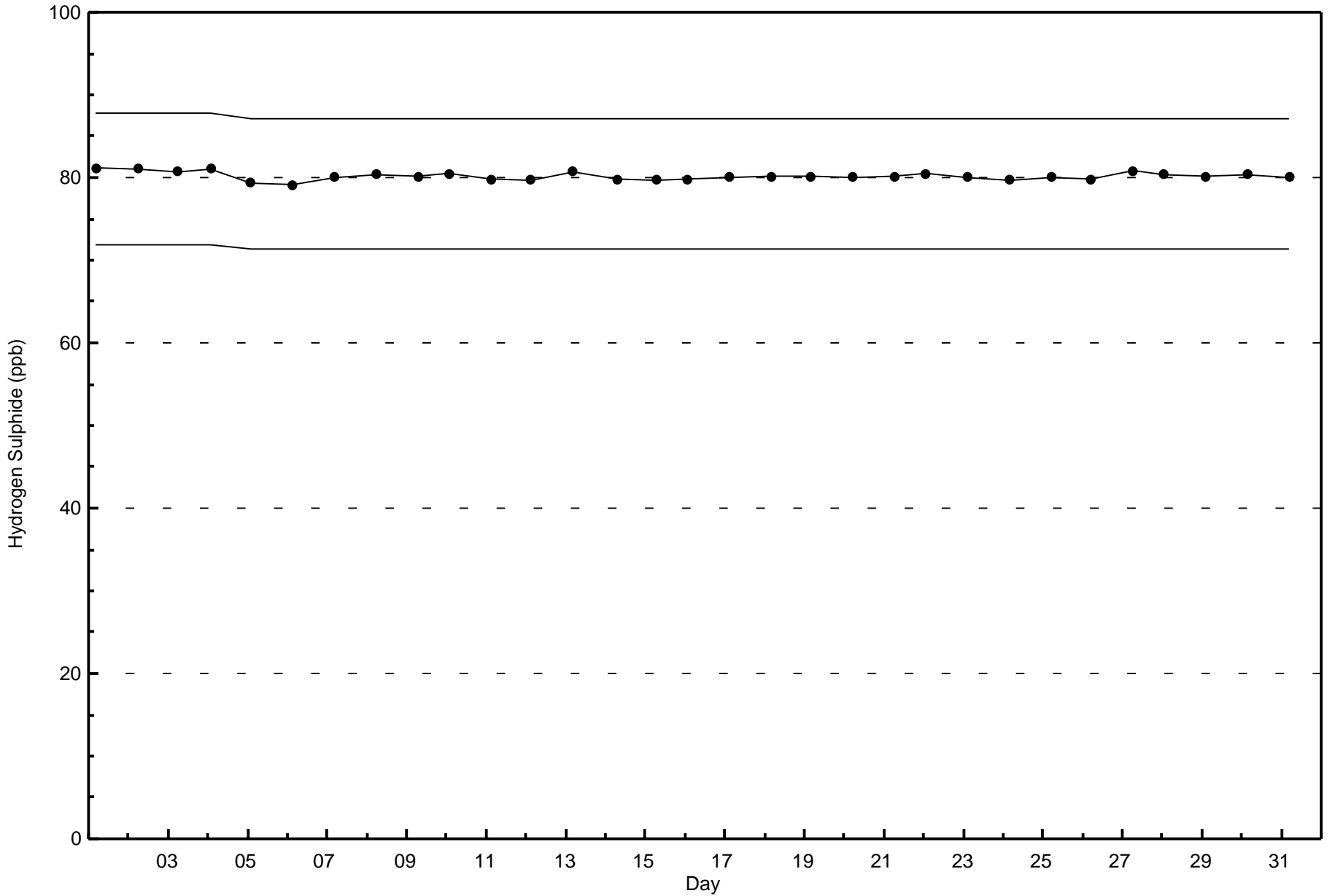
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Hydrogen Sulphide (H₂S) - ppb
Mildred Lake (AMS 2)



Total Number of Valid Hours: 709





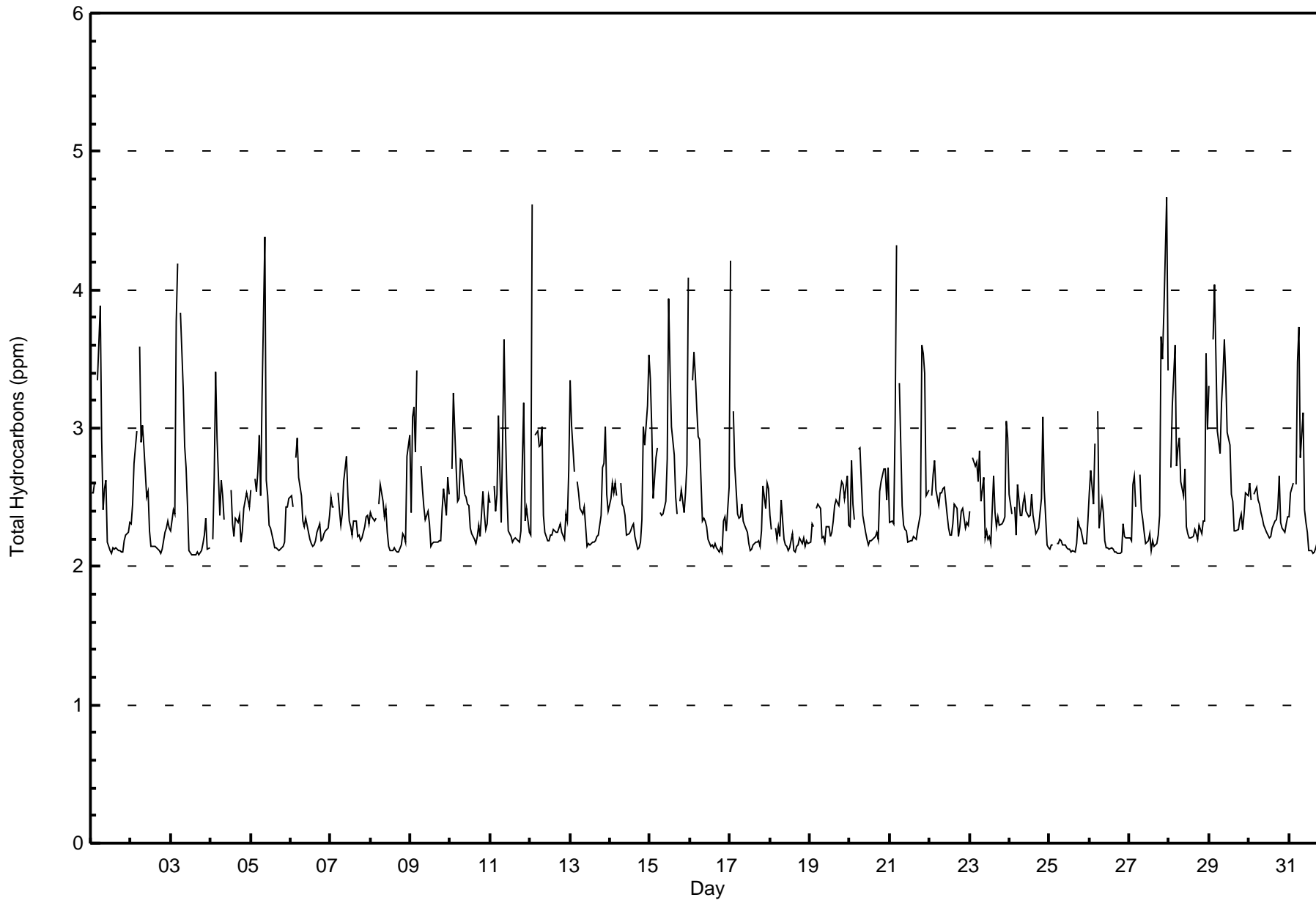


| Maximum Value: 4.7 ppm on Aug 27 23:00 | | | | | | | | | | | | | | | | | | | Maximum Daily Average: 2.9 ppm on Aug 29 | | | | | | Hours in Service: 744 | | |
|---|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|-----|-----|-----|-----|-----------------|--------------------------------|---------------|-----|
| Minimum Value: 2.1 ppm on Aug 3 13:00 | | | | | | | | | | | | | | | | | | | Minimum Daily Average: 2.2 ppm on Aug 25 | | | | | | Hours of Data: 709 | | |
| Maximum Diurnal Average: 2.9 ppm at hour 4 | | | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 2.2 ppm at hour 17 | | | | | | Hours of Missing Data: 35 | | |
| Monthly Average: 2.47 ppm | | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 2.1 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.3 Q ₃ = 2.6 P ₉₀ = 3.0 P ₉₉ = 4.0 | | | | | | Hours of Calibration: 34 | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 99.9 | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 2.5 | 2.5 | 2.6 | Z | 3.3 | 3.9 | 2.9 | 2.4 | 2.6 | 2.6 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.3 | 2.4 | 3.9 | |
| 2-Aug | 2.3 | 2.5 | 2.7 | 3.0 | Z | 3.6 | 2.9 | 3.0 | 2.9 | 2.5 | 2.5 | 2.3 | 2.1 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.3 | 2.3 | 2.3 | 2.3 | 2.4 | 3.6 | |
| 3-Aug | 2.3 | 2.4 | 2.4 | 3.8 | 4.2 | Z | 3.8 | 3.3 | 2.9 | 2.7 | 2.4 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.3 | 2.1 | 2.1 | 2.5 | 4.2 | |
| 4-Aug | Z | 2.2 | 2.6 | 3.4 | 2.9 | 2.4 | 2.6 | 2.5 | 2.3 | C | C | C | 2.6 | 2.3 | 2.2 | 2.3 | 2.3 | 2.4 | 2.2 | 2.3 | 2.4 | 2.5 | 2.5 | 2.4 | 2.5 | 3.4 | |
| 5-Aug | 2.6 | Z | 2.6 | 2.5 | 2.7 | 3.0 | 2.5 | 3.2 | 4.4 | 2.6 | 2.5 | 2.3 | 2.3 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.4 | 2.4 | 2.5 | 2.5 | 4.4 | |
| 6-Aug | 2.5 | 2.4 | Z | 2.8 | 2.9 | 2.6 | 2.5 | 2.3 | 2.3 | 2.4 | 2.3 | 2.2 | 2.2 | 2.1 | 2.2 | 2.2 | 2.2 | 2.3 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.4 | 2.3 | 2.9 | |
| 7-Aug | 2.5 | 2.4 | 2.4 | Z | 2.5 | 2.4 | 2.3 | 2.4 | 2.6 | 2.8 | 2.5 | 2.3 | 2.3 | 2.2 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.4 | 2.4 | 2.3 | 2.4 | 2.8 | |
| 8-Aug | 2.4 | 2.4 | 2.3 | 2.4 | Z | 2.4 | 2.6 | 2.5 | 2.4 | 2.4 | 2.3 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.8 | 2.9 | 2.3 | 2.9 | |
| 9-Aug | 2.4 | 3.1 | 3.2 | 2.8 | 3.4 | Z | 2.7 | 2.6 | 2.4 | 2.3 | 2.4 | 2.3 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.4 | 2.6 | 2.4 | 2.6 | 2.5 | 2.5 | 3.4 | |
| 10-Aug | Z | 2.7 | 3.3 | 2.7 | 2.5 | 2.5 | 2.8 | 2.8 | 2.5 | 2.5 | 2.5 | 2.4 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.2 | 2.5 | 2.4 | 2.3 | 2.3 | 2.5 | 2.5 | 3.3 | |
| 11-Aug | 2.5 | Z | 2.6 | 2.4 | 2.5 | 3.1 | 2.3 | 2.9 | 3.6 | 3.0 | 2.6 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.8 | 3.2 | 2.3 | 2.4 | 2.2 | 2.5 | 3.6 | |
| 12-Aug | 2.2 | 4.6 | Z | 3.0 | 3.0 | 2.9 | 2.9 | 3.0 | 2.4 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.2 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.4 | 2.3 | 2.7 | 2.5 | 4.6 | |
| 13-Aug | 3.3 | 3.0 | 2.7 | Z | 2.6 | 2.5 | 2.4 | 2.4 | 2.4 | 2.3 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.4 | 2.7 | 2.8 | 3.0 | 2.5 | 2.4 | 2.5 | 3.3 | |
| 14-Aug | 2.5 | 2.6 | 2.5 | 2.6 | 2.5 | Z | 2.6 | 2.4 | 2.4 | 2.4 | 2.2 | 2.2 | 2.3 | 2.3 | 2.3 | 2.2 | 2.1 | 2.1 | 2.2 | 2.3 | 3.0 | 2.9 | 3.2 | 3.5 | 2.5 | 3.5 | |
| 15-Aug | 3.4 | 3.0 | 2.5 | 2.8 | 2.9 | Z | 2.4 | 2.4 | 2.4 | 2.5 | 2.8 | 3.9 | 3.4 | 3.0 | 2.8 | 2.5 | 2.4 | PF | 2.5 | 2.6 | 2.4 | 2.5 | 2.7 | 4.1 | 2.8 | 4.1 | |
| 16-Aug | Z | 3.4 | 3.6 | 3.4 | 3.1 | 2.9 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.3 | 2.4 | 2.3 | 2.6 | 2.5 | 3.6 | |
| 17-Aug | 4.2 | Z | 3.1 | 2.7 | 2.4 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.3 | 2.6 | 2.4 | 2.6 | 2.6 | 2.4 | 4.2 |
| 18-Aug | 2.4 | 2.3 | Z | 2.3 | 2.2 | 2.3 | 2.2 | 2.5 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.2 | 2.2 | 2.2 | 2.5 | |
| 19-Aug | 2.2 | 2.3 | 2.3 | Z | 2.4 | 2.5 | 2.4 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.2 | 2.3 | 2.3 | 2.4 | 2.5 | 2.4 | 2.5 | 2.6 | 2.6 | 2.5 | 2.7 | 2.3 | 2.4 | 2.7 | |
| 20-Aug | 2.3 | 2.8 | 2.4 | 2.3 | Z | 2.8 | 2.9 | 2.6 | 2.4 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.5 | 2.6 | 2.7 | 2.7 | 2.5 | 2.7 | 2.4 | 2.9 |
| 21-Aug | 2.3 | 2.3 | 2.3 | 3.0 | 4.3 | Z | 3.3 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.4 | 3.6 | 3.5 | 3.4 | 2.5 | 2.6 | 2.6 | 4.3 | |
| 22-Aug | Z | 2.5 | 2.7 | 2.8 | 2.5 | 2.4 | 2.5 | 2.5 | 2.6 | 2.6 | 2.4 | 2.3 | 2.2 | 2.2 | 2.3 | 2.4 | 2.4 | 2.2 | 2.3 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.4 | 2.8 | |
| 23-Aug | 2.4 | Z | 2.8 | 2.7 | 2.8 | 2.6 | 2.8 | 2.5 | 2.6 | 2.2 | 2.3 | 2.2 | 2.2 | 2.2 | 2.7 | 2.4 | 2.3 | 2.4 | 2.3 | 2.3 | 2.3 | 2.4 | 3.0 | 2.9 | 2.5 | 3.0 | |
| 24-Aug | 2.5 | 2.4 | Z | 2.4 | 2.2 | 2.6 | 2.4 | 2.4 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 2.5 | 2.4 | 2.3 | 2.2 | 2.3 | 2.4 | 2.5 | 3.1 | 2.6 | 2.2 | 2.1 | 2.4 | 3.1 | |
| 25-Aug | 2.1 | 2.2 | 2.2 | Z | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.3 | 2.2 | 2.3 | |
| 26-Aug | 2.5 | 2.7 | 2.5 | 2.9 | Z | 3.1 | 2.3 | 2.5 | 2.4 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.3 | 2.2 | 2.2 | 2.2 | 2.3 | 3.1 | |
| 27-Aug | 2.2 | 2.2 | 2.6 | 2.7 | 2.4 | Z | 2.7 | 2.4 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.4 | 3.7 | 3.5 | 3.8 | 4.7 | 3.4 | 2.6 | 4.7 |
| 28-Aug | Z | 2.7 | 3.2 | 3.6 | 2.7 | 2.9 | 2.9 | 2.6 | 2.5 | 2.7 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.2 | 2.2 | 2.2 | 2.3 | 2.2 | 2.3 | 3.5 | 3.0 | 2.6 | 3.6 | |
| 29-Aug | 3.3 | Z | 3.6 | 4.0 | 3.5 | 3.0 | 2.8 | 3.2 | 3.4 | 3.6 | 3.4 | 3.0 | 2.9 | 2.5 | 2.5 | 2.3 | 2.3 | 2.3 | 2.3 | 2.4 | 2.3 | 2.4 | 2.5 | 2.5 | 2.9 | 4.0 | |
| 30-Aug | 2.6 | 2.5 | Z | 2.5 | 2.6 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.3 | 2.4 | 2.7 | 2.3 | 2.3 | 2.3 | 2.3 | 2.4 | 2.4 | 2.7 | |
| 31-Aug | 2.4 | 2.5 | 2.6 | Z | 2.6 | 3.5 | 3.7 | 2.8 | 3.1 | 2.4 | 2.3 | 2.3 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.3 | 2.2 | 2.2 | 2.2 | 2.4 | 2.5 | 2.5 | 3.7 | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | |
| Z - zerospan C - Calibration PF - Power Failure | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Mildred Lake - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Mildred Lake - August 2017

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2.0 | 0 | 0.00 | 0.00 |
| 2.1 - 3.0 | 652 | 91.96 | 91.96 |
| 3.1 - 10.0 | 57 | 8.04 | 100.00 |
| > 10.0 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 709

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Mildred Lake - August 2017

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----------|----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2.1 - 3.0 | 29 | 36 | 8 | 8 | 11 | 16 | 33 | 71 | 71 | 89 | 70 | 83 | 47 | 41 | 19 | 20 | 652 |
| 3.1 - 10.0 | 4 | 0 | 1 | 1 | 1 | 0 | 1 | 10 | 10 | 6 | 3 | 3 | 5 | 1 | 7 | 4 | 57 |
| > 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 33 | 36 | 9 | 9 | 12 | 16 | 34 | 81 | 81 | 95 | 73 | 86 | 52 | 42 | 26 | 24 | 709 |

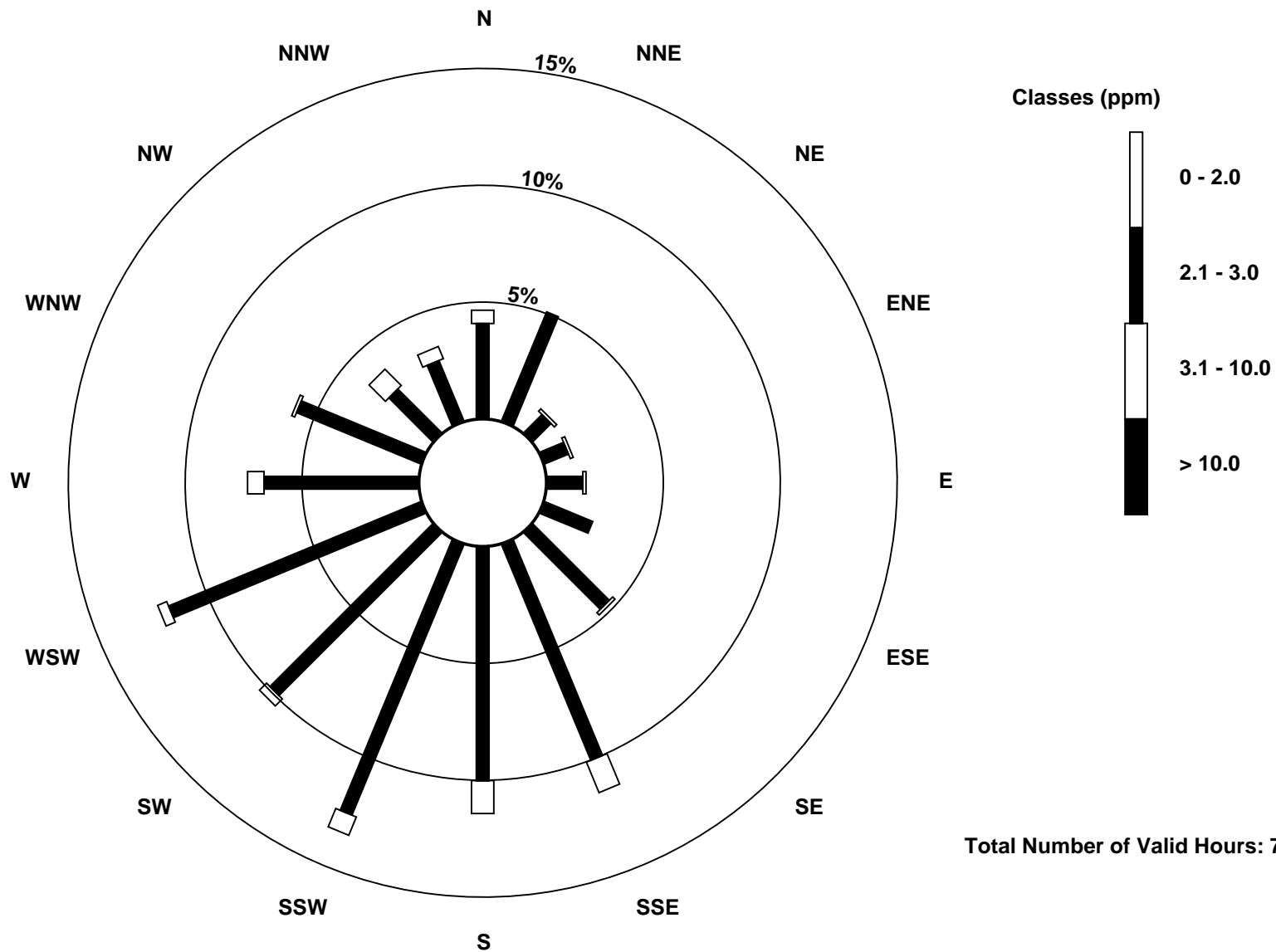
Total Number of Valid Hours: 709

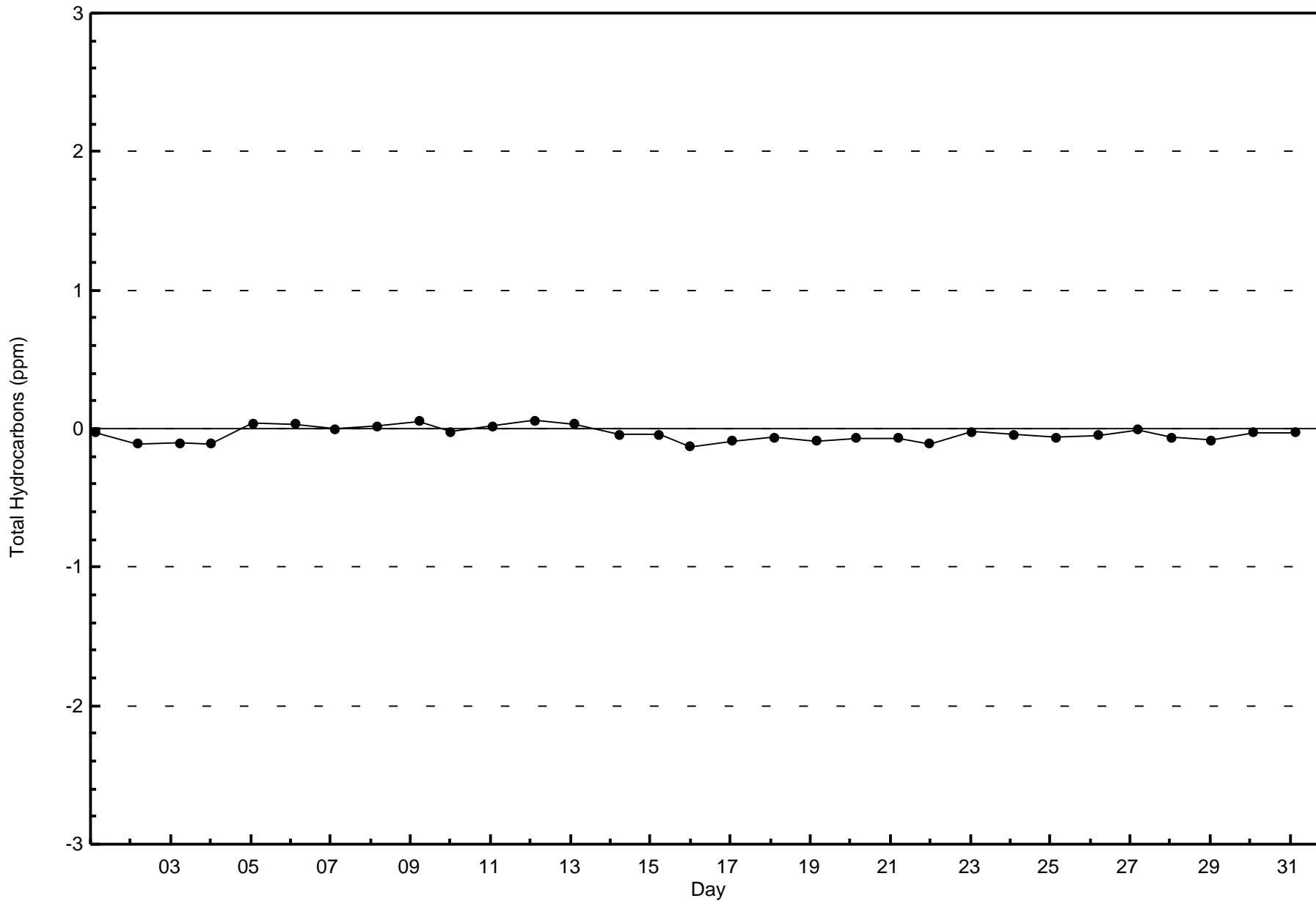
Total Number of Hours: 744

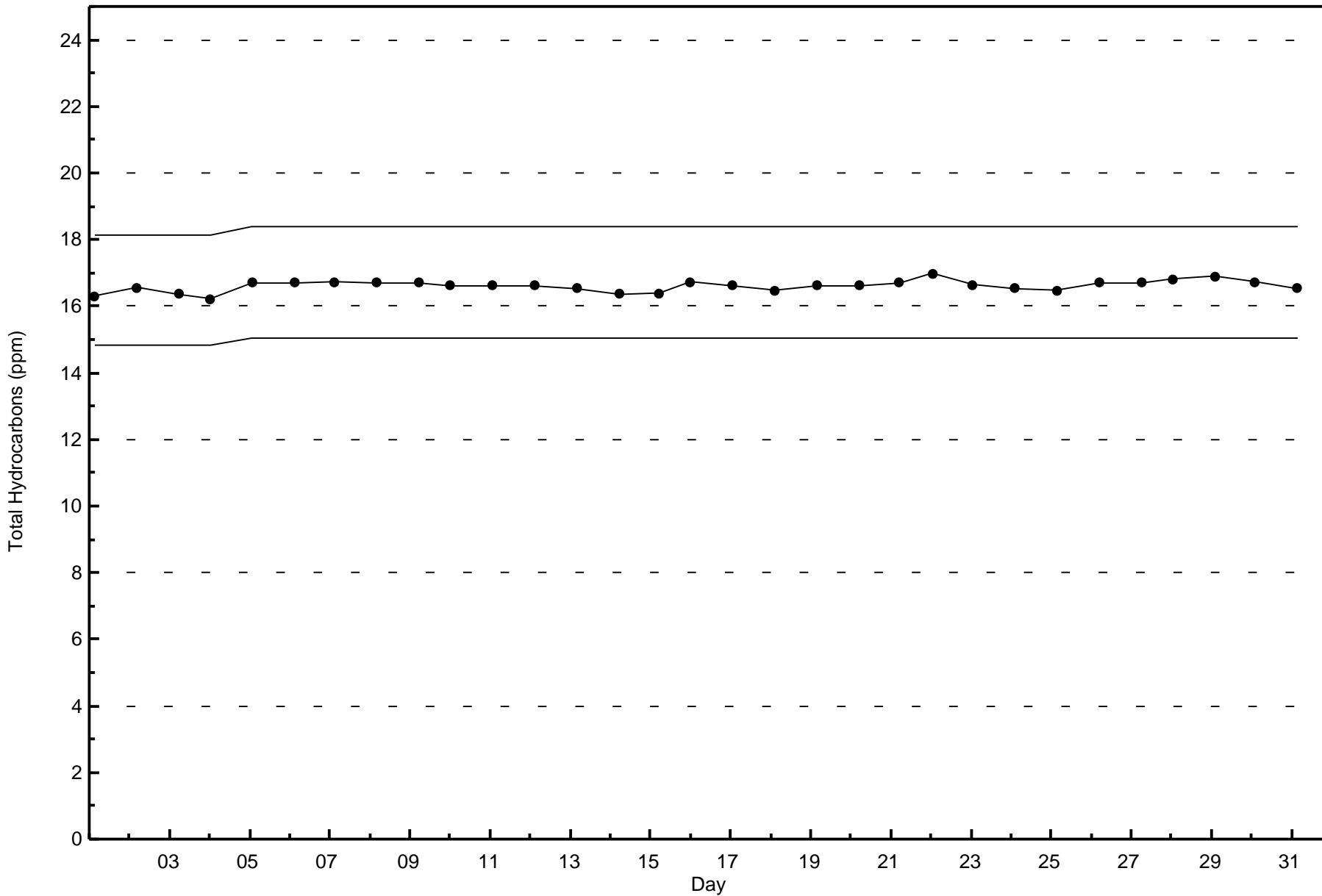


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Total Hydrocarbons (THC) - ppm
Mildred Lake (AMS 2)









Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

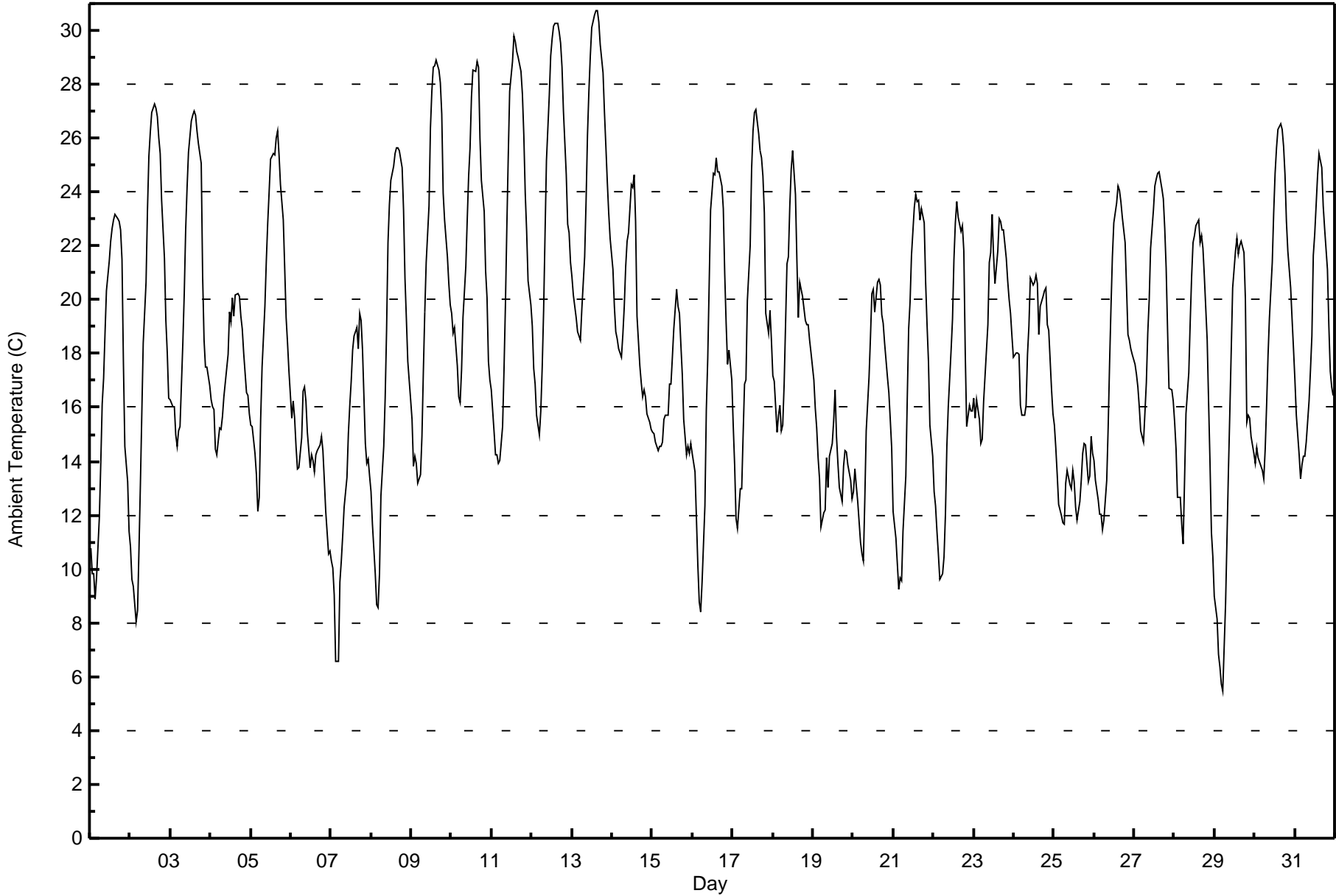
Mildred Lake - August 2017

| Maximum Value: 30.7 C on Aug 13 15:00 Maximum Daily Average: 24.9 C on Aug 13 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 | | | | |
|--|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|------|------|---------------|---------------|
| Minimum Value: 5.4 C on Aug 29 06:00 Minimum Daily Average: 13.3 C on Aug 25 Maximum Diurnal Average: 23.5 C at hour 15 Minimum Diurnal Average: 12.7 C at hour 5 Monthly Average: 18.44 C Percentiles: P ₁ = 8.2 P ₁₀ = 12.2 Q ₁ = 14.5 Median = 18.0 Q ₃ = 22.4 P ₉₀ = 25.5 P ₉₉ = 30.1 | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 10.8 | 9.8 | 9.8 | 8.9 | 9.7 | 11.9 | 13.9 | 16.1 | 17.1 | 18.8 | 20.4 | 21.5 | 22.2 | 22.6 | 23.0 | 23.2 | 23.0 | 22.9 | 22.6 | 21.5 | 17.7 | 14.5 | 13.2 | 11.4 | 16.9 | 23.2 |
| 2-Aug | 10.8 | 9.6 | 9.4 | 8.0 | 8.5 | 10.7 | 13.1 | 15.8 | 18.4 | 20.6 | 23.3 | 25.3 | 26.2 | 27.0 | 27.3 | 27.1 | 26.8 | 26.0 | 25.4 | 23.7 | 21.6 | 19.2 | 18.0 | 16.3 | 19.1 | 27.3 |
| 3-Aug | 16.3 | 16.0 | 16.0 | 15.0 | 14.6 | 15.1 | 15.3 | 18.4 | 20.2 | 22.6 | 24.2 | 25.5 | 26.7 | 26.8 | 27.0 | 26.8 | 26.3 | 25.8 | 25.1 | 20.8 | 18.5 | 17.5 | 17.5 | 16.8 | 20.6 | 27.0 |
| 4-Aug | 16.3 | 16.0 | 15.9 | 14.4 | 14.2 | 15.3 | 15.2 | 15.7 | 16.4 | 16.9 | 18.0 | 19.5 | 19.2 | 20.1 | 19.4 | 20.2 | 20.2 | 20.1 | 19.4 | 18.9 | 18.0 | 16.6 | 16.5 | 15.7 | 17.4 | 20.2 |
| 5-Aug | 15.3 | 15.3 | 14.3 | 13.5 | 12.2 | 12.7 | 15.6 | 17.5 | 19.7 | 21.5 | 22.8 | 24.0 | 25.2 | 25.5 | 25.4 | 26.0 | 26.3 | 25.4 | 24.3 | 23.0 | 21.2 | 19.3 | 18.4 | 17.4 | 20.1 | 26.3 |
| 6-Aug | 15.6 | 16.3 | 15.6 | 14.5 | 13.7 | 13.7 | 14.9 | 16.6 | 16.8 | 16.2 | 15.1 | 13.8 | 14.2 | 14.0 | 13.6 | 14.2 | 14.4 | 14.6 | 14.9 | 14.4 | 13.3 | 12.2 | 10.5 | 10.6 | 14.3 | 16.8 |
| 7-Aug | 10.3 | 10.1 | 9.0 | 6.6 | 6.5 | 9.5 | 10.3 | 11.2 | 12.3 | 13.4 | 15.0 | 16.1 | 16.9 | 18.1 | 18.7 | 19.0 | 18.2 | 19.5 | 19.2 | 18.1 | 14.7 | 13.9 | 14.1 | 13.4 | 13.9 | 19.5 |
| 8-Aug | 12.9 | 11.7 | 9.8 | 8.7 | 8.5 | 9.8 | 12.7 | 14.6 | 16.3 | 18.8 | 22.1 | 23.5 | 24.4 | 24.9 | 25.4 | 25.6 | 25.7 | 25.5 | 24.9 | 23.3 | 20.8 | 19.3 | 17.7 | 16.3 | 18.5 | 25.7 |
| 9-Aug | 15.6 | 13.8 | 14.2 | 13.9 | 13.2 | 13.5 | 14.9 | 17.3 | 19.6 | 21.4 | 23.5 | 26.4 | 27.7 | 28.6 | 28.7 | 28.9 | 28.5 | 28.1 | 26.9 | 24.0 | 23.0 | 21.6 | 20.6 | 19.8 | 21.4 | 28.9 |
| 10-Aug | 19.5 | 18.8 | 19.0 | 17.6 | 16.4 | 16.2 | 17.4 | 19.3 | 21.2 | 23.0 | 24.6 | 25.6 | 27.6 | 28.5 | 28.5 | 28.8 | 28.6 | 26.0 | 24.4 | 23.3 | 21.1 | 20.1 | 17.7 | 17.0 | 22.1 | 28.8 |
| 11-Aug | 16.7 | 15.1 | 14.2 | 14.3 | 13.9 | 14.0 | 15.3 | 17.4 | 19.8 | 22.7 | 25.3 | 27.7 | 28.8 | 29.8 | 29.6 | 29.2 | 29.0 | 28.5 | 27.6 | 26.1 | 24.0 | 22.6 | 20.7 | 19.8 | 22.2 | 29.8 |
| 12-Aug | 19.0 | 17.4 | 16.9 | 15.7 | 15.0 | 15.9 | 17.5 | 19.6 | 22.5 | 25.2 | 27.6 | 29.1 | 29.7 | 30.2 | 30.2 | 30.2 | 30.0 | 29.5 | 28.6 | 27.0 | 24.7 | 22.8 | 22.5 | 21.4 | 23.7 | 30.2 |
| 13-Aug | 20.9 | 20.2 | 19.4 | 18.8 | 18.7 | 18.5 | 19.6 | 21.6 | 23.7 | 26.1 | 27.7 | 29.0 | 30.1 | 30.6 | 30.7 | 30.7 | 30.3 | 29.5 | 28.4 | 27.0 | 25.7 | 24.4 | 23.2 | 22.3 | 24.9 | 30.7 |
| 14-Aug | 21.1 | 19.8 | 18.8 | 18.6 | 18.2 | 17.8 | 18.7 | 19.8 | 21.2 | 22.2 | 22.5 | 24.3 | 24.2 | 24.6 | 22.9 | 19.4 | 17.6 | 16.9 | 16.4 | 16.6 | 16.4 | 15.8 | 15.5 | 15.2 | 19.4 | 24.6 |
| 15-Aug | 15.1 | 15.0 | 14.7 | 14.4 | 14.6 | 14.5 | 14.7 | 15.6 | 15.7 | 15.7 | 16.9 | 16.9 | 17.9 | 18.9 | 20.4 | 19.8 | 19.5 | 18.3 | 17.2 | 15.6 | 14.3 | 14.5 | 14.3 | 14.6 | 16.2 | 20.4 |
| 16-Aug | 14.3 | 13.6 | 11.9 | 10.1 | 8.8 | 8.4 | 9.5 | 12.3 | 15.9 | 17.8 | 20.5 | 23.3 | 24.7 | 24.6 | 25.3 | 24.7 | 24.8 | 24.2 | 23.4 | 21.0 | 19.1 | 17.6 | 18.1 | 17.0 | 18.0 | 25.3 |
| 17-Aug | 15.4 | 13.9 | 11.9 | 11.5 | 13.0 | 13.0 | 15.0 | 16.9 | 17.0 | 20.0 | 22.0 | 24.9 | 26.2 | 26.9 | 27.1 | 26.2 | 25.5 | 25.3 | 24.6 | 23.2 | 19.5 | 18.8 | 19.6 | 18.5 | 19.8 | 27.1 |
| 18-Aug | 17.2 | 17.0 | 15.1 | 15.7 | 16.1 | 15.1 | 15.4 | 16.9 | 21.4 | 21.6 | 23.5 | 24.8 | 25.5 | 23.9 | 21.5 | 19.3 | 20.7 | 20.4 | 20.1 | 19.2 | 19.1 | 19.1 | 18.5 | 18.0 | 19.4 | 25.5 |
| 19-Aug | 17.0 | 16.0 | 15.2 | 14.2 | 13.4 | 11.6 | 12.1 | 12.2 | 14.2 | 13.0 | 14.2 | 14.7 | 15.5 | 16.7 | 14.9 | 13.9 | 13.0 | 12.5 | 13.8 | 14.4 | 14.3 | 13.9 | 13.3 | 12.6 | 14.0 | 17.0 |
| 20-Aug | 12.9 | 13.7 | 13.1 | 12.5 | 11.0 | 10.5 | 10.3 | 12.6 | 15.1 | 17.1 | 18.6 | 20.2 | 20.4 | 19.6 | 20.7 | 20.8 | 20.5 | 19.4 | 19.1 | 18.4 | 17.1 | 16.6 | 15.5 | 14.5 | 16.3 | 20.8 |
| 21-Aug | 12.2 | 11.1 | 10.2 | 9.3 | 9.7 | 9.5 | 11.4 | 13.4 | 16.3 | 18.9 | 19.9 | 21.6 | 23.4 | 23.9 | 23.7 | 23.7 | 22.9 | 23.4 | 22.8 | 20.6 | 19.1 | 17.7 | 15.3 | 14.2 | 17.3 | 23.9 |
| 22-Aug | 12.9 | 12.4 | 11.4 | 10.6 | 9.6 | 9.8 | 10.5 | 12.0 | 14.5 | 16.0 | 18.1 | 19.3 | 21.5 | 22.9 | 23.6 | 23.1 | 22.5 | 22.8 | 21.8 | 18.0 | 15.3 | 16.1 | 15.9 | 15.8 | 16.5 | 23.6 |
| 23-Aug | 16.3 | 15.6 | 16.3 | 15.6 | 14.7 | 14.8 | 16.3 | 17.2 | 19.1 | 21.4 | 21.7 | 23.2 | 21.7 | 20.6 | 21.8 | 23.0 | 22.9 | 22.6 | 22.6 | 21.5 | 20.7 | 20.0 | 19.5 | 18.7 | 19.5 | 23.2 |
| 24-Aug | 17.9 | 18.0 | 18.0 | 18.0 | 16.1 | 15.7 | 15.7 | 16.1 | 18.0 | 19.0 | 20.8 | 20.5 | 20.7 | 20.9 | 20.6 | 18.7 | 19.7 | 20.1 | 20.3 | 20.4 | 19.1 | 18.9 | 16.6 | 15.8 | 18.6 | 20.9 |
| 25-Aug | 15.3 | 14.5 | 13.5 | 12.4 | 12.0 | 11.7 | 11.7 | 13.2 | 13.7 | 13.2 | 13.0 | 13.7 | 13.2 | 12.3 | 11.8 | 12.5 | 13.3 | 14.3 | 14.7 | 14.6 | 13.2 | 13.5 | 14.9 | 14.3 | 13.3 | 15.3 |
| 26-Aug | 14.0 | 13.3 | 12.6 | 12.1 | 12.0 | 11.4 | 11.8 | 13.3 | 15.2 | 17.6 | 19.7 | 21.6 | 22.9 | 23.6 | 24.2 | 24.1 | 23.6 | 23.1 | 22.1 | 20.5 | 18.7 | 18.5 | 18.2 | 18.0 | 18.0 | 24.2 |
| 27-Aug | 17.6 | 17.2 | 16.7 | 16.0 | 15.2 | 14.7 | 15.8 | 16.9 | 18.8 | 20.0 | 21.9 | 23.3 | 24.2 | 24.5 | 24.7 | 24.8 | 24.1 | 23.7 | 22.7 | 21.2 | 18.9 | 16.7 | 16.6 | 16.2 | 19.7 | 24.8 |
| 28-Aug | 15.4 | 14.4 | 12.7 | 12.7 | 11.7 | 10.9 | 13.3 | 15.8 | 17.3 | 19.2 | 20.8 | 22.1 | 22.4 | 22.8 | 23.0 | 22.1 | 22.4 | 21.9 | 20.9 | 18.5 | 16.2 | 13.9 | 11.4 | 10.5 | 17.2 | 23.0 |
| 29-Aug | 9.0 | 8.2 | 6.8 | 6.4 | 5.7 | 5.4 | 8.7 | 11.1 | 13.6 | 15.8 | 18.1 | 20.4 | 21.8 | 22.3 | 21.7 | 22.0 | 22.2 | 21.7 | 20.0 | 15.5 | 15.7 | 15.6 | 14.9 | 14.3 | 14.9 | 22.3 |
| 30-Aug | 13.9 | 14.5 | 14.1 | 14.0 | 13.7 | 13.3 | 14.4 | 16.1 | 17.9 | 19.3 | 21.4 | 23.2 | 24.7 | 25.7 | 26.3 | 26.6 | 26.3 | 25.7 | 24.7 | 22.9 | 21.8 | 20.4 | 19.3 | 18.2 | 19.9 | 26.6 |
| 31-Aug | 17.0 | 15.7 | 14.3 | 13.4 | 13.9 | 14.2 | 14.2 | 14.7 | 16.2 | 17.4 | 18.7 | 21.6 | 22.4 | 24.6 | 25.5 | 25.2 | 24.9 | 23.5 | 22.6 | 21.1 | 19.0 | 17.4 | 16.8 | 16.4 | 18.8 | 25.5 |
| 15.3 14.6 13.9 13.1 12.7 12.9 14.0 15.7 17.6 19.1 20.7 22.2 23.0 23.4 23.5 23.2 23.0 22.6 22.0 20.5 18.8 17.7 16.9 16.2 | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | |
| 21.1 20.2 19.4 18.8 18.7 18.5 19.6 21.6 23.7 26.1 27.7 29.1 30.1 30.6 30.7 30.7 30.3 29.5 28.6 27.0 25.7 24.4 23.2 22.3 | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Mildred Lake - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Mildred Lake - August 2017**

| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 31 | 4.17 | 4.17 |
| 10 - 20 | 437 | 58.74 | 62.90 |
| > 20 | 276 | 37.10 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

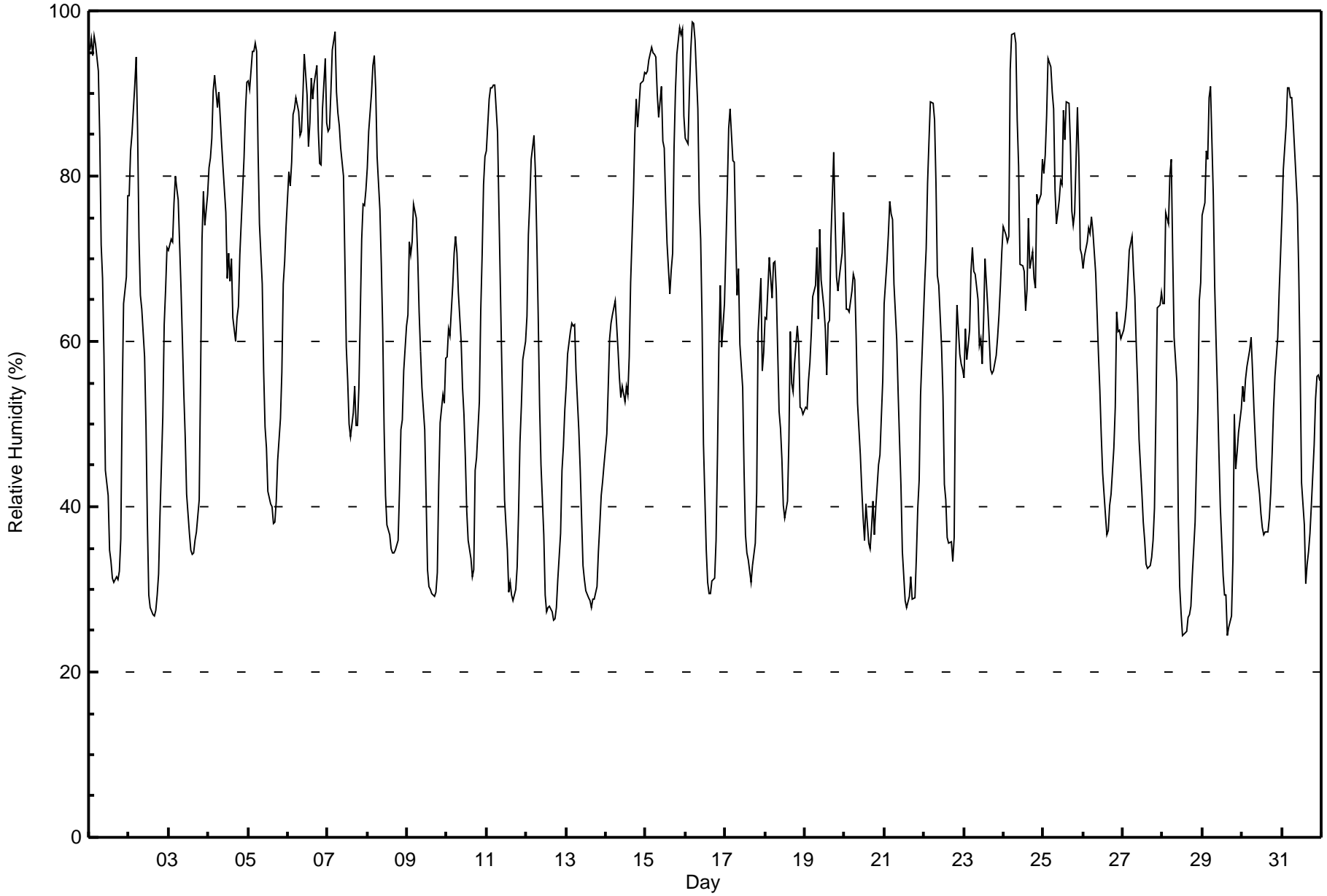
Mildred Lake - August 2017

| Maximum Value: 99 % on Aug 16 05:00 | | | | | | | | | | | | | | Maximum Daily Average: 87.4 % on Aug 15 | | | | | | | | | | | | | | Hours in Service: 744 | |
|---|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|---|------|------|------|------|------|------|------|------|------|------|---------------|-----------------|--|---------------------------------|--|
| Minimum Value: 24 % on Aug 28 13:00 | | | | | | | | | | | | | | Minimum Daily Average: 42.4 % on Aug 13 | | | | | | | | | | | | | | Hours of Data: 744 | |
| Maximum Diurnal Average: 81.8 % at hour 5 | | | | | | | | | | | | | | Minimum Diurnal Average: 43.1 % at hour 15 | | | | | | | | | | | | | | Hours of Missing Data: 0 | |
| Monthly Average: 61.2 % | | | | | | | | | | | | | | Percentiles: P ₁ = 27 P ₁₀ = 33 Q ₁ = 44 Median = 62 O ₃ = 77 P ₉₀ = 89 P ₉₉ = 97 | | | | | | | | | | | | | | Hours of Calibration: 0 | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | |
| 1-Aug | 95 | 97 | 95 | 97 | 96 | 93 | 85 | 72 | 68 | 58 | 44 | 41 | 35 | 33 | 31 | 31 | 32 | 31 | 32 | 36 | 53 | 65 | 68 | 78 | 61.0 | 97 | | | |
| 2-Aug | 78 | 83 | 85 | 91 | 94 | 86 | 73 | 66 | 64 | 58 | 50 | 38 | 29 | 28 | 27 | 27 | 27 | 29 | 32 | 39 | 51 | 62 | 66 | 71 | 56.4 | 94 | | | |
| 3-Aug | 71 | 72 | 72 | 77 | 80 | 78 | 77 | 66 | 60 | 54 | 48 | 41 | 37 | 35 | 34 | 34 | 36 | 37 | 41 | 56 | 72 | 78 | 74 | 78 | 58.8 | 80 | | | |
| 4-Aug | 81 | 82 | 85 | 90 | 92 | 88 | 90 | 87 | 84 | 81 | 76 | 68 | 71 | 67 | 70 | 63 | 60 | 63 | 64 | 71 | 74 | 82 | 88 | 91 | 77.8 | 92 | | | |
| 5-Aug | 91 | 91 | 95 | 95 | 96 | 95 | 83 | 74 | 67 | 57 | 50 | 47 | 42 | 40 | 40 | 38 | 38 | 41 | 46 | 51 | 56 | 67 | 70 | 74 | 64.3 | 96 | | | |
| 6-Aug | 80 | 79 | 82 | 87 | 88 | 89 | 88 | 85 | 85 | 90 | 95 | 90 | 84 | 86 | 92 | 89 | 91 | 93 | 86 | 81 | 81 | 88 | 94 | 86 | 87.1 | 95 | | | |
| 7-Aug | 85 | 86 | 90 | 95 | 97 | 90 | 88 | 86 | 83 | 80 | 70 | 59 | 55 | 50 | 49 | 51 | 55 | 50 | 50 | 54 | 72 | 77 | 76 | 78 | 72.0 | 97 | | | |
| 8-Aug | 81 | 85 | 90 | 93 | 95 | 90 | 82 | 76 | 69 | 61 | 50 | 41 | 38 | 37 | 35 | 34 | 34 | 35 | 36 | 42 | 49 | 50 | 56 | 62 | 59.3 | 95 | | | |
| 9-Aug | 63 | 72 | 71 | 72 | 77 | 75 | 70 | 64 | 59 | 54 | 49 | 41 | 32 | 30 | 30 | 29 | 29 | 30 | 32 | 43 | 50 | 54 | 53 | 58 | 51.5 | 77 | | | |
| 10-Aug | 58 | 62 | 61 | 67 | 71 | 73 | 71 | 66 | 60 | 54 | 51 | 46 | 40 | 36 | 34 | 31 | 32 | 44 | 46 | 53 | 64 | 70 | 79 | 82 | 56.3 | 82 | | | |
| 11-Aug | 83 | 89 | 91 | 91 | 91 | 91 | 85 | 76 | 67 | 57 | 49 | 41 | 35 | 30 | 31 | 29 | 29 | 30 | 33 | 39 | 48 | 52 | 58 | 60 | 57.7 | 91 | | | |
| 12-Aug | 63 | 73 | 77 | 82 | 85 | 81 | 73 | 63 | 52 | 45 | 37 | 29 | 27 | 28 | 28 | 27 | 26 | 26 | 28 | 31 | 37 | 44 | 47 | 52 | 48.4 | 85 | | | |
| 13-Aug | 55 | 59 | 61 | 62 | 62 | 62 | 57 | 49 | 45 | 39 | 33 | 31 | 30 | 29 | 29 | 28 | 29 | 29 | 30 | 35 | 38 | 41 | 43 | 45 | 42.4 | 62 | | | |
| 14-Aug | 49 | 54 | 60 | 62 | 63 | 65 | 62 | 59 | 56 | 53 | 55 | 53 | 55 | 53 | 58 | 67 | 78 | 85 | 89 | 86 | 88 | 91 | 91 | 92 | 67.7 | 92 | | | |
| 15-Aug | 92 | 93 | 94 | 96 | 95 | 95 | 94 | 90 | 87 | 91 | 84 | 83 | 77 | 72 | 66 | 69 | 71 | 83 | 90 | 95 | 98 | 97 | 98 | 87 | 87.4 | 98 | | | |
| 16-Aug | 85 | 84 | 91 | 96 | 99 | 98 | 96 | 88 | 77 | 72 | 63 | 48 | 35 | 31 | 30 | 30 | 31 | 31 | 36 | 46 | 59 | 67 | 59 | 65 | 63.1 | 99 | | | |
| 17-Aug | 71 | 78 | 86 | 88 | 82 | 82 | 73 | 66 | 69 | 60 | 54 | 44 | 37 | 34 | 34 | 31 | 33 | 34 | 36 | 42 | 61 | 68 | 56 | 59 | 57.3 | 88 | | | |
| 18-Aug | 63 | 63 | 70 | 68 | 65 | 70 | 70 | 66 | 51 | 49 | 46 | 40 | 39 | 41 | 48 | 61 | 55 | 54 | 57 | 62 | 60 | 52 | 52 | 51 | 56.4 | 70 | | | |
| 19-Aug | 52 | 52 | 55 | 57 | 61 | 65 | 67 | 71 | 63 | 74 | 67 | 64 | 61 | 56 | 62 | 63 | 72 | 83 | 75 | 68 | 66 | 68 | 71 | 76 | 65.4 | 83 | | | |
| 20-Aug | 71 | 64 | 64 | 64 | 66 | 68 | 67 | 61 | 53 | 46 | 42 | 39 | 36 | 40 | 36 | 35 | 37 | 41 | 37 | 40 | 45 | 46 | 51 | 55 | 50.1 | 71 | | | |
| 21-Aug | 65 | 70 | 73 | 77 | 75 | 75 | 67 | 60 | 54 | 48 | 42 | 35 | 29 | 28 | 28 | 29 | 32 | 29 | 29 | 34 | 40 | 43 | 54 | 63 | 49.0 | 77 | | | |
| 22-Aug | 67 | 71 | 79 | 84 | 89 | 89 | 87 | 79 | 68 | 67 | 59 | 53 | 43 | 41 | 36 | 36 | 36 | 33 | 36 | 57 | 64 | 58 | 57 | 57 | 60.3 | 89 | | | |
| 23-Aug | 56 | 61 | 58 | 61 | 68 | 71 | 68 | 68 | 65 | 60 | 60 | 57 | 63 | 70 | 64 | 60 | 57 | 56 | 57 | 58 | 61 | 63 | 67 | 71 | 62.5 | 71 | | | |
| 24-Aug | 74 | 73 | 72 | 73 | 93 | 97 | 97 | 96 | 87 | 81 | 69 | 69 | 68 | 64 | 66 | 75 | 69 | 71 | 68 | 66 | 78 | 77 | 78 | 82 | 76.8 | 97 | | | |
| 25-Aug | 80 | 83 | 87 | 94 | 93 | 90 | 88 | 78 | 74 | 77 | 80 | 79 | 88 | 84 | 89 | 89 | 84 | 76 | 74 | 76 | 88 | 82 | 71 | 70 | 82.3 | 94 | | | |
| 26-Aug | 69 | 70 | 72 | 74 | 73 | 75 | 73 | 68 | 64 | 58 | 54 | 49 | 44 | 39 | 37 | 37 | 40 | 42 | 47 | 52 | 64 | 61 | 61 | 60 | 57.7 | 75 | | | |
| 27-Aug | 61 | 63 | 64 | 67 | 71 | 73 | 69 | 65 | 60 | 55 | 48 | 42 | 38 | 36 | 33 | 33 | 33 | 34 | 36 | 40 | 51 | 64 | 64 | 66 | 52.7 | 73 | | | |
| 28-Aug | 65 | 65 | 76 | 74 | 80 | 82 | 71 | 60 | 55 | 39 | 30 | 27 | 24 | 25 | 25 | 27 | 27 | 28 | 32 | 38 | 45 | 52 | 65 | 67 | 49.1 | 82 | | | |
| 29-Aug | 75 | 77 | 83 | 82 | 90 | 91 | 78 | 67 | 60 | 54 | 47 | 40 | 32 | 29 | 29 | 24 | 25 | 27 | 34 | 51 | 45 | 47 | 49 | 52 | 53.6 | 91 | | | |
| 30-Aug | 55 | 53 | 55 | 57 | 59 | 61 | 56 | 52 | 48 | 45 | 41 | 39 | 37 | 37 | 37 | 37 | 39 | 42 | 46 | 52 | 56 | 61 | 66 | 71 | 50.0 | 71 | | | |
| 31-Aug | 75 | 81 | 86 | 91 | 91 | 89 | 89 | 87 | 80 | 77 | 68 | 57 | 43 | 38 | 31 | 33 | 35 | 37 | 40 | 47 | 53 | 56 | 56 | 55 | 62.3 | 91 | | | |
| | | 71.3 | 73.6 | 76.7 | 79.5 | 81.8 | 81.5 | 77.2 | 71.3 | 65.6 | 61.1 | 55.2 | 49.4 | 45.2 | 43.4 | 43.1 | 43.5 | 44.2 | 45.9 | 47.5 | 52.9 | 60.2 | 64.0 | 65.8 | 68.2 | Diurnal Average | | | |
| | | 95 | 97 | 95 | 97 | 99 | 98 | 97 | 96 | 87 | 91 | 95 | 90 | 88 | 86 | 92 | 89 | 91 | 93 | 90 | 95 | 98 | 97 | 98 | 92 | Diurnal Maximum | | | |



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Mildred Lake - August 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Mildred Lake - August 2017

| | | |
|--|---|---------------------------------|
| Maximum Speed: 26 km/h on Aug 30 14:00 | Maximum Daily Speed Average: 17.8 km/h on Aug 13 | Hours in Service: 744 |
| Minimum Speed Value: 0 km/h on Aug 29 04:00 | Minimum Daily Speed Average: 0.8 km/h on Aug 15 | Hours of Data: 744 |
| Maximum Diurnal Speed Average: 6.3 km/h at hour 15 | Minimum Diurnal Speed Average: 2.3 km/h at hour 2 | Hours of Missing Data: 0 |
| Monthly Average Velocity: 4.2 km/h 219.3 deg | Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 8 Q ₃ = 12 P ₉₀ = 16 P ₉₉ = 24 | Percent Operational Time: 100.0 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | N3 | NNW2 | NNW3 | NW2 | N1 | NE2 | N3 | N8 | NNE9 | NNE9 | NE10 | NNE11 | NNE12 | NNE10 | NNE11 | NNE11 | NNE11 | NNE9 | NNE8 | NNE5 | NNE4 | NE5 | NNE4 | N2 | NNE6.3 | NNE12 |
| 2-Aug | NNE2 | NNW1 | SW1 | SSE3 | SSW3 | SSW6 | SSW9 | SSW7 | SSW6 | SSW7 | SSW6 | SW8 | SSW10 | SW8 | WSW8 | WSW9 | SW8 | SW8 | SW6 | SSW5 | SW4 | NW1 | W2 | SSW4 | SW5.1 | SSW10 |
| 3-Aug | SW4 | SSW4 | SSW4 | S6 | S8 | S8 | S7 | SSE6 | SSE7 | S6 | S6 | SSW7 | SW6 | SW5 | SW5 | SSW5 | S5 | S6 | NE3 | NNE15 | SE8 | ESE10 | ENE8 | ENE3 | S3.7 | NNE15 |
| 4-Aug | N4 | N7 | NNW4 | ENE3 | E3 | N4 | N8 | E2 | ENE2 | NE5 | ENE2 | NNE2 | ESE9 | E9 | ESE8 | SE6 | SE7 | SSW4 | SSW5 | SSW5 | SSE2 | ENE2 | NNE3 | ESE3 | E2.1 | ESE9 |
| 5-Aug | NNE3 | N7 | SSW4 | WSW3 | SSW2 | S3 | S5 | SSE5 | SSE6 | S6 | S6 | SSE5 | S8 | SSE11 | SSE12 | S13 | SSW11 | S14 | SSW12 | SSW11 | SSW9 | SW6 | SSW7 | SW6 | S6.0 | S14 |
| 6-Aug | S3 | S3 | N6 | SSW5 | NNE3 | NNE7 | NE8 | NE7 | N10 | NNE11 | NNE13 | NNE17 | NNE15 | NNE13 | NNE10 | NNE9 | NNE4 | NE5 | NNE7 | NNE6 | N6 | N5 | NNW6 | NNW8 | NNE6.6 | NNE17 |
| 7-Aug | N8 | N9 | N6 | N4 | N5 | N5 | N7 | NNE7 | NNE8 | N9 | N8 | N7 | NNW5 | N7 | NW6 | WSW8 | SW7 | SW8 | SW5 | SW4 | WSW2 | WSW4 | W5 | WSW4 | NNW3.5 | N9 |
| 8-Aug | SW4 | S6 | SSE2 | S3 | SE1 | S4 | SSW8 | SSW7 | S8 | SSW7 | SW7 | SSW11 | SW10 | SSW11 | SW11 | SSW10 | SSW9 | SSW9 | SSW9 | SSW7 | S7 | S7 | S6 | SSW3 | SSW6.7 | SSW11 |
| 9-Aug | S6 | S5 | S7 | SSW8 | SSW8 | SSW8 | SSW9 | SSW9 | SSW9 | S8 | S8 | S8 | SSW10 | SSW11 | SSW11 | SW10 | SSW8 | SSW8 | SSW6 | S5 | SSW6 | WSW4 | WSW4 | S5 | SSW7.3 | SSW11 |
| 10-Aug | E1 | ESE6 | S8 | SSW6 | SW5 | SW4 | SSE5 | SE8 | S6 | SSE3 | E3 | E5 | SSW4 | NNW2 | NNE9 | NNE7 | ESE6 | SE14 | SSW10 | SSW5 | WSW2 | W4 | SSE2 | SSW5 | SSE2.8 | SE14 |
| 11-Aug | SSW3 | SSW4 | S6 | S7 | S6 | SSW6 | S7 | SSE7 | SSE9 | SSE8 | S5 | SW5 | SSW5 | SSW9 | S8 | SSE13 | S12 | SSE13 | SSE14 | S13 | S9 | S8 | S7 | S8 | S7.8 | SSE14 |
| 12-Aug | S8 | SSE7 | SE7 | E6 | ESE6 | SE9 | SSE9 | SSE12 | S12 | S14 | S16 | SSW20 | SSW21 | SSW20 | SSW20 | SSW19 | SSW20 | SSW18 | SSW17 | SSW14 | S11 | S8 | S11 | S11 | S12.2 | SSW21 |
| 13-Aug | SSE13 | SSE14 | SSE11 | SSE11 | SSE13 | SE12 | SE14 | SSE16 | SSE18 | SSE19 | SSE24 | SSE24 | SSE22 | SSE22 | S22 | SSE22 | SSE23 | SSE25 | SSE24 | S20 | SSE18 | SSE16 | SSE14 | SSE11 | SSE17.8 | SSE25 |
| 14-Aug | SE10 | SE8 | ESE8 | SE9 | SE8 | SE9 | SSE12 | SSE17 | S10 | S10 | S11 | SW8 | WSW10 | WSW10 | WSW13 | WSW14 | WSW12 | WSW8 | SSW7 | SSE7 | S9 | S10 | SSE11 | SSW10 | S7.5 | SSE17 |
| 15-Aug | SSE10 | SSE12 | S7 | SSE6 | SE6 | SSW7 | SSW6 | SSW5 | WNN2 | NE4 | WSW1 | NW6 | NW4 | NNW5 | WSW2 | E6 | ENE5 | NE5 | SSW2 | WNN8 | NNW8 | NNW6 | NNW4 | NW8 | SW0.8 | SSE12 |
| 16-Aug | NW11 | NW9 | NNW3 | N2 | SW2 | NW1 | WSW4 | SW5 | SSW5 | S6 | SSW8 | SW9 | WSW9 | W9 | W7 | W5 | SW7 | WSW10 | W7 | W7 | WNN3 | W4 | WSW5 | WSW4 | WSW4.8 | NW11 |
| 17-Aug | WSW2 | SW3 | E2 | SW3 | SW5 | WSW6 | SW5 | SW5 | SW6 | SW7 | SW8 | SSW8 | SW10 | SW10 | SW10 | NW9 | WNN11 | WNN9 | NW8 | W3 | SSW2 | SW4 | WSW10 | WSW8 | WSW5.3 | WNN11 |
| 18-Aug | WSW7 | WSW5 | SE4 | WSW8 | WSW10 | SSW7 | SSW8 | SSW7 | SW11 | WSW11 | SW11 | WSW15 | WSW16 | W18 | WSW18 | SW18 | SSW17 | SW14 | SW14 | SW13 | SW13 | WSW15 | WSW13 | WSW14 | SW11.4 | SW18 |
| 19-Aug | WSW13 | W14 | WNN13 | W11 | W13 | WSW9 | WSW11 | WSW13 | W15 | WSW17 | W17 | WNN21 | WNN20 | WNN26 | WNN24 | NW24 | WNN16 | WNN14 | WNN13 | WNN12 | WNN11 | WNN11 | WNN6 | W7 | WNN14.0 | WNN26 |
| 20-Aug | WSW9 | W13 | W14 | W15 | W9 | W10 | WSW7 | W10 | W12 | W16 | WNN17 | WNN16 | WNN19 | NW17 | WNN20 | WNN19 | W19 | WNN16 | NW16 | NW14 | WNN12 | WNN16 | WNN16 | NW7 | WNN13.5 | WNN20 |
| 21-Aug | N4 | SW3 | SW6 | S2 | WSW6 | WSW5 | SW7 | SSW7 | SW7 | SW8 | W9 | WSW13 | W13 | W13 | W12 | WNN12 | WNN7 | NW10 | WNN11 | NW8 | WNN9 | NNW9 | N9 | N12 | W6.0 | WSW13 |
| 22-Aug | N11 | N10 | N9 | N4 | N6 | N8 | NNE6 | NNE6 | NNE6 | NNW7 | N6 | N7 | W2 | SW5 | WNN5 | SW5 | SSW3 | S4 | SE3 | E3 | ENE5 | E9 | SE7 | SSE6 | NNE2.8 | N11 |
| 23-Aug | SE8 | SE4 | S9 | SSE8 | SSE5 | SSE8 | SSE13 | SSE14 | SSE14 | S15 | S13 | SSW13 | SSW14 | S11 | S14 | SSE16 | SSE19 | SSE17 | SSE18 | SSE17 | SSE14 | SSE14 | SSE13 | SSE10 | SSE12.1 | SSE19 |
| 24-Aug | SE7 | SE8 | SE9 | SSE12 | S10 | SE7 | E4 | ENE3 | SSE8 | SE8 | SE12 | ESE9 | SE6 | SSE10 | ESE11 | SE14 | ESE8 | NE4 | SE5 | SSE10 | SSW4 | SW9 | WSW10 | WSW11 | SSE6.2 | SE14 |
| 25-Aug | SW12 | SE10 | SW10 | SW11 | SW11 | SW11 | SSW13 | SSW14 | SW14 | SW13 | SSW16 | SW15 | WSW17 | WSW22 | WSW23 | WSW22 | W22 | W19 | W13 | WSW12 | SW7 | WSW12 | WSW16 | WSW14 | WSW13.7 | WSW23 |
| 26-Aug | W14 | W12 | WSW13 | WSW12 | W13 | W13 | WSW11 | W14 | WSW12 | WSW11 | SW11 | SW11 | WSW12 | WSW14 | WSW13 | WSW14 | SW11 | WSW12 | WSW11 | WSW8 | SW8 | SW9 | WSW7 | W8 | WSW11.1 | W14 |
| 27-Aug | WSW10 | WSW11 | WSW13 | WSW13 | WSW12 | WSW12 | WSW12 | W15 | W12 | W16 | WSW14 | W16 | W17 | WNN17 | WNN16 | WNN14 | WNN15 | WNN13 | WNN12 | NW8 | W3 | NNW3 | W1 | WSW4 | W11.0 | WNN17 |
| 28-Aug | NNW7 | NNW4 | W4 | W6 | WSW4 | WSW3 | W4 | SSW4 | W5 | NW9 | WNN12 | NW13 | NW15 | NW16 | NW17 | NW16 | NW16 | NNW15 | NNW11 | NNW7 | NNW8 | NNW5 | NNW4 | NW2 | NW7.8 | NW17 |
| 29-Aug | NW3 | NNW2 | N3 | N0 | SSW2 | SSW1 | WSW1 | SE3 | S3 | SSW4 | SW3 | SW3 | SW4 | S2 | ESE5 | ENE5 | SE4 | SE7 | ESE5 | E6 | ESE9 | ESE11 | SE9 | SE8 | SE2.7 | ESE11 |
| 30-Aug | SE8 | SSE12 | SE11 | SE11 | SE11 | SE9 | SE10 | SE16 | SSE17 | SSE20 | SSE22 | SSE22 | SSE22 | SSE26 | S24 | S24 | SSE19 | SSE17 | S15 | S14 | SSW14 | S14 | S11 | S9 | SSE15.0 | SSE26 |
| 31-Aug | S7 | SSW6 | S2 | S5 | SSW7 | SSE6 | S8 | S9 | S8 | SW7 | SSW10 | SW10 | SW12 | WSW12 | W17 | W15 | WNN15 | WNN17 | WNN14 | WNN13 | W8 | W8 | WSW10 | W12 | WSW7.6 | W17 |

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----------------|-----------------|--|
| SW2.4 | SW2.3 | SSW2.5 | SSW3.5 | SSW3.5 | SSW3.4 | SSW4.1 | SSW4.7 | SSW4.6 | SSW4.5 | SSW5.3 | SW5.4 | SW6.1 | WSW6.3 | SW5.8 | SW5.7 | SW5.4 | SW4.7 | SW3.7 | SW3.4 | SW3.2 | SW3.4 | SW3.5 | Diurnal Average | | |
| W14 | W14 | W14 | W15 | SSE13 | W13 | SE14 | SSE17 | SSE18 | SSE20 | SSE24 | SSE24 | SSE22 | SSE26 | WNN24 | NW24 | SSE23 | SSE25 | SSE24 | S20 | SSE18 | SSE16 | WSW16 | WSW14 | Diurnal Maximum | |

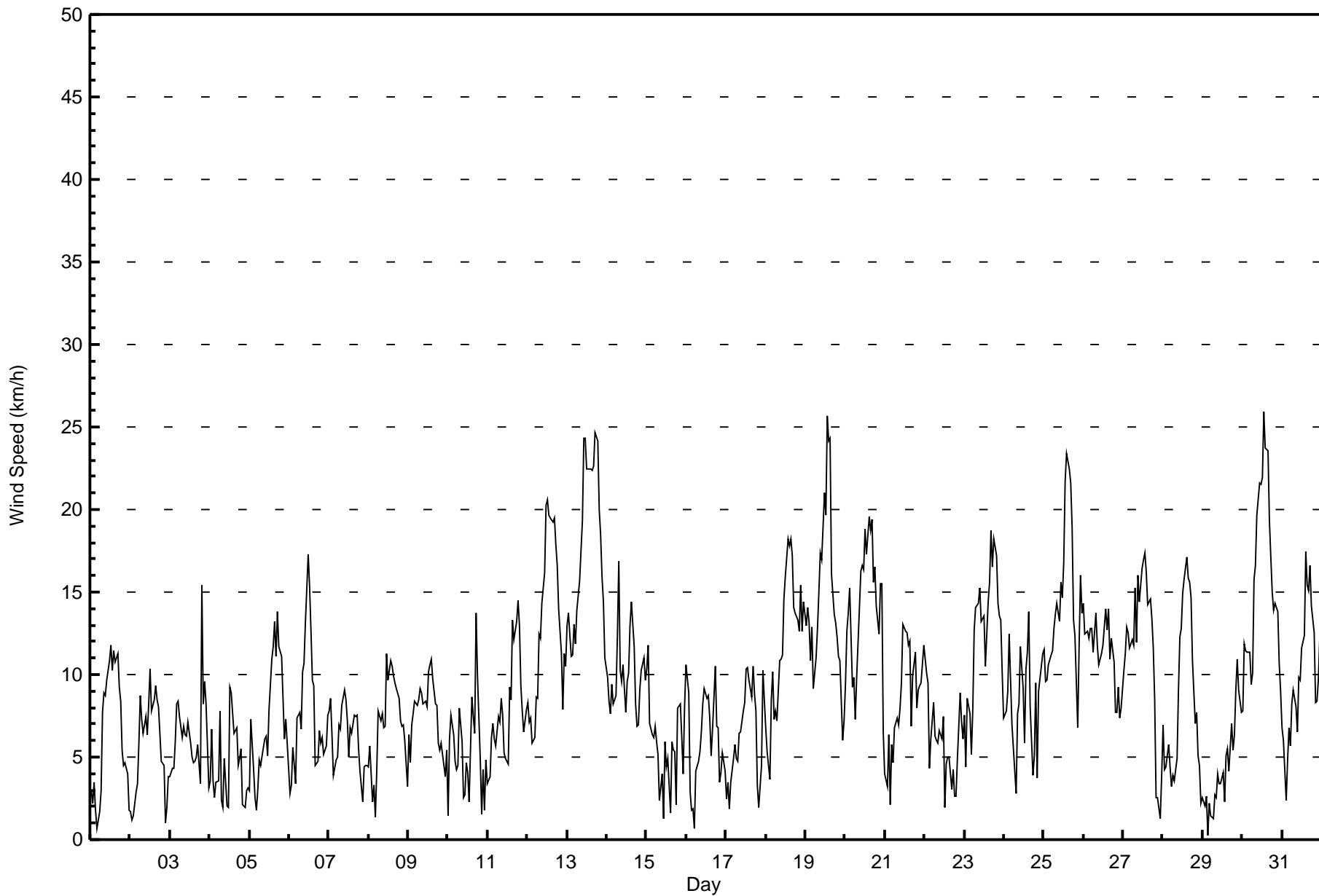
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Mildred Lake - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Aug 19 14:00 Minimum Value: 1 km/h on Aug 1 23:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 7 | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | |
|--|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 4 |
| 2-Aug | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 2 | 1 | 2 | 1 | 1 | 2 | 4 |
| 3-Aug | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 5 | 2 | 3 | 3 | 5 | |
| 4-Aug | 3 | 2 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 3 |
| 5-Aug | 2 | 3 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 3 | 2 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 4 |
| 6-Aug | 2 | 2 | 3 | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 4 | 3 | 2 | 3 | 1 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 4 |
| 7-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 3 |
| 8-Aug | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 4 |
| 9-Aug | 2 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 3 |
| 10-Aug | 2 | 2 | 2 | 3 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 3 | 3 | 3 | 5 | 1 | 2 | 1 | 1 | 1 | 5 |
| 11-Aug | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 2 | 2 | 1 | 2 | 4 |
| 12-Aug | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 4 | 5 | 6 | 6 | 5 | 5 | 5 | 5 | 4 | 3 | 2 | 2 | 3 | 2 | 6 |
| 13-Aug | 3 | 3 | 3 | 2 | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 3 | 3 | 3 | 2 | 5 |
| 14-Aug | 3 | 2 | 2 | 2 | 2 | 2 | 6 | 3 | 3 | 3 | 3 | 4 | 4 | 5 | 5 | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 6 |
| 15-Aug | 3 | 3 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 4 | 2 | 2 | 2 | 2 | 4 |
| 16-Aug | 2 | 2 | 3 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 4 | 2 | 3 | 4 | 3 | 3 | 1 | 1 | 2 | 1 | 4 |
| 17-Aug | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 5 | 3 | 3 | 2 | 2 | 2 | 2 | 4 | 3 | 5 |
| 18-Aug | 2 | 4 | 2 | 4 | 4 | 2 | 2 | 2 | 4 | 4 | 5 | 6 | 7 | 7 | 7 | 6 | 5 | 5 | 4 | 4 | 5 | 5 | 5 | 5 | 7 |
| 19-Aug | 5 | 5 | 4 | 4 | 6 | 3 | 4 | 4 | 6 | 7 | 6 | 7 | 7 | 9 | 8 | 8 | 5 | 5 | 4 | 4 | 3 | 4 | 3 | 3 | 9 |
| 20-Aug | 3 | 5 | 5 | 5 | 3 | 5 | 3 | 5 | 5 | 6 | 6 | 5 | 6 | 6 | 6 | 6 | 7 | 5 | 5 | 4 | 4 | 5 | 5 | 4 | 7 |
| 21-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 5 | 5 | 3 | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 5 |
| 22-Aug | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 3 |
| 23-Aug | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 2 | 3 | 3 | 3 | 4 | 3 | 4 | 4 | 3 | 2 | 2 | 3 | 4 |
| 24-Aug | 2 | 2 | 3 | 4 | 8 | 2 | 1 | 1 | 4 | 2 | 4 | 3 | 2 | 3 | 5 | 4 | 3 | 1 | 3 | 2 | 2 | 5 | 4 | 5 | 8 |
| 25-Aug | 5 | 4 | 4 | 3 | 3 | 4 | 3 | 4 | 4 | 4 | 4 | 4 | 7 | 8 | 7 | 8 | 8 | 7 | 5 | 4 | 3 | 5 | 6 | 5 | 8 |
| 26-Aug | 5 | 4 | 4 | 4 | 5 | 5 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 5 | 4 | 5 | 4 | 4 | 4 | 3 | 2 | 3 | 3 | 3 | 5 |
| 27-Aug | 3 | 4 | 5 | 4 | 4 | 4 | 4 | 6 | 5 | 5 | 6 | 6 | 6 | 6 | 5 | 5 | 5 | 4 | 3 | 2 | 2 | 1 | 1 | 2 | 6 |
| 28-Aug | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 3 | 4 | 5 | 5 | 6 | 6 | 5 | 4 | 4 | 3 | 1 | 1 | 1 | 1 | 1 | 6 |
| 29-Aug | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 1 | 3 |
| 30-Aug | 2 | 4 | 3 | 3 | 3 | 2 | 3 | 4 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 6 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 6 |
| 31-Aug | 2 | 1 | 2 | 1 | 2 | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 4 | 5 | 6 | 6 | 5 | 6 | 5 | 4 | 3 | 3 | 3 | 5 | 6 |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Mildred Lake - August 2017**

| Wind Speed Ranges (km/h) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 5 | 193 | 25.94 | 25.94 |
| 6 - 11 | 341 | 45.83 | 71.77 |
| 12 - 19 | 178 | 23.92 | 95.70 |
| 20 - 28 | 32 | 4.30 | 100.00 |
| 29 - 38 | 0 | 0.00 | 100.00 |
| > 38 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Mildred Lake - August 2017**

| Wind Speed Ranges (km/h) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-----------------------------|----------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 5 | 15 | 9 | 8 | 9 | 8 | 3 | 7 | 10 | 16 | 29 | 24 | 21 | 11 | 3 | 6 | 14 | 193 |
| 6 - 11 | 22 | 22 | 3 | 1 | 5 | 13 | 28 | 25 | 51 | 53 | 41 | 31 | 14 | 9 | 12 | 11 | 341 |
| 12 - 19 | 1 | 6 | 0 | 0 | 0 | 0 | 6 | 34 | 12 | 12 | 10 | 33 | 29 | 25 | 9 | 1 | 178 |
| 20 - 28 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 4 | 5 | 0 | 3 | 1 | 5 | 1 | 0 | 32 |
| 29 - 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 38 | 37 | 11 | 10 | 13 | 16 | 41 | 82 | 83 | 99 | 75 | 88 | 55 | 42 | 28 | 26 | 744 |

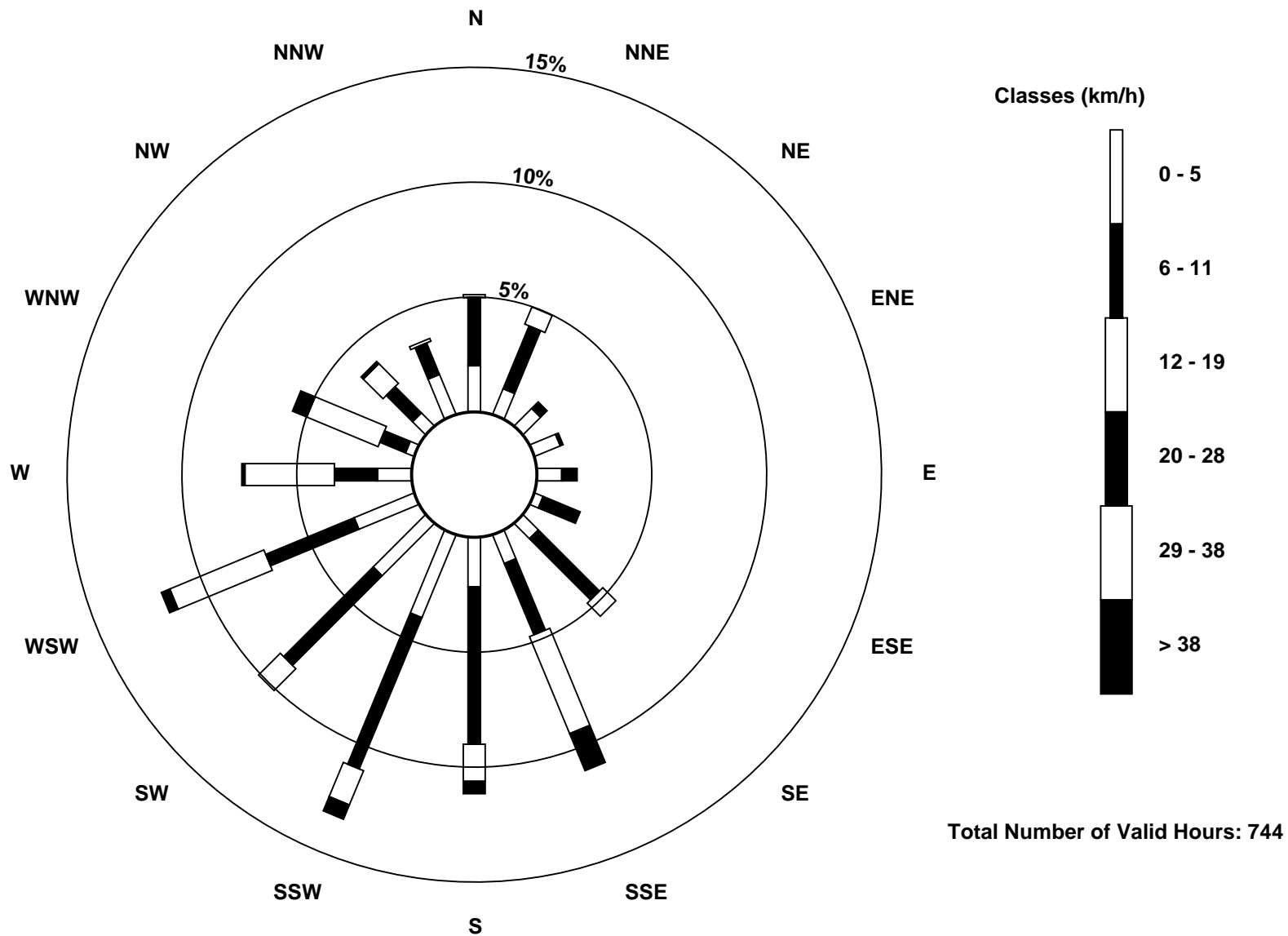
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Wind Speed (WS) - km/h
Mildred Lake (AMS 2)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Mildred Lake - August 2017

| Direction of Maximum Speed: 163 deg on Aug 30 14:00 | | | | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 | | |
|---|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------------------------|-----|---------------|
| Direction of Maximum Daily Speed Average: 161.3 deg on Aug 13 | | | | | | | | | | | | | | | | | | | | | | | Hours of Data: 744 | | |
| Direction of Minimum Speed: 359 deg on Aug 29 04:00 | | | | | | | | | | | Direction of Minimum Daily Speed Average: 0.8 deg on Aug 15 | | | | | | | | | | | | Hours of Missing Data: 0 | | |
| Monthly Average Direction: 234.3 deg | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 350 | 348 | 342 | 322 | 2 | 39 | 11 | 355 | 15 | 15 | 41 | 19 | 23 | 16 | 13 | 13 | 24 | 33 | 31 | 18 | 18 | 44 | 25 | 357 | 18.0 |
| 2-Aug | 21 | 335 | 221 | 153 | 196 | 200 | 198 | 197 | 200 | 200 | 212 | 219 | 211 | 224 | 237 | 237 | 221 | 227 | 234 | 213 | 229 | 306 | 272 | 209 | 216.7 |
| 3-Aug | 219 | 196 | 207 | 176 | 181 | 187 | 182 | 163 | 157 | 177 | 182 | 197 | 217 | 220 | 218 | 200 | 169 | 191 | 50 | 16 | 144 | 108 | 64 | 76 | 169.8 |
| 4-Aug | 359 | 0 | 332 | 78 | 82 | 6 | 3 | 82 | 70 | 38 | 64 | 30 | 107 | 89 | 120 | 132 | 130 | 209 | 204 | 195 | 167 | 59 | 30 | 110 | 84.6 |
| 5-Aug | 26 | 6 | 211 | 257 | 197 | 171 | 180 | 166 | 163 | 169 | 169 | 163 | 180 | 168 | 160 | 188 | 196 | 182 | 198 | 195 | 195 | 216 | 203 | 216 | 185.4 |
| 6-Aug | 174 | 180 | 11 | 213 | 29 | 17 | 50 | 47 | 8 | 12 | 16 | 18 | 31 | 21 | 15 | 13 | 16 | 34 | 29 | 15 | 3 | 357 | 347 | 346 | 17.7 |
| 7-Aug | 349 | 349 | 357 | 357 | 357 | 354 | 8 | 15 | 26 | 11 | 357 | 10 | 342 | 1 | 316 | 243 | 226 | 222 | 231 | 222 | 251 | 250 | 275 | 248 | 330.8 |
| 8-Aug | 214 | 176 | 160 | 173 | 125 | 185 | 200 | 205 | 191 | 196 | 221 | 211 | 215 | 210 | 214 | 211 | 212 | 213 | 211 | 201 | 180 | 186 | 190 | 199 | 202.4 |
| 9-Aug | 185 | 171 | 191 | 193 | 199 | 206 | 204 | 198 | 195 | 171 | 173 | 186 | 205 | 209 | 213 | 214 | 210 | 197 | 206 | 191 | 207 | 239 | 247 | 185 | 199.2 |
| 10-Aug | 87 | 113 | 186 | 193 | 217 | 216 | 163 | 127 | 172 | 159 | 90 | 81 | 194 | 342 | 19 | 30 | 117 | 146 | 194 | 203 | 257 | 264 | 162 | 204 | 159.8 |
| 11-Aug | 207 | 195 | 177 | 191 | 189 | 193 | 177 | 163 | 164 | 161 | 182 | 235 | 196 | 199 | 189 | 166 | 172 | 166 | 166 | 170 | 176 | 174 | 178 | 190 | 178.2 |
| 12-Aug | 186 | 164 | 145 | 97 | 116 | 145 | 153 | 159 | 169 | 177 | 188 | 195 | 200 | 199 | 197 | 198 | 198 | 207 | 204 | 197 | 191 | 182 | 188 | 176 | 185.4 |
| 13-Aug | 162 | 161 | 153 | 149 | 148 | 140 | 144 | 156 | 164 | 160 | 161 | 164 | 167 | 167 | 171 | 162 | 165 | 165 | 166 | 170 | 167 | 165 | 158 | 149 | 161.3 |
| 14-Aug | 135 | 131 | 123 | 130 | 136 | 142 | 153 | 163 | 174 | 177 | 186 | 217 | 245 | 244 | 248 | 248 | 247 | 242 | 202 | 164 | 181 | 171 | 167 | 163 | 183.4 |
| 15-Aug | 165 | 163 | 187 | 159 | 142 | 206 | 204 | 201 | 299 | 53 | 238 | 311 | 322 | 335 | 252 | 100 | 72 | 53 | 203 | 292 | 329 | 344 | 330 | 309 | 223.3 |
| 16-Aug | 305 | 311 | 335 | 7 | 233 | 318 | 249 | 227 | 209 | 184 | 206 | 215 | 244 | 270 | 267 | 281 | 232 | 244 | 260 | 264 | 287 | 260 | 256 | 256 | 254.4 |
| 17-Aug | 240 | 235 | 97 | 231 | 236 | 246 | 235 | 220 | 219 | 230 | 214 | 213 | 214 | 218 | 230 | 313 | 296 | 293 | 306 | 262 | 211 | 227 | 253 | 256 | 244.7 |
| 18-Aug | 252 | 240 | 138 | 239 | 242 | 204 | 210 | 202 | 228 | 248 | 235 | 240 | 249 | 265 | 244 | 219 | 208 | 229 | 223 | 220 | 235 | 247 | 238 | 243 | 233.6 |
| 19-Aug | 252 | 267 | 290 | 275 | 281 | 256 | 256 | 248 | 265 | 257 | 262 | 284 | 286 | 296 | 299 | 307 | 299 | 293 | 293 | 299 | 297 | 292 | 288 | 260 | 281.7 |
| 20-Aug | 254 | 268 | 273 | 278 | 260 | 264 | 258 | 265 | 276 | 280 | 292 | 292 | 298 | 305 | 301 | 291 | 280 | 286 | 313 | 314 | 299 | 289 | 291 | 325 | 287.4 |
| 21-Aug | 357 | 215 | 236 | 171 | 238 | 249 | 218 | 213 | 230 | 220 | 267 | 253 | 263 | 265 | 266 | 286 | 289 | 313 | 300 | 308 | 301 | 347 | 4 | 2 | 277.5 |
| 22-Aug | 10 | 6 | 7 | 9 | 8 | 9 | 15 | 18 | 13 | 344 | 349 | 5 | 259 | 234 | 284 | 233 | 206 | 191 | 138 | 79 | 70 | 93 | 124 | 148 | 16.8 |
| 23-Aug | 137 | 141 | 171 | 156 | 151 | 166 | 163 | 161 | 164 | 174 | 175 | 203 | 201 | 190 | 171 | 166 | 165 | 164 | 162 | 159 | 157 | 160 | 162 | 154 | 166.9 |
| 24-Aug | 134 | 133 | 140 | 155 | 185 | 126 | 98 | 65 | 149 | 135 | 146 | 120 | 128 | 159 | 122 | 124 | 111 | 45 | 130 | 164 | 213 | 222 | 247 | 239 | 149.1 |
| 25-Aug | 236 | 235 | 235 | 218 | 216 | 218 | 209 | 213 | 219 | 223 | 213 | 215 | 240 | 255 | 250 | 253 | 259 | 263 | 262 | 256 | 235 | 251 | 257 | 256 | 239.4 |
| 26-Aug | 260 | 259 | 255 | 257 | 264 | 261 | 251 | 260 | 255 | 238 | 223 | 228 | 245 | 249 | 237 | 240 | 236 | 249 | 242 | 246 | 219 | 229 | 257 | 260 | 247.4 |
| 27-Aug | 247 | 252 | 251 | 249 | 249 | 249 | 256 | 276 | 274 | 275 | 254 | 267 | 274 | 285 | 285 | 284 | 286 | 299 | 301 | 321 | 279 | 341 | 275 | 251 | 272.0 |
| 28-Aug | 343 | 332 | 261 | 270 | 257 | 238 | 266 | 211 | 267 | 312 | 302 | 309 | 315 | 304 | 304 | 318 | 321 | 329 | 330 | 344 | 335 | 330 | 335 | 306 | 310.8 |
| 29-Aug | 312 | 332 | 7 | 359 | 210 | 193 | 242 | 133 | 180 | 209 | 225 | 224 | 232 | 169 | 114 | 68 | 131 | 127 | 111 | 91 | 106 | 115 | 131 | 124 | 130.1 |
| 30-Aug | 127 | 149 | 137 | 138 | 131 | 136 | 146 | 145 | 147 | 156 | 163 | 162 | 159 | 163 | 169 | 174 | 162 | 162 | 174 | 188 | 195 | 190 | 188 | 179 | 161.7 |
| 31-Aug | 189 | 193 | 179 | 178 | 203 | 166 | 184 | 189 | 173 | 216 | 212 | 221 | 236 | 244 | 277 | 277 | 282 | 290 | 292 | 286 | 276 | 259 | 258 | 266 | 247.0 |
| 223.7 216.7 212.2 201.7 206.5 203.0 196.7 191.3 199.8 207.7 210.2 226.6 232.4 239.4 239.5 233.8 223.5 225.5 225.9 224.3 214.7 218.3 225.8 224.5 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Diurnal Average | | | | | | | | | | | | | | | | | | | | | | | | | |
| All monthly, daily, and diurnal averages have been calculated using vector methods | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

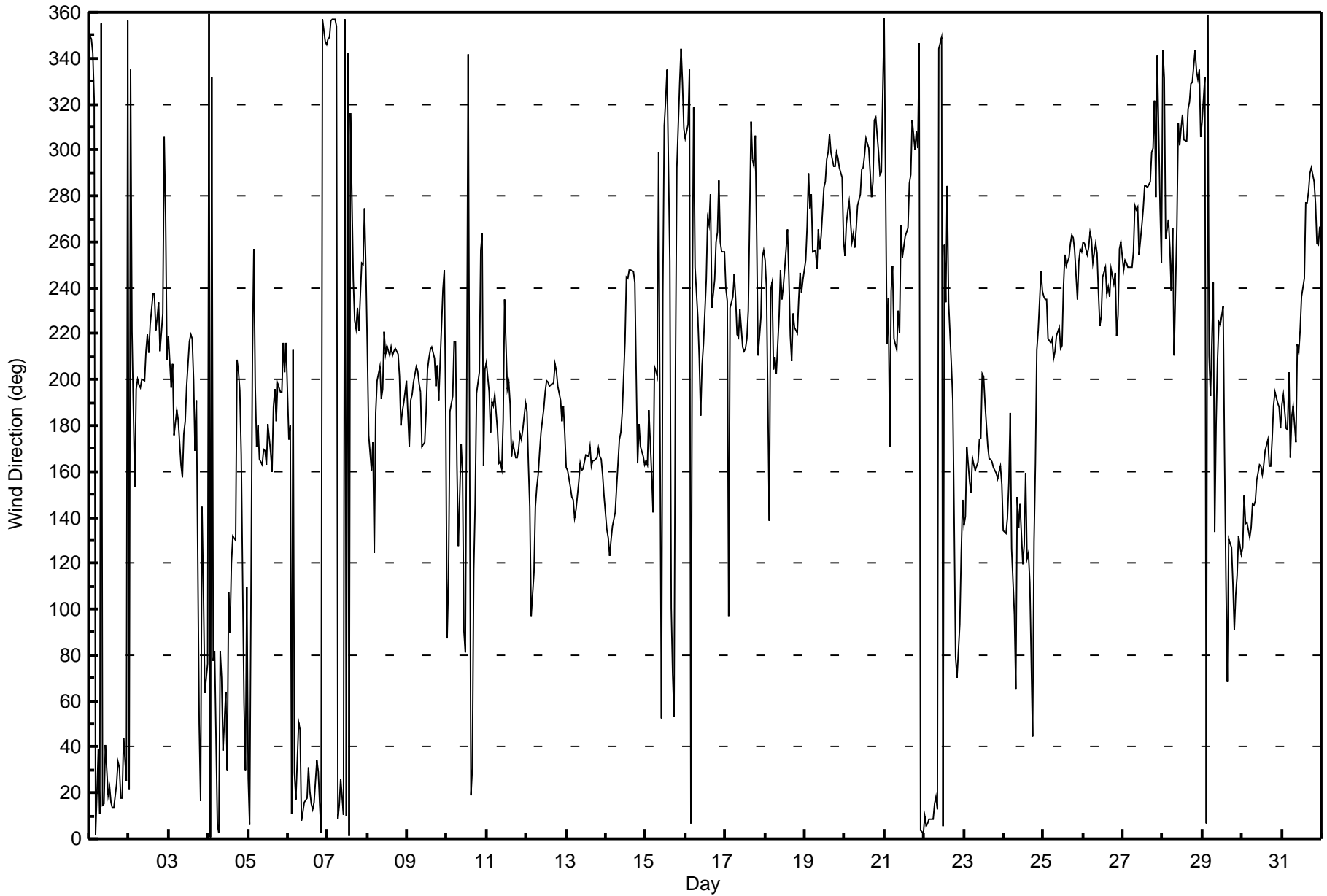
Wind Direction (WD) - deg
Mildred Lake - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 96 deg on Aug 2 22:00 Minimum Value: 5 deg on Aug 28 21:00 Percentiles: P ₁ = 9 P ₁₀ = 14 Q ₁ = 18 Median = 25 Q ₃ = 32 P ₉₀ = 52 P ₉₉ = 89 | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 27 | 50 | 37 | 76 | 70 | 28 | 33 | 18 | 22 | 28 | 35 | 30 | 25 | 38 | 33 | 35 | 31 | 25 | 24 | 16 | 12 | 8 | 12 | 62 | 76 |
| 2-Aug | 66 | 23 | 54 | 34 | 26 | 18 | 14 | 20 | 24 | 22 | 31 | 33 | 27 | 38 | 38 | 37 | 33 | 28 | 26 | 19 | 43 | 96 | 59 | 24 | 96 |
| 3-Aug | 37 | 63 | 37 | 14 | 9 | 13 | 19 | 21 | 28 | 39 | 41 | 39 | 43 | 54 | 54 | 49 | 37 | 28 | 54 | 18 | 39 | 12 | 21 | 53 | 63 |
| 4-Aug | 47 | 15 | 47 | 65 | 41 | 53 | 14 | 56 | 51 | 28 | 71 | 88 | 19 | 26 | 20 | 24 | 21 | 29 | 22 | 20 | 83 | 63 | 49 | 64 | 88 |
| 5-Aug | 54 | 40 | 30 | 28 | 36 | 29 | 19 | 32 | 31 | 32 | 46 | 58 | 44 | 32 | 29 | 26 | 33 | 21 | 22 | 14 | 16 | 19 | 15 | 27 | 58 |
| 6-Aug | 68 | 65 | 29 | 46 | 20 | 18 | 20 | 26 | 16 | 18 | 19 | 17 | 20 | 18 | 16 | 20 | 27 | 19 | 16 | 11 | 11 | 10 | 8 | 68 | 68 |
| 7-Aug | 8 | 7 | 10 | 16 | 20 | 21 | 13 | 16 | 16 | 15 | 27 | 38 | 56 | 54 | 57 | 28 | 24 | 24 | 25 | 25 | 22 | 24 | 38 | 32 | 57 |
| 8-Aug | 31 | 15 | 42 | 36 | 64 | 39 | 16 | 20 | 23 | 29 | 38 | 24 | 28 | 25 | 25 | 23 | 25 | 22 | 19 | 16 | 14 | 17 | 14 | 43 | 64 |
| 9-Aug | 9 | 52 | 14 | 12 | 12 | 13 | 14 | 16 | 19 | 24 | 22 | 31 | 22 | 27 | 24 | 26 | 26 | 22 | 26 | 20 | 15 | 38 | 45 | 24 | 52 |
| 10-Aug | 75 | 44 | 34 | 49 | 57 | 30 | 22 | 21 | 34 | 73 | 80 | 55 | 68 | 96 | 38 | 49 | 50 | 22 | 20 | 22 | 90 | 24 | 70 | 17 | 96 |
| 11-Aug | 56 | 27 | 13 | 10 | 12 | 23 | 17 | 22 | 17 | 24 | 36 | 44 | 62 | 34 | 39 | 21 | 21 | 15 | 14 | 13 | 14 | 12 | 14 | 19 | 62 |
| 12-Aug | 12 | 13 | 21 | 19 | 13 | 16 | 14 | 13 | 15 | 18 | 19 | 17 | 19 | 21 | 18 | 20 | 19 | 18 | 16 | 14 | 13 | 14 | 14 | 15 | 21 |
| 13-Aug | 11 | 12 | 15 | 15 | 16 | 17 | 19 | 17 | 14 | 16 | 16 | 14 | 18 | 18 | 17 | 18 | 16 | 13 | 13 | 14 | 12 | 11 | 15 | 16 | 19 |
| 14-Aug | 19 | 17 | 14 | 16 | 16 | 17 | 20 | 14 | 22 | 21 | 20 | 45 | 30 | 28 | 25 | 24 | 24 | 29 | 31 | 17 | 16 | 15 | 12 | 14 | 45 |
| 15-Aug | 14 | 14 | 23 | 30 | 28 | 18 | 26 | 24 | 63 | 23 | 92 | 30 | 35 | 50 | 86 | 31 | 27 | 21 | 76 | 34 | 17 | 24 | 20 | 15 | 92 |
| 16-Aug | 15 | 15 | 64 | 54 | 44 | 94 | 26 | 23 | 32 | 31 | 23 | 28 | 38 | 43 | 46 | 55 | 50 | 26 | 35 | 29 | 47 | 35 | 36 | 24 | 94 |
| 17-Aug | 52 | 53 | 61 | 44 | 23 | 21 | 29 | 33 | 30 | 32 | 25 | 26 | 23 | 32 | 41 | 46 | 22 | 20 | 18 | 51 | 66 | 38 | 29 | 29 | 66 |
| 18-Aug | 26 | 62 | 42 | 35 | 28 | 19 | 27 | 19 | 27 | 28 | 30 | 32 | 30 | 28 | 29 | 24 | 20 | 27 | 24 | 22 | 29 | 26 | 28 | 24 | 62 |
| 19-Aug | 28 | 26 | 20 | 26 | 24 | 30 | 28 | 26 | 30 | 26 | 27 | 24 | 23 | 21 | 20 | 20 | 20 | 21 | 21 | 19 | 18 | 22 | 34 | 29 | 34 |
| 20-Aug | 28 | 25 | 25 | 23 | 29 | 31 | 37 | 32 | 27 | 23 | 25 | 23 | 22 | 22 | 22 | 26 | 23 | 24 | 16 | 17 | 17 | 18 | 18 | 49 | 49 |
| 21-Aug | 38 | 62 | 25 | 70 | 31 | 59 | 29 | 29 | 30 | 35 | 29 | 29 | 32 | 32 | 32 | 28 | 36 | 34 | 18 | 15 | 13 | 21 | 13 | 13 | 70 |
| 22-Aug | 13 | 14 | 13 | 19 | 14 | 15 | 20 | 26 | 33 | 22 | 42 | 29 | 89 | 46 | 47 | 38 | 39 | 34 | 23 | 20 | 13 | 15 | 18 | 18 | 89 |
| 23-Aug | 18 | 33 | 23 | 17 | 40 | 18 | 14 | 14 | 15 | 16 | 16 | 21 | 16 | 15 | 14 | 14 | 13 | 13 | 13 | 15 | 15 | 13 | 12 | 14 | 40 |
| 24-Aug | 14 | 16 | 20 | 23 | 40 | 23 | 46 | 44 | 28 | 20 | 22 | 20 | 19 | 18 | 22 | 16 | 41 | 47 | 22 | 32 | 32 | 31 | 27 | 27 | 47 |
| 25-Aug | 29 | 31 | 29 | 22 | 23 | 22 | 19 | 21 | 24 | 25 | 20 | 22 | 29 | 25 | 24 | 25 | 27 | 27 | 28 | 29 | 27 | 26 | 26 | 29 | 31 |
| 26-Aug | 25 | 25 | 28 | 28 | 26 | 27 | 31 | 27 | 28 | 31 | 26 | 26 | 30 | 28 | 28 | 27 | 29 | 26 | 27 | 34 | 19 | 27 | 28 | 23 | 34 |
| 27-Aug | 25 | 26 | 28 | 27 | 27 | 28 | 31 | 24 | 25 | 22 | 29 | 27 | 27 | 24 | 26 | 26 | 22 | 22 | 19 | 12 | 47 | 23 | 66 | 23 | 66 |
| 28-Aug | 43 | 62 | 34 | 29 | 23 | 55 | 38 | 50 | 39 | 24 | 26 | 28 | 27 | 28 | 25 | 19 | 19 | 13 | 11 | 8 | 5 | 19 | 19 | 54 | 62 |
| 29-Aug | 59 | 42 | 81 | 94 | 49 | 91 | 66 | 44 | 61 | 37 | 70 | 71 | 56 | 84 | 60 | 48 | 61 | 23 | 23 | 8 | 14 | 10 | 13 | 12 | 94 |
| 30-Aug | 16 | 18 | 18 | 16 | 16 | 17 | 21 | 19 | 19 | 17 | 14 | 14 | 16 | 15 | 15 | 17 | 16 | 14 | 15 | 15 | 13 | 13 | 16 | 17 | 21 |
| 31-Aug | 17 | 17 | 68 | 14 | 15 | 35 | 25 | 20 | 37 | 43 | 22 | 26 | 27 | 32 | 25 | 25 | 27 | 20 | 19 | 20 | 28 | 28 | 26 | 26 | 68 |
| 75 65 81 94 70 94 66 56 63 73 92 88 89 96 86 55 61 41 76 51 90 96 70 64 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Mildred Lake - August 2017





Wood Buffalo Environmental Association

SO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|----------------|-----------------|--------------|
| Station Name: | Mildred Lake | Station number: | AMS 02 |
| Calibration Date: | August 4, 2017 | Last Cal Date: | July 7, 2017 |
| Start time (MST): | 9:11 | End time (MST): | 12:07 |
| Reason: | Routine | | |

Calibration Standards

| | | | | |
|-----------------------|----------|-----|------------------|---------|
| Cal Gas Concentration | 51.2 | ppm | Cal Gas Exp Date | 2/19/18 |
| Calibrator Make/Model | API T700 | | Serial Number | 1185 |
| ZAG Make/Model | APT T701 | | Serial Number | 4767 |

Analyzer Information

| | | | | | |
|----------------------|--------------|--------------------|--------------|---------------|--------|
| Analyzer make: | Thermo 43i | Analyzer serial #: | JC1404901075 | | |
| | <u>Start</u> | <u>Finish</u> | <u>Start</u> | <u>Finish</u> | |
| Analyzer Range | 0 - 1000 | ppb | PMT voltage | -653.4 | -653.1 |
| Calculated slope | 0.991547 | 0.994046 | Lamp voltage | 801 | 800 |
| Calculated intercept | 1.677183 | 1.964542 | Pressure | 700.0 | 696.2 |
| Analyzer Background | 19.6 | 19.7 | Flow | 0.499 | 0.495 |
| Analyzer Coefficient | 0.951 | 0.951 | Intensity | 90 | 90 |

SO₂ Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5001 | 0.0 | 0.0 | -0.8 | ---- |
| as found span | 4931 | 76.4 | 781.2 | 784.8 | 0.995 |
| calibrator zero | 5000 | 0.0 | 0.0 | -0.8 | ---- |
| high point | 4931 | 76.4 | 781.2 | 784.8 | 0.995 |
| second point | 4969 | 38.3 | 391.6 | 390.4 | 1.003 |
| third point | 4986 | 19.2 | 196.4 | 195.1 | 1.007 |
| as left zero | 5003 | 0.0 | 0.0 | -0.7 | ---- |
| as left span | 4932 | 76.4 | 781.0 | 783.5 | 0.997 |
| Average Correction Factor | | | | | 1.002 |

| | | | | | |
|--------------------|--------|-------------------|--------|-----------|------|
| Corrected As found | 785.60 | Previous response | 786.16 | *% change | 0.1% |
|--------------------|--------|-------------------|--------|-----------|------|

* = > +/-5% change initiates investigation

Notes: No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association

SO₂ Calibration Summary

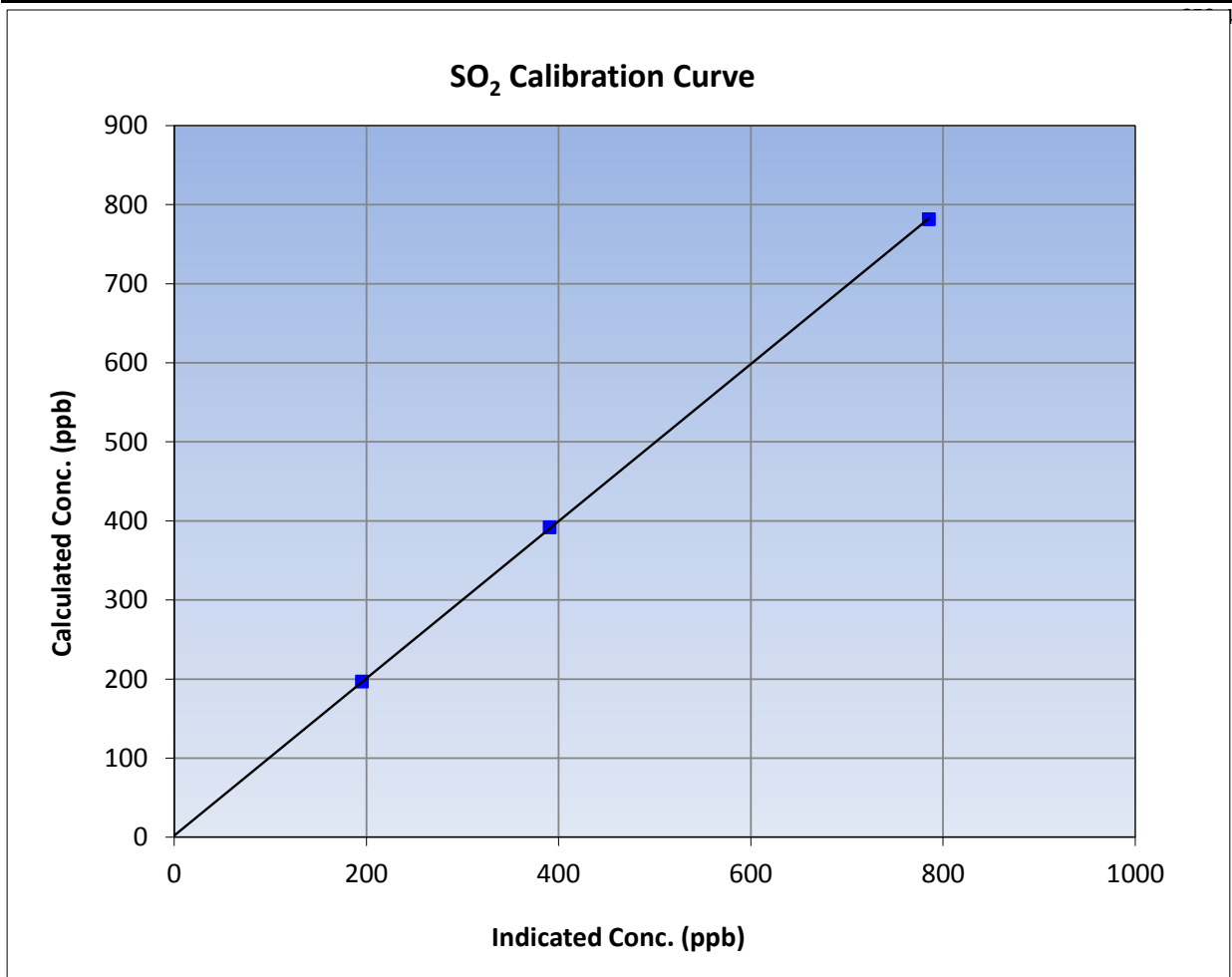
Version-03-2017

Station Information

| | | | |
|------------------|----------------|----------------------|--------------|
| Calibration Date | August 4, 2017 | Previous Calibration | July 7, 2017 |
| Station Name | Mildred Lake | Station Number | AMS 02 |
| Start Time (MST) | 9:42 | End Time (MST) | 12:07 |
| Analyzer make | Thermo 43i | Analyzer serial # | JC1404901075 |

Calibration Data

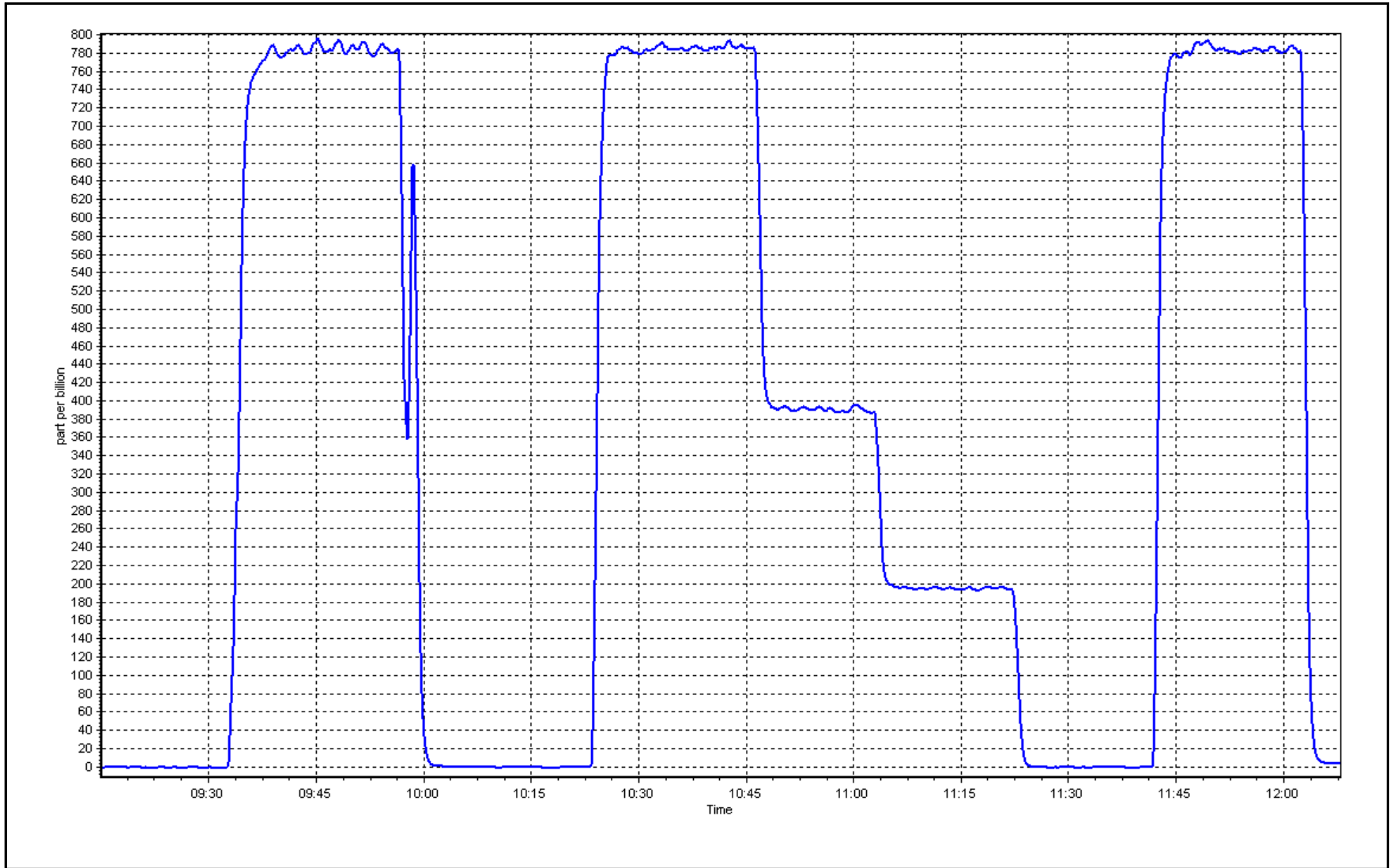
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|-------------|
| 0.0 | -0.8 | ---- | Correlation Coefficient | 0.999985 | ≥0.995 |
| 781.2 | 784.8 | 0.9954 | | | |
| 391.6 | 390.4 | 1.0031 | Slope | 0.994046 | 0.90 - 1.10 |
| 196.4 | 195.1 | 1.0067 | | | |
| | | | Intercept | 1.964542 | +/-30 |



SO2 Calibration Plot

Date: August 4, 2017

Location: Mildred Lake





Wood Buffalo Environmental Association

H₂S Calibration Report

Version-06-2017

Station Information

| | | | |
|-------------------|----------------|-----------------|---------------|
| Station Name: | Mildred Lake | Station number: | AMS 02 |
| Calibration Date: | August 4, 2017 | Last Cal Date: | July 11, 2017 |
| Start time (MST): | 12:18 | End time (MST): | 14:45 |
| Reason: | Routine | | |

Calibration Standards

| | | | | |
|-----------------------|------------------|-----|------------------|-------------------|
| Cal Gas Concentration | <u>5.04</u> | ppm | Cal Gas Exp Date | September 9, 2017 |
| Cal Gas Cylinder # | <u>ALM028262</u> | | | |
| Calibrator Make/Model | API T700 | | Serial Number | 1185 |
| ZAG Make/Model | API T701 | | Serial Number | 825 |

Analyzer Information

| | | | |
|----------------|----------|--------------------|-----------|
| Analyzer make: | TEI 450i | Analyzer serial #: | 815129107 |
|----------------|----------|--------------------|-----------|

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|----------------------|--------------|---------------|--------------|--------------|---------------|
| Analyzer Range | 0 - 100 ppb | | PMT voltage | -601 | -601 |
| Calculated slope | 0.987731 | 0.986246 | Lamp voltage | 793 | 780 |
| Calculated intercept | 0.330918 | 0.405692 | Pressure | 563.7 | 560.0 |
| Analyzer Background | 17.4 | 17.5 | Flow | 0.982 | 0.977 |
| Analyzer Coefficient | 0.976 | 0.966 | Intensity | 88 | 87 |

H₂S Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|-----------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5002 | 0.0 | 0.0 | 0.0 | ---- |
| as found span | 4928 | 80.1 | 80.6 | 81.4 | 0.990 |
| calibrator zero | 5000 | 0.0 | 0.0 | -0.3 | ---- |
| high point | 4927 | 80.1 | 80.6 | 81.4 | 0.990 |
| second point | 4966 | 40.1 | 40.4 | 40.5 | 0.997 |
| third point | 4988 | 20.1 | 20.2 | 19.9 | 1.016 |
| as left zero | 5004 | 0.0 | 0.0 | 0.0 | ---- |
| as left span | 3945 | 64.1 | 80.6 | 81.9 | 0.984 |

SO₂ Scrubber Check

| | | | Average Correction Factor | 1.001 |
|--------------------|-------|-------------------|---------------------------|--------------------|
| Corrected As found | 81.40 | Previous response | 81.28 | *% change -0.1% |

** = > +/-5% change initiates investigation*

Notes:

Adjusted span slightly.

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association

H₂S Calibration Summary

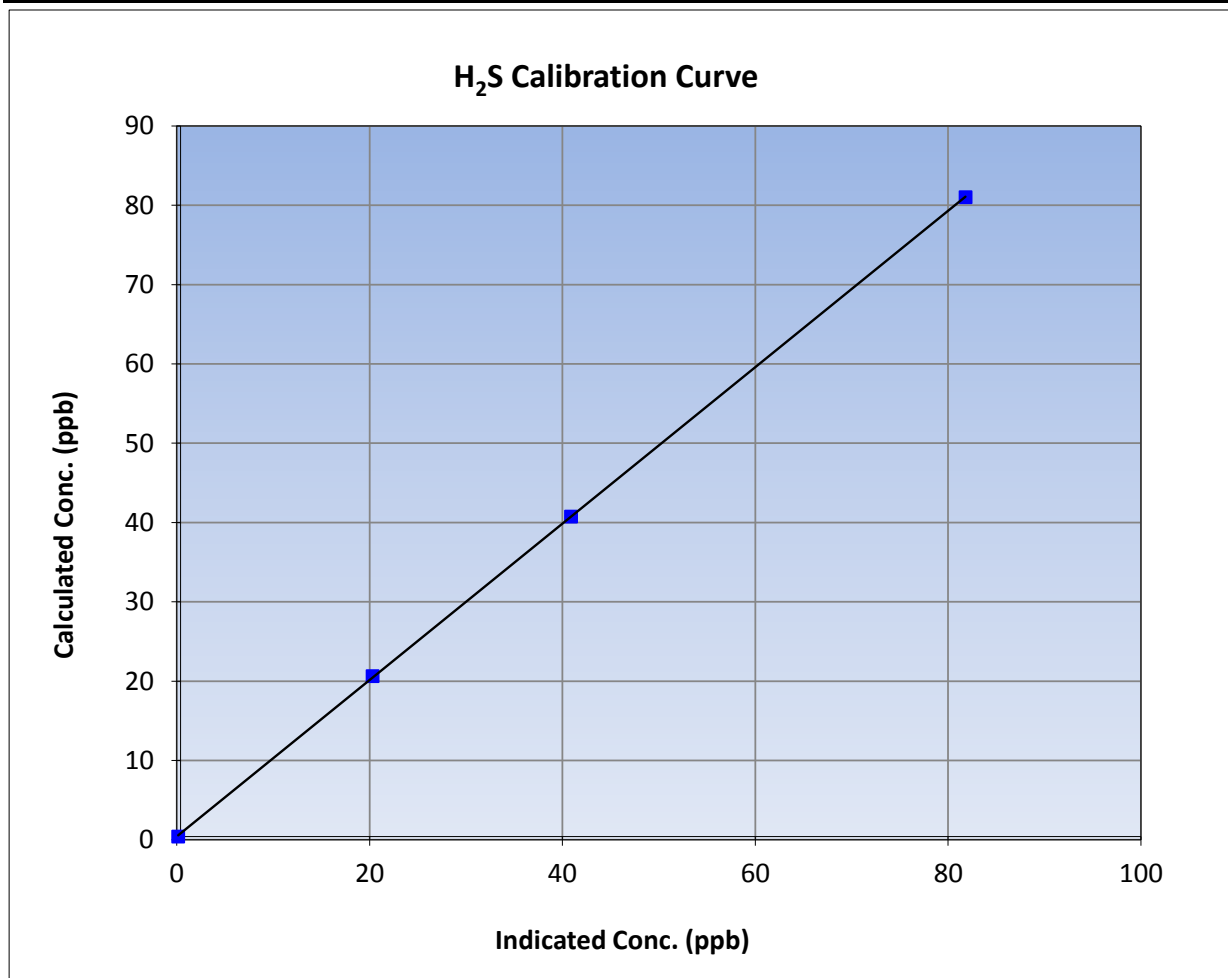
Version-03-2017

Station Information

| | | | |
|------------------|----------------|----------------------|---------------|
| Calibration Date | August 4, 2017 | Previous Calibration | July 11, 2017 |
| Station Name | Mildred Lake | Station Number | AMS 02 |
| Start Time (MST) | 12:18 | End Time (MST) | 14:45 |
| Analyzer make | TEI 450i | Analyzer serial # | 815129107 |

Calibration Data

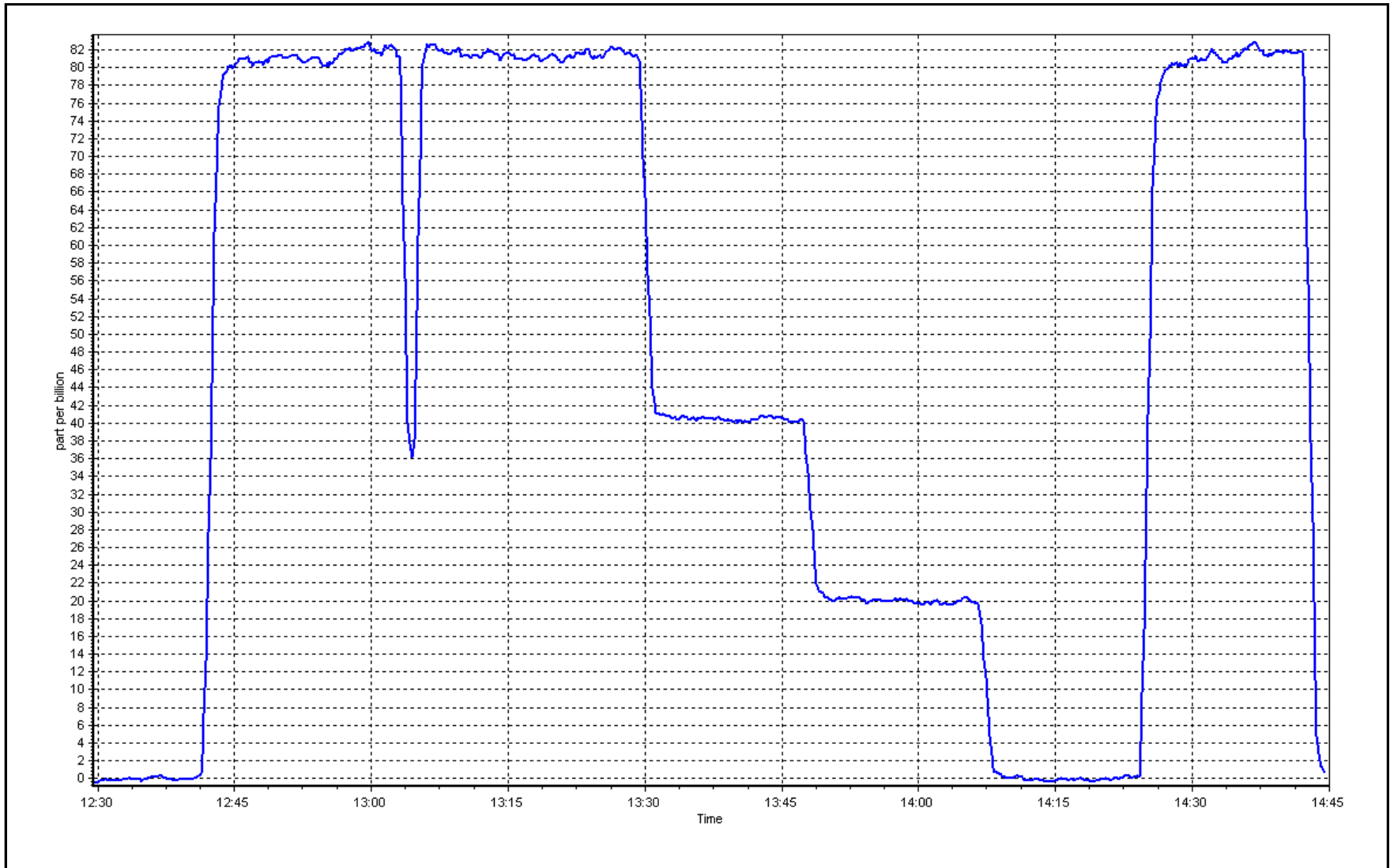
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-------------|
| 0.0 | -0.3 | ---- | Correlation Coefficient | ≥0.995 |
| 80.6 | 81.4 | 0.9905 | | |
| 40.4 | 40.5 | 0.9968 | Slope | 0.90 - 1.10 |
| 20.2 | 19.9 | 1.0165 | | |
| | | | Intercept | +/-3 |



H₂S Calibration Plot

Date: August 4, 2017

Location: Mildred Lake





Wood Buffalo Environmental Association

THC Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|----------------|-----------------|--------------|
| Station Name: | Mildred Lake | Station number: | AMS 02 |
| Calibration Date: | August 4, 2017 | Last Cal Date: | July 7, 2017 |
| Start time (MST): | 9:11 | End time (MST): | 12:07 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|-----------------------|------------------|---------------------|------------|
| Gas Cert Reference | LL107930 | Cal Gas Expiry Date | 2/9/18 |
| CH4 Cal Gas Conc. | 509 ppm | CH4 Equiv Conc. | 1081.0 ppm |
| C3H8 Cal Gas Conc. | 208 ppm | Station temp. | 22 Deg C |
| Calibrator Make/Model | API T700 | Serial Number | 1185 |
| ZAG Make/Model | Teledyne API 701 | Serial Number | 4767 |

Analyzer Information

| | | | |
|----------------------|---------------|---------------------|--------------|
| Analyzer make: | Thermo 51i-LT | Analyzer serial #: | 1300156231 |
| | <u>Start</u> | <u>Finish</u> | <u>Start</u> |
| Analyzer Range | 0 - 25 ppm | Bias voltage supply | -301.9 |
| Calculated slope | 0.997649 | Sample pressure | 8.2 |
| Calculated intercept | 0.061273 | Fuel pressure | 21.8 |
| Analyzer Background | 0.58 | Air pressure | 33.1 |
| Analyzer Coefficient | 3.771 | Flame temperature | 143.6 |

THC Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5001 | 0.0 | 0.00 | -0.10 | ---- |
| as found span | 4931 | 76.4 | 16.49 | 16.29 | 1.012 |
| calibrator zero | 5002 | 0.0 | 0.00 | 0.00 | ---- |
| high point | 4931 | 76.4 | 16.49 | 16.51 | 0.999 |
| second point | 4969 | 38.3 | 8.27 | 8.27 | 1.000 |
| third point | 4987 | 19.2 | 4.15 | 4.16 | 0.997 |
| as left zero | 5004 | 0.0 | 0.00 | 0.03 | ---- |
| as left span | 4932 | 76.4 | 16.49 | 16.44 | 1.003 |
| Average Correction Factor | | | | | 0.998 |
| Corrected As found | 16.39 | Previous response | 16.47 | *% change | 0.5% |

* = > +/-5% change initiates investigation

Notes:

Adjusted zero and span.

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association

THC Calibration Summary

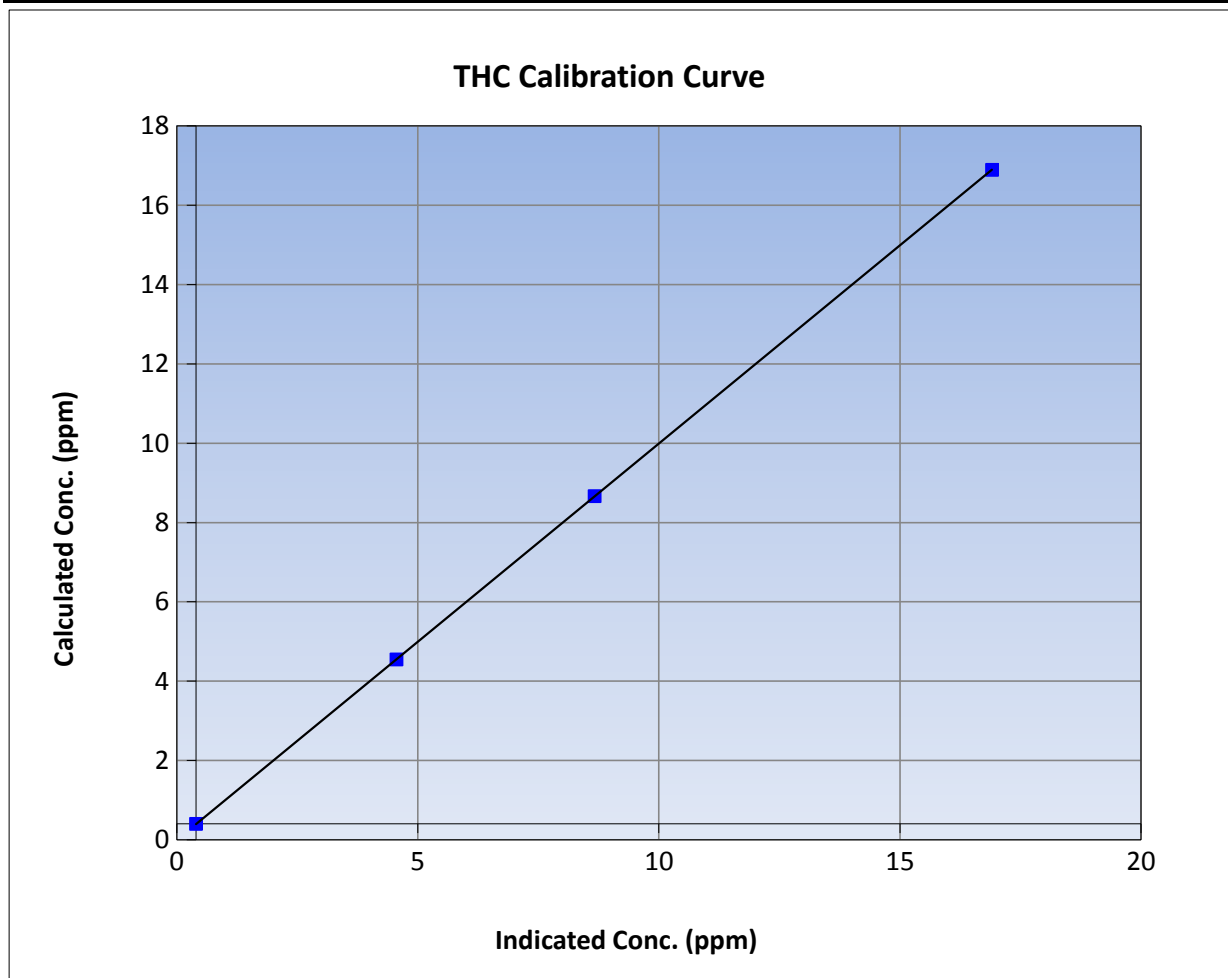
Version-03-2017

Station Information

| | | | |
|------------------|----------------|----------------------|--------------|
| Calibration Date | August 4, 2017 | Previous Calibration | July 7, 2017 |
| Station Name | Mildred Lake | Station Number | AMS 02 |
| Start Time (MST) | 9:11 | End Time (MST) | 12:07 |
| Analyzer make | Thermo 51i-LT | Analyzer serial # | 1300156231 |

Calibration Data

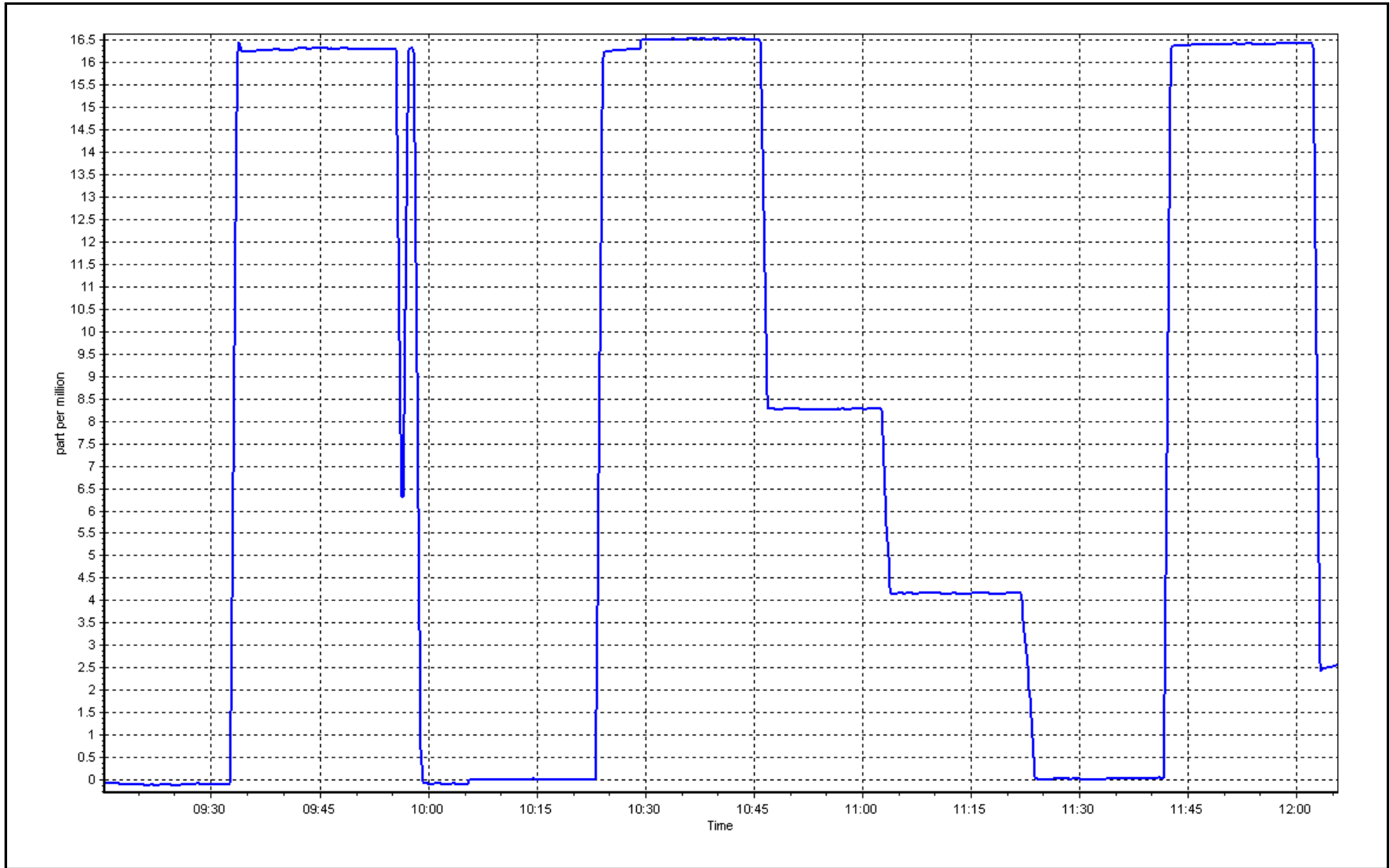
| Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | 0.999999 | ≥0.995 |
| 16.5 | 16.5 | 0.9990 | | | |
| 8.3 | 8.3 | 0.9998 | Slope | 0.999238 | 0.90 - 1.10 |
| 4.1 | 4.2 | 0.9966 | | | |
| | | | Intercept | -0.002597 | +/-1.5 |



THC Calibration Plot

Date: August 4, 2017

Location: Mildred Lake





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 3 LOWER CAMP METEOROLOGY AUGUST 2017

Operations, Data Collection,
QA/QC, Data Validation and Reporting by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

September 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP MET TOWER (AMS 3)
AUGUST 2017

MONTHLY SUMMARY for
AMD SECTION III.B.1(c)

| Parameter | Hours of Data | Hours of Calibration | Hours without Data | Operational Time | Maximum 1-Hour Value | 1-Hour Exceedances | Maximum 24-Hour Value | 24-Hour Exceedances |
|--|------------------|-------------------------|-----------------------|---------------------|-------------------------|-----------------------|--------------------------|------------------------|
| Temperature 20 m (C) Average | 744 | 0 | 0 | 100 | 30.3 | - | 25.0 | - |
| Temperature 45 m (C) Average | 612 | 0 | 132 | 82.26 | 30.1 | - | 24.9 | - |
| Temperature 100 m (C) Average | 744 | 0 | 0 | 100 | 29.6 | - | 24.8 | - |
| Temperature 167 m (C) Average | 744 | 0 | 0 | 100 | 29 | - | 24.5 | - |
| Relative Humidity 20 m (%) Average | 744 | 0 | 0 | 100 | 99 | - | 86.0 | - |
| Relative Humidity 45 m (%) Average | 612 | 0 | 132 | 82.26 | 99 | - | 86.0 | - |
| Relative Humidity 100 m (%) Average | 744 | 0 | 0 | 100 | 96 | - | 85.0 | - |
| Relative Humidity 167 m (%) Average | 744 | 0 | 0 | 100 | 94 | - | 84.0 | - |
| Wind Speed 20 m (km/h) Average | 744 | 0 | 0 | 100 | 27 | - | 17.0 | - |
| Wind Speed 45 m (km/h) Average | 612 | 0 | 132 | 82.26 | 40 | - | 23.0 | - |
| Wind Speed 100 m (km/h) Average | 744 | 0 | 0 | 100 | 49 | - | 32.0 | - |
| Wind Speed 167 m (km/h) Average | 744 | 0 | 0 | 100 | 54 | - | 37.0 | - |
| Wind Direction 20 m (deg) Average | 744 | 0 | 0 | 100 | - | - | - | - |
| Wind Direction 45 m (deg) Average | 612 | 0 | 132 | 82.26 | - | - | - | - |
| Wind Direction 100 m (deg) Average | 744 | 0 | 0 | 100 | - | - | - | - |
| Wind Direction 167 m (deg) Average | 744 | 0 | 0 | 100 | - | - | - | - |
| Vertical Wind Speed 20 m (km/h) Average | 744 | 0 | 0 | 100 | 0.9 | - | 0.3 | - |
| Vertical Wind Speed 45 m (km/h) Average | 612 | 0 | 132 | 82.26 | 1.4 | - | 1.0 | - |
| Vertical Wind Speed 100 m (km/h) Average | 744 | 0 | 0 | 100 | 3.9 | - | 2.0 | - |
| Vertical Wind Speed 167 m (km/h) Average | 742 | 0 | 2 | 99.73 | 4.5 | - | 2.0 | - |

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP MET TOWER (AMS 3)
AUGUST 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

| Parameter | Number | Mean | StnDev | Total | Percentile | | | | | | |
|--|--------|-------|--------|-------|------------|------|------|--------|------|------|------|
| | | | | | Min | P10 | Q1 | Median | Q3 | P90 | Max |
| Temperature 20 m (C) Average | 744 | 18.79 | 4.8 | - | 6.4 | 12.9 | 15.1 | 18.6 | 22.5 | 25.4 | 30.3 |
| Temperature 45 m (C) Average | 612 | 18.71 | 4.8 | - | 8.4 | 12.8 | 15.1 | 18.3 | 22.2 | 25.3 | 30.1 |
| Temperature 100 m (C) Average | 744 | 18.62 | 4.5 | - | 8.7 | 12.8 | 15.2 | 18.6 | 21.8 | 24.6 | 29.6 |
| Temperature 167 m (C) Average | 744 | 18.44 | 4.3 | - | 9.2 | 12.9 | 15.1 | 18.4 | 21.5 | 24.1 | 29 |
| Relative Humidity 20 m (%) Average | 744 | 60.8 | 21 | - | 24 | 32 | 43 | 61 | 77 | 90 | 99 |
| Relative Humidity 45 m (%) Average | 612 | 61.3 | 20 | - | 25 | 32 | 44 | 62 | 78 | 89 | 99 |
| Relative Humidity 100 m (%) Average | 744 | 57.2 | 19 | - | 22 | 31 | 40 | 58 | 73 | 84 | 96 |
| Relative Humidity 167 m (%) Average | 744 | 55.9 | 18 | - | 22 | 31 | 40 | 57 | 70 | 81 | 94 |
| Wind Speed 20 m (km/h) Average | 744 | 8.6 | 6 | - | 0 | 2 | 4 | 8 | 13 | 17 | 27 |
| Wind Speed 45 m (km/h) Average | 612 | 11.1 | 8 | - | 0 | 3 | 5 | 9 | 16 | 23 | 40 |
| Wind Speed 100 m (km/h) Average | 744 | 16.3 | 10 | - | 1 | 4 | 8 | 14 | 24 | 32 | 49 |
| Wind Speed 167 m (km/h) Average | 744 | 19.4 | 12 | - | 0 | 6 | 10 | 17 | 28 | 37 | 54 |
| Wind Direction 20 m (deg) Average | 744 | - | - | - | - | - | - | - | - | - | - |
| Wind Direction 45 m (deg) Average | 612 | - | - | - | - | - | - | - | - | - | - |
| Wind Direction 100 m (deg) Average | 744 | - | - | - | - | - | - | - | - | - | - |
| Wind Direction 167 m (deg) Average | 744 | - | - | - | - | - | - | - | - | - | - |
| Vertical Wind Speed 20 m (km/h) Average | 744 | -0.04 | 0.3 | - | -0.9 | -0.5 | -0.2 | 0 | 0.2 | 0.4 | 0.9 |
| Vertical Wind Speed 45 m (km/h) Average | 612 | 0.08 | 0.5 | - | -2 | -0.6 | -0.2 | 0.1 | 0.4 | 0.8 | 1.4 |
| Vertical Wind Speed 100 m (km/h) Average | 744 | 0.44 | 0.8 | - | -1.7 | -0.3 | 0 | 0.3 | 0.7 | 1.4 | 3.9 |
| Vertical Wind Speed 167 m (km/h) Average | 742 | 0.81 | 0.9 | - | -1.2 | -0.1 | 0.1 | 0.6 | 1.4 | 2.2 | 4.5 |

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP MET TOWER (AMS 3)
AUGUST 2017

OPERATIONAL NOTES

| Parameter | Period Start | Period End | Duration (Hours) | Notes |
|--|-------------------|-------------------|------------------|-----------------------|
| Wind Speed, Wind Direction, Vertical Wind Speed 45 m | 26 Aug 2017 13:00 | 01 Sep 2017 00:00 | 132 | Sensor wiring failure |
| Temperature, Relative Humidity 45 m | 26 Aug 2017 13:00 | 01 Sep 2017 00:00 | 132 | Sensor wiring failure |
| Vertical Wind Speed 167 m | 15 Aug 2017 21:00 | 15 Aug 2017 22:00 | 2 | Unstable operation |



Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature 20 m (AT20m) - C

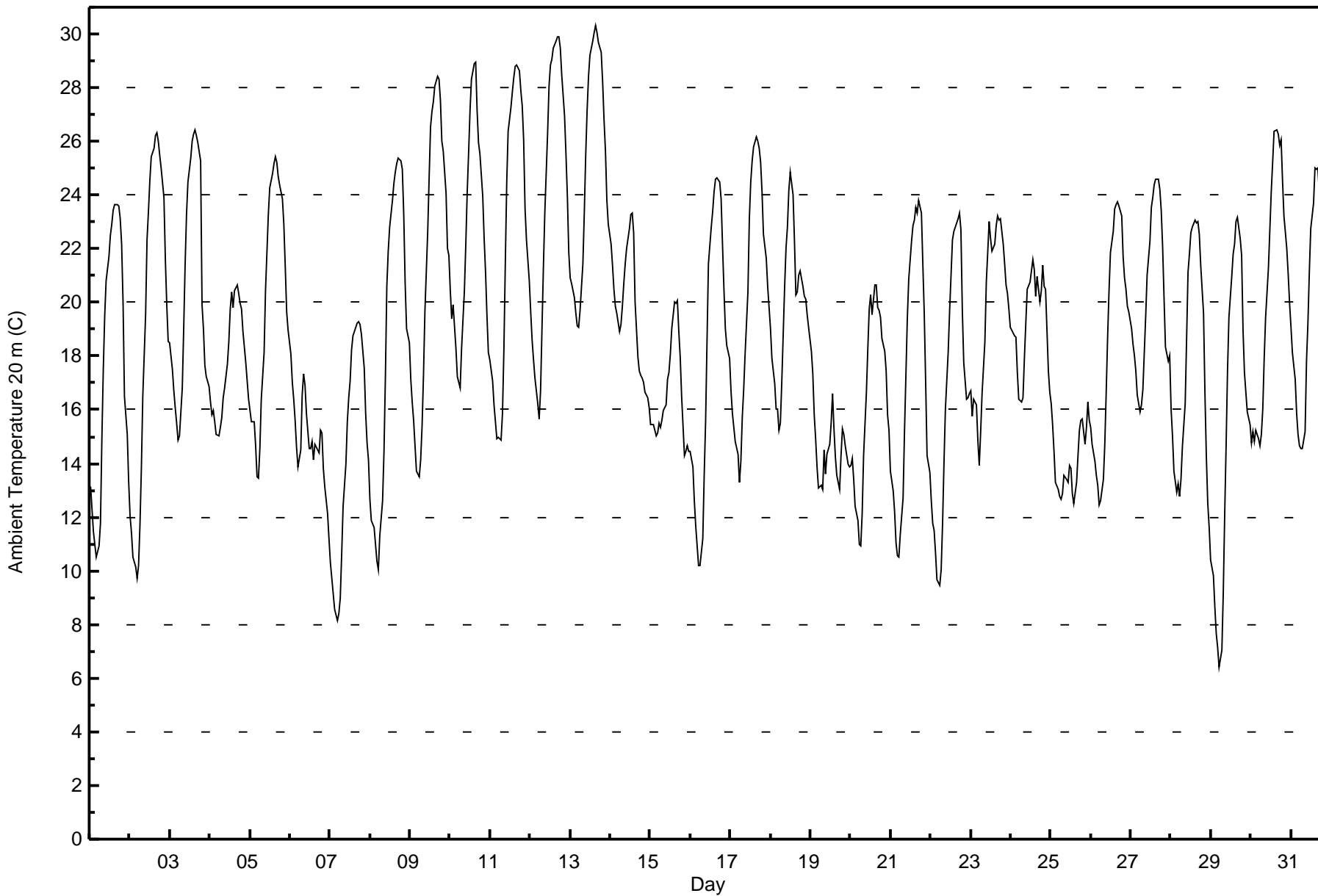
Lower Camp Met Tower - August 2017

| Maximum Value: 30.3 C on Aug 13 16:00 | | Maximum Daily Average: 25.0 C on Aug 13 | | Hours in Service: | 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|--|------|---------------------------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|
| Minimum Value: 6.4 C on Aug 29 06:00 | | Minimum Daily Average: 14.2 C on Aug 25 | | Hours of Data: | 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 23.3 C at hour 16 | | Minimum Diurnal Average: 13.4 C at hour 6 | | Hours of Missing Data: | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 18.79 C | | Percentiles: P ₁ = 8.7 P ₁₀ = 12.9 Q ₁ = 15.1 Median = 18.6 Q ₃ = 22.5 P ₉₀ = 25.4 P ₉₉ = 29.7 | | Hours of Calibration: | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Percent Operational Time: | 100.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 13.1 | 12.3 | 11.5 | 11.0 | 10.5 | 10.9 | 11.8 | 14.9 | 17.5 | 19.5 | 20.8 | 21.7 | 22.5 | 22.9 | 23.4 | 23.7 | 23.7 | 23.6 | 23.1 | 22.2 | 20.0 | 16.5 | 15.1 | 13.3 | 17.7 | 23.7 | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 12.0 | 11.4 | 10.5 | 10.1 | 9.7 | 10.2 | 11.7 | 13.8 | 16.5 | 19.5 | 22.3 | 23.4 | 24.5 | 25.5 | 25.7 | 26.2 | 26.3 | 26.0 | 25.5 | 25.0 | 23.9 | 21.6 | 19.9 | 18.6 | 19.2 | 26.3 | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 18.5 | 17.5 | 16.7 | 16.1 | 15.5 | 14.8 | 15.0 | 16.8 | 19.0 | 21.4 | 23.3 | 24.5 | 25.4 | 26.0 | 26.3 | 26.4 | 26.2 | 26.0 | 25.3 | 19.9 | 19.0 | 17.7 | 17.3 | 16.9 | 20.5 | 26.4 | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 16.3 | 15.8 | 16.0 | 15.6 | 15.1 | 15.0 | 15.3 | 15.7 | 16.5 | 16.8 | 17.7 | 18.6 | 19.7 | 20.4 | 19.8 | 20.5 | 20.6 | 20.3 | 19.9 | 19.7 | 18.9 | 17.8 | 17.1 | 16.4 | 17.7 | 20.6 | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 16.0 | 15.5 | 15.5 | 14.6 | 13.5 | 13.4 | 14.6 | 16.4 | 18.1 | 20.4 | 21.8 | 23.3 | 24.3 | 24.8 | 25.2 | 25.4 | 25.2 | 24.7 | 24.4 | 23.9 | 22.9 | 21.4 | 19.6 | 19.0 | 20.2 | 25.4 | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 18.1 | 17.0 | 16.4 | 15.6 | 14.6 | 13.9 | 14.5 | 16.5 | 17.3 | 16.9 | 15.9 | 14.5 | 14.6 | 14.8 | 14.1 | 14.7 | 14.6 | 14.4 | 15.2 | 15.1 | 13.8 | 13.1 | 12.1 | 11.2 | 15.0 | 18.1 | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 10.3 | 9.7 | 9.2 | 8.6 | 8.2 | 8.4 | 9.0 | 10.6 | 12.4 | 14.0 | 15.6 | 16.5 | 17.1 | 18.2 | 18.8 | 19.1 | 19.3 | 19.3 | 19.2 | 18.8 | 17.5 | 15.9 | 14.8 | 14.1 | 14.3 | 19.3 | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 12.7 | 11.9 | 11.6 | 11.0 | 10.3 | 10.0 | 11.3 | 12.6 | 14.5 | 17.2 | 20.6 | 21.9 | 22.8 | 23.8 | 24.4 | 24.8 | 25.2 | 25.4 | 25.2 | 25.0 | 23.3 | 20.7 | 19.0 | 18.5 | 18.5 | 25.4 | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 17.1 | 16.3 | 15.6 | 14.7 | 13.7 | 13.5 | 14.1 | 15.4 | 17.3 | 19.6 | 22.7 | 24.6 | 26.5 | 27.1 | 27.5 | 28.0 | 28.4 | 28.3 | 27.6 | 26.0 | 25.6 | 24.1 | 22.0 | 21.8 | 21.6 | 28.4 | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 20.4 | 19.4 | 19.9 | 18.3 | 17.2 | 17.0 | 16.8 | 18.3 | 20.4 | 22.2 | 24.1 | 25.6 | 27.1 | 28.3 | 28.9 | 29.0 | 27.1 | 25.9 | 25.5 | 24.0 | 22.4 | 21.1 | 19.5 | 18.2 | 22.4 | 29.0 | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 17.9 | 17.1 | 16.2 | 15.6 | 14.9 | 15.0 | 14.9 | 15.9 | 18.2 | 21.5 | 24.5 | 26.4 | 27.2 | 27.9 | 28.4 | 28.8 | 28.8 | 28.6 | 27.9 | 27.3 | 26.1 | 23.5 | 22.3 | 20.8 | 22.3 | 28.8 | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 19.6 | 18.6 | 17.9 | 17.2 | 16.2 | 15.7 | 16.7 | 19.0 | 21.3 | 23.3 | 26.3 | 28.1 | 28.8 | 29.1 | 29.5 | 29.8 | 29.9 | 29.9 | 29.5 | 28.5 | 27.0 | 25.6 | 24.0 | 21.9 | 23.9 | 29.9 | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 20.9 | 20.7 | 20.2 | 19.6 | 19.1 | 19.0 | 19.7 | 21.5 | 23.3 | 25.5 | 27.2 | 28.4 | 29.2 | 29.7 | 30.1 | 30.3 | 30.1 | 29.7 | 29.3 | 28.2 | 26.8 | 25.6 | 23.8 | 22.9 | 25.0 | 30.3 | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 22.1 | 21.4 | 20.5 | 19.8 | 19.6 | 18.9 | 19.2 | 19.9 | 20.7 | 21.4 | 22.0 | 22.7 | 23.3 | 23.3 | 22.6 | 20.0 | 18.0 | 17.5 | 17.3 | 17.2 | 17.0 | 16.6 | 16.4 | 16.1 | 19.7 | 23.3 | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 15.5 | 15.5 | 15.5 | 15.0 | 15.1 | 15.5 | 15.3 | 15.6 | 16.0 | 16.2 | 17.1 | 17.4 | 18.1 | 19.0 | 20.0 | 20.0 | 20.0 | 18.9 | 17.9 | 16.5 | 14.3 | 14.5 | 14.7 | 14.5 | 16.6 | 20.0 | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 14.5 | 13.9 | 12.6 | 11.7 | 10.9 | 10.2 | 10.2 | 11.2 | 13.6 | 15.5 | 18.6 | 21.4 | 22.8 | 23.4 | 24.1 | 24.6 | 24.7 | 24.5 | 23.9 | 22.1 | 20.5 | 19.0 | 18.4 | 17.9 | 17.9 | 24.7 | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 16.7 | 15.9 | 15.3 | 14.8 | 14.3 | 13.3 | 14.1 | 15.7 | 16.8 | 18.1 | 20.4 | 23.1 | 24.5 | 25.3 | 25.8 | 26.2 | 26.0 | 25.7 | 25.2 | 24.1 | 22.6 | 21.6 | 20.6 | 19.8 | 20.2 | 26.2 | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 19.0 | 17.9 | 17.0 | 16.0 | 16.0 | 15.3 | 15.5 | 17.0 | 20.5 | 22.0 | 22.8 | 24.2 | 24.9 | 24.0 | 22.3 | 20.3 | 20.4 | 21.0 | 21.2 | 20.6 | 20.2 | 20.1 | 19.6 | 19.1 | 19.9 | 24.9 | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 18.2 | 17.3 | 15.8 | 14.9 | 13.9 | 13.1 | 13.2 | 13.0 | 14.5 | 13.6 | 14.4 | 14.7 | 15.5 | 16.6 | 15.3 | 14.3 | 13.6 | 13.0 | 14.3 | 15.3 | 15.1 | 14.7 | 14.0 | 13.9 | 14.7 | 18.2 | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 13.9 | 14.2 | 13.4 | 12.4 | 11.9 | 11.0 | 10.9 | 12.1 | 14.3 | 16.7 | 18.3 | 19.8 | 20.3 | 19.6 | 20.6 | 20.6 | 19.8 | 19.7 | 19.5 | 18.6 | 18.2 | 17.4 | 15.8 | 15.3 | 16.4 | 20.6 | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 13.7 | 13.0 | 12.2 | 11.0 | 10.6 | 10.5 | 11.4 | 12.7 | 15.2 | 17.3 | 19.4 | 20.9 | 22.3 | 22.9 | 23.1 | 23.6 | 23.3 | 23.8 | 23.3 | 21.5 | 19.6 | 17.0 | 14.3 | 13.7 | 17.3 | 23.8 | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 12.6 | 11.8 | 11.5 | 10.7 | 9.7 | 9.5 | 10.1 | 11.8 | 14.0 | 16.0 | 18.2 | 19.7 | 21.0 | 22.3 | 22.7 | 22.8 | 23.1 | 23.4 | 22.7 | 19.7 | 17.8 | 16.4 | 16.4 | 16.6 | 16.7 | 23.4 | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 16.7 | 15.8 | 16.4 | 16.2 | 14.9 | 13.9 | 15.2 | 16.6 | 18.6 | 20.8 | 21.9 | 23.0 | 22.4 | 21.9 | 22.2 | 22.8 | 23.2 | 23.0 | 23.1 | 22.2 | 21.4 | 20.6 | 20.3 | 19.8 | 19.7 | 23.2 | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 19.1 | 18.9 | 18.7 | 18.7 | 17.4 | 16.4 | 16.3 | 16.4 | 17.9 | 19.2 | 20.5 | 20.8 | 21.2 | 21.6 | 21.2 | 20.2 | 21.0 | 20.0 | 20.5 | 21.4 | 20.6 | 20.5 | 17.4 | 16.6 | 19.3 | 21.6 | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 16.2 | 15.4 | 14.4 | 13.3 | 13.0 | 12.8 | 12.6 | 12.9 | 13.5 | 13.4 | 13.3 | 13.9 | 13.8 | 12.9 | 12.5 | 13.3 | 14.3 | 15.2 | 15.6 | 15.7 | 14.7 | 15.3 | 16.3 | 15.6 | 14.2 | 16.3 | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 15.3 | 14.7 | 14.1 | 13.5 | 13.2 | 12.4 | 12.6 | 13.4 | 14.7 | 16.7 | 18.7 | 20.4 | 21.9 | 22.7 | 23.5 | 23.6 | 23.8 | 23.6 | 23.2 | 21.7 | 20.9 | 20.5 | 19.9 | 19.6 | 18.5 | 23.8 | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 19.0 | 18.4 | 18.0 | 17.4 | 16.5 | 15.9 | 16.2 | 16.8 | 18.1 | 19.5 | 21.0 | 22.3 | 23.6 | 23.9 | 24.4 | 24.6 | 24.6 | 24.2 | 23.4 | 22.0 | 20.2 | 18.3 | 17.8 | 18.0 | 20.2 | 24.6 | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 16.0 | 15.0 | 13.7 | 12.9 | 13.2 | 12.8 | 13.4 | 14.6 | 16.2 | 18.6 | 21.1 | 21.8 | 22.6 | 22.8 | 23.1 | 23.0 | 23.0 | 22.6 | 21.4 | 19.6 | 16.6 | 14.3 | 12.5 | 11.6 | 17.6 | 23.1 | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 10.4 | 9.8 | 8.7 | 7.7 | 7.1 | 6.4 | 7.1 | 9.2 | 12.1 | 14.6 | 17.5 | 19.4 | 21.0 | 21.8 | 22.2 | 23.0 | 23.2 | 22.4 | 21.8 | 18.9 | 17.4 | 16.7 | 15.9 | 15.5 | 15.4 | 23.2 | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 14.8 | 15.2 | 14.8 | 15.2 | 14.9 | 14.7 | 15.1 | 16.0 | 17.9 | 19.4 | 21.3 | 22.7 | 24.1 | 25.2 | 26.4 | 26.4 | 26.3 | 25.9 | 26.1 | 24.5 | 23.2 | 22.0 | 21.1 | 20.0 | 20.5 | 26.4 | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 19.1 | 18.1 | 17.1 | 15.9 | 15.1 | 14.6 | 14.6 | 14.6 | 15.2 | 17.8 | 19.2 | 21.1 | 22.8 | 23.7 | 25.0 | 25.0 | 25.0 | 24.2 | 23.2 | 21.4 | 19.5 | 18.3 | 17.7 | 16.9 | 19.4 | 25.0 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 16.3 | 15.7 | 15.1 | 14.4 | 13.7 | 13.4 | 13.8 | 15.1 | 16.8 | 18.5 | 20.3 | 21.5 | 22.4 | 22.9 | 23.2 | 23.3 | 23.2 | 22.9 | 22.6 | 21.5 | 20.2 | 19.0 | 17.9 | 17.2 | Diurnal Average |
| | | | | | | | | | | | | | | | | | | | | | | | | 22.1 | 21.4 | 20.5 | 19.8 | 19.6 | 19.0 | 19.7 | 21.5 | 23.3 | 25.5 | 27.2 | 28.4 | 29.2 | 29.7 | 30.1 | 30.3 | 30.1 | 29.9 | 29.5 | 28.5 | 27.0 | 25.6 | 24.0 | 22.9 | Diurnal Maximum |



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 20 m (AT20m) - C
Lower Camp Met Tower - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 20 m (AT20m) - C
Lower Camp Met Tower - August 2017**

| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 16 | 2.15 | 2.15 |
| 10 - 20 | 431 | 57.93 | 60.08 |
| > 20 | 297 | 39.92 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature 45 m (AT45m) - C

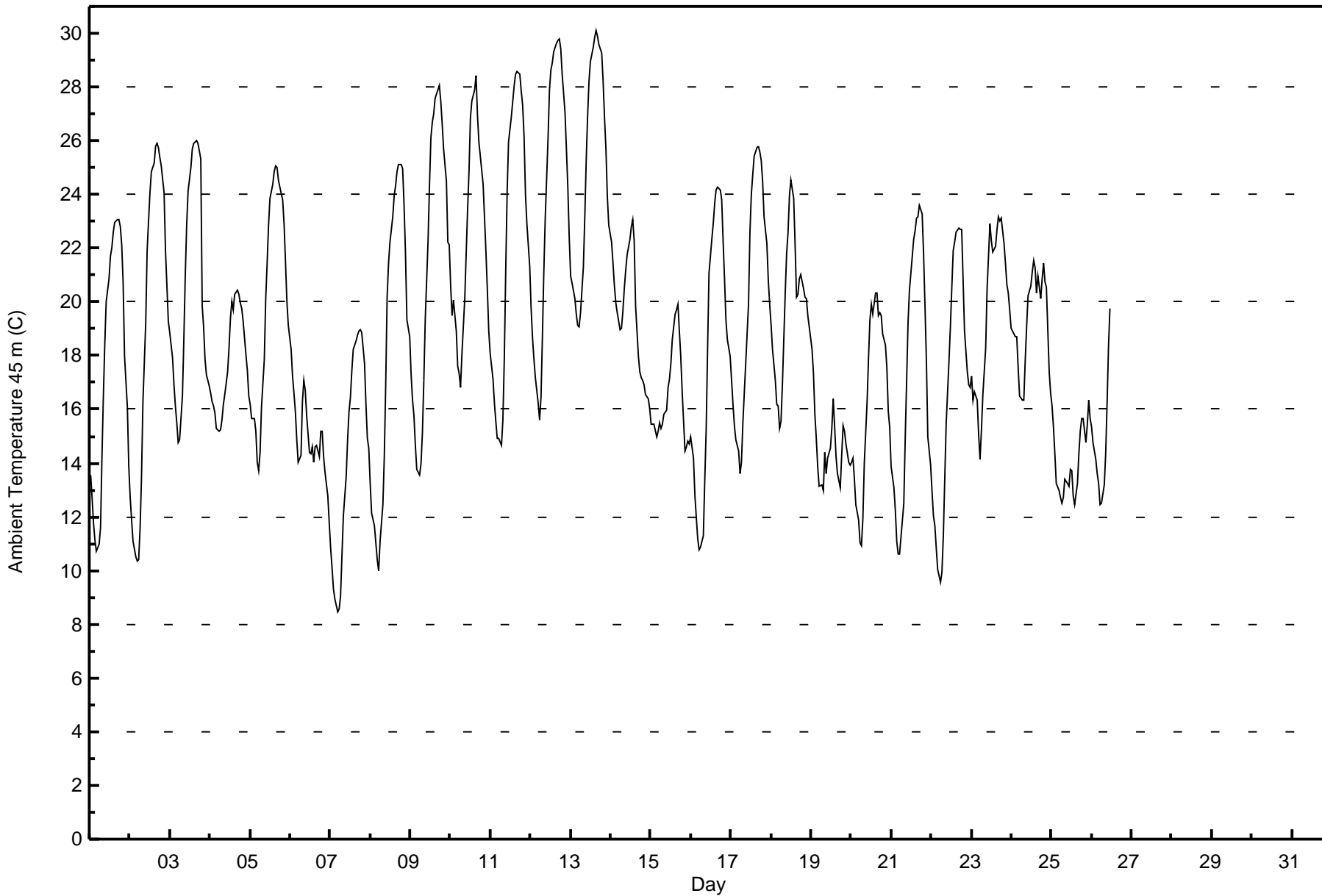
Lower Camp Met Tower - August 2017

| Maximum Value: 30.1 C on Aug 13 16:00 | | | | | | | | | | | | | | | | | | | | Maximum Daily Average: 24.9 C on Aug 13 | | | | | Hours in Service: | 744 | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|------|------|------|-----------------|---------------------------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Minimum Value: 8.4 C on Aug 7 05:00 | | | | | | | | | | | | | | | | | | | | Minimum Daily Average: 14.1 C on Aug 25 | | | | | Hours of Data: | 612 | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 22.7 C at hour 16 | | | | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 13.6 C at hour 6 | | | | | Hours of Missing Data: | 132 | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 18.71 C | | | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 9.9 P ₁₀ = 12.8 Q ₁ = 15.1 Median = 18.3 Q ₃ = 22.2 P ₉₀ = 25.3 P ₉₉ = 29.5 | | | | | Hours of Calibration: | 0 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: | 82.3 | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 13.6 | 12.7 | 11.8 | 11.2 | 10.7 | 11.0 | 11.6 | 14.2 | 16.5 | 18.4 | 20.0 | 20.9 | 21.7 | 22.0 | 22.6 | 22.9 | 23.1 | 23.1 | 22.8 | 22.1 | 20.7 | 18.0 | 16.1 | 13.9 | 17.6 | 23.1 | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 12.7 | 11.9 | 11.1 | 10.5 | 10.3 | 10.4 | 11.6 | 13.5 | 16.2 | 19.2 | 21.9 | 23.0 | 24.1 | 24.9 | 25.2 | 25.8 | 25.9 | 25.7 | 25.4 | 25.1 | 24.1 | 21.9 | 20.6 | 19.3 | 19.2 | 25.9 | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 18.9 | 17.9 | 16.9 | 16.1 | 15.5 | 14.8 | 14.9 | 16.5 | 18.6 | 20.9 | 22.9 | 24.1 | 25.0 | 25.7 | 25.9 | 26.0 | 26.0 | 25.9 | 25.3 | 19.9 | 19.1 | 17.9 | 17.3 | 16.9 | 20.4 | 26.0 | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 16.6 | 16.3 | 16.1 | 15.9 | 15.3 | 15.2 | 15.3 | 15.6 | 16.2 | 16.6 | 17.4 | 18.3 | 19.4 | 20.0 | 19.7 | 20.3 | 20.5 | 20.3 | 20.0 | 19.8 | 19.3 | 18.0 | 17.4 | 16.5 | 17.7 | 20.5 | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 16.2 | 15.7 | 15.7 | 15.2 | 14.0 | 13.7 | 14.4 | 16.1 | 17.9 | 20.1 | 21.5 | 22.8 | 23.8 | 24.4 | 24.9 | 25.1 | 25.0 | 24.5 | 24.3 | 23.8 | 22.9 | 21.5 | 20.0 | 19.1 | 20.1 | 25.1 | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 18.2 | 17.2 | 16.6 | 15.9 | 14.9 | 14.0 | 14.3 | 16.3 | 17.1 | 16.7 | 15.8 | 14.4 | 14.4 | 14.6 | 14.0 | 14.6 | 14.6 | 14.3 | 15.2 | 15.2 | 14.3 | 13.7 | 12.8 | 11.8 | 15.0 | 18.2 | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 10.8 | 10.1 | 9.3 | 8.9 | 8.4 | 8.6 | 9.0 | 10.6 | 12.1 | 13.5 | 14.9 | 15.9 | 16.5 | 17.4 | 18.3 | 18.6 | 18.8 | 18.9 | 19.0 | 18.8 | 17.7 | 16.2 | 14.9 | 14.5 | 14.2 | 19.0 | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 13.2 | 12.1 | 11.7 | 11.0 | 10.4 | 10.0 | 11.1 | 12.4 | 14.2 | 16.9 | 20.2 | 21.4 | 22.2 | 23.2 | 24.0 | 24.3 | 24.8 | 25.1 | 25.1 | 24.9 | 23.6 | 21.8 | 19.3 | 18.7 | 18.4 | 25.1 | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 17.3 | 16.4 | 15.7 | 14.7 | 13.8 | 13.5 | 14.0 | 15.1 | 17.1 | 19.4 | 22.3 | 24.3 | 26.1 | 26.7 | 27.0 | 27.6 | 27.9 | 28.0 | 27.5 | 26.7 | 25.7 | 24.5 | 22.2 | 22.1 | 21.5 | 28.0 | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 20.6 | 19.5 | 20.0 | 18.9 | 17.6 | 17.3 | 16.8 | 18.1 | 20.1 | 21.8 | 23.4 | 24.8 | 26.8 | 27.5 | 27.9 | 28.4 | 27.0 | 25.9 | 25.4 | 24.4 | 23.1 | 21.9 | 20.4 | 18.9 | 22.4 | 28.4 | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 18.1 | 17.1 | 16.2 | 15.6 | 14.9 | 14.9 | 14.7 | 15.6 | 17.9 | 21.1 | 24.1 | 26.0 | 26.9 | 27.5 | 28.1 | 28.5 | 28.6 | 28.5 | 27.9 | 27.3 | 26.2 | 24.0 | 22.9 | 21.3 | 22.2 | 28.6 | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 19.8 | 18.6 | 17.9 | 17.2 | 16.3 | 15.6 | 16.5 | 18.7 | 21.1 | 23.1 | 26.1 | 27.9 | 28.6 | 28.9 | 29.3 | 29.6 | 29.8 | 29.8 | 29.4 | 28.5 | 27.1 | 25.7 | 24.3 | 22.4 | 23.8 | 29.8 | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 21.0 | 20.7 | 20.1 | 19.5 | 19.1 | 19.1 | 19.6 | 21.3 | 23.1 | 25.2 | 26.9 | 28.2 | 28.9 | 29.5 | 29.8 | 30.1 | 29.9 | 29.6 | 29.2 | 28.2 | 26.9 | 25.7 | 23.9 | 22.9 | 24.9 | 30.1 | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 22.2 | 21.4 | 20.6 | 19.9 | 19.6 | 19.0 | 19.0 | 19.7 | 20.5 | 21.2 | 21.7 | 22.3 | 22.8 | 23.0 | 22.3 | 19.8 | 18.0 | 17.4 | 17.2 | 17.1 | 16.9 | 16.6 | 16.4 | 16.0 | 19.6 | 23.0 | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 15.5 | 15.4 | 15.4 | 15.0 | 15.2 | 15.5 | 15.3 | 15.5 | 15.8 | 16.0 | 16.8 | 17.1 | 17.7 | 18.6 | 19.6 | 19.7 | 19.9 | 18.9 | 18.0 | 16.6 | 14.5 | 14.6 | 14.8 | 14.7 | 16.5 | 19.9 | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 15.0 | 14.2 | 12.8 | 12.0 | 11.2 | 10.8 | 10.9 | 11.3 | 13.4 | 15.2 | 18.2 | 21.1 | 22.3 | 22.9 | 23.6 | 24.2 | 24.2 | 24.2 | 23.8 | 22.3 | 20.8 | 19.3 | 18.6 | 18.0 | 17.9 | 24.2 | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 17.1 | 16.2 | 15.4 | 14.8 | 14.4 | 13.6 | 14.0 | 15.5 | 16.6 | 17.7 | 19.9 | 22.6 | 24.0 | 24.7 | 25.4 | 25.8 | 25.8 | 25.6 | 25.3 | 24.5 | 23.2 | 22.2 | 20.8 | 19.9 | 20.2 | 25.8 | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 19.1 | 18.2 | 17.1 | 16.2 | 16.1 | 15.3 | 15.6 | 16.9 | 20.3 | 21.8 | 22.6 | 24.0 | 24.5 | 23.8 | 22.1 | 20.2 | 20.3 | 20.9 | 21.0 | 20.5 | 20.2 | 20.1 | 19.5 | 19.1 | 19.8 | 24.5 | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 18.2 | 17.3 | 15.8 | 14.9 | 13.9 | 13.1 | 13.2 | 13.0 | 14.4 | 13.6 | 14.2 | 14.6 | 15.3 | 16.4 | 15.3 | 14.3 | 13.6 | 13.1 | 14.3 | 15.4 | 15.2 | 14.7 | 14.0 | 13.9 | 14.7 | 18.2 | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 14.0 | 14.2 | 13.4 | 12.4 | 11.9 | 11.0 | 10.9 | 11.9 | 14.0 | 16.3 | 17.9 | 19.3 | 19.9 | 19.6 | 20.3 | 20.3 | 19.5 | 19.6 | 19.5 | 18.8 | 18.4 | 17.5 | 15.9 | 15.4 | 16.3 | 20.3 | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 13.9 | 13.1 | 12.3 | 11.1 | 10.6 | 10.6 | 11.2 | 12.5 | 14.9 | 17.1 | 19.3 | 20.5 | 21.7 | 22.3 | 22.6 | 23.1 | 23.2 | 23.6 | 23.3 | 21.8 | 19.9 | 17.8 | 15.0 | 13.9 | 17.3 | 23.6 | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 12.9 | 12.0 | 11.6 | 10.8 | 10.0 | 9.6 | 9.9 | 11.3 | 13.4 | 15.5 | 17.8 | 19.1 | 20.6 | 21.9 | 22.2 | 22.6 | 22.7 | 22.7 | 22.7 | 20.8 | 18.9 | 17.4 | 16.9 | 16.8 | 16.7 | 22.7 | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 17.2 | 16.3 | 16.7 | 16.3 | 15.1 | 14.2 | 15.2 | 16.5 | 18.3 | 20.5 | 21.7 | 22.9 | 22.3 | 21.8 | 22.1 | 22.7 | 23.2 | 23.0 | 23.1 | 22.2 | 21.4 | 20.6 | 20.3 | 19.7 | 19.7 | 23.2 | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 19.0 | 18.8 | 18.7 | 18.7 | 17.5 | 16.5 | 16.3 | 16.4 | 17.8 | 19.1 | 20.2 | 20.6 | 21.1 | 21.5 | 21.3 | 20.3 | 21.0 | 20.1 | 20.9 | 21.4 | 20.8 | 20.6 | 17.4 | 16.6 | 19.3 | 21.5 | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 16.1 | 15.4 | 14.3 | 13.2 | 13.0 | 12.7 | 12.5 | 12.7 | 13.4 | 13.2 | 13.2 | 13.8 | 13.7 | 12.8 | 12.4 | 13.3 | 14.3 | 15.2 | 15.6 | 15.7 | 14.7 | 15.5 | 16.3 | 15.7 | 14.1 | 16.3 | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 15.4 | 14.8 | 14.1 | 13.6 | 13.2 | 12.5 | 12.5 | 13.2 | 14.3 | 16.2 | 18.4 | 19.8 | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- | 19.8 | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- | -- | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- | -- | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- | -- | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- | -- | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- | -- | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | 16.6 | 15.9 | 15.3 | 14.6 | 14.0 | 13.6 | 13.9 | 15.0 | 16.7 | 18.3 | 20.0 | 21.1 | 22.0 | 22.5 | 22.6 | 22.7 | 22.7 | 22.6 | 22.4 | 21.7 | 20.6 | 19.5 | 18.3 | 17.5 |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | 22.2 | 21.4 | 20.6 | 19.9 | 19.6 | 19.1 | 19.6 | 21.3 | 23.1 | 25.2 | 26.9 | 28.2 | 28.9 | 29.5 | 29.8 | 30.1 | 29.9 | 29.8 | 29.4 | 28.5 | 27.1 | 25.7 | 24.3 | 22.9 |
| AF - Analyzer Failure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 45 m (AT45m) - C
Lower Camp Met Tower - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 45 m (AT45m) - C
Lower Camp Met Tower - August 2017**

| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 8 | 1.31 | 1.31 |
| 10 - 20 | 367 | 59.97 | 61.27 |
| > 20 | 237 | 38.73 | 100.00 |

Total Number of Valid Hours: 612

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature 100 m (AT100m) - C

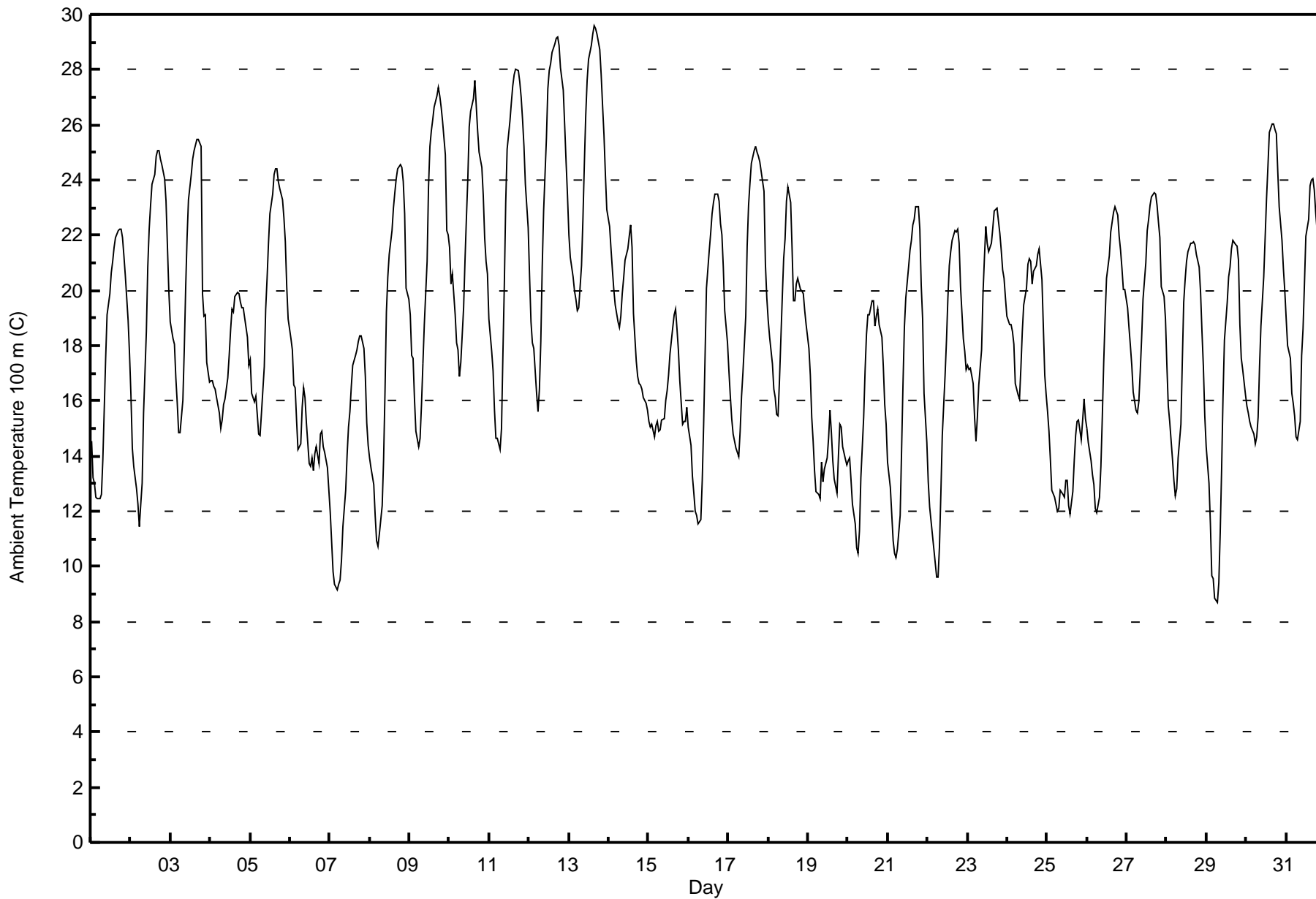
Lower Camp Met Tower - August 2017

| Maximum Value: 29.6 C on Aug 13 16:00 Maximum Daily Average: 24.8 C on Aug 13 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: | 744 | | | |
|--|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------------------|-------|------|---------------|---------------|
| Minimum Value: 8.7 C on Aug 29 07:00 Minimum Daily Average: 13.6 C on Aug 25 | | | | | | | | | | | | | | | | | | | | | | Hours of Data: | 744 | | | |
| Maximum Diurnal Average: 22.3 C at hour 17 Minimum Diurnal Average: 13.7 C at hour 7 | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: | 0 | | | |
| Monthly Average: 18.62 C Percentiles: P ₁ = 9.6 P ₁₀ = 12.8 Q ₁ = 15.2 Median = 18.6 Q ₃ = 21.8 P ₉₀ = 24.6 P ₉₉ = 28.8 | | | | | | | | | | | | | | | | | | | | | | Hours of Calibration: | 0 | | | |
| | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: | 100.0 | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 14.5 | 13.2 | 13.0 | 12.5 | 12.4 | 12.5 | 12.6 | 13.9 | 15.7 | 17.5 | 19.1 | 19.9 | 20.6 | 21.0 | 21.6 | 21.9 | 22.1 | 22.2 | 22.2 | 21.9 | 21.2 | 20.5 | 18.9 | 17.7 | 17.9 | 22.2 |
| 2-Aug | 16.2 | 14.3 | 13.6 | 12.8 | 12.2 | 11.4 | 12.3 | 13.0 | 15.6 | 18.5 | 20.9 | 22.2 | 23.1 | 23.8 | 24.2 | 24.8 | 25.1 | 25.0 | 24.8 | 24.6 | 24.1 | 23.2 | 21.6 | 20.0 | 19.5 | 25.1 |
| 3-Aug | 18.9 | 18.3 | 18.1 | 16.8 | 15.9 | 14.8 | 14.8 | 16.0 | 17.8 | 20.1 | 21.9 | 23.3 | 24.2 | 24.8 | 25.0 | 25.3 | 25.5 | 25.5 | 25.2 | 19.9 | 19.1 | 19.1 | 17.4 | 16.7 | 20.2 | 25.5 |
| 4-Aug | 16.7 | 16.7 | 16.5 | 16.4 | 16.1 | 15.6 | 15.0 | 15.3 | 15.8 | 16.1 | 16.9 | 17.6 | 18.6 | 19.3 | 19.2 | 19.8 | 19.9 | 19.9 | 19.6 | 19.4 | 19.4 | 18.6 | 18.3 | 17.3 | 17.7 | 19.9 |
| 5-Aug | 17.5 | 16.3 | 16.0 | 16.2 | 15.5 | 14.8 | 14.7 | 15.6 | 17.2 | 19.3 | 20.4 | 21.7 | 22.8 | 23.5 | 24.2 | 24.4 | 24.4 | 23.9 | 23.7 | 23.3 | 22.6 | 21.8 | 20.1 | 19.0 | 20.0 | 24.4 |
| 6-Aug | 18.3 | 17.8 | 16.6 | 16.5 | 15.3 | 14.2 | 14.4 | 15.8 | 16.5 | 16.1 | 15.2 | 13.7 | 13.6 | 13.9 | 13.5 | 14.1 | 14.4 | 13.8 | 14.8 | 14.9 | 14.4 | 14.1 | 13.6 | 12.7 | 14.9 | 18.3 |
| 7-Aug | 11.9 | 10.9 | 9.8 | 9.4 | 9.2 | 9.4 | 9.5 | 10.2 | 11.4 | 12.8 | 14.0 | 15.0 | 15.6 | 16.5 | 17.3 | 17.6 | 17.9 | 18.2 | 18.3 | 18.4 | 17.9 | 16.9 | 15.2 | 14.4 | 14.1 | 18.4 |
| 8-Aug | 13.9 | 13.6 | 13.0 | 11.8 | 10.9 | 10.7 | 11.2 | 12.2 | 13.9 | 16.3 | 19.2 | 20.5 | 21.3 | 22.2 | 23.0 | 23.5 | 24.0 | 24.4 | 24.6 | 24.5 | 23.9 | 22.8 | 20.1 | 19.7 | 18.4 | 24.6 |
| 9-Aug | 19.1 | 17.7 | 17.5 | 16.1 | 14.9 | 14.3 | 14.6 | 15.9 | 17.4 | 18.8 | 21.0 | 23.7 | 25.2 | 25.8 | 26.2 | 26.7 | 27.1 | 27.4 | 27.1 | 26.6 | 26.1 | 24.9 | 22.2 | 22.0 | 21.6 | 27.4 |
| 10-Aug | 21.6 | 20.2 | 20.6 | 19.1 | 18.1 | 17.9 | 16.9 | 17.4 | 19.4 | 21.1 | 22.6 | 24.1 | 25.9 | 26.5 | 27.0 | 27.6 | 26.7 | 25.8 | 25.0 | 24.4 | 23.4 | 21.9 | 21.1 | 20.6 | 22.3 | 27.6 |
| 11-Aug | 19.0 | 17.8 | 17.1 | 15.7 | 14.6 | 14.6 | 14.2 | 15.0 | 17.7 | 20.2 | 23.2 | 25.1 | 26.1 | 26.8 | 27.4 | 27.8 | 28.0 | 28.0 | 27.6 | 27.0 | 26.2 | 25.2 | 23.9 | 22.3 | 22.1 | 28.0 |
| 12-Aug | 20.5 | 18.9 | 18.1 | 17.9 | 16.3 | 15.6 | 16.4 | 18.2 | 20.9 | 22.9 | 25.5 | 27.3 | 28.0 | 28.2 | 28.6 | 29.0 | 29.1 | 29.2 | 28.9 | 28.1 | 27.2 | 26.0 | 24.7 | 23.4 | 23.7 | 29.2 |
| 13-Aug | 22.0 | 21.2 | 20.5 | 20.0 | 19.7 | 19.3 | 19.4 | 20.9 | 22.6 | 24.6 | 26.3 | 27.6 | 28.4 | 28.9 | 29.3 | 29.6 | 29.5 | 29.3 | 28.7 | 27.8 | 26.7 | 25.6 | 24.2 | 22.9 | 24.8 | 29.6 |
| 14-Aug | 22.3 | 21.5 | 20.8 | 20.0 | 19.5 | 18.9 | 18.7 | 19.1 | 19.9 | 20.4 | 21.1 | 21.5 | 22.0 | 22.4 | 21.6 | 19.2 | 17.4 | 16.9 | 16.6 | 16.6 | 16.4 | 16.1 | 15.9 | 15.7 | 19.2 | 22.4 |
| 15-Aug | 15.3 | 15.1 | 15.1 | 14.7 | 15.1 | 15.2 | 14.9 | 14.9 | 15.3 | 15.3 | 16.0 | 16.4 | 16.9 | 17.7 | 18.7 | 19.1 | 19.3 | 18.6 | 17.8 | 16.7 | 15.1 | 15.3 | 15.3 | 15.8 | 16.2 | 19.3 |
| 16-Aug | 15.0 | 14.4 | 13.3 | 12.7 | 12.0 | 11.8 | 11.5 | 11.7 | 13.1 | 15.2 | 17.6 | 20.1 | 21.5 | 22.1 | 22.8 | 23.2 | 23.5 | 23.5 | 23.3 | 22.4 | 22.0 | 20.9 | 19.3 | 18.1 | 17.9 | 23.5 |
| 17-Aug | 17.1 | 16.1 | 15.3 | 14.8 | 14.3 | 14.1 | 14.0 | 14.9 | 16.2 | 17.0 | 19.1 | 21.6 | 23.1 | 23.9 | 24.6 | 25.1 | 25.2 | 25.0 | 24.9 | 24.7 | 24.3 | 23.6 | 20.9 | 19.7 | 20.0 | 25.2 |
| 18-Aug | 18.9 | 18.3 | 17.4 | 16.4 | 16.1 | 15.5 | 15.5 | 16.7 | 19.7 | 21.1 | 21.9 | 23.3 | 23.8 | 23.2 | 21.5 | 19.6 | 19.6 | 20.3 | 20.5 | 20.1 | 20.0 | 19.9 | 19.2 | 18.7 | 19.5 | 23.8 |
| 19-Aug | 17.9 | 16.9 | 15.4 | 14.6 | 13.5 | 12.7 | 12.6 | 12.5 | 13.8 | 13.1 | 13.5 | 13.9 | 14.7 | 15.7 | 14.9 | 13.8 | 13.2 | 12.7 | 14.0 | 15.1 | 15.0 | 14.3 | 13.9 | 13.7 | 14.2 | 17.9 |
| 20-Aug | 13.8 | 13.9 | 13.1 | 12.2 | 11.6 | 10.7 | 10.5 | 11.3 | 13.2 | 15.4 | 17.1 | 18.4 | 19.1 | 19.1 | 19.6 | 19.6 | 18.7 | 19.1 | 19.3 | 18.8 | 18.3 | 17.3 | 15.9 | 15.2 | 15.9 | 19.6 |
| 21-Aug | 13.8 | 12.8 | 11.9 | 10.9 | 10.5 | 10.3 | 10.6 | 11.9 | 14.2 | 16.6 | 18.7 | 19.7 | 20.9 | 21.5 | 21.8 | 22.4 | 22.6 | 23.0 | 23.0 | 22.2 | 20.2 | 19.0 | 16.3 | 14.5 | 17.1 | 23.0 |
| 22-Aug | 13.1 | 12.2 | 11.6 | 11.1 | 10.6 | 9.6 | 9.6 | 10.8 | 12.7 | 14.7 | 16.9 | 18.2 | 19.7 | 20.9 | 21.4 | 21.8 | 22.2 | 22.1 | 22.2 | 21.7 | 20.1 | 18.2 | 17.8 | 17.1 | 16.5 | 22.2 |
| 23-Aug | 17.3 | 17.1 | 17.2 | 16.6 | 15.4 | 14.5 | 15.4 | 16.6 | 17.8 | 19.9 | 21.2 | 22.3 | 21.7 | 21.4 | 21.7 | 22.3 | 22.9 | 22.9 | 23.0 | 22.1 | 21.5 | 20.7 | 20.4 | 19.7 | 19.7 | 23.0 |
| 24-Aug | 19.1 | 18.8 | 18.8 | 18.5 | 18.1 | 16.6 | 16.2 | 16.1 | 17.2 | 18.5 | 19.5 | 20.1 | 21.0 | 21.1 | 21.0 | 20.2 | 20.7 | 20.9 | 21.3 | 21.5 | 20.9 | 20.4 | 16.9 | 16.2 | 19.2 | 21.5 |
| 25-Aug | 15.6 | 14.9 | 13.9 | 12.8 | 12.5 | 12.2 | 12.0 | 12.1 | 12.7 | 12.6 | 12.5 | 13.1 | 13.1 | 12.2 | 11.9 | 12.7 | 13.8 | 14.8 | 15.2 | 15.3 | 14.6 | 15.3 | 16.1 | 15.4 | 13.6 | 16.1 |
| 26-Aug | 15.0 | 14.5 | 13.8 | 13.3 | 13.0 | 12.1 | 12.0 | 12.5 | 13.6 | 15.4 | 17.4 | 19.0 | 20.4 | 21.3 | 22.1 | 22.5 | 22.8 | 23.0 | 22.8 | 22.0 | 21.5 | 20.8 | 20.1 | 20.0 | 17.9 | 23.0 |
| 27-Aug | 19.4 | 18.7 | 18.0 | 17.3 | 16.3 | 15.7 | 15.6 | 16.0 | 17.0 | 18.3 | 19.7 | 21.0 | 22.2 | 22.6 | 23.1 | 23.4 | 23.5 | 23.5 | 23.1 | 22.5 | 21.9 | 20.1 | 19.8 | 19.0 | 19.9 | 23.5 |
| 28-Aug | 17.3 | 15.8 | 15.2 | 13.9 | 13.1 | 12.6 | 12.8 | 13.9 | 15.2 | 17.5 | 19.6 | 20.4 | 21.0 | 21.4 | 21.7 | 21.7 | 21.8 | 21.6 | 21.3 | 20.8 | 19.9 | 18.5 | 17.3 | 15.4 | 17.9 | 21.8 |
| 29-Aug | 14.3 | 13.0 | 11.6 | 9.7 | 9.6 | 8.9 | 8.7 | 9.4 | 11.2 | 13.5 | 16.2 | 18.2 | 19.6 | 20.5 | 20.8 | 21.5 | 21.8 | 21.7 | 21.6 | 21.1 | 18.7 | 17.5 | 17.2 | 16.2 | 15.9 | 21.8 |
| 30-Aug | 15.8 | 15.5 | 15.3 | 15.1 | 14.8 | 14.5 | 14.7 | 15.4 | 17.2 | 18.7 | 20.5 | 21.9 | 23.3 | 24.5 | 25.7 | 26.0 | 26.0 | 25.8 | 25.7 | 24.3 | 23.0 | 21.8 | 20.8 | 20.0 | 20.3 | 26.0 |
| 31-Aug | 19.0 | 18.0 | 17.5 | 16.3 | 15.9 | 15.5 | 14.7 | 14.6 | 15.2 | 17.6 | 18.6 | 20.2 | 22.0 | 22.6 | 23.8 | 24.0 | 24.1 | 23.7 | 22.8 | 21.5 | 19.8 | 18.6 | 17.8 | 16.9 | 19.2 | 24.1 |
| | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | 17.1 | | | |
| | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | 22.3 | | | |



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 100 m (AT100m) - C
Lower Camp Met Tower - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 100 m (AT100m) - C
Lower Camp Met Tower - August 2017**

| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 12 | 1.61 | 1.61 |
| 10 - 20 | 446 | 59.95 | 61.56 |
| > 20 | 286 | 38.44 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744

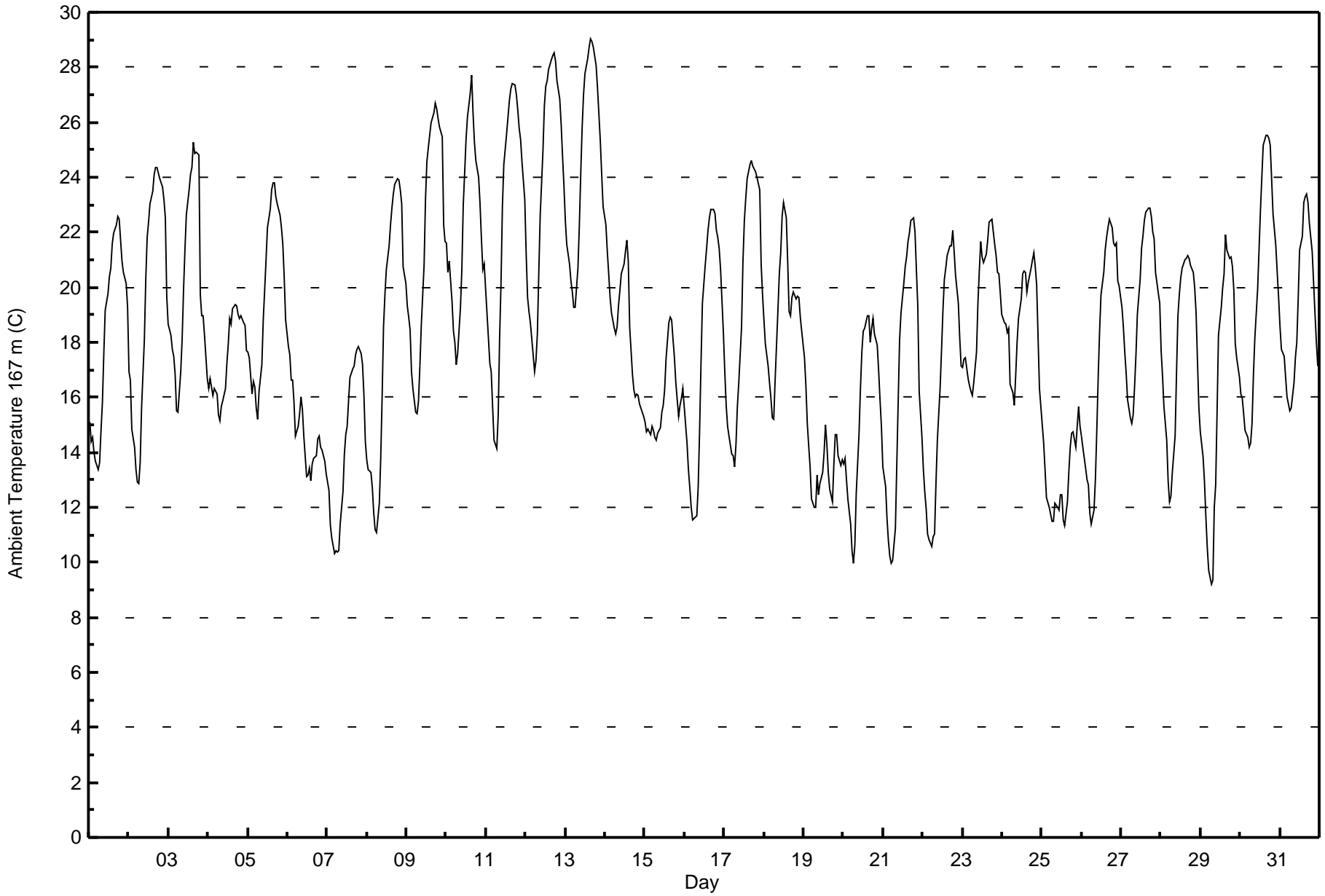


| Maximum Value: 29.0 C on Aug 13 16:00 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------------------------|------|------|---------------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|
| Maximum Daily Average: 24.5 C on Aug 13 | | | | | | | | | | | | | | | | | | | | | | Hours of Data: 744 | | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum Value: 9.2 C on Aug 29 07:00 | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 21.8 C at hour 18 | | | | | | | | | | | | | | | | | | | | | | Hours of Calibration: 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 18.44 C | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum Daily Average: 13.1 C on Aug 25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum Diurnal Average: 13.9 C at hour 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Percentiles: P ₁ = 10.3 P ₁₀ = 12.9 Q ₁ = 15.1 Median = 18.4 Q ₃ = 21.5 P ₉₀ = 24.1 P ₉₉ = 28.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 15.1 | 14.4 | 14.6 | 14.0 | 13.7 | 13.4 | 13.6 | 14.8 | 15.8 | 17.6 | 19.2 | 19.8 | 20.4 | 20.7 | 21.5 | 22.0 | 22.3 | 22.6 | 22.5 | 21.7 | 20.9 | 20.5 | 20.1 | 19.3 | 18.3 | 22.6 | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 16.9 | 16.7 | 14.9 | 14.2 | 13.4 | 12.9 | 12.8 | 13.6 | 15.6 | 18.1 | 20.3 | 21.8 | 22.4 | 23.1 | 23.5 | 24.1 | 24.4 | 24.4 | 24.1 | 24.0 | 23.6 | 23.2 | 22.5 | 19.7 | 19.6 | 24.4 | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 18.7 | 18.2 | 17.8 | 17.5 | 16.8 | 15.5 | 15.5 | 16.9 | 18.1 | 19.9 | 21.4 | 22.6 | 23.6 | 24.1 | 24.4 | 25.3 | 24.9 | 24.9 | 24.8 | 19.7 | 19.0 | 19.0 | 18.2 | 16.7 | 20.1 | 25.3 | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 16.3 | 16.7 | 16.4 | 16.1 | 16.3 | 16.1 | 15.4 | 15.1 | 15.7 | 15.9 | 16.3 | 17.2 | 18.0 | 18.9 | 18.6 | 19.2 | 19.4 | 19.3 | 19.0 | 18.9 | 19.0 | 18.7 | 18.6 | 17.7 | 17.5 | 19.4 | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 17.6 | 17.5 | 16.1 | 16.6 | 16.4 | 15.6 | 15.2 | 16.2 | 17.2 | 18.8 | 19.9 | 21.0 | 22.1 | 22.8 | 23.5 | 23.8 | 23.8 | 23.3 | 23.0 | 22.6 | 22.2 | 21.6 | 20.4 | 18.8 | 19.8 | 23.8 | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 17.8 | 17.6 | 16.6 | 16.6 | 15.8 | 14.6 | 14.9 | 15.4 | 16.0 | 15.6 | 14.6 | 13.1 | 13.2 | 13.4 | 12.9 | 13.6 | 13.8 | 13.9 | 14.5 | 14.6 | 14.2 | 14.1 | 13.7 | 13.2 | 14.7 | 17.8 | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 12.9 | 12.6 | 11.3 | 10.9 | 10.3 | 10.4 | 10.4 | 10.4 | 11.4 | 12.6 | 13.9 | 14.7 | 14.9 | 15.9 | 16.7 | 17.0 | 17.1 | 17.5 | 17.8 | 17.8 | 17.6 | 17.2 | 16.1 | 14.4 | 14.2 | 17.8 | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 13.7 | 13.4 | 13.3 | 12.7 | 11.8 | 11.2 | 11.1 | 12.2 | 13.8 | 16.0 | 18.5 | 19.8 | 20.6 | 21.5 | 22.3 | 22.9 | 23.4 | 23.8 | 23.9 | 23.9 | 23.5 | 23.0 | 20.7 | 20.1 | 18.2 | 23.9 | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 19.3 | 18.9 | 18.5 | 16.9 | 16.3 | 15.5 | 15.4 | 15.8 | 17.1 | 18.6 | 20.8 | 23.2 | 24.6 | 25.1 | 25.5 | 26.0 | 26.3 | 26.7 | 26.5 | 26.1 | 25.8 | 25.5 | 22.3 | 21.7 | 21.6 | 26.7 | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 21.6 | 20.6 | 21.0 | 19.5 | 18.4 | 18.0 | 17.2 | 17.6 | 19.3 | 20.7 | 23.0 | 24.1 | 25.4 | 26.2 | 27.1 | 27.7 | 26.3 | 25.3 | 24.6 | 24.0 | 23.0 | 21.7 | 20.7 | 20.8 | 22.2 | 27.7 | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 19.9 | 18.2 | 17.3 | 16.9 | 15.6 | 14.5 | 14.1 | 15.4 | 18.1 | 20.1 | 22.9 | 24.5 | 25.6 | 26.2 | 26.8 | 27.2 | 27.4 | 27.4 | 27.0 | 26.4 | 25.8 | 25.4 | 24.6 | 23.2 | 22.1 | 27.4 | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 21.2 | 19.6 | 19.1 | 18.7 | 17.5 | 17.0 | 17.3 | 18.3 | 20.5 | 22.6 | 25.0 | 26.6 | 27.3 | 27.5 | 27.9 | 28.3 | 28.4 | 28.5 | 28.2 | 27.5 | 26.9 | 25.9 | 24.7 | 23.7 | 23.7 | 28.5 | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 22.4 | 21.6 | 20.8 | 20.2 | 19.8 | 19.3 | 19.3 | 20.7 | 22.2 | 24.1 | 25.8 | 27.0 | 27.8 | 28.3 | 28.7 | 29.0 | 28.9 | 28.7 | 28.1 | 27.3 | 26.3 | 25.3 | 24.1 | 22.9 | 24.5 | 29.0 | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 22.2 | 21.3 | 20.5 | 19.6 | 19.1 | 18.5 | 18.3 | 18.5 | 19.3 | 19.9 | 20.5 | 20.8 | 21.3 | 21.7 | 20.9 | 18.6 | 16.8 | 16.3 | 16.0 | 16.1 | 16.1 | 15.8 | 15.5 | 15.3 | 18.7 | 22.2 | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 15.1 | 14.8 | 14.8 | 14.6 | 14.9 | 14.8 | 14.5 | 14.4 | 14.7 | 14.9 | 15.4 | 15.7 | 16.2 | 17.4 | 18.7 | 18.9 | 18.8 | 18.1 | 17.4 | 16.5 | 15.3 | 15.7 | 15.9 | 16.3 | 16.0 | 18.9 | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 15.7 | 14.3 | 13.4 | 12.7 | 12.0 | 11.6 | 11.6 | 11.7 | 12.8 | 14.8 | 17.2 | 19.4 | 20.8 | 21.4 | 22.1 | 22.5 | 22.8 | 22.8 | 22.7 | 22.1 | 21.8 | 21.4 | 20.6 | 18.4 | 17.8 | 22.8 | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 17.0 | 15.7 | 15.0 | 14.6 | 13.9 | 13.9 | 13.5 | 14.3 | 15.6 | 16.5 | 18.5 | 21.0 | 22.4 | 23.2 | 23.9 | 24.5 | 24.6 | 24.4 | 24.3 | 24.2 | 24.0 | 23.6 | 20.8 | 19.8 | 19.6 | 24.6 | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 18.8 | 18.0 | 17.1 | 16.5 | 16.0 | 15.2 | 15.2 | 16.6 | 19.2 | 20.5 | 21.2 | 22.6 | 23.1 | 22.5 | 20.9 | 19.1 | 19.0 | 19.6 | 19.8 | 19.6 | 19.7 | 19.6 | 18.9 | 18.4 | 19.0 | 23.1 | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 17.5 | 16.4 | 15.1 | 14.2 | 13.5 | 12.3 | 12.0 | 12.0 | 13.1 | 12.5 | 12.9 | 13.3 | 14.0 | 15.0 | 14.3 | 13.3 | 12.6 | 12.2 | 13.6 | 14.7 | 14.6 | 13.9 | 13.5 | 13.7 | 13.8 | 17.5 | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 13.6 | 13.8 | 13.0 | 12.3 | 11.4 | 10.4 | 10.0 | 10.6 | 12.5 | 14.7 | 16.3 | 17.7 | 18.4 | 18.5 | 19.0 | 18.9 | 18.0 | 18.5 | 18.8 | 18.3 | 17.9 | 17.0 | 15.9 | 14.9 | 15.4 | 19.0 | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 13.5 | 12.7 | 11.6 | 10.8 | 10.2 | 10.0 | 10.1 | 11.2 | 13.6 | 15.9 | 18.1 | 19.1 | 20.1 | 20.8 | 21.1 | 21.7 | 22.0 | 22.4 | 22.5 | 22.0 | 20.6 | 19.3 | 16.2 | 14.5 | 16.7 | 22.5 | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 13.4 | 12.5 | 11.9 | 11.0 | 10.8 | 10.6 | 10.9 | 11.1 | 12.9 | 14.5 | 16.4 | 17.7 | 19.2 | 20.3 | 20.7 | 21.2 | 21.5 | 21.5 | 22.1 | 21.3 | 20.4 | 19.4 | 18.1 | 17.2 | 16.5 | 22.1 | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 17.1 | 17.4 | 17.5 | 16.7 | 16.4 | 16.2 | 16.1 | 16.5 | 17.6 | 19.4 | 20.6 | 21.7 | 21.1 | 20.9 | 21.2 | 21.7 | 22.4 | 22.4 | 22.5 | 21.6 | 21.1 | 20.5 | 20.5 | 19.8 | 19.5 | 22.5 | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 19.0 | 18.7 | 18.6 | 18.4 | 18.5 | 16.5 | 16.2 | 15.7 | 16.8 | 18.0 | 18.9 | 19.6 | 20.5 | 20.6 | 20.5 | 19.8 | 20.2 | 20.7 | 21.0 | 21.3 | 20.7 | 20.1 | 16.3 | 15.7 | 18.8 | 21.3 | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 15.0 | 14.3 | 13.4 | 12.3 | 12.0 | 11.7 | 11.5 | 11.5 | 12.1 | 12.0 | 11.9 | 12.5 | 12.5 | 11.6 | 11.3 | 12.2 | 13.3 | 14.2 | 14.7 | 14.8 | 14.2 | 15.0 | 15.6 | 14.9 | 13.1 | 15.6 | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 14.6 | 14.2 | 13.4 | 13.0 | 12.8 | 11.8 | 11.4 | 11.9 | 13.0 | 14.8 | 16.7 | 18.4 | 19.7 | 20.6 | 21.4 | 21.8 | 22.2 | 22.5 | 22.2 | 21.6 | 21.5 | 21.6 | 20.2 | 20.0 | 17.6 | 22.5 | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 19.3 | 18.5 | 17.7 | 16.9 | 15.9 | 15.3 | 15.0 | 15.3 | 16.4 | 17.6 | 19.0 | 20.3 | 21.4 | 21.9 | 22.4 | 22.7 | 22.9 | 22.9 | 22.6 | 22.0 | 21.8 | 20.5 | 19.8 | 19.4 | 19.5 | 22.9 | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 17.7 | 16.8 | 15.7 | 14.4 | 12.9 | 12.2 | 12.4 | 13.3 | 14.6 | 16.9 | 18.9 | 19.7 | 20.4 | 20.7 | 21.0 | 21.1 | 21.2 | 21.1 | 20.8 | 20.5 | 20.0 | 19.1 | 17.3 | 15.6 | 17.7 | 21.2 | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 14.7 | 13.8 | 12.9 | 11.6 | 10.5 | 9.7 | 9.2 | 9.4 | 12.0 | 12.8 | 15.5 | 18.2 | 19.3 | 20.0 | 20.5 | 21.9 | 21.4 | 21.0 | 21.1 | 20.8 | 19.9 | 18.0 | 17.5 | 16.7 | 16.2 | 21.9 | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 16.1 | 16.0 | 15.4 | 14.8 | 14.6 | 14.2 | 14.4 | 15.0 | 16.8 | 18.1 | 19.9 | 21.4 | 22.8 | 24.0 | 25.1 | 25.5 | 25.5 | 25.4 | 25.2 | 24.0 | 22.7 | 21.5 | 20.6 | 19.6 | 19.9 | 25.5 | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 18.6 | 17.8 | 17.5 | 16.8 | 16.0 | 15.7 | 15.5 | 15.6 | 16.5 | 17.5 | 18.0 | 19.6 | 21.3 | 21.9 | 23.1 | 23.3 | 23.4 | 23.1 | 22.3 | 21.3 | 20.2 | 19.1 | 18.0 | 17.1 | 19.1 | 23.4 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | 17.2 | 16.5 | 15.9 | 15.2 | 14.6 | 14.0 | 13.9 | 14.4 | 15.8 | 17.1 | 18.6 | 19.8 | 20.7 | 21.2 | 21.5 | 21.8 | 21.8 | 21.8 | 21.7 | 21.2 | 20.7 | 20.1 | 19.0 | 18.1 | Diurnal Average |
| | | | | | | | | | | | | | | | | | | | | | | 22.4 | 21.6 | 21.0 | 20.2 | 19.8 | 19.3 | 19.3 | 20.7 | 22.2 | 24.1 | 25.8 | 27.0 | 27.8 | 28.3 | 28.7 | 29.0 | 28.9 | 28.7 | 28.2 | 27.5 | 26.9 | 25.9 | 24.7 | 23.7 | Diurnal Maximum |



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 167 m (AT167m) - C
Lower Camp Met Tower - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 167 m (AT167m) - C
Lower Camp Met Tower - August 2017**

| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 5 | 0.67 | 0.67 |
| 10 - 20 | 464 | 62.37 | 63.04 |
| > 20 | 275 | 36.96 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



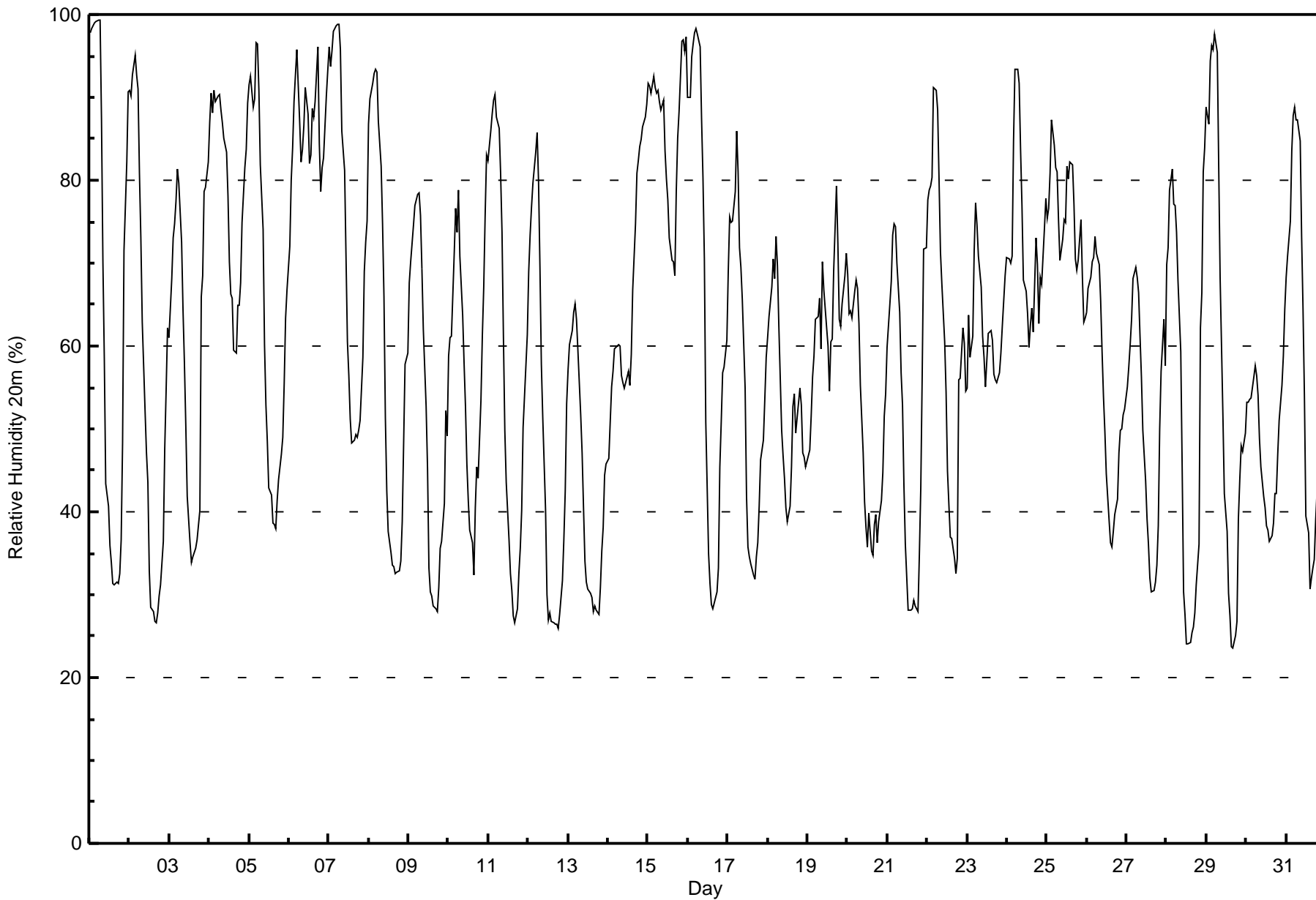
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity 20m (RH20m) - %

Lower Camp Met Tower - August 2017

| Maximum Value: 99 % on Aug 1 07:00 Maximum Daily Average: 86.3 % on Aug 6 | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|----|----|----|----|----|-----------------|---------------|---------------|
| Minimum Value: 24 % on Aug 29 17:00 Minimum Daily Average: 43.0 % on Aug 13 Maximum Diurnal Average: 82.4 % at hour 6 Minimum Diurnal Average: 42.1 % at hour 16 Monthly Average: 60.8 % Percentiles: P ₁ = 26 P ₁₀ = 32 Q ₁ = 43 Median = 61 Q ₃ = 77 P ₉₀ = 90 P ₉₉ = 98 | | | | | | | | | | | | | | | | | | Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 98 | 98 | 99 | 99 | 99 | 99 | 99 | 87 | 70 | 58 | 43 | 41 | 36 | 34 | 31 | 31 | 31 | 31 | 33 | 37 | 48 | 72 | 82 | 91 | 64.5 | 99 |
| 2-Aug | 91 | 90 | 93 | 95 | 93 | 91 | 81 | 73 | 63 | 52 | 47 | 44 | 33 | 28 | 28 | 27 | 27 | 28 | 30 | 31 | 36 | 48 | 55 | 62 | 56.0 | 95 |
| 3-Aug | 61 | 68 | 73 | 75 | 78 | 81 | 80 | 73 | 64 | 58 | 50 | 42 | 36 | 34 | 35 | 35 | 36 | 37 | 40 | 66 | 69 | 79 | 79 | 82 | 59.6 | 82 |
| 4-Aug | 87 | 90 | 88 | 91 | 89 | 90 | 90 | 88 | 87 | 85 | 83 | 78 | 70 | 66 | 66 | 60 | 59 | 65 | 65 | 68 | 75 | 82 | 84 | 89 | 79.0 | 91 |
| 5-Aug | 91 | 93 | 89 | 90 | 97 | 97 | 91 | 82 | 74 | 60 | 53 | 49 | 43 | 42 | 39 | 39 | 38 | 41 | 44 | 47 | 49 | 55 | 63 | 67 | 63.8 | 97 |
| 6-Aug | 72 | 80 | 84 | 90 | 93 | 96 | 87 | 82 | 84 | 87 | 91 | 88 | 82 | 83 | 89 | 88 | 89 | 96 | 84 | 79 | 82 | 83 | 90 | 93 | 86.3 | 96 |
| 7-Aug | 96 | 94 | 96 | 98 | 99 | 99 | 99 | 96 | 86 | 81 | 71 | 60 | 56 | 51 | 48 | 49 | 49 | 49 | 50 | 51 | 59 | 69 | 73 | 75 | 73.0 | 99 |
| 8-Aug | 87 | 90 | 92 | 93 | 93 | 93 | 87 | 82 | 75 | 66 | 51 | 43 | 38 | 35 | 34 | 33 | 33 | 33 | 33 | 34 | 39 | 48 | 58 | 59 | 59.5 | 93 |
| 9-Aug | 68 | 70 | 72 | 75 | 77 | 78 | 78 | 76 | 69 | 62 | 53 | 45 | 33 | 30 | 30 | 29 | 28 | 28 | 31 | 36 | 36 | 41 | 52 | 49 | 52.0 | 78 |
| 10-Aug | 59 | 61 | 61 | 71 | 77 | 74 | 79 | 71 | 64 | 58 | 53 | 46 | 41 | 38 | 36 | 32 | 40 | 45 | 44 | 53 | 61 | 67 | 76 | 83 | 57.9 | 83 |
| 11-Aug | 82 | 86 | 88 | 90 | 90 | 88 | 86 | 81 | 74 | 61 | 50 | 44 | 37 | 33 | 31 | 27 | 27 | 28 | 33 | 36 | 40 | 50 | 54 | 61 | 57.3 | 90 |
| 12-Aug | 69 | 73 | 77 | 80 | 83 | 86 | 80 | 69 | 58 | 51 | 40 | 30 | 27 | 28 | 27 | 27 | 26 | 27 | 26 | 28 | 32 | 37 | 43 | 53 | 49.0 | 86 |
| 13-Aug | 57 | 60 | 62 | 64 | 65 | 63 | 59 | 52 | 47 | 40 | 34 | 32 | 31 | 30 | 30 | 28 | 29 | 28 | 28 | 31 | 35 | 38 | 44 | 46 | 43.0 | 65 |
| 14-Aug | 47 | 51 | 55 | 57 | 60 | 60 | 60 | 60 | 57 | 56 | 55 | 56 | 57 | 55 | 59 | 67 | 75 | 81 | 82 | 84 | 85 | 86 | 88 | 89 | 65.9 | 89 |
| 15-Aug | 92 | 91 | 90 | 93 | 91 | 91 | 91 | 89 | 89 | 90 | 84 | 80 | 78 | 73 | 70 | 70 | 68 | 79 | 85 | 88 | 97 | 97 | 96 | 97 | 86.2 | 97 |
| 16-Aug | 90 | 90 | 95 | 96 | 98 | 98 | 98 | 96 | 87 | 80 | 71 | 51 | 35 | 31 | 29 | 28 | 29 | 30 | 33 | 45 | 51 | 57 | 58 | 61 | 64.1 | 98 |
| 17-Aug | 69 | 76 | 75 | 75 | 79 | 86 | 81 | 72 | 69 | 66 | 55 | 42 | 36 | 35 | 34 | 32 | 32 | 35 | 36 | 41 | 46 | 49 | 54 | 59 | 55.5 | 86 |
| 18-Aug | 61 | 64 | 67 | 71 | 68 | 73 | 70 | 62 | 50 | 47 | 44 | 40 | 39 | 41 | 45 | 53 | 54 | 49 | 51 | 55 | 53 | 47 | 47 | 45 | 54.0 | 73 |
| 19-Aug | 47 | 47 | 52 | 56 | 59 | 63 | 64 | 66 | 60 | 70 | 67 | 62 | 60 | 55 | 60 | 61 | 69 | 79 | 72 | 63 | 62 | 65 | 68 | 71 | 62.5 | 79 |
| 20-Aug | 69 | 64 | 64 | 63 | 67 | 68 | 67 | 63 | 55 | 47 | 41 | 38 | 36 | 40 | 35 | 35 | 38 | 40 | 36 | 39 | 41 | 45 | 51 | 54 | 49.9 | 69 |
| 21-Aug | 60 | 65 | 68 | 73 | 75 | 74 | 70 | 64 | 57 | 53 | 43 | 36 | 28 | 28 | 28 | 28 | 29 | 29 | 28 | 35 | 43 | 56 | 72 | 72 | 50.6 | 75 |
| 22-Aug | 78 | 79 | 79 | 80 | 91 | 91 | 88 | 80 | 71 | 67 | 60 | 54 | 45 | 41 | 37 | 37 | 34 | 33 | 34 | 56 | 56 | 62 | 60 | 55 | 61.3 | 91 |
| 23-Aug | 55 | 64 | 59 | 61 | 72 | 77 | 75 | 71 | 67 | 61 | 59 | 55 | 58 | 62 | 62 | 61 | 57 | 56 | 56 | 57 | 59 | 62 | 65 | 68 | 62.4 | 77 |
| 24-Aug | 71 | 71 | 70 | 71 | 85 | 93 | 93 | 92 | 84 | 77 | 68 | 67 | 64 | 60 | 62 | 65 | 62 | 73 | 70 | 63 | 68 | 68 | 74 | 78 | 72.8 | 93 |
| 25-Aug | 75 | 77 | 81 | 87 | 84 | 82 | 81 | 75 | 70 | 73 | 75 | 75 | 82 | 80 | 82 | 82 | 77 | 70 | 69 | 70 | 75 | 68 | 63 | 63 | 75.8 | 87 |
| 26-Aug | 64 | 67 | 68 | 70 | 71 | 73 | 71 | 70 | 65 | 59 | 54 | 50 | 45 | 39 | 36 | 36 | 38 | 40 | 42 | 47 | 50 | 50 | 52 | 52 | 54.5 | 73 |
| 27-Aug | 55 | 58 | 60 | 63 | 68 | 70 | 68 | 66 | 61 | 56 | 50 | 44 | 39 | 36 | 32 | 30 | 30 | 32 | 34 | 38 | 50 | 57 | 63 | 58 | 50.8 | 70 |
| 28-Aug | 70 | 72 | 79 | 81 | 77 | 77 | 74 | 68 | 59 | 45 | 30 | 28 | 24 | 24 | 24 | 25 | 26 | 28 | 31 | 36 | 62 | 66 | 81 | 84 | 53.0 | 84 |
| 29-Aug | 89 | 87 | 94 | 96 | 96 | 98 | 95 | 82 | 68 | 60 | 52 | 42 | 38 | 30 | 28 | 24 | 24 | 25 | 27 | 39 | 44 | 48 | 47 | 50 | 57.5 | 98 |
| 30-Aug | 53 | 53 | 54 | 54 | 56 | 58 | 56 | 54 | 49 | 45 | 42 | 40 | 38 | 38 | 36 | 37 | 39 | 42 | 42 | 47 | 51 | 55 | 59 | 64 | 48.5 | 64 |
| 31-Aug | 68 | 71 | 75 | 84 | 88 | 89 | 87 | 87 | 85 | 73 | 64 | 54 | 39 | 38 | 31 | 32 | 33 | 34 | 39 | 46 | 53 | 57 | 58 | 58 | 60.1 | 89 |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity 20m (RH20m) - %
Lower Camp Met Tower - August 2017**

| Concentration Ranges (%) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 0 | 0.00 | 0.00 |
| 20 - 40 | 159 | 21.37 | 21.37 |
| 40 - 60 | 197 | 26.48 | 47.85 |
| 60 - 80 | 225 | 30.24 | 78.09 |
| 80 - 100 | 163 | 21.91 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity 45m (RH45m) - %

Lower Camp Met Tower - August 2017

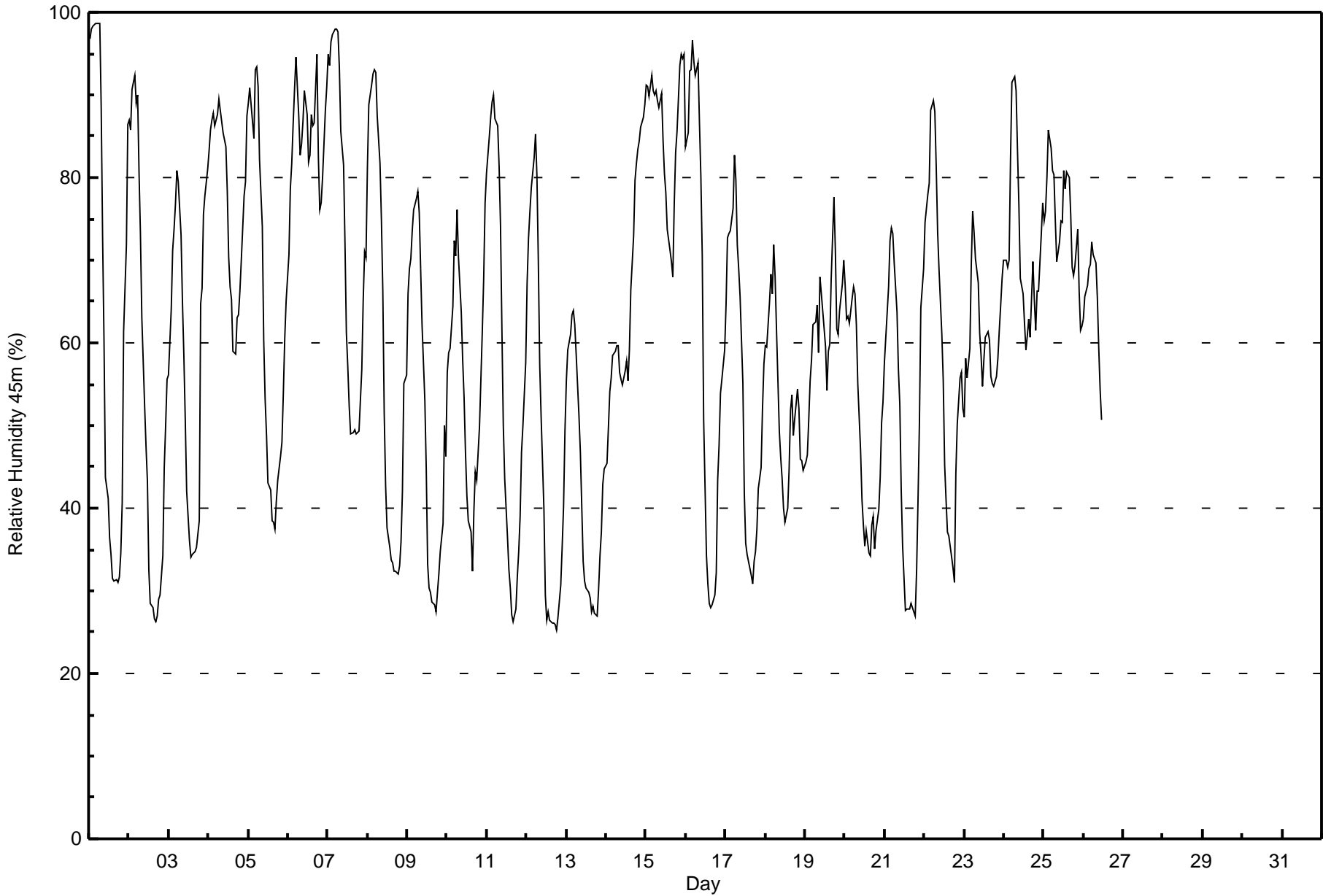
| Maximum Value: 99 % on Aug 1 06:00 | | | | | | | | | | | | | | | | | | | Maximum Daily Average: 85.5 % on Aug 15 | | | | | | Hours in Service: 744 | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|-----------------|--------------------------------|---------------|
| Minimum Value: 25 % on Aug 12 19:00 | | | | | | | | | | | | | | | | | | | Minimum Daily Average: 42.3 % on Aug 13 | | | | | | Hours of Data: 612 | |
| Maximum Diurnal Average: 81.9 % at hour 6 | | | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 44.4 % at hour 16 | | | | | | Hours of Missing Data: 132 | |
| Monthly Average: 61.3 % | | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 26 P ₁₀ = 32 Q ₁ = 44 Median = 62 Q ₃ = 78 P ₉₀ = 89 P ₉₉ = 98 | | | | | | Hours of Calibration: 0 | |
| | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 82.3 | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 97 | 98 | 98 | 98 | 99 | 99 | 99 | 89 | 73 | 60 | 44 | 41 | 36 | 34 | 32 | 31 | 31 | 31 | 32 | 35 | 41 | 61 | 72 | 87 | 63.2 | 99 |
| 2-Aug | 87 | 86 | 91 | 92 | 89 | 90 | 81 | 73 | 63 | 52 | 48 | 43 | 33 | 28 | 28 | 27 | 26 | 27 | 29 | 30 | 34 | 45 | 50 | 56 | 54.5 | 92 |
| 3-Aug | 56 | 64 | 71 | 74 | 77 | 81 | 79 | 73 | 65 | 58 | 51 | 42 | 36 | 34 | 34 | 35 | 35 | 35 | 38 | 65 | 67 | 76 | 78 | 81 | 58.6 | 81 |
| 4-Aug | 83 | 86 | 87 | 88 | 86 | 88 | 90 | 88 | 87 | 85 | 84 | 78 | 70 | 67 | 65 | 59 | 59 | 63 | 63 | 66 | 70 | 78 | 80 | 87 | 77.4 | 90 |
| 5-Aug | 89 | 91 | 87 | 85 | 93 | 93 | 91 | 82 | 74 | 60 | 53 | 49 | 43 | 42 | 39 | 38 | 38 | 41 | 43 | 46 | 48 | 54 | 61 | 65 | 62.7 | 93 |
| 6-Aug | 71 | 79 | 82 | 87 | 91 | 95 | 87 | 83 | 84 | 87 | 90 | 88 | 82 | 83 | 88 | 86 | 87 | 95 | 83 | 76 | 77 | 80 | 88 | 91 | 84.9 | 95 |
| 7-Aug | 95 | 94 | 96 | 97 | 98 | 98 | 98 | 93 | 86 | 82 | 72 | 61 | 57 | 52 | 49 | 49 | 50 | 49 | 49 | 49 | 57 | 65 | 71 | 70 | 72.4 | 98 |
| 8-Aug | 81 | 89 | 91 | 93 | 93 | 93 | 87 | 82 | 75 | 66 | 52 | 43 | 38 | 35 | 34 | 33 | 32 | 32 | 32 | 33 | 36 | 42 | 55 | 56 | 58.4 | 93 |
| 9-Aug | 66 | 69 | 70 | 74 | 76 | 78 | 78 | 76 | 69 | 62 | 53 | 45 | 33 | 30 | 30 | 29 | 28 | 28 | 30 | 32 | 35 | 38 | 50 | 46 | 51.0 | 78 |
| 10-Aug | 57 | 59 | 59 | 64 | 72 | 70 | 76 | 70 | 64 | 58 | 53 | 47 | 41 | 39 | 37 | 32 | 40 | 44 | 43 | 50 | 56 | 61 | 68 | 77 | 55.8 | 77 |
| 11-Aug | 80 | 85 | 87 | 89 | 90 | 87 | 86 | 81 | 74 | 62 | 50 | 44 | 37 | 32 | 30 | 27 | 26 | 28 | 32 | 35 | 39 | 47 | 50 | 58 | 56.5 | 90 |
| 12-Aug | 67 | 73 | 76 | 79 | 82 | 85 | 80 | 70 | 57 | 51 | 40 | 29 | 26 | 27 | 26 | 26 | 26 | 26 | 25 | 27 | 31 | 35 | 40 | 49 | 48.1 | 85 |
| 13-Aug | 55 | 59 | 61 | 63 | 64 | 62 | 59 | 51 | 47 | 40 | 34 | 31 | 30 | 30 | 29 | 27 | 28 | 27 | 27 | 30 | 34 | 37 | 43 | 45 | 42.3 | 64 |
| 14-Aug | 45 | 50 | 54 | 56 | 59 | 60 | 60 | 60 | 56 | 56 | 55 | 57 | 58 | 55 | 59 | 67 | 73 | 80 | 82 | 83 | 84 | 86 | 87 | 89 | 65.4 | 89 |
| 15-Aug | 91 | 91 | 90 | 92 | 91 | 90 | 91 | 89 | 88 | 90 | 85 | 80 | 78 | 74 | 71 | 70 | 68 | 77 | 83 | 86 | 94 | 95 | 94 | 95 | 85.5 | 95 |
| 16-Aug | 84 | 85 | 93 | 93 | 97 | 94 | 92 | 94 | 87 | 80 | 70 | 51 | 34 | 31 | 29 | 28 | 28 | 30 | 32 | 43 | 48 | 54 | 56 | 59 | 62.1 | 97 |
| 17-Aug | 65 | 73 | 73 | 74 | 76 | 83 | 80 | 72 | 69 | 66 | 55 | 42 | 36 | 34 | 34 | 32 | 31 | 34 | 35 | 37 | 42 | 45 | 52 | 57 | 54.0 | 83 |
| 18-Aug | 60 | 60 | 65 | 68 | 66 | 72 | 68 | 62 | 49 | 46 | 44 | 40 | 38 | 40 | 45 | 52 | 54 | 49 | 51 | 54 | 52 | 46 | 46 | 45 | 52.9 | 72 |
| 19-Aug | 46 | 46 | 51 | 55 | 58 | 62 | 63 | 64 | 59 | 68 | 66 | 62 | 60 | 54 | 59 | 60 | 68 | 78 | 71 | 62 | 61 | 64 | 67 | 70 | 61.3 | 78 |
| 20-Aug | 67 | 63 | 63 | 62 | 65 | 67 | 66 | 62 | 55 | 47 | 41 | 38 | 35 | 37 | 35 | 34 | 38 | 39 | 35 | 37 | 40 | 44 | 50 | 53 | 48.9 | 67 |
| 21-Aug | 58 | 64 | 67 | 72 | 74 | 73 | 70 | 64 | 57 | 52 | 42 | 35 | 28 | 28 | 28 | 28 | 28 | 28 | 27 | 33 | 41 | 50 | 64 | 69 | 49.1 | 74 |
| 22-Aug | 75 | 76 | 78 | 79 | 88 | 89 | 88 | 81 | 73 | 69 | 61 | 55 | 45 | 41 | 37 | 37 | 34 | 33 | 31 | 44 | 50 | 56 | 57 | 52 | 59.6 | 89 |
| 23-Aug | 51 | 58 | 56 | 59 | 69 | 76 | 73 | 70 | 67 | 61 | 58 | 55 | 58 | 61 | 61 | 60 | 56 | 55 | 55 | 56 | 58 | 61 | 65 | 68 | 61.2 | 76 |
| 24-Aug | 70 | 70 | 69 | 70 | 82 | 92 | 92 | 90 | 83 | 77 | 68 | 66 | 62 | 59 | 61 | 63 | 61 | 70 | 65 | 62 | 66 | 66 | 73 | 77 | 71.4 | 92 |
| 25-Aug | 75 | 76 | 80 | 86 | 84 | 81 | 80 | 75 | 70 | 72 | 75 | 75 | 81 | 79 | 81 | 80 | 75 | 69 | 68 | 69 | 74 | 66 | 61 | 62 | 74.7 | 86 |
| 26-Aug | 63 | 66 | 67 | 69 | 70 | 72 | 71 | 70 | 65 | 59 | 54 | 51 | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- | 72 |
| 27-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- | -- |
| 28-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- | -- |
| 29-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- | -- |
| 30-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- | -- |
| 31-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- | -- |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| 70.5 73.4 75.5 77.7 80.3 81.9 80.2 75.6 69.1 64.1 57.6 51.8 47.1 45.1 44.8 44.4 44.8 46.6 46.4 49.6 53.3 58.1 63.1 66.6 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 97 98 98 98 99 99 99 94 88 90 90 88 82 83 88 86 87 95 83 86 94 95 94 95 | | | | | | | | | | | | | | | | | | | | | | | | | | |

AF - Analyzer Failure



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity 45m (RH45m) - %
Lower Camp Met Tower - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity 45m (RH45m) - %
Lower Camp Met Tower - August 2017**

| Concentration Ranges (%) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 0 | 0.00 | 0.00 |
| 20 - 40 | 124 | 20.26 | 20.26 |
| 40 - 60 | 159 | 25.98 | 46.24 |
| 60 - 80 | 190 | 31.05 | 77.29 |
| 80 - 100 | 139 | 22.71 | 100.00 |

Total Number of Valid Hours: 612

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity 100m (RH100m) - %

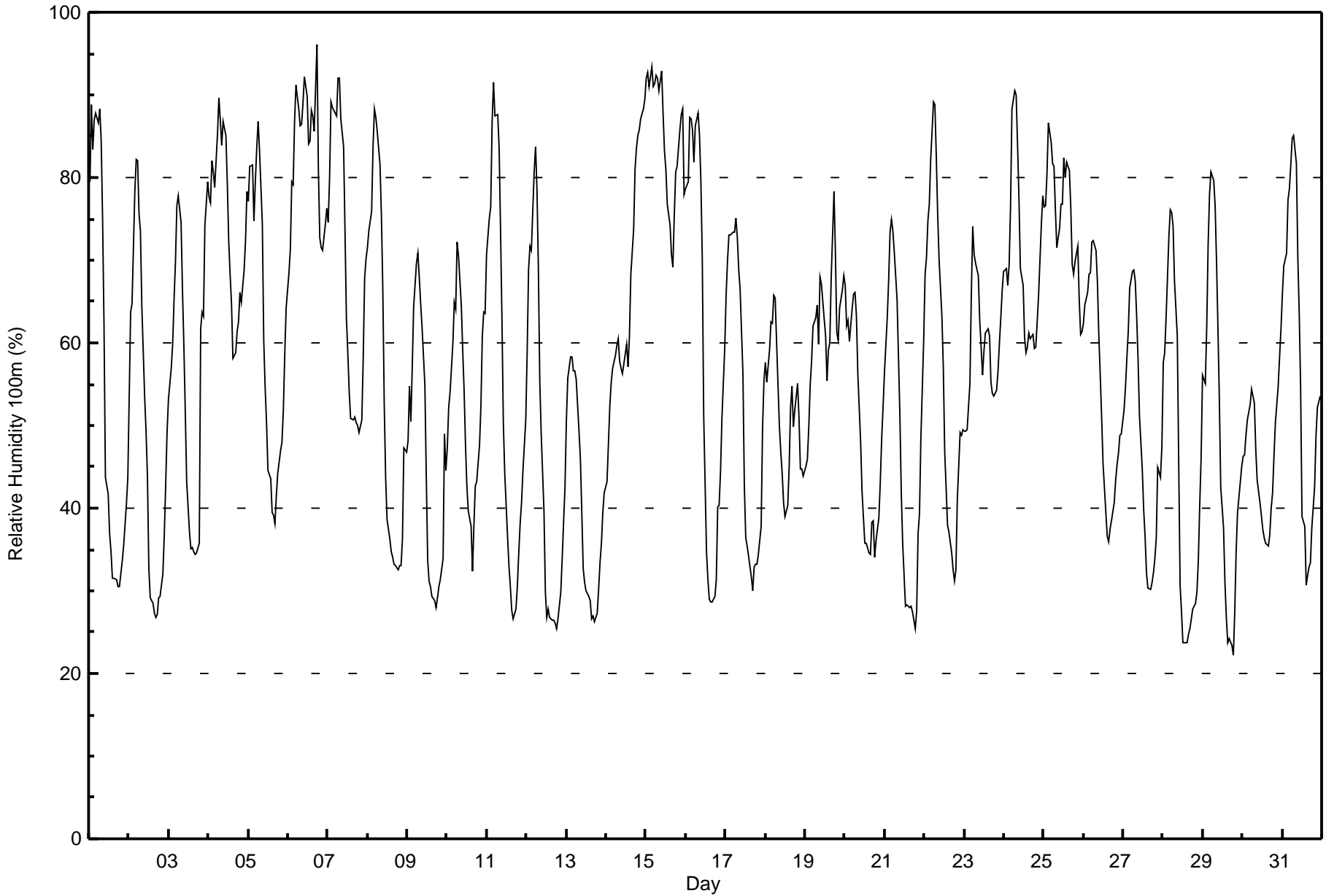
Lower Camp Met Tower - August 2017

| Maximum Value: 96 % on Aug 6 18:00 Maximum Daily Average: 85.0 % on Aug 15 | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|----|------|----|------|----|------|---------------|---------------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|-----------------|--|-----------------|--|
| Minimum Value: 22 % on Aug 29 19:00 Minimum Daily Average: 40.3 % on Aug 13 Maximum Diurnal Average: 77.2 % at hour 7 Minimum Diurnal Average: 42.0 % at hour 16 Monthly Average: 57.2 % Percentiles: P ₁ = 25 P ₁₀ = 31 Q ₁ = 40 Median = 58 Q ₃ = 73 P ₉₀ = 84 P ₉₉ = 92 | | | | | | | | | | | | | | | | | | Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 79 | 89 | 83 | 87 | 88 | 87 | 88 | 84 | 75 | 62 | 44 | 42 | 37 | 35 | 32 | 32 | 31 | 31 | 30 | 32 | 34 | 35 | 41 | 44 | 55.0 | 89 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 54 | 64 | 65 | 78 | 82 | 82 | 76 | 74 | 64 | 54 | 49 | 44 | 33 | 29 | 28 | 27 | 27 | 29 | 29 | 32 | 37 | 43 | 49 | 49.0 | 82 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 53 | 57 | 60 | 65 | 70 | 77 | 78 | 75 | 66 | 60 | 52 | 43 | 37 | 35 | 35 | 35 | 34 | 35 | 36 | 62 | 64 | 63 | 74 | 80 | 56.0 | 80 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 78 | 77 | 82 | 81 | 79 | 85 | 90 | 87 | 84 | 87 | 85 | 79 | 72 | 68 | 65 | 58 | 59 | 61 | 63 | 66 | 65 | 69 | 72 | 78 | 74.6 | 90 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 77 | 81 | 81 | 75 | 79 | 84 | 87 | 83 | 74 | 60 | 55 | 50 | 45 | 44 | 39 | 39 | 38 | 42 | 44 | 47 | 48 | 52 | 59 | 64 | 60.3 | 87 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 68 | 71 | 80 | 79 | 87 | 91 | 88 | 86 | 86 | 89 | 92 | 90 | 84 | 84 | 88 | 88 | 86 | 96 | 81 | 73 | 72 | 71 | 74 | 76 | 82.6 | 96 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 75 | 80 | 89 | 89 | 88 | 87 | 92 | 92 | 87 | 84 | 74 | 63 | 59 | 54 | 51 | 51 | 51 | 50 | 50 | 49 | 51 | 58 | 68 | 70 | 69.2 | 92 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 72 | 73 | 76 | 84 | 88 | 87 | 86 | 82 | 75 | 66 | 52 | 44 | 39 | 36 | 35 | 34 | 33 | 33 | 33 | 33 | 33 | 36 | 47 | 47 | 55.2 | 88 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 48 | 55 | 50 | 57 | 64 | 70 | 71 | 68 | 65 | 62 | 55 | 44 | 34 | 31 | 30 | 29 | 29 | 28 | 29 | 31 | 31 | 34 | 49 | 45 | 46.2 | 71 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 47 | 52 | 54 | 60 | 65 | 64 | 72 | 71 | 65 | 59 | 54 | 48 | 43 | 40 | 38 | 32 | 38 | 43 | 43 | 48 | 52 | 61 | 64 | 64 | 53.1 | 72 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 71 | 75 | 77 | 87 | 92 | 87 | 88 | 84 | 74 | 63 | 50 | 44 | 37 | 33 | 31 | 28 | 27 | 28 | 31 | 35 | 38 | 41 | 45 | 51 | 54.7 | 92 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 59 | 69 | 72 | 71 | 81 | 84 | 79 | 69 | 55 | 49 | 40 | 30 | 27 | 28 | 27 | 26 | 26 | 26 | 25 | 27 | 30 | 34 | 38 | 43 | 46.4 | 84 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 51 | 56 | 58 | 58 | 57 | 57 | 56 | 49 | 46 | 39 | 33 | 31 | 30 | 29 | 29 | 27 | 27 | 26 | 27 | 30 | 33 | 36 | 39 | 42 | 40.3 | 58 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 43 | 48 | 52 | 55 | 57 | 59 | 60 | 60 | 58 | 57 | 56 | 59 | 60 | 57 | 61 | 68 | 74 | 81 | 84 | 85 | 86 | 87 | 88 | 89 | 66.0 | 89 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 92 | 93 | 91 | 93 | 91 | 91 | 92 | 92 | 91 | 93 | 88 | 83 | 81 | 77 | 74 | 71 | 69 | 75 | 81 | 81 | 86 | 88 | 88 | 78 | 85.0 | 93 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 79 | 80 | 87 | 87 | 86 | 82 | 86 | 88 | 85 | 79 | 70 | 51 | 35 | 31 | 29 | 29 | 29 | 29 | 31 | 40 | 40 | 44 | 51 | 59 | 58.7 | 88 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 66 | 70 | 73 | 73 | 73 | 73 | 75 | 73 | 69 | 66 | 56 | 43 | 36 | 35 | 34 | 32 | 30 | 33 | 33 | 33 | 34 | 38 | 50 | 55 | 52.3 | 75 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 58 | 55 | 59 | 63 | 62 | 66 | 65 | 60 | 50 | 47 | 44 | 41 | 39 | 40 | 45 | 52 | 55 | 50 | 52 | 55 | 51 | 45 | 45 | 44 | 51.8 | 66 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 45 | 46 | 50 | 55 | 58 | 62 | 63 | 65 | 60 | 68 | 67 | 63 | 61 | 55 | 59 | 60 | 68 | 78 | 71 | 61 | 60 | 64 | 66 | 68 | 61.4 | 78 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 67 | 62 | 63 | 60 | 64 | 66 | 66 | 63 | 56 | 48 | 42 | 39 | 36 | 36 | 35 | 34 | 38 | 38 | 34 | 36 | 39 | 43 | 48 | 52 | 48.6 | 67 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 56 | 63 | 68 | 73 | 75 | 74 | 71 | 65 | 58 | 51 | 42 | 36 | 28 | 28 | 28 | 28 | 28 | 27 | 25 | 28 | 37 | 39 | 48 | 60 | 47.4 | 75 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 68 | 70 | 75 | 77 | 82 | 89 | 89 | 83 | 76 | 70 | 63 | 57 | 47 | 43 | 38 | 37 | 35 | 33 | 31 | 33 | 41 | 49 | 49 | 50 | 57.6 | 89 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 49 | 49 | 49 | 55 | 66 | 74 | 71 | 70 | 68 | 63 | 60 | 56 | 59 | 61 | 62 | 61 | 55 | 54 | 54 | 54 | 56 | 60 | 63 | 66 | 59.8 | 74 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 69 | 69 | 67 | 70 | 77 | 88 | 91 | 90 | 84 | 77 | 69 | 67 | 61 | 59 | 59 | 61 | 60 | 61 | 59 | 59 | 63 | 66 | 74 | 78 | 69.9 | 91 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 76 | 77 | 81 | 87 | 84 | 82 | 81 | 76 | 71 | 74 | 77 | 77 | 82 | 80 | 82 | 81 | 76 | 70 | 68 | 70 | 72 | 65 | 61 | 61 | 75.5 | 87 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 62 | 65 | 66 | 68 | 68 | 72 | 72 | 71 | 67 | 61 | 56 | 51 | 46 | 39 | 37 | 36 | 37 | 39 | 41 | 43 | 45 | 47 | 49 | 49 | 53.7 | 72 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 52 | 55 | 58 | 61 | 67 | 69 | 69 | 67 | 63 | 58 | 51 | 45 | 40 | 37 | 32 | 30 | 30 | 31 | 32 | 34 | 36 | 45 | 44 | 47 | 48.1 | 69 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 58 | 59 | 63 | 73 | 76 | 76 | 74 | 67 | 61 | 46 | 31 | 27 | 24 | 24 | 24 | 25 | 25 | 27 | 28 | 29 | 30 | 34 | 40 | 46 | 44.3 | 76 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 56 | 55 | 62 | 72 | 78 | 81 | 80 | 77 | 70 | 62 | 53 | 43 | 38 | 31 | 27 | 24 | 24 | 23 | 22 | 27 | 35 | 39 | 41 | 45 | 48.5 | 81 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 46 | 46 | 49 | 51 | 52 | 54 | 54 | 53 | 47 | 43 | 41 | 39 | 37 | 37 | 36 | 36 | 37 | 40 | 42 | 46 | 50 | 55 | 58 | 62 | 46.3 | 62 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 66 | 69 | 71 | 77 | 79 | 82 | 85 | 85 | 82 | 71 | 64 | 55 | 39 | 38 | 31 | 32 | 33 | 33 | 38 | 43 | 49 | 52 | 53 | 54 | 57.4 | 85 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | 62.6 | | 65.5 | | 68.1 | | 71.6 | | 74.7 | | 76.8 | | 77.2 | | 74.5 | | 68.8 | | 63.5 | | 56.9 | | 51.0 | | 45.9 | | 43.7 | | 42.6 | | 42.0 | | 42.3 | | 43.5 | | 43.5 | | 45.8 | | 48.2 | | 51.2 | | 55.8 | | 58.6 | | Diurnal Average | | | |
| | | | | | | | | | | | | | | | | | | 92 | | 93 | | 91 | | 93 | | 92 | | 92 | | 91 | | 93 | | 92 | | 91 | | 93 | | 92 | | 90 | | 84 | | 84 | | 88 | | 88 | | 86 | | 96 | | 84 | | 85 | | 86 | | 88 | | 88 | | 89 | | Diurnal Maximum | |



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity 100m (RH100m) - %
Lower Camp Met Tower - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity 100m (RH100m) - %
Lower Camp Met Tower - August 2017**

| Concentration Ranges (%) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 0 | 0.00 | 0.00 |
| 20 - 40 | 185 | 24.87 | 24.87 |
| 40 - 60 | 217 | 29.17 | 54.03 |
| 60 - 80 | 231 | 31.05 | 85.08 |
| 80 - 100 | 111 | 14.92 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

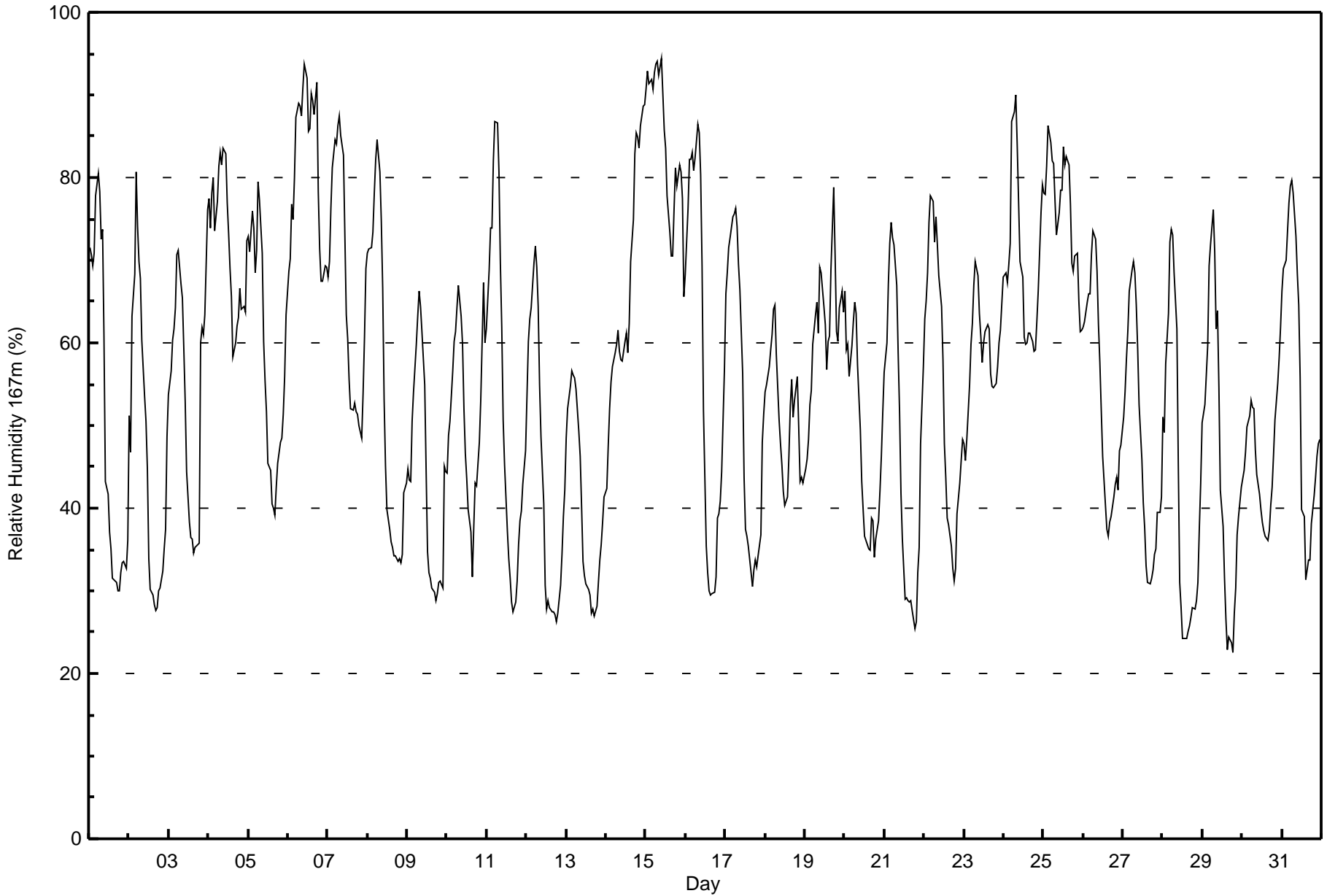
Relative Humidity 167m (RH167m) - %
Lower Camp Met Tower - August 2017

| Maximum Value: 94 % on Aug 15 10:00 | | | | | | | | | | | | | | | | | | | Maximum Daily Average: 84.1 % on Aug 15 | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|------|------|------|------|------|---------------------------------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|--|
| Minimum Value: 22 % on Aug 29 19:00 | | | | | | | | | | | | | | | | | | | Minimum Daily Average: 40.0 % on Aug 13 | | | | | | Hours of Data: 744 | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 73.8 % at hour 7 | | | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 42.6 % at hour 16 | | | | | | Hours of Missing Data: 0 | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 55.9 % | | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 25 P ₁₀ = 31 Q ₁ = 40 Median = 57 O ₃ = 70 P ₉₀ = 81 P ₉₉ = 92 | | | | | | Hours of Calibration: 0 | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 71 | 71 | 69 | 71 | 78 | 81 | 78 | 73 | 74 | 61 | 43 | 42 | 37 | 35 | 31 | 31 | 31 | 30 | 30 | 32 | 33 | 33 | 33 | 36 | 50.2 | 81 | | | | | | | | | | | | | | | | | | |
| 2-Aug | 51 | 47 | 63 | 68 | 81 | 74 | 70 | 68 | 60 | 54 | 51 | 45 | 34 | 30 | 29 | 28 | 28 | 28 | 30 | 30 | 32 | 35 | 37 | 49 | 46.8 | 81 | | | | | | | | | | | | | | | | | | |
| 3-Aug | 54 | 57 | 60 | 62 | 64 | 71 | 71 | 67 | 65 | 59 | 53 | 44 | 38 | 36 | 36 | 35 | 35 | 35 | 36 | 60 | 62 | 61 | 63 | 76 | 54.2 | 76 | | | | | | | | | | | | | | | | | | |
| 4-Aug | 77 | 74 | 78 | 80 | 74 | 77 | 81 | 83 | 82 | 84 | 83 | 77 | 73 | 69 | 66 | 58 | 60 | 62 | 63 | 67 | 64 | 64 | 64 | 72 | 72.2 | 84 | | | | | | | | | | | | | | | | | | |
| 5-Aug | 73 | 71 | 76 | 74 | 68 | 71 | 79 | 77 | 71 | 60 | 55 | 52 | 45 | 45 | 40 | 40 | 39 | 43 | 45 | 48 | 49 | 51 | 56 | 63 | 58.0 | 79 | | | | | | | | | | | | | | | | | | |
| 6-Aug | 69 | 70 | 77 | 75 | 80 | 87 | 89 | 89 | 87 | 91 | 94 | 92 | 86 | 86 | 90 | 89 | 88 | 92 | 78 | 71 | 67 | 67 | 69 | 69 | 81.4 | 94 | | | | | | | | | | | | | | | | | | |
| 7-Aug | 68 | 70 | 76 | 81 | 85 | 84 | 86 | 88 | 85 | 83 | 73 | 63 | 60 | 56 | 52 | 52 | 53 | 52 | 51 | 50 | 48 | 54 | 61 | 69 | 66.7 | 88 | | | | | | | | | | | | | | | | | | |
| 8-Aug | 71 | 71 | 71 | 73 | 78 | 82 | 85 | 81 | 75 | 67 | 53 | 45 | 40 | 38 | 36 | 35 | 34 | 34 | 34 | 34 | 33 | 34 | 42 | 43 | 53.7 | 85 | | | | | | | | | | | | | | | | | | |
| 9-Aug | 45 | 43 | 43 | 50 | 54 | 60 | 63 | 66 | 64 | 61 | 55 | 45 | 35 | 32 | 32 | 30 | 30 | 29 | 30 | 31 | 31 | 30 | 45 | 44 | 43.7 | 66 | | | | | | | | | | | | | | | | | | |
| 10-Aug | 44 | 49 | 51 | 57 | 60 | 61 | 64 | 67 | 63 | 60 | 52 | 47 | 44 | 40 | 37 | 32 | 38 | 43 | 43 | 48 | 53 | 60 | 67 | 60 | 51.6 | 67 | | | | | | | | | | | | | | | | | | |
| 11-Aug | 62 | 69 | 74 | 74 | 82 | 87 | 87 | 81 | 70 | 62 | 51 | 45 | 37 | 34 | 32 | 29 | 27 | 29 | 31 | 36 | 38 | 40 | 43 | 47 | 52.7 | 87 | | | | | | | | | | | | | | | | | | |
| 12-Aug | 54 | 60 | 63 | 64 | 70 | 72 | 69 | 64 | 55 | 49 | 40 | 31 | 28 | 29 | 28 | 27 | 27 | 27 | 26 | 27 | 31 | 34 | 39 | 42 | 44.1 | 72 | | | | | | | | | | | | | | | | | | |
| 13-Aug | 49 | 52 | 55 | 57 | 56 | 56 | 54 | 49 | 46 | 40 | 34 | 32 | 31 | 30 | 30 | 27 | 28 | 27 | 28 | 31 | 34 | 36 | 38 | 41 | 40.0 | 57 | | | | | | | | | | | | | | | | | | |
| 14-Aug | 42 | 48 | 52 | 55 | 57 | 59 | 60 | 61 | 59 | 58 | 58 | 60 | 61 | 59 | 62 | 70 | 75 | 83 | 85 | 85 | 84 | 86 | 89 | 89 | 66.6 | 89 | | | | | | | | | | | | | | | | | | |
| 15-Aug | 91 | 93 | 91 | 92 | 91 | 93 | 94 | 94 | 92 | 94 | 90 | 86 | 84 | 78 | 73 | 71 | 71 | 76 | 81 | 79 | 82 | 81 | 77 | 66 | 84.1 | 94 | | | | | | | | | | | | | | | | | | |
| 16-Aug | 68 | 76 | 82 | 82 | 83 | 81 | 82 | 86 | 85 | 80 | 69 | 52 | 35 | 32 | 30 | 30 | 30 | 30 | 32 | 39 | 39 | 41 | 44 | 57 | 57.0 | 86 | | | | | | | | | | | | | | | | | | |
| 17-Aug | 66 | 69 | 72 | 73 | 75 | 76 | 76 | 74 | 69 | 66 | 56 | 44 | 37 | 37 | 35 | 32 | 30 | 33 | 34 | 33 | 34 | 37 | 48 | 51 | 52.4 | 76 | | | | | | | | | | | | | | | | | | |
| 18-Aug | 54 | 55 | 57 | 59 | 61 | 64 | 65 | 59 | 51 | 48 | 45 | 42 | 40 | 41 | 46 | 52 | 56 | 51 | 53 | 56 | 50 | 43 | 44 | 43 | 51.5 | 65 | | | | | | | | | | | | | | | | | | |
| 19-Aug | 45 | 46 | 48 | 53 | 54 | 60 | 63 | 65 | 61 | 69 | 69 | 64 | 62 | 57 | 60 | 61 | 69 | 79 | 70 | 61 | 60 | 64 | 66 | 64 | 61.3 | 79 | | | | | | | | | | | | | | | | | | |
| 20-Aug | 66 | 59 | 60 | 56 | 60 | 62 | 65 | 64 | 57 | 49 | 43 | 40 | 37 | 36 | 35 | 35 | 39 | 39 | 34 | 36 | 38 | 42 | 46 | 52 | 47.9 | 66 | | | | | | | | | | | | | | | | | | |
| 21-Aug | 56 | 60 | 67 | 72 | 75 | 73 | 72 | 67 | 59 | 52 | 42 | 36 | 29 | 29 | 29 | 29 | 29 | 28 | 25 | 26 | 32 | 35 | 48 | 57 | 46.9 | 75 | | | | | | | | | | | | | | | | | | |
| 22-Aug | 63 | 65 | 69 | 75 | 78 | 77 | 72 | 75 | 72 | 68 | 64 | 58 | 48 | 44 | 39 | 38 | 35 | 33 | 31 | 33 | 39 | 43 | 46 | 48 | 54.7 | 78 | | | | | | | | | | | | | | | | | | |
| 23-Aug | 48 | 46 | 48 | 55 | 60 | 62 | 67 | 70 | 68 | 64 | 61 | 58 | 60 | 61 | 62 | 62 | 56 | 55 | 55 | 55 | 57 | 60 | 62 | 65 | 59.0 | 70 | | | | | | | | | | | | | | | | | | |
| 24-Aug | 68 | 69 | 67 | 69 | 72 | 87 | 88 | 90 | 84 | 77 | 70 | 68 | 61 | 60 | 60 | 61 | 61 | 60 | 59 | 59 | 62 | 66 | 76 | 79 | 69.7 | 90 | | | | | | | | | | | | | | | | | | |
| 25-Aug | 78 | 78 | 81 | 86 | 84 | 82 | 82 | 77 | 73 | 76 | 79 | 79 | 84 | 81 | 83 | 81 | 77 | 70 | 69 | 70 | 71 | 65 | 61 | 62 | 76.2 | 86 | | | | | | | | | | | | | | | | | | |
| 26-Aug | 62 | 63 | 65 | 66 | 66 | 71 | 74 | 73 | 69 | 62 | 58 | 52 | 46 | 40 | 38 | 37 | 38 | 39 | 41 | 43 | 44 | 42 | 47 | 48 | 53.4 | 74 | | | | | | | | | | | | | | | | | | |
| 27-Aug | 51 | 54 | 58 | 62 | 66 | 69 | 70 | 69 | 65 | 59 | 53 | 46 | 41 | 38 | 33 | 31 | 31 | 32 | 33 | 34 | 35 | 39 | 39 | 41 | 47.8 | 70 | | | | | | | | | | | | | | | | | | |
| 28-Aug | 51 | 49 | 58 | 63 | 72 | 74 | 73 | 69 | 62 | 45 | 31 | 28 | 24 | 24 | 24 | 25 | 26 | 27 | 28 | 28 | 29 | 31 | 37 | 43 | 42.6 | 74 | | | | | | | | | | | | | | | | | | |
| 29-Aug | 50 | 52 | 56 | 60 | 69 | 72 | 76 | 71 | 62 | 64 | 55 | 42 | 38 | 31 | 27 | 23 | 24 | 24 | 22 | 27 | 30 | 37 | 39 | 43 | 45.6 | 76 | | | | | | | | | | | | | | | | | | |
| 30-Aug | 44 | 45 | 47 | 50 | 51 | 53 | 52 | 52 | 47 | 44 | 42 | 40 | 38 | 37 | 37 | 36 | 37 | 40 | 43 | 47 | 51 | 55 | 58 | 62 | 46.1 | 62 | | | | | | | | | | | | | | | | | | |
| 31-Aug | 66 | 69 | 70 | 74 | 77 | 79 | 80 | 78 | 73 | 68 | 65 | 56 | 40 | 39 | 31 | 33 | 34 | 34 | 38 | 42 | 44 | 46 | 48 | 48 | 55.4 | 80 | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | 59.9 | 61.2 | 64.7 | 67.3 | 70.4 | 72.7 | 73.8 | 72.4 | 67.9 | 63.7 | 57.6 | 51.9 | 46.9 | 44.7 | 43.3 | 42.6 | 43.1 | 43.9 | 43.8 | 45.7 | 47.0 | 48.9 | 52.7 | 55.8 | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | | 91 | 93 | 91 | 92 | 91 | 93 | 94 | 94 | 92 | 94 | 94 | 92 | 86 | 86 | 90 | 89 | 88 | 92 | 85 | 85 | 84 | 86 | 89 | 89 | Diurnal Maximum | |



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity 167m (RH167m) - %
Lower Camp Met Tower - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity 167m (RH167m) - %
Lower Camp Met Tower - August 2017**

| Concentration Ranges (%) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 0 | 0.00 | 0.00 |
| 20 - 40 | 189 | 25.40 | 25.40 |
| 40 - 60 | 219 | 29.44 | 54.84 |
| 60 - 80 | 257 | 34.54 | 89.38 |
| 80 - 100 | 79 | 10.62 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 20 m (WS20m) - km/h

Lower Camp Met Tower - August 2017

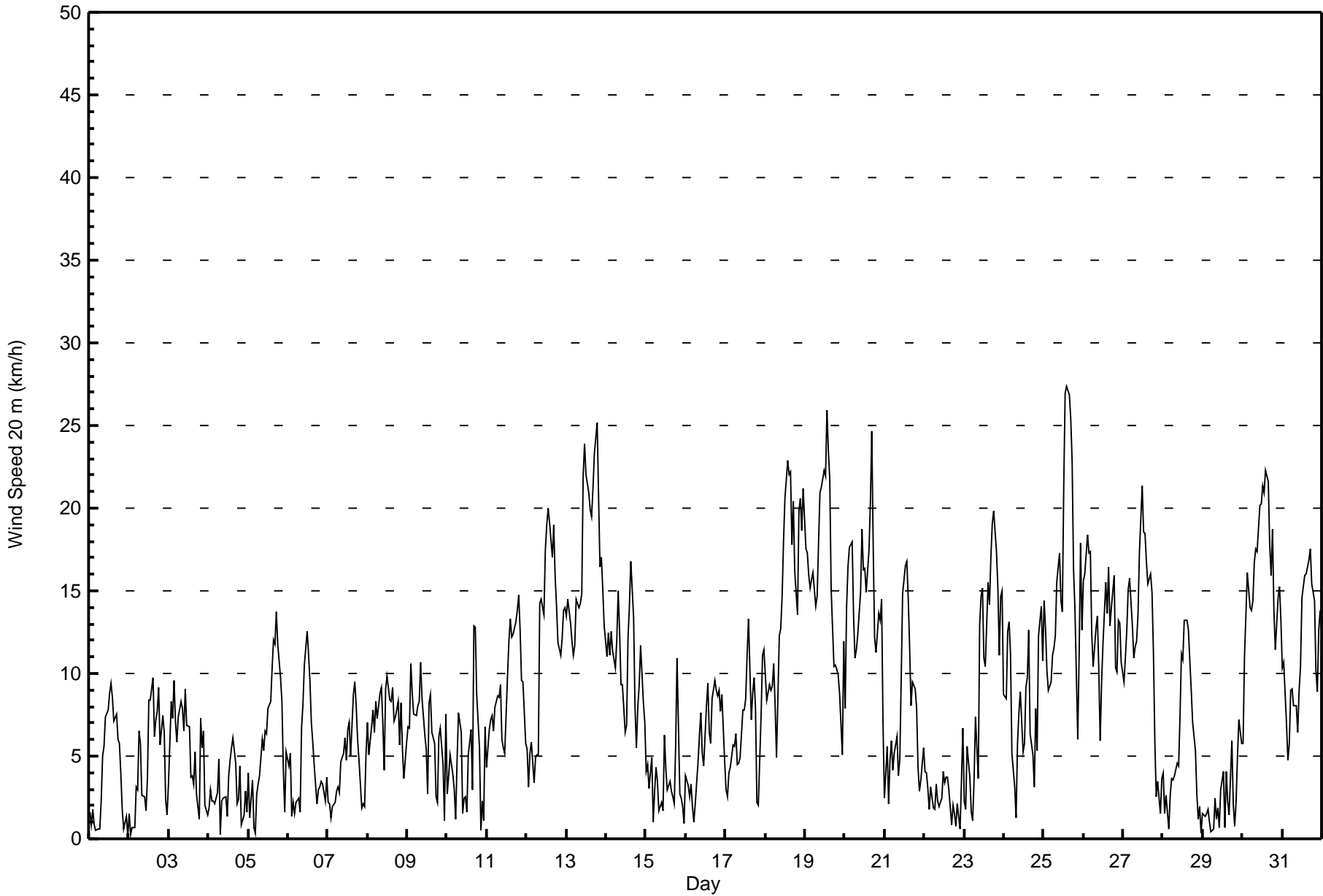
| Maximum Speed: 27 km/h on Aug 25 15:00 | | Maximum Daily Speed Average: 17.0 km/h on Aug 13 | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|---|-------|---------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----------------|---------------|---------------|
| Minimum Speed Value: 0 km/h on Aug 2 00:00 | | Minimum Daily Speed Average: 0.7 km/h on Aug 15 | | Hours of Data: 744 | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Speed Average: 6.7 km/h at hour 14 | | Minimum Diurnal Speed Average: 2.5 km/h at hour 1 | | Hours of Missing Data: 0 | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average Velocity: 4.2 km/h 215.9 deg | | Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 4 Median = 8 Q ₃ = 13 P ₉₀ = 17 P ₉₉ = 24 | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | N2 | N1 | NNW2 | E1 | NE1 | N1 | WNW1 | N2 | N5 | NNW6 | NNE7 | N8 | N9 | N9 | N7 | N8 | N6 | N6 | N4 | N2 | NW1 | NNW1 | NNW0 | N3.9 | N9 | |
| 2-Aug | N2 | N0 | NE1 | ESE1 | SE3 | ESE3 | SE7 | SE6 | SE3 | S3 | ESE2 | ENE4 | W8 | WNW8 | WNW10 | W6 | W7 | W8 | WSW9 | SW6 | SW7 | WSW6 | WNW2 | SSE1 | WSW2.3 | WNW10 |
| 3-Aug | S3 | SSE8 | SSE7 | SSE10 | SSE7 | SE6 | SE7 | SE8 | SE8 | SE7 | SE9 | S7 | S7 | S4 | SSE4 | NNE3 | SE5 | SSE3 | E1 | NNW7 | SSE5 | ESE6 | NE2 | SSE1 | SSE4.6 | SSE10 |
| 4-Aug | NNW2 | NNW3 | WNW2 | ESE2 | ENE2 | NNW3 | NNW5 | N0 | NNW2 | N2 | NW3 | ENE1 | ESE4 | E5 | SE5 | SSE6 | SSE5 | SE2 | S2 | S4 | NE1 | NE1 | N3 | SE2 | E0.8 | SSE6 |
| 5-Aug | N4 | NNE1 | SSW4 | SSE1 | E0 | SE3 | SE3 | SE4 | SE6 | SE5 | SE7 | SE6 | SSE8 | S8 | S10 | S12 | S12 | S14 | SSW12 | SSW10 | SSW8 | SW4 | W2 | ESE5 | S5.0 | S14 |
| 6-Aug | SE4 | SE5 | NE1 | S2 | NNE1 | N2 | ENE2 | E2 | N7 | N8 | NNE11 | N13 | NNE11 | NNE9 | N7 | N6 | N4 | NW2 | NNE3 | N3 | NNW3 | NNW3 | NNW2 | NNW4 | N3.8 | N13 |
| 7-Aug | NW2 | NW2 | NW1 | N2 | NNW2 | NNW3 | WNW3 | NW3 | NNW5 | NNW5 | N6 | NNW5 | NW7 | NW7 | NW5 | WNW9 | W10 | WSW8 | W6 | WSW5 | SW2 | WSW2 | SSW2 | SSE5 | WNW3.2 | W10 |
| 8-Aug | SE7 | SE5 | SE7 | SE8 | SE6 | SE8 | SE7 | SSE9 | SSE9 | SSE7 | SW4 | W9 | W10 | WSW8 | WSW8 | WSW9 | SW7 | WSW7 | SW8 | SSW6 | S8 | SSE5 | ESE4 | SE6 | S4.6 | W10 |
| 9-Aug | SSE7 | SE7 | SSE11 | SSE9 | SE8 | SE7 | SE8 | SE8 | SSE11 | SSE8 | SE6 | SE5 | WSW3 | WSW8 | WSW9 | W6 | W6 | SW3 | SE2 | S6 | SW7 | WSW4 | NE1 | SSE8 | S4.5 | SSE11 |
| 10-Aug | ESE3 | SE4 | SSE5 | SE4 | ESE3 | WSW1 | SE5 | SE8 | SE6 | NE2 | NNE2 | NNW3 | SW2 | NNW5 | N7 | ENE3 | SSE13 | SSE13 | S9 | SE6 | S1 | SSE2 | SSW1 | SE7 | SE2.9 | SSE13 |
| 11-Aug | SE4 | SE7 | SE7 | SE7 | SE7 | SSE8 | SE9 | SE9 | SE9 | SE6 | SE6 | SE5 | SSE10 | SSE12 | SSE13 | SSE12 | S12 | S13 | S14 | S15 | S13 | SSE10 | SSE10 | SSE6 | SSE9.0 | S15 |
| 12-Aug | SE5 | ESE3 | SSE5 | SSE6 | SSE3 | SE5 | SE5 | SSE5 | SSE14 | SSE14 | S14 | S17 | S19 | S20 | S19 | SSW17 | S19 | S16 | SSW14 | SSW12 | S11 | S12 | SSE14 | SSE14 | S11.3 | S20 |
| 13-Aug | SSE13 | SSE15 | SSE13 | SSE12 | SSE11 | SE12 | SE14 | SSE14 | SSE14 | SSE15 | SSE22 | SSE24 | SSE22 | SSE21 | SSE20 | SSE19 | SSE21 | SSE23 | S25 | S21 | S16 | S17 | SSE15 | SSE13 | SSE17.0 | S25 |
| 14-Aug | SE11 | SE12 | SE11 | SE13 | SE11 | SE10 | SE12 | SSE15 | S13 | SSE9 | SSW9 | SW6 | WSW7 | SW12 | WSW14 | W17 | WSW13 | WSW8 | SW5 | SSE8 | SSE9 | SSE12 | SSE8 | SSE7 | S7.6 | W17 |
| 15-Aug | SE4 | SSE4 | SSE3 | SE5 | N1 | SSW3 | SW4 | W3 | NNW2 | NNE2 | NW2 | W6 | W4 | NW3 | NE3 | NE3 | NNE2 | WSW6 | WNW11 | N3 | E2 | E2 | NNW1 | W0.7 | WNW11 | |
| 16-Aug | N4 | N3 | N3 | NNW2 | N1 | SE2 | SE5 | SE6 | SSE8 | SE5 | WSW4 | WSW8 | WSW9 | W6 | W6 | WSW9 | W10 | WSW9 | WSW9 | WSW9 | WSW8 | W9 | SW5 | WSW3.7 | W10 | |
| 17-Aug | SE3 | S3 | SSW4 | SSW4 | SSE6 | SE6 | SE6 | SSW4 | S5 | SW5 | W8 | WSW8 | WSW8 | WSW11 | WSW13 | W7 | WNW9 | W10 | W8 | W2 | WSW2 | SW7 | W11 | W11 | WSW5.2 | WSW13 |
| 18-Aug | W10 | SSE8 | SSE9 | SE9 | SSE9 | SSE11 | SE8 | SSE5 | SW12 | WSW13 | SW15 | SW18 | WSW21 | W23 | WSW22 | SW22 | SSW18 | SW20 | SW16 | SSW14 | SW20 | WSW21 | SW19 | WSW21 | SW12.7 | W23 |
| 19-Aug | WSW18 | W17 | W16 | W15 | W16 | W16 | W14 | WSW15 | W18 | WSW21 | W21 | W22 | W22 | WNW26 | NW23 | NW22 | WNW15 | WNW10 | W11 | WNW10 | WNW10 | WNW9 | W5 | W12 | W15.3 | WNW26 |
| 20-Aug | WSW8 | W14 | W16 | W18 | W18 | W13 | W11 | W11 | W12 | W15 | W19 | WNW16 | WNW16 | WNW15 | NW17 | WNW20 | W25 | W18 | NW12 | NW11 | WNW14 | WNW13 | W15 | WNW7 | WNW14.3 | W25 |
| 21-Aug | W2 | W6 | S2 | SSE5 | S6 | SSW4 | SW5 | SW6 | S4 | SSE5 | WSW10 | WSW15 | WSW17 | WSW17 | W15 | W12 | W8 | WNW9 | WNW9 | WNW8 | WNW4 | NW3 | N4 | N5 | W5.6 | WSW17 |
| 22-Aug | N4 | N4 | N3 | NE2 | N3 | N2 | WNW2 | NNW3 | NW2 | NNW2 | WNW2 | NNW4 | W3 | W4 | WNW4 | WSW3 | NNW1 | NNW2 | N1 | SSW1 | WNW2 | S1 | SSE4 | SE7 | NW1.3 | SE7 |
| 23-Aug | ESE2 | NE2 | SSE6 | SSE4 | E2 | E1 | S4 | SSE7 | SSE4 | SSE13 | SSE15 | SSW15 | SSW11 | S10 | S16 | SSE14 | SSE17 | SSE19 | SSE20 | SSE17 | SSE15 | SSE11 | SSE15 | SSE15 | SSE10.0 | SSE20 |
| 24-Aug | SSE9 | SSE9 | SSE13 | SSE13 | S11 | SE5 | SE3 | NE1 | SSE6 | SE8 | SE9 | SSE5 | SE6 | SE9 | SE10 | SE13 | ESE6 | N5 | ENE3 | SSE8 | SSW5 | SW12 | WSW14 | SW11 | SSE5.9 | WSW14 |
| 25-Aug | SW14 | SW13 | SW10 | SSW9 | SSW10 | SW11 | SSW12 | SSW12 | SSW16 | SW17 | SW14 | SSW14 | SW21 | WSW27 | WSW27 | WSW27 | W25 | W23 | W16 | W14 | SW6 | WSW11 | WSW18 | W13 | WSW14.8 | WSW27 |
| 26-Aug | W16 | W16 | W18 | W17 | W17 | W12 | WSW10 | WSW13 | WSW13 | WSW10 | WSW6 | W9 | W12 | W16 | W14 | WSW16 | WSW13 | WSW14 | WSW16 | WSW10 | SW10 | SW13 | WSW13 | SW11 | WSW12.8 | W18 |
| 27-Aug | WSW10 | WSW11 | W13 | W15 | W16 | W13 | WSW11 | W12 | W12 | W14 | W17 | WSW21 | W19 | W18 | W17 | W15 | W16 | WNW15 | WNW11 | NW6 | W3 | NNW3 | WNW2 | SW4 | W11.8 | WSW21 |
| 28-Aug | NNW4 | WNW2 | SSE3 | SSE1 | W3 | WSW4 | SSW4 | S4 | WSW5 | WSW4 | NW7 | WNW11 | NW11 | NW13 | NW13 | NW13 | NNW11 | NNW9 | NNW7 | NNW5 | N3 | NW1 | NNW2 | NNW0 | NW4.6 | NW13 |
| 29-Aug | NW1 | NNW1 | NW2 | ESE2 | ENE1 | SE0 | ENE1 | SE2 | S1 | SSW2 | NW1 | NE3 | NNE4 | ESE1 | NE4 | N2 | SW1 | SE6 | ESE2 | SE1 | SSE2 | SE5 | SE7 | SE6 | ESE1.3 | SE7 |
| 30-Aug | SE6 | SSE11 | SE13 | SE16 | SE14 | SE14 | SE14 | SE17 | SE18 | SSE17 | SSE20 | SSE20 | SSE21 | SSE21 | S22 | SSE22 | SSE18 | SSE16 | S19 | S14 | S11 | S15 | SSE15 | SSE13 | SSE15.8 | S22 |
| 31-Aug | SSE10 | SSE11 | SSE7 | SSE5 | SSE6 | SE9 | SSE9 | SSE8 | SE8 | S6 | SW9 | SW10 | WSW15 | WSW16 | W16 | W16 | W17 | W18 | W15 | W14 | W10 | W9 | W13 | W14 | WSW7.1 | WNW18 |
| SSW2.5 SSW3.0 S3.4 S3.7 SSW2.9 S2.9 S3.8 S4.2 S4.4 SSW4.0 SSW4.1 SW5.2 WSW6.2 WSW6.7 WSW6.5 WSW6.2 SW6.0 SW6.0 SW5.6 SW4.5 SW4.5 SSW4.6 SW4.1 SSW4.0 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| WSW18 W17 W18 W18 W18 W16 SE14 SE17 W18 WSW21 SSE22 SSE24 SSE22 WSW27 WSW27 WSW27 W25 SSE23 S25 S21 SW20 WSW21 SW19 WSW21 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| All monthly, daily, and diurnal averages have been calculated using vector methods | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed 20 m (WS20m) - km/h
Lower Camp Met Tower - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on Aug 19 14:00 Minimum Value: 0 km/h on Aug 29 07:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 5 P ₉₀ = 6 P ₉₉ = 9 | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | |
|--|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 5 | 4 | 4 | 4 | 4 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 5 |
| 2-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 2 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 2 | 2 | 2 | 2 | 1 | 4 |
| 3-Aug | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 2 | 4 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 6 | 4 | 3 | 2 | 2 | 6 | |
| 4-Aug | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 2 | 1 | 1 | 2 | 2 | 4 | 3 | 3 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 2 | 4 |
| 5-Aug | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 3 | 2 | 3 | 3 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 3 | 2 | 2 | 2 | 5 | |
| 6-Aug | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 3 | 3 | 4 | 5 | 5 | 4 | 3 | 3 | 2 | 1 | 2 | 2 | 1 | 1 | 2 | 5 | |
| 7-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 2 | 3 | 3 | 3 | 4 | 4 | 3 | 2 | 1 | 1 | 1 | 1 | 4 | |
| 8-Aug | 1 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 3 | 2 | 2 | 2 | 2 | 4 | |
| 9-Aug | 2 | 3 | 4 | 3 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 4 | |
| 10-Aug | 2 | 3 | 4 | 3 | 2 | 1 | 2 | 3 | 3 | 1 | 2 | 2 | 2 | 3 | 4 | 3 | 5 | 5 | 4 | 2 | 1 | 1 | 1 | 5 | |
| 11-Aug | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 3 | 3 | 2 | 2 | 4 | 4 | 5 | 5 | 5 | 4 | 3 | 4 | 4 | 3 | 2 | 2 | 5 | |
| 12-Aug | 3 | 2 | 3 | 3 | 2 | 3 | 3 | 4 | 4 | 4 | 5 | 7 | 7 | 7 | 6 | 6 | 6 | 6 | 5 | 4 | 3 | 3 | 3 | 7 | |
| 13-Aug | 3 | 3 | 3 | 3 | 3 | 4 | 5 | 5 | 5 | 6 | 8 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 6 | 6 | 5 | 4 | 4 | 8 | |
| 14-Aug | 4 | 4 | 3 | 4 | 4 | 3 | 4 | 5 | 4 | 4 | 4 | 4 | 5 | 5 | 6 | 6 | 6 | 3 | 2 | 2 | 3 | 4 | 3 | 6 | |
| 15-Aug | 2 | 3 | 2 | 3 | 1 | 2 | 3 | 2 | 1 | 1 | 1 | 3 | 2 | 3 | 2 | 1 | 1 | 1 | 4 | 5 | 3 | 1 | 1 | 5 | |
| 16-Aug | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 4 | 3 | 4 | 4 | 3 | 2 | 2 | 2 | 2 | 4 | |
| 17-Aug | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 4 | 6 | 6 | 4 | 4 | 4 | 2 | 1 | 5 | 4 | 6 | |
| 18-Aug | 4 | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 5 | 5 | 5 | 7 | 8 | 8 | 8 | 7 | 5 | 6 | 5 | 4 | 6 | 5 | 5 | 8 | |
| 19-Aug | 6 | 6 | 6 | 5 | 6 | 6 | 6 | 5 | 7 | 7 | 9 | 8 | 9 | 11 | 10 | 10 | 7 | 5 | 5 | 4 | 4 | 4 | 3 | 11 | |
| 20-Aug | 3 | 6 | 6 | 6 | 6 | 6 | 5 | 5 | 6 | 6 | 7 | 7 | 7 | 8 | 7 | 9 | 9 | 8 | 5 | 4 | 5 | 5 | 6 | 9 | |
| 21-Aug | 1 | 3 | 2 | 1 | 2 | 3 | 4 | 3 | 2 | 2 | 6 | 5 | 6 | 7 | 6 | 5 | 4 | 5 | 4 | 2 | 3 | 2 | 1 | 7 | |
| 22-Aug | 1 | 2 | 2 | 1 | 1 | 2 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 0 | 1 | 1 | 3 | 3 | |
| 23-Aug | 1 | 2 | 4 | 3 | 1 | 2 | 3 | 3 | 2 | 5 | 4 | 4 | 3 | 3 | 4 | 4 | 5 | 5 | 6 | 6 | 5 | 4 | 3 | 6 | |
| 24-Aug | 4 | 3 | 5 | 6 | 8 | 4 | 2 | 2 | 3 | 3 | 4 | 2 | 4 | 4 | 7 | 6 | 3 | 3 | 2 | 4 | 4 | 9 | 7 | 9 | |
| 25-Aug | 5 | 4 | 4 | 3 | 3 | 4 | 3 | 4 | 6 | 5 | 5 | 4 | 9 | 9 | 8 | 9 | 9 | 9 | 7 | 6 | 3 | 5 | 6 | 9 | |
| 26-Aug | 6 | 6 | 6 | 6 | 6 | 6 | 4 | 5 | 5 | 4 | 3 | 4 | 5 | 6 | 6 | 7 | 6 | 5 | 5 | 2 | 3 | 4 | 4 | 7 | |
| 27-Aug | 3 | 4 | 5 | 5 | 6 | 5 | 5 | 5 | 5 | 6 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 6 | 6 | 2 | 1 | 2 | 1 | 7 | |
| 28-Aug | 3 | 2 | 2 | 1 | 2 | 3 | 2 | 2 | 3 | 3 | 6 | 5 | 5 | 6 | 6 | 6 | 5 | 4 | 2 | 1 | 1 | 1 | 1 | 6 | |
| 29-Aug | 2 | 1 | 1 | 2 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 1 | 2 | 3 | 3 | 3 | |
| 30-Aug | 3 | 4 | 5 | 5 | 5 | 5 | 6 | 6 | 7 | 6 | 7 | 7 | 8 | 8 | 7 | 7 | 6 | 4 | 6 | 4 | 3 | 3 | 4 | 8 | |
| 31-Aug | 3 | 2 | 4 | 2 | 2 | 3 | 4 | 4 | 4 | 3 | 3 | 4 | 6 | 6 | 7 | 7 | 7 | 7 | 6 | 5 | 3 | 3 | 4 | 7 | |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed 20 m (WS20m) - km/h
Lower Camp Met Tower - August 2017**

| Wind Speed Ranges (km/h) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 5 | 272 | 36.56 | 36.56 |
| 6 - 11 | 249 | 33.47 | 70.03 |
| 12 - 19 | 182 | 24.46 | 94.49 |
| 20 - 28 | 41 | 5.51 | 100.00 |
| 29 - 38 | 0 | 0.00 | 100.00 |
| > 38 | 0 | 0.00 | 100.00 |

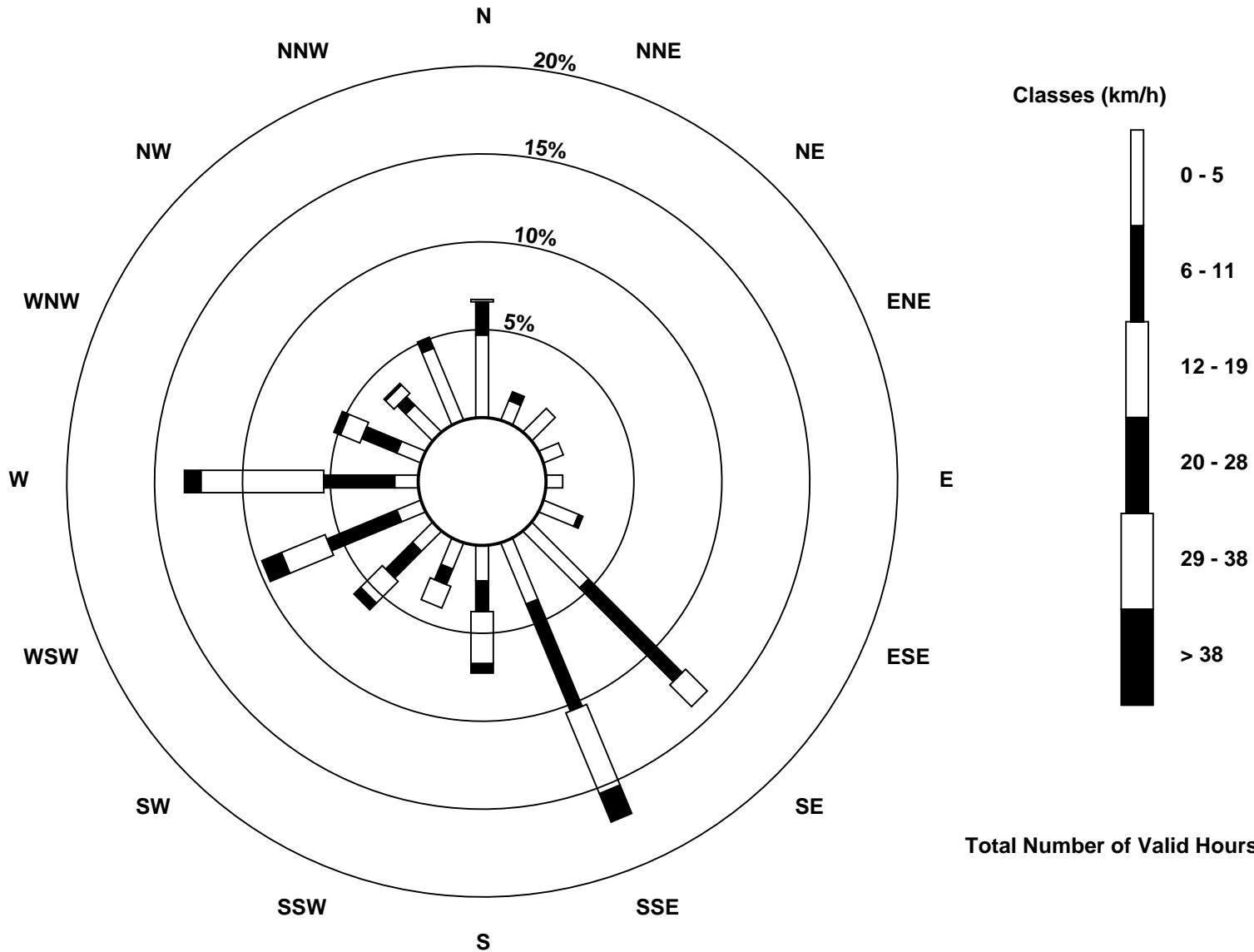
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Wind Speed 20 m (WS20m) - km/h
Lower Camp Met Tower (AMS 3)



Total Number of Valid Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 45 m (WS45m) - km/h

Lower Camp Met Tower - August 2017

| | | |
|--|---|--------------------------------|
| Maximum Speed: 40 km/h on Aug 25 14:00 | Maximum Daily Speed Average: 21.8 km/h on Aug 19 | Hours in Service: 744 |
| Minimum Speed Value: 0 km/h on Aug 4 08:00 | Minimum Daily Speed Average: 1.0 km/h on Aug 15 | Hours of Data: 612 |
| Maximum Diurnal Speed Average: 8.4 km/h at hour 14 | Minimum Diurnal Speed Average: 3.4 km/h at hour 1 | Hours of Missing Data: 132 |
| Monthly Average Velocity: 5.2 km/h 207.8 deg | Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 9 Q ₃ = 16 P ₉₀ = 23 P ₉₉ = 34 | Percent Operational Time: 82.3 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | N2 | NNW1 | NNW3 | SE1 | NW1 | N1 | NNW1 | NNW3 | NNW6 | NNW8 | N10 | N11 | N12 | N12 | N12 | N10 | N10 | N9 | N8 | NEE7 | N3 | NNW2 | NNW3 | WNW1 | N5.4 | N12 |
| 2-Aug | NNW2 | WSW1 | WNW1 | S1 | SE3 | SE4 | SE8 | ESE7 | SE3 | SSE3 | E2 | ENE4 | WSW11 | W11 | W12 | WSW8 | WSW9 | W11 | WSW13 | SW8 | SW10 | WSW10 | WSW4 | SE4 | SW3.5 | WSW13 |
| 3-Aug | S4 | SSE10 | SE10 | SE12 | SE9 | SE8 | SE10 | SE10 | SE10 | SE7 | SE11 | S8 | S8 | S4 | SSE4 | NNE4 | SE7 | SE3 | ENE2 | NNW12 | SE6 | ESE10 | ENE4 | SE2 | SE5.7 | NNW12 |
| 4-Aug | NNW3 | NNW5 | WNW3 | E3 | ENE3 | NNW3 | NNW7 | NNE0 | NNW3 | N3 | NW3 | NE2 | ESE4 | E7 | ESE8 | SE8 | SE6 | SE3 | S3 | SSE5 | E1 | NE2 | N3 | ESE2 | ENE1.2 | ESE8 |
| 5-Aug | N6 | N3 | SSW5 | SSW2 | SE2 | SE4 | SE4 | ESE4 | SE7 | SE6 | SE7 | SE7 | SE9 | SSE9 | S12 | SSE14 | S13 | S16 | S14 | S12 | S10 | SW7 | WSW3 | ESE6 | SSE6.0 | S16 |
| 6-Aug | ESE6 | SE7 | ENE2 | SSE4 | NE1 | N4 | ENE3 | E3 | N9 | N12 | N15 | N18 | NNE16 | NNE13 | N10 | NNW9 | N7 | NW3 | NNE5 | N5 | NNW6 | NNW4 | NNW3 | NNW6 | N5.6 | N18 |
| 7-Aug | NNW3 | N2 | NNW1 | NNW2 | NNW3 | NNW3 | NNW5 | NW4 | NNW6 | NNW7 | N8 | NNW6 | NW9 | NNW9 | NW6 | W11 | W12 | WSW10 | WSW9 | WSW7 | SW3 | WSW4 | SSW3 | SSE5 | WNW4.1 | W12 |
| 8-Aug | SE9 | SE8 | SE9 | SE10 | SE8 | SE10 | SE9 | SE10 | SE10 | SE8 | WSW5 | WSW12 | WSW13 | WSW10 | WSW10 | WSW12 | SW9 | SW9 | SSW11 | SSW8 | S10 | SSE8 | ESE5 | SE8 | S5.9 | WSW13 |
| 9-Aug | SE9 | SE9 | SE14 | SE12 | SE10 | SE9 | SE10 | SE10 | SE12 | SE10 | SE7 | SE6 | SW3 | WSW10 | WSW11 | WSW8 | W8 | SW3 | SSE3 | S9 | SSW10 | SW7 | NW1 | SE9 | SSE5.8 | SE14 |
| 10-Aug | ESE4 | ESE6 | SSE8 | SE5 | ESE5 | WSW2 | SE7 | SE10 | SE8 | NE2 | N3 | NNW4 | WSW2 | NNW6 | N9 | ENE4 | SE17 | SE17 | S10 | SE7 | S2 | S2 | SW3 | SE9 | SE3.8 | SE17 |
| 11-Aug | SE7 | SE8 | SE10 | SE10 | SE8 | SSE9 | SE11 | SE11 | SE11 | SE7 | SE6 | SE6 | SSE12 | SSE14 | SSE15 | SSE14 | SSE14 | SSE14 | SSE16 | SSE16 | SSE15 | SSE12 | SSE13 | SSE9 | SSE11.0 | SSE16 |
| 12-Aug | SE8 | SE5 | SE7 | SE9 | SE6 | SE8 | SE7 | SE7 | SSE17 | SE18 | SSE16 | S20 | S22 | S23 | S22 | S20 | S21 | S18 | S17 | S14 | S13 | SSE14 | SSE16 | SSE17 | SSE13.6 | S23 |
| 13-Aug | SE17 | SE18 | SE16 | SSE14 | SE15 | SE17 | SE20 | SE19 | SE17 | SE19 | SE29 | SSE28 | SSE26 | SSE26 | SSE24 | SE25 | SE27 | SSE28 | SSE28 | SSE23 | SSE19 | SSE19 | SSE18 | SE16 | SSE20.8 | SE29 |
| 14-Aug | SE16 | SE17 | SE16 | SE18 | SE16 | SE15 | SE17 | SSE18 | SSE15 | SSE11 | SSW12 | SSW8 | SW9 | SSW15 | WSW19 | WSW24 | WSW20 | SW10 | SSW7 | SE10 | SSE11 | SSE14 | SSE10 | SE9 | S9.8 | WSW24 |
| 15-Aug | SE6 | SE7 | SSE4 | SE7 | E1 | S4 | SW6 | WSW5 | NW2 | N3 | NW2 | W8 | W6 | WNW4 | NNE4 | NE4 | NE4 | NNE5 | WSW7 | W16 | NNW4 | ENE3 | E2 | N2 | W1.0 | W16 |
| 16-Aug | NNW7 | N5 | N3 | N5 | NNW3 | WNW2 | S2 | SE6 | SE7 | SE9 | SE5 | WSW6 | WSW11 | WSW12 | WSW8 | WSW7 | WSW11 | WSW14 | WSW13 | WSW13 | SW13 | WSW12 | WSW13 | SW7 | WSW5.3 | WSW14 |
| 17-Aug | S3 | SSW4 | SSW5 | SSW6 | SSE7 | SE6 | SE7 | SSW6 | SSE5 | SW6 | WSW10 | WSW10 | WSW11 | WSW14 | SW17 | W10 | W13 | WSW15 | WSW12 | SW5 | SSW4 | SW11 | WSW17 | W17 | SW7.7 | W17 |
| 18-Aug | WSW15 | SE10 | SSE12 | SE11 | SSE10 | SE13 | SE9 | SSE6 | SW15 | WSW18 | SW19 | SW23 | WSW29 | WSW33 | WSW30 | SSW27 | S19 | SW25 | SSW20 | SSW17 | SW25 | SW26 | SW24 | SW26 | SW16.3 | WSW33 |
| 19-Aug | WSW25 | WSW26 | W23 | W22 | W23 | W23 | W20 | WSW20 | WSW26 | WSW32 | WSW32 | W31 | W31 | WNW36 | WNW32 | WNW29 | WNW21 | WNW15 | W14 | WNW15 | WNW15 | W13 | W7 | W18 | W21.8 | WNW36 |
| 20-Aug | WSW12 | W21 | W23 | W26 | W26 | W20 | W17 | WSW17 | W18 | W21 | W26 | W23 | WNW22 | WNW21 | WNW24 | W28 | WSW35 | W25 | NW17 | NW16 | WNW20 | W19 | W21 | WNW9 | W20.3 | WSW35 |
| 21-Aug | WNW3 | WSW9 | SSW3 | SSE5 | S6 | SSW6 | SW7 | SW8 | SSE4 | SE5 | WSW14 | WSW21 | WSW23 | WSW23 | WSW20 | W16 | W12 | W14 | WNW13 | WNW12 | W7 | NW4 | NNW7 | N9 | WSW8.3 | WSW23 |
| 22-Aug | N6 | N6 | N5 | N3 | N5 | N3 | NW2 | NW4 | NW3 | NNW3 | WNW3 | NNW5 | W4 | W4 | W5 | WSW4 | NW1 | NW3 | NNW2 | ESE1 | NNW2 | ESE2 | SE6 | SE9 | NNW1.8 | SE9 |
| 23-Aug | SE5 | E3 | SE10 | SE7 | ESE3 | ESE2 | SSE6 | SE10 | SE5 | SSE15 | SSE17 | S17 | SSW12 | SSE11 | SSE18 | SSE16 | SSE21 | SSE23 | SSE25 | SE23 | SE20 | SE16 | SSE17 | SSE17 | SSE12.8 | SSE25 |
| 24-Aug | SE12 | SE12 | SE18 | SSE17 | S13 | SE9 | ESE5 | ENE2 | SE7 | SE10 | SE11 | SE7 | SE9 | SE12 | SE14 | ESE18 | ESE9 | N6 | E5 | SSE10 | SSW7 | SW15 | WSW20 | SW14 | SSE8.0 | WSW20 |
| 25-Aug | SW18 | SW16 | SW13 | SSW11 | SSW12 | SSW14 | S13 | SSW14 | SSW19 | SW22 | SSW18 | SSW16 | SW29 | WSW40 | SW36 | WSW39 | WSW37 | WSW33 | WSW24 | WSW20 | SW8 | WSW17 | WSW27 | WSW19 | SW20.3 | WSW40 |
| 26-Aug | W23 | W23 | WSW27 | W25 | W25 | WSW18 | SW14 | WSW17 | WSW19 | WSW14 | WSW8 | WSW12 | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | ---- | WSW27 |
| 27-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | ---- | ---- |
| 28-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | ---- | ---- |
| 29-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | ---- | ---- |
| 30-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | ---- | ---- |
| 31-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | ---- | ---- |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|--------|-------|-------|------|------|------|--------|-------|-------|--------|--------|-------|-------|--------|--------|-------|-------|-------|-------|--------|--------|--------|-------|--------|-----------------|
| SSW3.4 | S3.8 | S4.6 | S4.9 | S4.0 | S3.7 | SSE4.5 | S5.1 | S5.0 | SSW4.4 | SSW4.6 | SW6.0 | SW7.7 | WSW8.4 | WSW7.8 | SW7.3 | SW7.4 | SW7.5 | SW6.8 | SSW5.8 | SSW5.8 | SSW6.1 | SW5.5 | SSW4.9 | Diurnal Average |
| WSW25 | WSW26 | WSW27 | W26 | W26 | W23 | W20 | WSW20 | WSW26 | WSW32 | WSW32 | W31 | W31 | WSW40 | SW36 | WSW39 | WSW37 | WSW33 | SSE28 | SE23 | SW25 | SW26 | WSW27 | SW26 | Diurnal Maximum |

AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed 45 m (WS45m) - km/h
Lower Camp Met Tower - August 2017

| | |
|---|--------------------------------|
| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | Hours in Service: 744 |
| Maximum Value: 12 km/h on Aug 24 22:00 | Hours of Data: 612 |
| Minimum Value: 0 km/h on Aug 1 07:00 | Hours of Missing Data: 132 |
| | Hours of Calibration: 0 |
| | Percent Operational Time: 82.3 |
| Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 5 P ₉₀ = 6 P ₉₉ = 10 | |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
|--------|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 2 | 2 | 3 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 4 | 3 | 2 | 1 | 1 | 1 | 1 | 5 |
| 2-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 2 | 2 | 5 | 4 | 4 | 4 | 4 | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 5 |
| 3-Aug | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 4 | 4 | 3 | 4 | 3 | 2 | 3 | 3 | 3 | 7 | 4 | 4 | 3 | 2 | 7 |
| 4-Aug | 2 | 1 | 1 | 2 | 1 | 2 | 2 | 1 | 2 | 2 | 1 | 2 | 2 | 5 | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 5 |
| 5-Aug | 2 | 3 | 3 | 1 | 1 | 2 | 1 | 2 | 3 | 2 | 3 | 3 | 4 | 4 | 4 | 5 | 4 | 4 | 3 | 3 | 2 | 3 | 2 | 2 | 5 |
| 6-Aug | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 2 | 4 | 3 | 4 | 5 | 6 | 4 | 4 | 3 | 3 | 1 | 3 | 2 | 1 | 1 | 2 | 1 | 6 |
| 7-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 5 | 4 | 3 | 2 | 1 | 2 | 2 | 2 | 2 | 5 |
| 8-Aug | 1 | 2 | 2 | 4 | 2 | 2 | 2 | 2 | 2 | 3 | 5 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 5 |
| 9-Aug | 2 | 3 | 4 | 4 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 2 | 4 |
| 10-Aug | 2 | 3 | 6 | 4 | 3 | 2 | 2 | 3 | 4 | 2 | 2 | 3 | 2 | 3 | 4 | 3 | 5 | 6 | 5 | 2 | 2 | 1 | 1 | 2 | 6 |
| 11-Aug | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 5 | 5 | 5 | 5 | 5 | 4 | 3 | 4 | 4 | 3 | 2 | 2 | 3 | 5 |
| 12-Aug | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 5 | 4 | 4 | 5 | 6 | 6 | 7 | 5 | 5 | 5 | 6 | 5 | 3 | 2 | 3 | 3 | 3 | 7 |
| 13-Aug | 3 | 3 | 3 | 3 | 4 | 5 | 5 | 6 | 6 | 8 | 9 | 8 | 8 | 8 | 7 | 8 | 7 | 8 | 7 | 5 | 5 | 4 | 4 | 4 | 9 |
| 14-Aug | 4 | 4 | 3 | 3 | 4 | 3 | 4 | 5 | 4 | 4 | 4 | 4 | 5 | 5 | 7 | 6 | 6 | 3 | 2 | 3 | 4 | 4 | 3 | 5 | 7 |
| 15-Aug | 3 | 3 | 3 | 3 | 1 | 2 | 3 | 2 | 1 | 1 | 1 | 2 | 2 | 3 | 2 | 1 | 2 | 2 | 5 | 6 | 4 | 2 | 1 | 1 | 6 |
| 16-Aug | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 4 | 4 | 4 | 5 | 3 | 4 | 4 | 2 | 2 | 2 | 2 | 2 | 3 | 5 |
| 17-Aug | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 2 | 4 | 3 | 4 | 3 | 4 | 7 | 7 | 4 | 5 | 4 | 2 | 2 | 5 | 4 | 4 | 7 |
| 18-Aug | 4 | 4 | 2 | 2 | 3 | 3 | 2 | 3 | 6 | 6 | 4 | 6 | 8 | 7 | 8 | 8 | 5 | 6 | 6 | 5 | 5 | 4 | 5 | 4 | 8 |
| 19-Aug | 5 | 6 | 6 | 5 | 6 | 6 | 5 | 5 | 7 | 7 | 9 | 8 | 9 | 11 | 10 | 10 | 7 | 6 | 5 | 5 | 4 | 5 | 3 | 6 | 11 |
| 20-Aug | 3 | 6 | 5 | 5 | 5 | 6 | 5 | 5 | 5 | 7 | 7 | 7 | 7 | 10 | 7 | 10 | 9 | 8 | 4 | 4 | 5 | 5 | 6 | 7 | 10 |
| 21-Aug | 2 | 3 | 2 | 2 | 3 | 3 | 4 | 3 | 3 | 2 | 7 | 4 | 5 | 6 | 6 | 5 | 5 | 6 | 4 | 3 | 5 | 2 | 1 | 2 | 7 |
| 22-Aug | 1 | 2 | 2 | 1 | 1 | 2 | 1 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 2 | 3 |
| 23-Aug | 2 | 4 | 5 | 4 | 2 | 2 | 4 | 4 | 3 | 5 | 4 | 5 | 4 | 3 | 5 | 4 | 6 | 6 | 7 | 6 | 6 | 5 | 4 | 4 | 7 |
| 24-Aug | 5 | 4 | 5 | 6 | 7 | 5 | 3 | 2 | 4 | 3 | 4 | 2 | 5 | 4 | 9 | 6 | 4 | 3 | 3 | 5 | 5 | 12 | 9 | 4 | 12 |
| 25-Aug | 5 | 5 | 4 | 3 | 4 | 5 | 3 | 4 | 7 | 5 | 5 | 5 | 11 | 8 | 8 | 8 | 9 | 9 | 7 | 6 | 4 | 7 | 5 | 5 | 11 |
| 26-Aug | 6 | 5 | 5 | 6 | 6 | 6 | 5 | 5 | 4 | 4 | 3 | 4 | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | 6 |
| 27-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- |
| 28-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- |
| 29-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- |
| 30-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- |
| 31-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- |
| | 6 | 6 | 6 | 6 | 7 | 6 | 5 | 6 | 7 | 8 | 9 | 8 | 11 | 11 | 10 | 10 | 9 | 9 | 7 | 7 | 6 | 12 | 9 | 7 | |

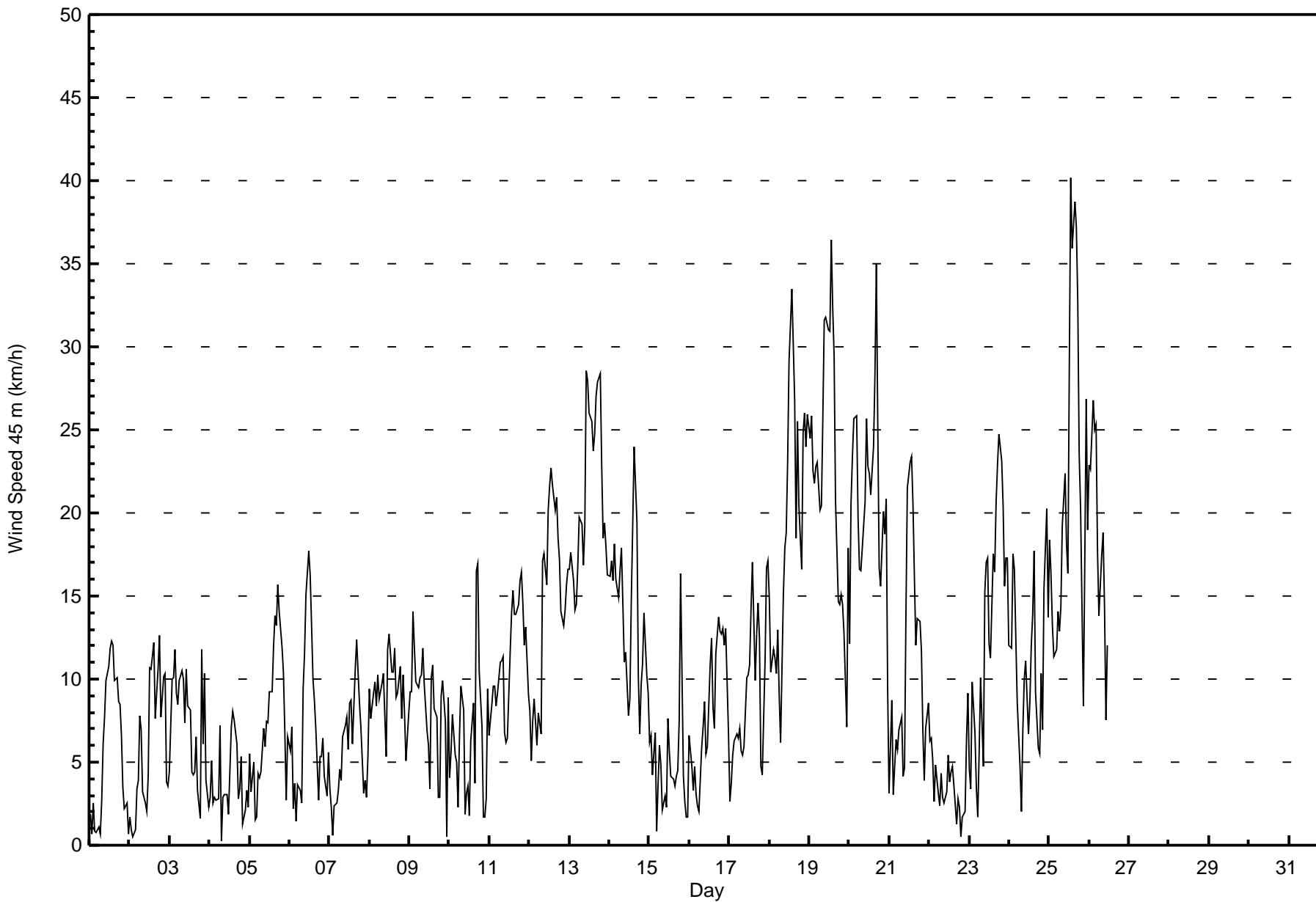
Diurnal Maximum

AF - Analyzer Failure



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed 45 m (WS45m) - km/h
Lower Camp Met Tower - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed 45 m (WS45m) - km/h
Lower Camp Met Tower - August 2017**

| Wind Speed Ranges (km/h) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 5 | 164 | 26.80 | 26.80 |
| 6 - 11 | 207 | 33.82 | 60.62 |
| 12 - 19 | 153 | 25.00 | 85.62 |
| 20 - 28 | 70 | 11.44 | 97.06 |
| 29 - 38 | 16 | 2.61 | 99.67 |
| > 38 | 2 | 0.33 | 100.00 |

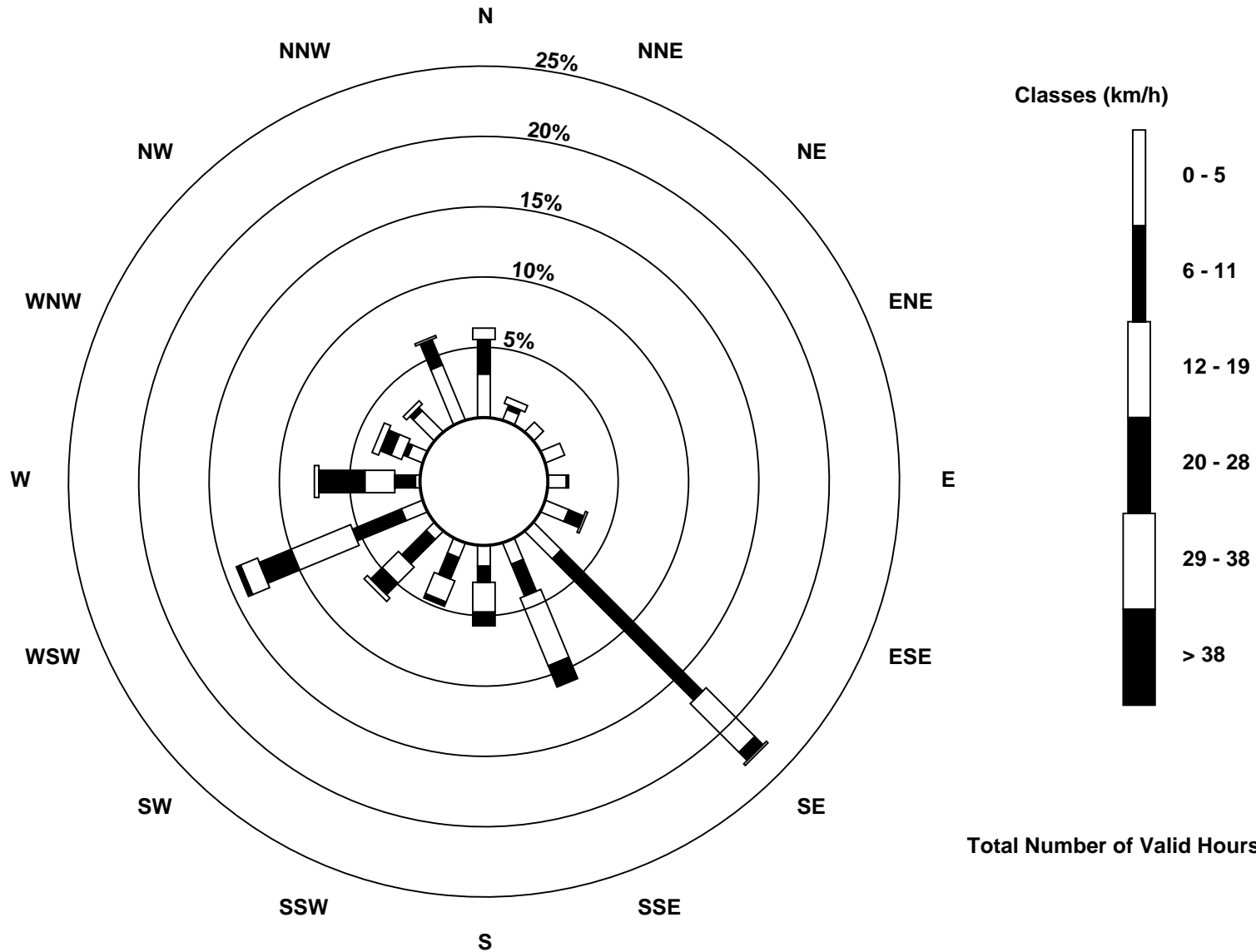
Total Number of Valid Hours: 612

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Wind Speed 45 m (WS45m) - km/h
Lower Camp Met Tower (AMS 3)





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 100 m (WS100m) - km/h

Lower Camp Met Tower - August 2017

| | | |
|---|--|---------------------------------|
| Maximum Speed: 49 km/h on Aug 19 14:00 | Maximum Daily Speed Average: 31.8 km/h on Aug 30 | Hours in Service: 744 |
| Minimum Speed Value: 1 km/h on Aug 2 03:00 | Minimum Daily Speed Average: 1.2 km/h on Aug 15 | Hours of Data: 744 |
| Maximum Diurnal Speed Average: 10.5 km/h at hour 14 | Minimum Diurnal Speed Average: 6.1 km/h at hour 1 | Hours of Missing Data: 0 |
| Monthly Average Velocity: 7.9 km/h 212.2 deg | Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 8 Median = 14 Q ₃ = 24 P ₉₀ = 32 P ₉₉ = 43 | Percent Operational Time: 100.0 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | NW5 | NNW3 | NNW6 | NNW2 | SW1 | ESE1 | NE2 | NNW6 | NNW7 | NNW9 | NNE14 | N14 | N16 | N16 | N17 | N14 | N14 | N13 | NNE13 | NNE12 | NE11 | NE10 | NNE5 | NNE3 | N8.3 | N17 |
| 2-Aug | NW5 | N5 | N1 | SE6 | SSE6 | S5 | SSE6 | SE8 | ESE4 | ESE4 | ESE3 | ENE4 | WSW13 | W12 | W14 | WSW10 | WSW11 | W13 | WSW13 | SW9 | SW15 | WSW17 | SW10 | SE6 | SW5.0 | WSW17 |
| 3-Aug | SSW7 | S7 | S8 | SSE12 | SSE11 | SSE14 | SSE13 | SE12 | SE13 | SE9 | SE14 | SSE10 | S9 | S5 | SSE5 | NNE4 | SE8 | S4 | E3 | N20 | SE8 | ESE21 | E13 | E5 | SE6.8 | ESE21 |
| 4-Aug | N5 | N9 | NW7 | NE2 | ESE5 | ESE3 | NNW10 | ESE1 | NNW2 | NNE4 | NNW3 | NNE2 | ESE7 | E11 | ESE13 | SE12 | SE8 | SE4 | SSW5 | SSE7 | SSE4 | E4 | E1 | ESE6 | E2.6 | ESE13 |
| 5-Aug | NE4 | N8 | SW6 | WSW7 | SSE4 | SSE4 | SSE4 | SE6 | SE9 | SE6 | SE11 | SE9 | SE12 | SSE11 | S13 | SSE16 | S14 | S17 | S14 | S13 | SSW15 | SW18 | SSW8 | SSE5 | S7.5 | SW18 |
| 6-Aug | SSE4 | SSE6 | ESE4 | S5 | SSW1 | N6 | NE9 | NE6 | N13 | N16 | NNE21 | N25 | NNE24 | NNE19 | N15 | N13 | N11 | N5 | NNE12 | N11 | N13 | N11 | NNW11 | NNW12 | N9.5 | N25 |
| 7-Aug | NNW13 | NNW12 | NNW7 | NNW6 | NW7 | NW7 | N9 | N7 | N9 | N9 | NNW6 | NW9 | NW9 | NW8 | W12 | W14 | WSW11 | WSW10 | SW8 | SW9 | WSW13 | WSW11 | SW6 | WNW6.5 | W14 | |
| 8-Aug | S5 | S7 | SSE9 | SSE10 | SSE9 | SSE9 | SSE9 | SSE10 | SSE10 | SSE7 | WSW9 | WSW13 | WSW14 | WSW12 | WSW12 | WSW13 | SW11 | SW10 | SW13 | SSW11 | S16 | SSW14 | SE11 | SSE8 | SSW8.2 | S16 |
| 9-Aug | S7 | SSE11 | S13 | S11 | S8 | SSE9 | SSE9 | SSE7 | SSE10 | SE11 | SE9 | SE5 | SW4 | WSW11 | WSW12 | WSW10 | WSW9 | SW4 | S5 | SSW14 | SW23 | SW19 | WSW6 | SSE9 | SSW7.7 | SW23 |
| 10-Aug | SE5 | ESE13 | SE17 | SSE9 | S9 | SSW6 | SE10 | SE14 | SE10 | NE2 | N3 | N4 | WSW1 | NNW7 | N11 | NE6 | SE21 | SE25 | S14 | S6 | WSW8 | WSW6 | SW6 | SSE7 | SSE5.4 | SE25 |
| 11-Aug | S6 | S5 | SSE9 | SSE13 | SSE13 | SSE7 | SE13 | SE13 | SE12 | SE10 | SE8 | SE9 | SSE14 | SSE17 | SSE17 | SSE16 | SSE16 | SSE16 | SSE21 | SSE20 | SSE20 | SSE17 | S16 | S14 | SSE13.1 | SSE21 |
| 12-Aug | SSE12 | SSE14 | SSE17 | SSE17 | SE17 | SE18 | SE16 | SSE15 | SSE19 | SSE21 | SSE17 | S22 | S23 | S25 | S23 | S23 | S20 | SSW20 | SSW17 | S22 | S21 | S24 | SSE22 | S18.8 | S25 | |
| 13-Aug | SSE25 | SSE25 | SSE26 | SE26 | SE31 | SE32 | SE32 | SE33 | SE27 | SE33 | SE43 | SSE35 | SSE36 | SSE35 | SSE32 | SE37 | SE40 | SSE38 | SSE33 | SSE28 | SSE26 | SSE27 | SSE26 | SE28 | SSE31.1 | SE43 |
| 14-Aug | SE28 | SE29 | SE28 | SE28 | SE26 | SE24 | SE26 | SE25 | SE15 | SSE15 | SSW13 | SSW9 | SW11 | SSW16 | WSW22 | WSW28 | WSW21 | SW11 | SSW7 | SSE11 | SSE12 | SSE18 | SSE17 | SSE15 | SSW14.6 | SE29 |
| 15-Aug | SE14 | SE13 | SSE8 | SE12 | SE8 | SSE5 | WSW4 | WNW3 | NNE4 | WNW3 | W9 | W7 | WNW4 | NNE4 | NE4 | NE7 | NE10 | WSW6 | W22 | NW10 | NNW6 | NW3 | NW10 | WSW1.2 | W22 | |
| 16-Aug | NW11 | WNW8 | W5 | WNW4 | W8 | WSW10 | WSW7 | SSW5 | SSE5 | S6 | SSE5 | WSW8 | WSW13 | WSW14 | WSW9 | WSW8 | WSW13 | WSW17 | WSW15 | WSW18 | WSW18 | WSW21 | WSW20 | WSW12 | WSW9.7 | WSW21 |
| 17-Aug | WSW7 | WSW12 | WSW9 | SW11 | SW9 | SSW7 | SW7 | SSW5 | SW7 | WSW10 | WSW11 | WSW12 | WSW16 | SW19 | W12 | W17 | WSW18 | WSW15 | SW11 | SW16 | SW25 | WSW26 | WSW27 | WSW12.7 | WSW27 | |
| 18-Aug | WSW22 | SSE9 | S9 | SSW8 | SSW11 | S10 | S7 | SSW10 | SW20 | WSW20 | SW23 | SW26 | WSW33 | WSW38 | WSW37 | SW34 | SSW21 | SW31 | SW27 | SSW27 | SW37 | SW36 | SW35 | SW35 | SW22.2 | WSW38 |
| 19-Aug | WSW32 | WSW34 | W34 | W30 | W32 | W32 | WSW26 | WSW26 | WSW33 | WSW38 | WSW40 | W42 | W41 | WNW49 | WNW44 | WNW42 | WNW29 | W20 | W22 | WNW23 | WNW23 | W19 | W12 | W26 | W29.9 | WNW49 |
| 20-Aug | WSW19 | WSW31 | WSW33 | W38 | WSW35 | WSW29 | WSW25 | WSW22 | WSW22 | W27 | W32 | W30 | WNW30 | WNW29 | WNW32 | W37 | WSW43 | W34 | NW26 | NW25 | WNW30 | W27 | W31 | WNW14 | W28.0 | WSW43 |
| 21-Aug | NNW7 | WSW14 | WSW8 | SW5 | SW12 | WSW10 | SW9 | SW10 | SSW4 | SSW3 | WSW18 | WSW23 | WSW25 | WSW26 | WSW25 | W21 | W17 | W19 | WNW21 | WNW21 | W12 | NW11 | NNW14 | NNW16 | W12.2 | WSW26 |
| 22-Aug | N12 | N12 | N11 | N8 | N11 | N9 | NNE4 | NNW4 | NW3 | NW4 | WNW4 | NW7 | WNW4 | W5 | W5 | WSW4 | WNW2 | WNW4 | NNW2 | ENE4 | ENE6 | ESE11 | SE18 | SE17 | N2.6 | SE18 |
| 23-Aug | SE12 | SE17 | SE23 | SE19 | SE13 | SE11 | SE19 | SE20 | SE13 | SSE18 | SSE19 | SSW19 | SSW14 | S13 | SSE23 | SSE20 | SE35 | SSE34 | SE36 | SE38 | SE37 | SE28 | SSE25 | SSE27 | SSE21.5 | SE38 |
| 24-Aug | SE26 | SE25 | SE34 | SSE28 | S20 | SE19 | ESE13 | ESE6 | SE13 | SE15 | SE16 | SE10 | SE17 | SE24 | ESE30 | ESE17 | ESE7 | SE17 | SE22 | S11 | SW22 | WSW24 | SW20 | SSE15.5 | SE34 | |
| 25-Aug | SW23 | SW23 | SW20 | SSW19 | SSW22 | SW23 | SSW17 | SSW18 | SSW25 | SW27 | SSW24 | SSW21 | SW36 | WSW46 | SW43 | WSW45 | WSW45 | WSW43 | WSW32 | WSW28 | SW16 | WSW25 | WSW34 | WSW27 | SW27.3 | WSW46 |
| 26-Aug | WSW33 | WSW32 | WSW36 | WSW35 | WSW37 | WSW27 | WSW19 | WSW21 | WSW20 | WSW15 | WSW8 | WSW15 | WSW19 | WSW26 | WSW24 | WSW26 | WSW22 | WSW24 | SW25 | WSW21 | SW26 | SW32 | SW27 | SW25 | WSW24.5 | WSW37 |
| 27-Aug | WSW25 | WSW26 | WSW28 | WSW31 | WSW30 | WSW27 | WSW22 | W24 | WSW20 | WSW26 | WSW30 | WSW33 | WSW33 | W32 | W32 | W31 | W32 | W29 | W24 | WNW14 | W12 | WNW7 | WNW5 | WSW12 | WSW23.8 | WSW33 |
| 28-Aug | NW12 | NW6 | WSW6 | WSW10 | WSW10 | WSW11 | SW7 | SSW5 | WSW7 | W6 | WNW14 | WNW19 | NW19 | WNW23 | WNW25 | NW24 | NW22 | NW20 | NW18 | NW18 | NW14 | NNW8 | WNW9 | WNW6 | WNW11.8 | WNW25 |
| 29-Aug | WNW5 | NW5 | NNW4 | NE2 | S2 | SSE3 | SSW3 | S3 | SE1 | WSW2 | WNW2 | N2 | N4 | E1 | NE4 | NNW3 | SSW1 | SE11 | ESE11 | E18 | ESE17 | SE17 | SE18 | SE19 | ESE3.9 | SE19 |
| 30-Aug | SE25 | SE31 | SE33 | SE34 | SE32 | SE32 | SE36 | SE36 | SE40 | SE40 | SE40 | SE42 | SE44 | SE45 | SSE34 | SE43 | SE40 | SSE28 | SSE26 | S22 | S20 | S21 | S20 | SSE18 | SSE31.8 | SE45 |
| 31-Aug | SSE15 | S13 | S10 | S6 | SSW8 | SSE12 | SSE13 | SSE14 | SSE15 | SSW10 | SW14 | SW16 | WSW22 | WSW24 | W29 | W31 | W33 | W35 | W31 | W34 | WSW24 | WSW22 | WSW29 | WSW31 | WSW16.1 | W35 |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|--------|--------|--------|--------|--------|--------|------|------|------|--------|--------|-------|-------|---------|---------|-------|-------|-------|-------|-------|-------|--------|-------|--------|-----------------|
| SSW6.1 | SSW6.5 | SSW7.8 | SSW8.3 | SSW8.4 | SSW7.6 | S7.1 | S7.5 | S6.9 | SSW6.2 | SSW6.7 | SW7.8 | SW9.6 | WSW10.1 | WSW10.1 | SW9.8 | SW9.6 | SW9.7 | SW9.1 | SW7.7 | SW9.4 | SW10.2 | SW9.4 | SSW8.2 | Diurnal Average |
| WSW33 | WSW34 | WSW36 | W38 | WSW37 | W32 | SE36 | SE36 | SE40 | SE40 | SE43 | SE42 | SE44 | WNW49 | WNW44 | WSW45 | WSW45 | WSW43 | SE36 | SE38 | SW37 | SW36 | SW35 | SW35 | Diurnal Maximum |

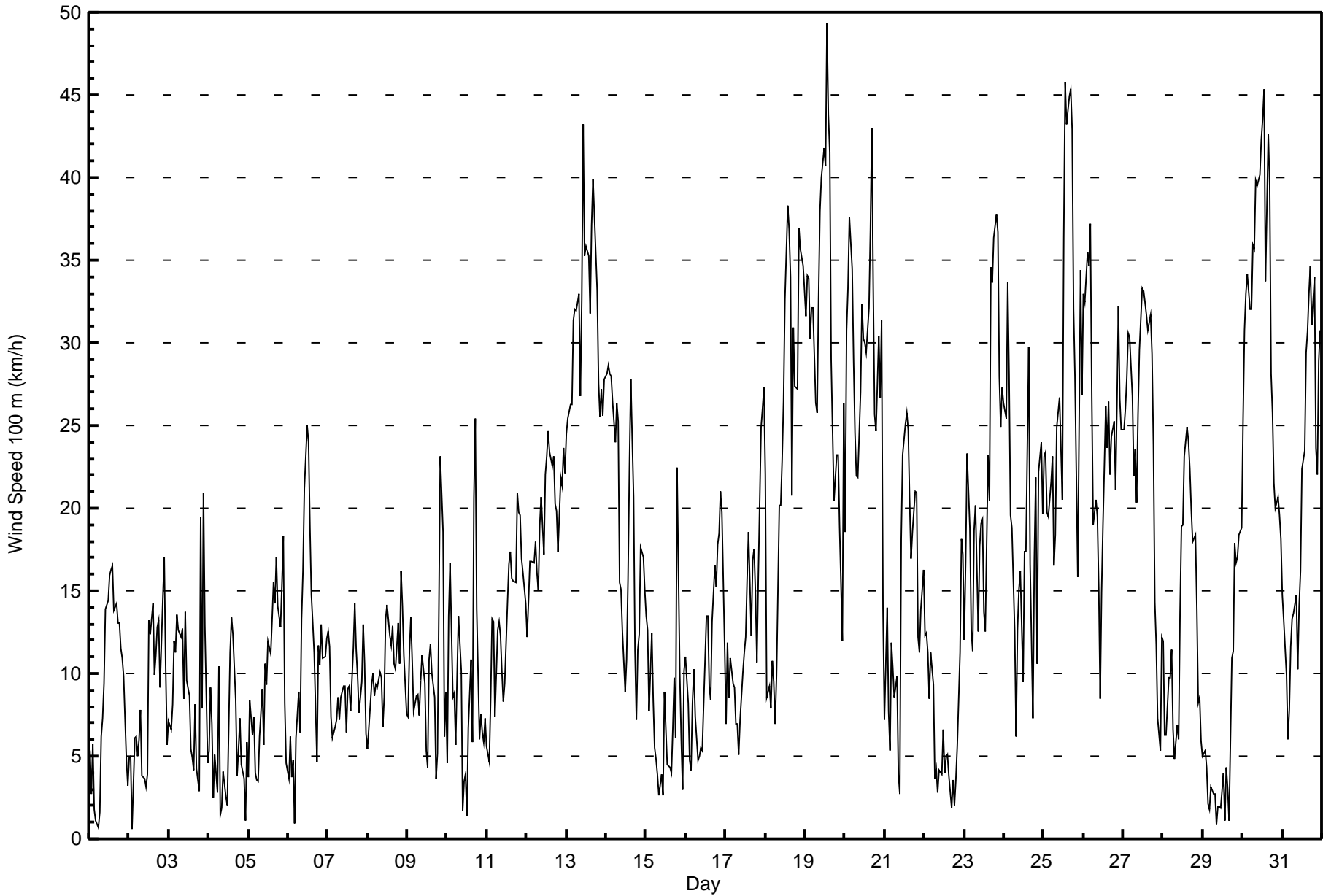
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed 100 m (WS100m) - km/h
Lower Camp Met Tower - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 13 km/h on Aug 24 15:00 Minimum Value: 1 km/h on Aug 22 19:00 Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 3 Q ₃ = 5 P ₉₀ = 6 P ₉₉ = 10 | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | |
|---|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 6 | 5 | 5 | 5 | 4 | 4 | 3 | 2 | 1 | 1 | 2 | 1 | 6 |
| 2-Aug | 2 | 2 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 4 | 4 | 4 | 4 | 2 | 2 | 2 | 2 | 1 | 4 | 3 | 4 |
| 3-Aug | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 1 | 2 | 2 | 4 | 4 | 4 | 4 | 3 | 2 | 3 | 3 | 4 | 12 | 5 | 3 | 6 | 3 | 12 |
| 4-Aug | 2 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 7 | 3 | 2 | 3 | 2 | 3 | 2 | 4 | 4 | 4 | 2 | 3 | 7 |
| 5-Aug | 3 | 4 | 3 | 2 | 1 | 2 | 1 | 2 | 4 | 2 | 2 | 2 | 4 | 4 | 5 | 4 | 4 | 2 | 4 | 3 | 4 | 3 | 5 | 3 | 5 |
| 6-Aug | 2 | 3 | 2 | 2 | 1 | 2 | 3 | 3 | 4 | 2 | 3 | 4 | 5 | 3 | 3 | 2 | 2 | 2 | 4 | 3 | 2 | 1 | 1 | 1 | 5 |
| 7-Aug | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 3 | 5 | 3 | 2 | 2 | 1 | 1 | 3 | 4 | 2 | 5 |
| 8-Aug | 1 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 5 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 4 | 3 | 2 | 3 | 5 |
| 9-Aug | 2 | 3 | 2 | 3 | 2 | 2 | 3 | 2 | 2 | 1 | 2 | 3 | 4 | 4 | 3 | 3 | 3 | 3 | 2 | 4 | 2 | 6 | 4 | 3 | 6 |
| 10-Aug | 3 | 5 | 8 | 5 | 4 | 2 | 2 | 2 | 3 | 1 | 2 | 3 | 2 | 3 | 5 | 4 | 4 | 6 | 6 | 3 | 3 | 3 | 2 | 2 | 8 |
| 11-Aug | 2 | 1 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 1 | 2 | 6 | 4 | 5 | 5 | 4 | 4 | 4 | 5 | 4 | 3 | 3 | 3 | 4 | 6 |
| 12-Aug | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 4 | 4 | 4 | 5 | 6 | 7 | 7 | 6 | 6 | 5 | 7 | 6 | 4 | 4 | 4 | 4 | 5 | 7 |
| 13-Aug | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 7 | 5 | 9 | 9 | 9 | 9 | 7 | 7 | 9 | 8 | 6 | 7 | 6 | 6 | 3 | 9 |
| 14-Aug | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 5 | 5 | 3 | 4 | 3 | 5 | 5 | 7 | 3 | 5 | 2 | 3 | 4 | 3 | 3 | 2 | 4 | 7 |
| 15-Aug | 3 | 4 | 3 | 4 | 4 | 3 | 3 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 2 | 1 | 2 | 2 | 5 | 7 | 6 | 2 | 2 | 2 | 7 |
| 16-Aug | 4 | 2 | 2 | 2 | 3 | 2 | 3 | 1 | 2 | 2 | 2 | 3 | 4 | 3 | 5 | 3 | 3 | 4 | 3 | 2 | 1 | 1 | 1 | 3 | 5 |
| 17-Aug | 2 | 3 | 2 | 2 | 3 | 2 | 2 | 3 | 3 | 4 | 2 | 2 | 2 | 3 | 6 | 7 | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 3 | 7 |
| 18-Aug | 5 | 3 | 3 | 3 | 4 | 3 | 3 | 6 | 6 | 6 | 5 | 6 | 6 | 6 | 6 | 11 | 6 | 6 | 6 | 6 | 4 | 4 | 3 | 4 | 11 |
| 19-Aug | 4 | 5 | 5 | 4 | 5 | 4 | 5 | 4 | 6 | 5 | 6 | 7 | 8 | 10 | 11 | 10 | 6 | 7 | 5 | 6 | 5 | 6 | 4 | 5 | 11 |
| 20-Aug | 4 | 7 | 4 | 3 | 4 | 4 | 4 | 4 | 4 | 6 | 6 | 6 | 6 | 10 | 6 | 10 | 7 | 6 | 5 | 4 | 5 | 5 | 6 | 8 | 10 |
| 21-Aug | 3 | 3 | 4 | 3 | 5 | 4 | 5 | 3 | 3 | 2 | 6 | 3 | 3 | 4 | 5 | 5 | 6 | 7 | 5 | 3 | 6 | 3 | 2 | 2 | 7 |
| 22-Aug | 1 | 2 | 3 | 1 | 1 | 3 | 1 | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 4 | 3 | 4 | 4 |
| 23-Aug | 2 | 7 | 5 | 5 | 4 | 5 | 4 | 4 | 4 | 3 | 4 | 6 | 5 | 4 | 5 | 4 | 6 | 5 | 4 | 3 | 4 | 5 | 4 | 3 | 7 |
| 24-Aug | 3 | 3 | 3 | 5 | 8 | 5 | 5 | 4 | 5 | 4 | 4 | 3 | 6 | 6 | 13 | 7 | 4 | 3 | 6 | 5 | 6 | 12 | 9 | 4 | 13 |
| 25-Aug | 4 | 4 | 3 | 4 | 4 | 5 | 4 | 5 | 7 | 4 | 6 | 7 | 11 | 5 | 6 | 7 | 7 | 8 | 6 | 8 | 3 | 6 | 4 | 4 | 11 |
| 26-Aug | 5 | 4 | 4 | 4 | 4 | 7 | 5 | 4 | 3 | 4 | 3 | 3 | 5 | 4 | 5 | 4 | 5 | 3 | 5 | 1 | 3 | 2 | 2 | 3 | 7 |
| 27-Aug | 2 | 3 | 3 | 3 | 4 | 3 | 4 | 4 | 5 | 5 | 4 | 3 | 6 | 5 | 6 | 6 | 6 | 5 | 7 | 3 | 2 | 3 | 2 | 2 | 7 |
| 28-Aug | 6 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 7 | 5 | 6 | 6 | 6 | 6 | 4 | 3 | 2 | 2 | 1 | 2 | 2 | 2 | 7 |
| 29-Aug | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 4 | 4 | 2 | 4 | 4 |
| 30-Aug | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 3 | 5 | 5 | 5 | 5 | 8 | 7 | 4 | 7 | 7 | 4 | 4 | 4 | 4 | 4 | 8 |
| 31-Aug | 4 | 3 | 3 | 2 | 2 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 5 | 7 | 6 | 5 | 6 | 7 | 4 | 3 | 4 | 3 | 3 | 7 |
| | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | | | |





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed 100 m (WS100m) - km/h
Lower Camp Met Tower - August 2017**

| Wind Speed Ranges (km/h) | Number of Hours | % | Cumulative % |
|-------------------------------------|----------------------------|----------|---------------------|
| 0 - 5 | 108 | 14.52 | 14.52 |
| 6 - 11 | 197 | 26.48 | 40.99 |
| 12 - 19 | 185 | 24.87 | 65.86 |
| 20 - 28 | 145 | 19.49 | 85.35 |
| 29 - 38 | 87 | 11.69 | 97.04 |
| > 38 | 22 | 2.96 | 100.00 |

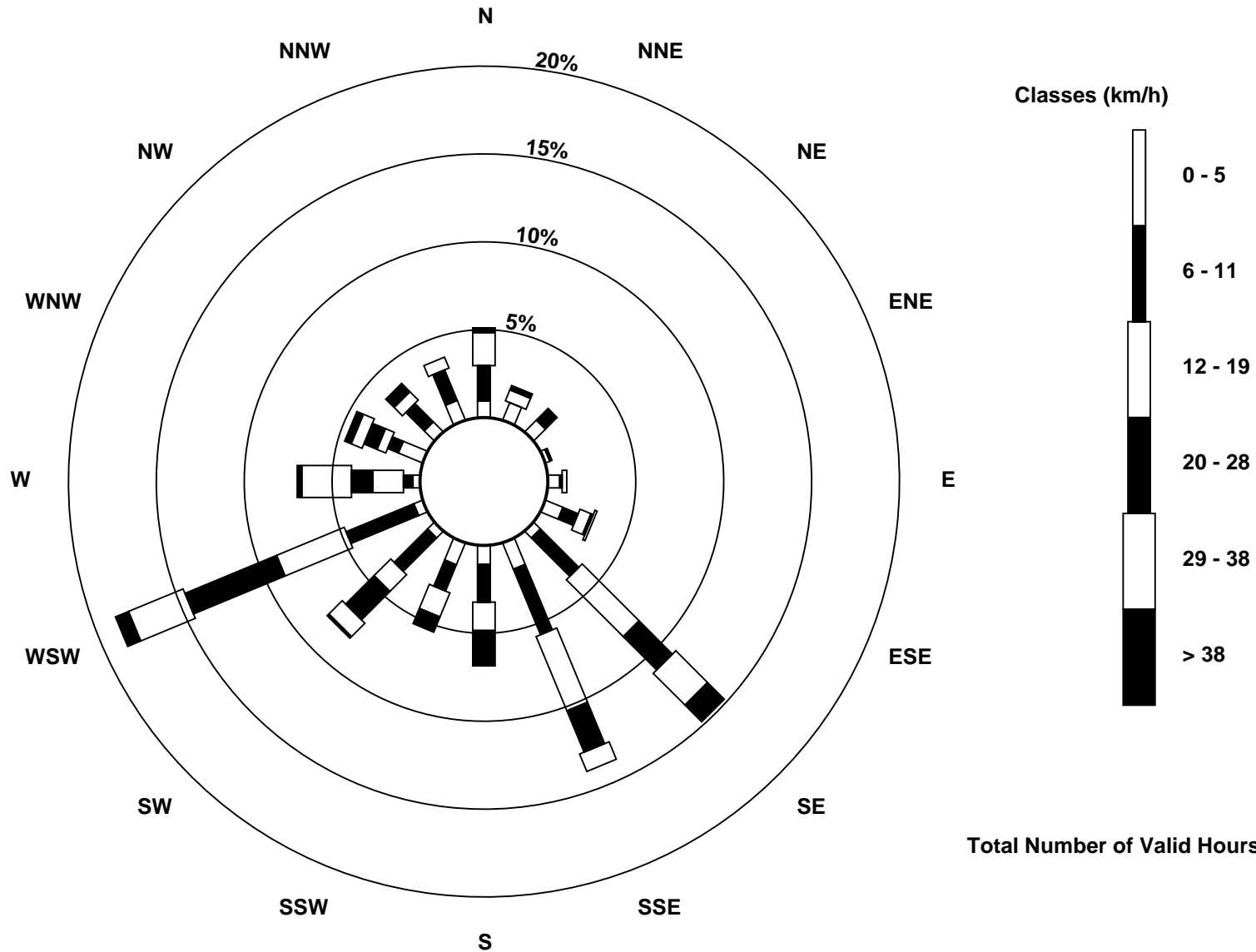
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Wind Speed 100 m (WS100m) - km/h
Lower Camp Met Tower (AMS 3)



Total Number of Valid Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 167 m (WS167m) - km/h

Lower Camp Met Tower - August 2017

| | | |
|---|---|---------------------------------|
| Maximum Speed: 54 km/h on Aug 19 14:00 | Maximum Daily Speed Average: 35.7 km/h on Aug 19 | Hours in Service: 744 |
| Minimum Speed Value: 0 km/h on Aug 10 10:00 | Minimum Daily Speed Average: 1.8 km/h on Aug 15 | Hours of Data: 744 |
| Maximum Diurnal Speed Average: 12.9 km/h at hour 22 | Minimum Diurnal Speed Average: 7.5 km/h at hour 10 | Hours of Missing Data: 0 |
| Monthly Average Velocity: 10.1 km/h 224.3 deg | Percentiles: P ₁ = 2 P ₁₀ = 6 Q ₁ = 10 Median = 17 Q ₃ = 28 P ₉₀ = 37 P ₉₉ = 48 | Percent Operational Time: 100.0 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | NW12 | NW12 | NW10 | NW9 | WNW6 | NW7 | NW8 | NNW11 | NNW8 | N10 | NNE14 | N15 | N17 | N17 | N17 | N15 | N15 | N14 | NNE14 | NNE13 | NE13 | NE13 | NE12 | ENE8 | N10.4 | N17 |
| 2-Aug | WNW3 | NNW8 | W7 | W5 | SSW5 | SW9 | SSW7 | SSW5 | SSE3 | SE3 | SSE3 | NE2 | W15 | W13 | W15 | WSW12 | WSW13 | WSW15 | WSW15 | SW10 | SW16 | WSW19 | WSW18 | SSW8 | WSW7.9 | WSW19 |
| 3-Aug | SW13 | SW10 | SW11 | SSW10 | SSW9 | S10 | S8 | S6 | SSE7 | SSE8 | SE13 | S11 | S10 | S6 | S5 | N4 | SE8 | S5 | E2 | N25 | ESE11 | ESE19 | E20 | E12 | SSE5.0 | N25 |
| 4-Aug | NNE5 | NNW8 | NNW7 | NE2 | E5 | ESE6 | N9 | ESE3 | WSW1 | NE3 | WNW3 | NNW3 | E8 | E12 | ESE13 | SE13 | SE8 | SSE3 | SSW8 | S8 | S7 | SSE2 | WSW1 | SE5 | ESE2.6 | ESE13 |
| 5-Aug | NNW2 | N12 | SSW3 | WSW10 | SW8 | SW6 | S4 | S3 | SE8 | SSE5 | SE9 | SE9 | SSE12 | SSE12 | S15 | S16 | S17 | S18 | SSW16 | SSW15 | SSW20 | SW24 | SW21 | SSW13 | S9.0 | SW24 |
| 6-Aug | SSW7 | SSW8 | NNW2 | SW4 | WNW5 | N7 | NE19 | NE12 | N13 | N17 | NNE23 | N26 | NNE25 | NNE19 | N16 | N13 | N13 | NNE9 | NNE15 | N13 | N21 | N18 | N18 | N18 | N12.2 | N26 |
| 7-Aug | NNW18 | N18 | N15 | N10 | N7 | N11 | N14 | N12 | N12 | N11 | N10 | NNW7 | NW10 | NW10 | NW8 | W11 | W15 | WSW12 | WSW10 | SW7 | WSW11 | WSW17 | WSW21 | WSW16 | NW7.8 | WSW21 |
| 8-Aug | SW9 | SW9 | SW12 | SW13 | SW11 | SW11 | SSW8 | SSW7 | SSW8 | SSW6 | WSW11 | WSW15 | WSW16 | WSW14 | WSW13 | WSW15 | WSW12 | SW11 | SW14 | SSW14 | SSW17 | SSW28 | SSW13 | SSW13 | SW11.8 | SSW28 |
| 9-Aug | SSW13 | SSW12 | SSW14 | SSW16 | SSW17 | SSW15 | SSW12 | SSW8 | S7 | SSE9 | SSE8 | S4 | WSW5 | WSW12 | WSW13 | WSW11 | WSW10 | SW5 | S6 | SSW14 | SW23 | SW24 | WSW14 | SSW10 | SW10.8 | SW24 |
| 10-Aug | SSW4 | ESE13 | SSE18 | S17 | S17 | SSW11 | SSW5 | SE11 | SSE8 | N0 | N3 | N4 | WNW2 | NNW7 | N11 | NNE7 | SE16 | SE26 | S17 | SSW9 | WSW11 | W12 | W4 | S8 | S5.6 | SE26 |
| 11-Aug | SSW7 | SW8 | SSW8 | S11 | S9 | S5 | S7 | S8 | S9 | SSE9 | SSE6 | SSE9 | SSE13 | SSE16 | SSE17 | SSE17 | SSE16 | SSE18 | SSE23 | S25 | S29 | S27 | S25 | SSW23 | S13.7 | S29 |
| 12-Aug | SSW18 | S17 | S21 | S24 | S22 | S21 | SSE21 | SSE20 | S18 | S19 | S18 | S25 | S27 | S28 | S28 | S26 | S27 | S23 | SSW23 | SSW23 | S25 | S29 | S32 | S32 | S23.4 | S32 |
| 13-Aug | SSE28 | SSE30 | SSE27 | SSE26 | SSE30 | SSE33 | SE36 | SSE32 | SSE26 | SE34 | SSE43 | SSE36 | SSE37 | SSE36 | SSE33 | SSE38 | SSE41 | SSE38 | SSE38 | S36 | SSE32 | SSE33 | SSE30 | SSE30 | SSE33.2 | SSE43 |
| 14-Aug | SE32 | SE34 | SE34 | SE33 | SE32 | SE28 | SE30 | SSE27 | SSE15 | SSE15 | SSW14 | SSW10 | SW12 | SSW17 | WSW24 | WSW31 | WSW24 | WSW12 | SSW8 | SSE11 | SSE12 | SSE17 | SSE17 | SSE17 | S16.5 | SE34 |
| 15-Aug | SSE16 | SSE17 | SSE10 | SE16 | SE15 | SE7 | SE4 | W2 | W4 | NNE4 | WNW3 | W9 | W7 | WNW5 | N4 | NE4 | NE7 | NE12 | WSW3 | W22 | N28 | N20 | NW14 | WNW22 | WNW1.8 | N28 |
| 16-Aug | WNW23 | WNW16 | W11 | W8 | W12 | W13 | W13 | WSW10 | SSW6 | SSW7 | SSW7 | WSW10 | WSW15 | WSW15 | WSW11 | WSW10 | WSW15 | WSW20 | WSW18 | WSW24 | WSW23 | WSW27 | WSW31 | WSW21 | WSW14.5 | WSW31 |
| 17-Aug | W13 | WSW18 | WSW12 | WSW12 | WSW13 | WSW13 | SW11 | SW9 | SW7 | SW10 | WSW11 | WSW12 | WSW13 | WSW17 | WSW21 | W14 | W20 | WSW22 | WSW18 | SW11 | SW15 | WSW27 | WSW36 | WSW38 | WSW16.0 | WSW38 |
| 18-Aug | WSW31 | SSW8 | SSW13 | SW18 | SW20 | SSW13 | SW16 | SW22 | SW26 | WSW23 | SW25 | SW29 | WSW36 | WSW44 | WSW41 | SW41 | SSW27 | SW34 | SW32 | SW35 | SW44 | WSW45 | SW40 | SW43 | SW28.6 | WSW45 |
| 19-Aug | WSW41 | WSW42 | W40 | W36 | W40 | W39 | W32 | WSW34 | WSW37 | WSW44 | WSW46 | W46 | W46 | WNW54 | WNW49 | WNW48 | WNW34 | WNW25 | W28 | WNW29 | WNW29 | WNW24 | WNW17 | W32 | W35.7 | WNW54 |
| 20-Aug | WSW26 | WSW39 | WSW41 | W46 | W42 | W37 | W31 | W27 | W26 | W31 | W36 | W34 | WNW34 | W34 | WNW36 | W41 | WSW48 | W37 | NW32 | NW31 | WNW37 | W34 | WNW39 | WNW20 | W33.6 | WSW48 |
| 21-Aug | NW10 | W13 | WSW14 | WSW14 | WSW17 | WSW17 | WSW13 | SW12 | SW6 | WSW7 | WSW23 | WSW27 | WSW28 | WSW29 | WSW27 | W23 | W19 | W21 | WNW25 | WNW25 | WNW19 | NNW15 | NNE12 | N19 | W15.2 | WSW29 |
| 22-Aug | NNE18 | NNE15 | NNE17 | NNE10 | NNE14 | NNE12 | NNE10 | NNE7 | N4 | NW5 | NW5 | NNW8 | WNW4 | W5 | WNW6 | W4 | WNW3 | WNW4 | NNW2 | ENE3 | ENE13 | ESE25 | SE24 | SE22 | NE4.9 | ESE25 |
| 23-Aug | SE19 | SE26 | SSE27 | SE24 | SE23 | SE27 | SE26 | SSE21 | SSE16 | SSE18 | SSE20 | SSW22 | SSW18 | S17 | SSE27 | SSE20 | SSE34 | SSE33 | SSE36 | SSE40 | SSE35 | SSE28 | SSE29 | SSE28 | SSE24.7 | SSE40 |
| 24-Aug | SSE26 | SSE25 | SSE34 | SSE31 | SSW25 | SE21 | SE17 | SE9 | SE16 | SE17 | SE17 | ESE11 | SE21 | SE18 | SE26 | SE35 | ESE21 | SE14 | SE23 | SSE28 | SSW16 | SW30 | WSW28 | SW23 | SSE18.0 | SE35 |
| 25-Aug | SW26 | SW26 | SW23 | SW25 | SW27 | SW29 | SSW25 | SSW25 | SSW29 | SW28 | SSW27 | SSW25 | SW41 | WSW52 | WSW51 | WSW54 | WSW54 | WSW52 | WSW40 | WSW35 | WSW22 | WSW35 | WSW44 | WSW36 | WSW33.3 | WSW54 |
| 26-Aug | WSW41 | WSW43 | WSW45 | WSW45 | W48 | WSW37 | WSW26 | WSW25 | WSW22 | WSW16 | WSW9 | WSW16 | WSW21 | WSW30 | WSW27 | WSW30 | WSW25 | WSW30 | WSW31 | WSW28 | WSW32 | WSW44 | WSW37 | WSW35 | WSW30.7 | W48 |
| 27-Aug | WSW37 | WSW38 | WSW38 | WSW40 | WSW39 | WSW36 | WSW30 | W29 | W24 | W30 | WSW33 | WSW38 | WSW38 | W36 | W35 | W34 | W35 | W33 | W27 | WNW16 | WNW14 | NW10 | NNW8 | WSW7 | W28.5 | WSW40 |
| 28-Aug | NW15 | NW14 | W10 | W13 | W16 | WSW16 | WSW10 | SW7 | WSW8 | W8 | WNW15 | WNW20 | NW21 | NW26 | WNW27 | NW27 | NW25 | NW22 | NW21 | NW22 | NNW19 | NNW17 | NW14 | WNW9 | WNW15.2 | WNW27 |
| 29-Aug | WNW8 | WNW8 | WNW8 | W5 | WSW7 | W5 | W6 | WSW4 | S1 | SW3 | W3 | WNW1 | NW4 | SE0 | ENE4 | N2 | SSW1 | SE11 | ESE13 | E17 | ESE24 | SE27 | SE25 | SSE27 | SE3.9 | SSE27 |
| 30-Aug | SE33 | SSE35 | SE39 | SE39 | SE38 | SE38 | SE43 | SE42 | SE42 | SE41 | SSE39 | SE42 | SE44 | SSE45 | SSE35 | SSE43 | SSE40 | SSE30 | SSE31 | S29 | S25 | S28 | S26 | S22 | SSE35.1 | SSE45 |
| 31-Aug | S17 | SSW16 | SSW8 | SSW8 | SW10 | SSW8 | S10 | SSW12 | SSW13 | SW15 | SW17 | SW19 | WSW26 | WSW27 | W33 | W35 | W37 | W39 | W36 | W40 | W34 | W36 | W40 | W42 | WSW21.6 | W42 |

| | |
|---|-----------------|
| SW9.5 SW9.0 SW9.9 SW11.0 SW11.5 SW10.0 SSW8.2 SSW8.3 SSW8.0 SSW7.5 SW8.1 SW9.2 SW11.0 SW12.0 SW11.0 SW11.5 SW11.2 SW11.3 SW10.8 SW9.6 SW10.4 SW12.9 SW12.8 SW12.0 | Diurnal Average |
| WSW41 WSW43 WSW45 W46 W48 W39 SE43 SE42 SE42 WSW44 WSW46 W46 W46 WNW54 WSW51 WSW54 WSW54 WSW52 WSW40 W40 SW44 WSW45 WSW44 SW43 | Diurnal Maximum |

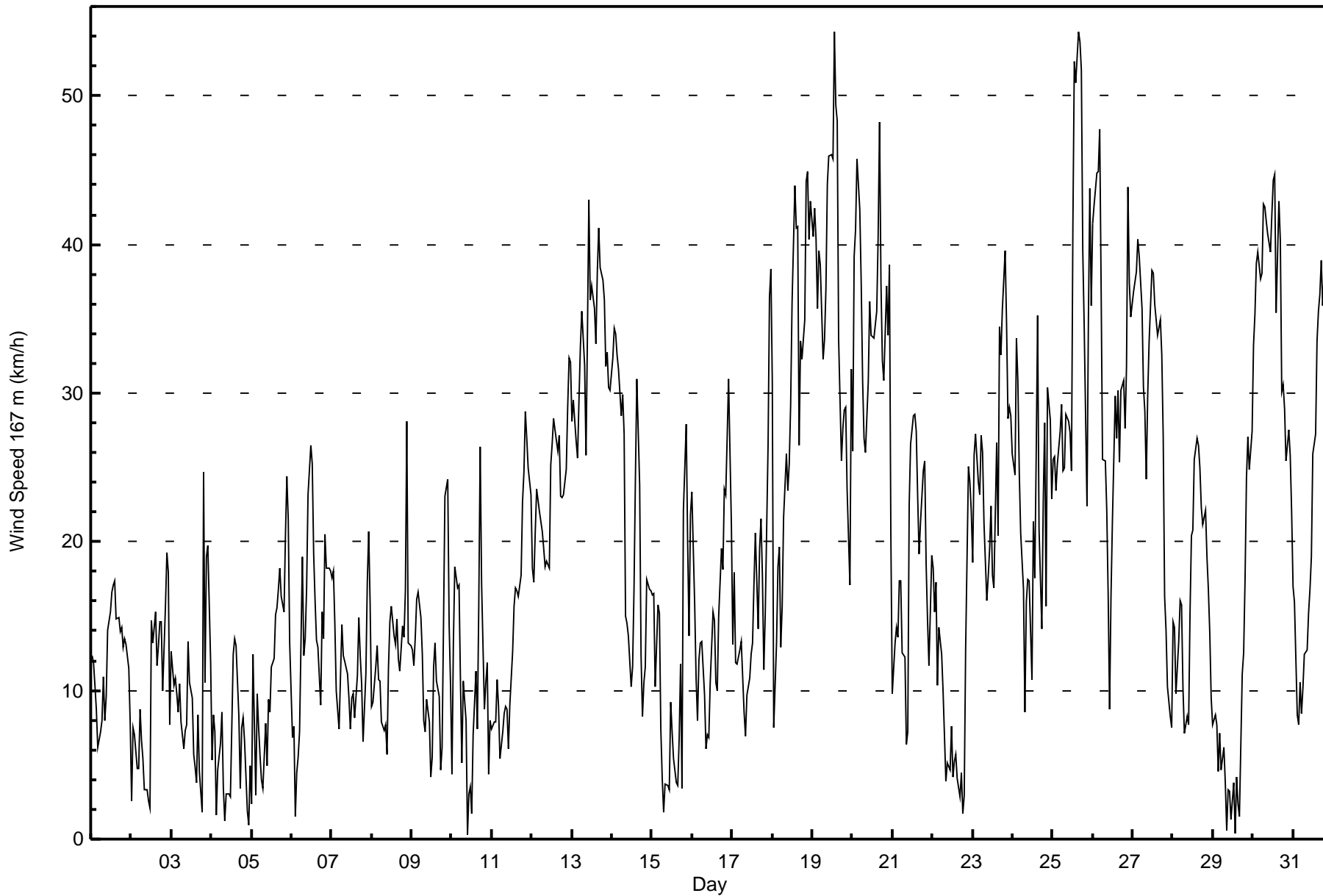
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed 167 m (WS167m) - km/h
Lower Camp Met Tower - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 28 km/h on Aug 15 21:00 Minimum Value: 0 km/h on Aug 22 19:00 Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 6 P ₉₉ = 10 | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | | |
|---|-------------------------------|---|---|---|----|---|---|---|---|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|---------------|---|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 3 | 3 | 3 | 5 | 4 | 5 | 5 | 4 | 4 | 3 | 1 | 1 | 1 | 1 | 2 | 5 | |
| 2-Aug | 2 | 1 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 2 | 4 | 4 | 4 | 4 | 4 | 2 | 2 | 2 | 2 | 1 | 3 | 4 | 4 | |
| 3-Aug | 4 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 4 | 4 | 4 | 4 | 3 | 2 | 3 | 3 | 4 | 12 | 5 | 2 | 3 | 5 | 12 | |
| 4-Aug | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 2 | 2 | 7 | 3 | 2 | 3 | 3 | 3 | 6 | 3 | 2 | 3 | 7 |
| 5-Aug | 2 | 3 | 1 | 2 | 2 | 2 | 2 | 1 | 3 | 2 | 2 | 2 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 2 | 4 | 2 | 4 | 6 | 6 | |
| 6-Aug | 3 | 2 | 2 | 3 | 1 | 3 | 4 | 2 | 3 | 3 | 3 | 4 | 5 | 3 | 3 | 2 | 2 | 3 | 3 | 4 | 2 | 1 | 1 | 1 | 5 | |
| 7-Aug | 1 | 1 | 2 | 2 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 2 | 1 | 1 | 4 | 3 | 3 | 4 | |
| 8-Aug | 2 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 5 | 3 | 5 | |
| 9-Aug | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 5 | 5 | 3 | 3 | 3 | 4 | 2 | 5 | 2 | 2 | 4 | 3 | 5 | |
| 10-Aug | 4 | 5 | 6 | 7 | 5 | 5 | 2 | 3 | 2 | 1 | 2 | 3 | 2 | 3 | 4 | 3 | 4 | 6 | 5 | 2 | 2 | 2 | 2 | 2 | 7 | |
| 11-Aug | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 6 | 4 | 4 | 5 | 4 | 4 | 3 | 5 | 3 | 2 | 1 | 2 | 2 | 6 | |
| 12-Aug | 4 | 2 | 2 | 2 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 5 | 6 | 6 | 6 | 5 | 5 | 6 | 5 | 3 | 2 | 2 | 2 | 2 | 6 | |
| 13-Aug | 4 | 4 | 3 | 3 | 4 | 3 | 3 | 5 | 4 | 7 | 6 | 8 | 8 | 8 | 8 | 6 | 6 | 8 | 5 | 4 | 5 | 4 | 5 | 3 | 8 | |
| 14-Aug | 2 | 2 | 2 | 3 | 2 | 3 | 3 | 5 | 4 | 3 | 4 | 3 | 5 | 5 | 7 | 2 | 5 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 7 | |
| 15-Aug | 3 | 3 | 3 | 4 | 4 | 2 | 2 | 1 | 2 | 1 | 2 | 2 | 2 | 3 | 2 | 1 | 2 | 2 | 4 | 10 | 28 | 21 | 1 | 3 | 28 | |
| 16-Aug | 5 | 3 | 2 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 3 | 4 | 4 | 3 | 5 | 3 | 3 | 3 | 4 | 1 | 1 | 2 | 2 | 4 | 5 | |
| 17-Aug | 4 | 3 | 1 | 3 | 2 | 2 | 2 | 3 | 2 | 3 | 2 | 2 | 3 | 4 | 6 | 7 | 3 | 2 | 4 | 1 | 3 | 6 | 2 | 2 | 7 | |
| 18-Aug | 5 | 3 | 3 | 3 | 2 | 3 | 4 | 9 | 6 | 7 | 5 | 5 | 7 | 5 | 6 | 8 | 5 | 5 | 5 | 4 | 5 | 4 | 4 | 4 | 9 | |
| 19-Aug | 4 | 4 | 3 | 3 | 3 | 3 | 4 | 4 | 5 | 5 | 5 | 6 | 7 | 9 | 10 | 10 | 6 | 8 | 6 | 6 | 6 | 7 | 5 | 3 | 10 | |
| 20-Aug | 5 | 6 | 4 | 2 | 2 | 3 | 3 | 3 | 4 | 5 | 5 | 5 | 6 | 10 | 7 | 10 | 5 | 5 | 5 | 4 | 4 | 5 | 5 | 10 | 10 | |
| 21-Aug | 4 | 4 | 4 | 3 | 3 | 5 | 4 | 3 | 4 | 3 | 5 | 3 | 3 | 5 | 4 | 4 | 5 | 7 | 4 | 3 | 3 | 3 | 2 | 2 | 7 | |
| 22-Aug | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 0 | 1 | 4 | 6 | 3 | 3 | 6 | |
| 23-Aug | 3 | 3 | 3 | 4 | 2 | 1 | 3 | 4 | 5 | 3 | 3 | 6 | 5 | 4 | 4 | 4 | 6 | 6 | 6 | 4 | 6 | 6 | 5 | 5 | 6 | |
| 24-Aug | 4 | 4 | 5 | 6 | 10 | 4 | 4 | 4 | 5 | 3 | 3 | 6 | 6 | 13 | 8 | 4 | 4 | 6 | 5 | 6 | 8 | 9 | 4 | 4 | 13 | |
| 25-Aug | 5 | 4 | 3 | 2 | 3 | 4 | 4 | 5 | 6 | 4 | 5 | 6 | 12 | 6 | 7 | 7 | 7 | 7 | 5 | 9 | 3 | 6 | 4 | 5 | 12 | |
| 26-Aug | 4 | 3 | 3 | 3 | 3 | 7 | 5 | 5 | 3 | 4 | 3 | 3 | 5 | 3 | 5 | 3 | 5 | 4 | 6 | 1 | 5 | 2 | 2 | 2 | 7 | |
| 27-Aug | 2 | 3 | 4 | 3 | 4 | 3 | 4 | 4 | 5 | 4 | 5 | 3 | 5 | 4 | 5 | 5 | 5 | 4 | 6 | 2 | 3 | 3 | 2 | 3 | 6 | |
| 28-Aug | 7 | 5 | 5 | 3 | 2 | 3 | 3 | 2 | 2 | 4 | 7 | 5 | 6 | 6 | 5 | 5 | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 7 | |
| 29-Aug | 2 | 2 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 4 | 4 | 3 | 4 | 4 | |
| 30-Aug | 3 | 4 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 5 | 4 | 5 | 5 | 8 | 7 | 4 | 7 | 5 | 4 | 3 | 3 | 2 | 3 | 8 | |
| 31-Aug | 3 | 3 | 2 | 1 | 2 | 3 | 4 | 3 | 3 | 7 | 5 | 4 | 5 | 6 | 6 | 5 | 4 | 4 | 6 | 2 | 1 | 2 | 2 | 2 | 7 | |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | | |





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed 167 m (WS167m) - km/h
Lower Camp Met Tower - August 2017**

| Wind Speed Ranges (km/h) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 5 | 74 | 9.95 | 9.95 |
| 6 - 11 | 154 | 20.70 | 30.65 |
| 12 - 19 | 200 | 26.88 | 57.53 |
| 20 - 28 | 144 | 19.35 | 76.88 |
| 29 - 38 | 111 | 14.92 | 91.80 |
| > 38 | 61 | 8.20 | 100.00 |

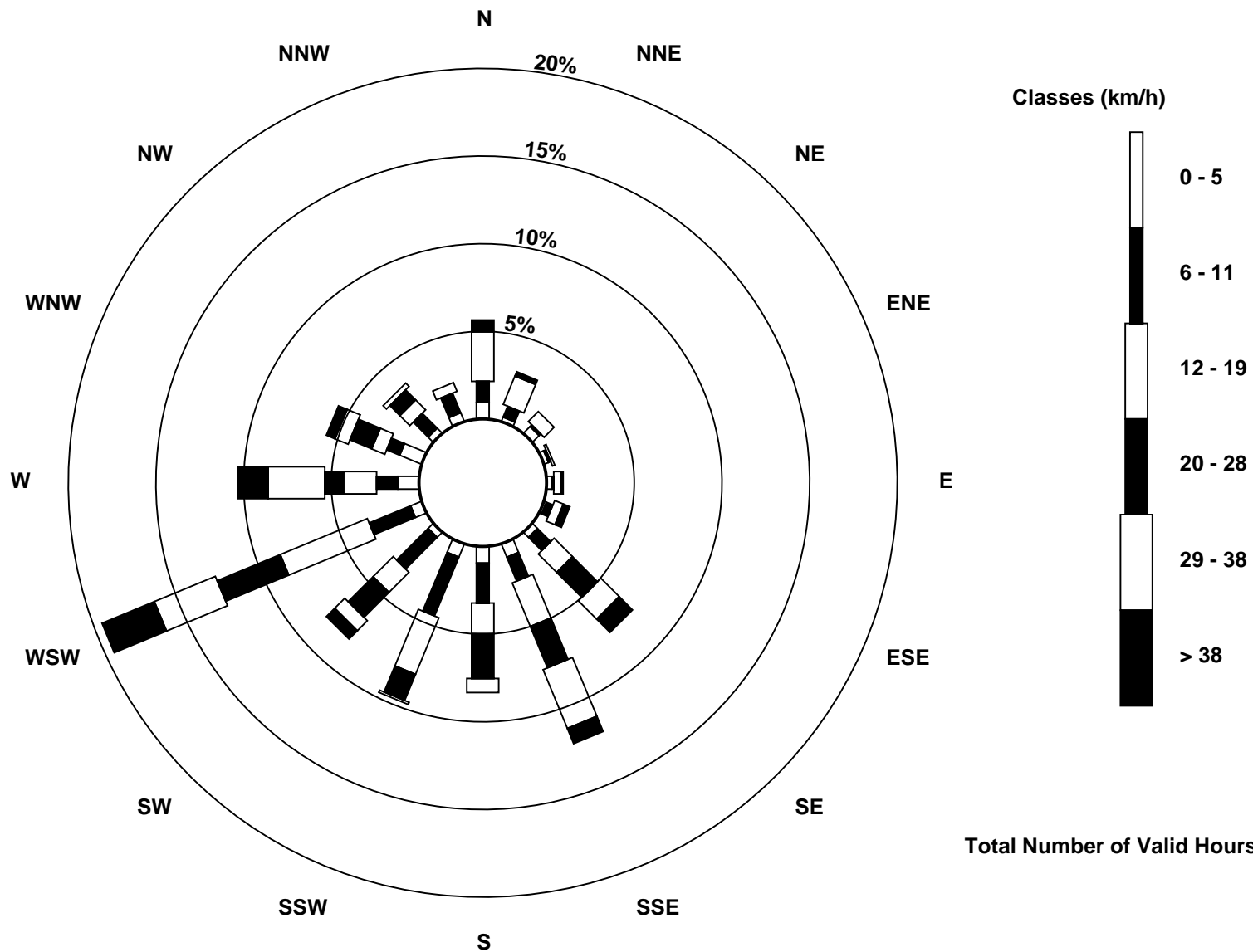
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Wind Speed 167 m (WS167m) - km/h
Lower Camp Met Tower (AMS 3)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction 20 m (WD20m) - deg
Lower Camp Met Tower - August 2017

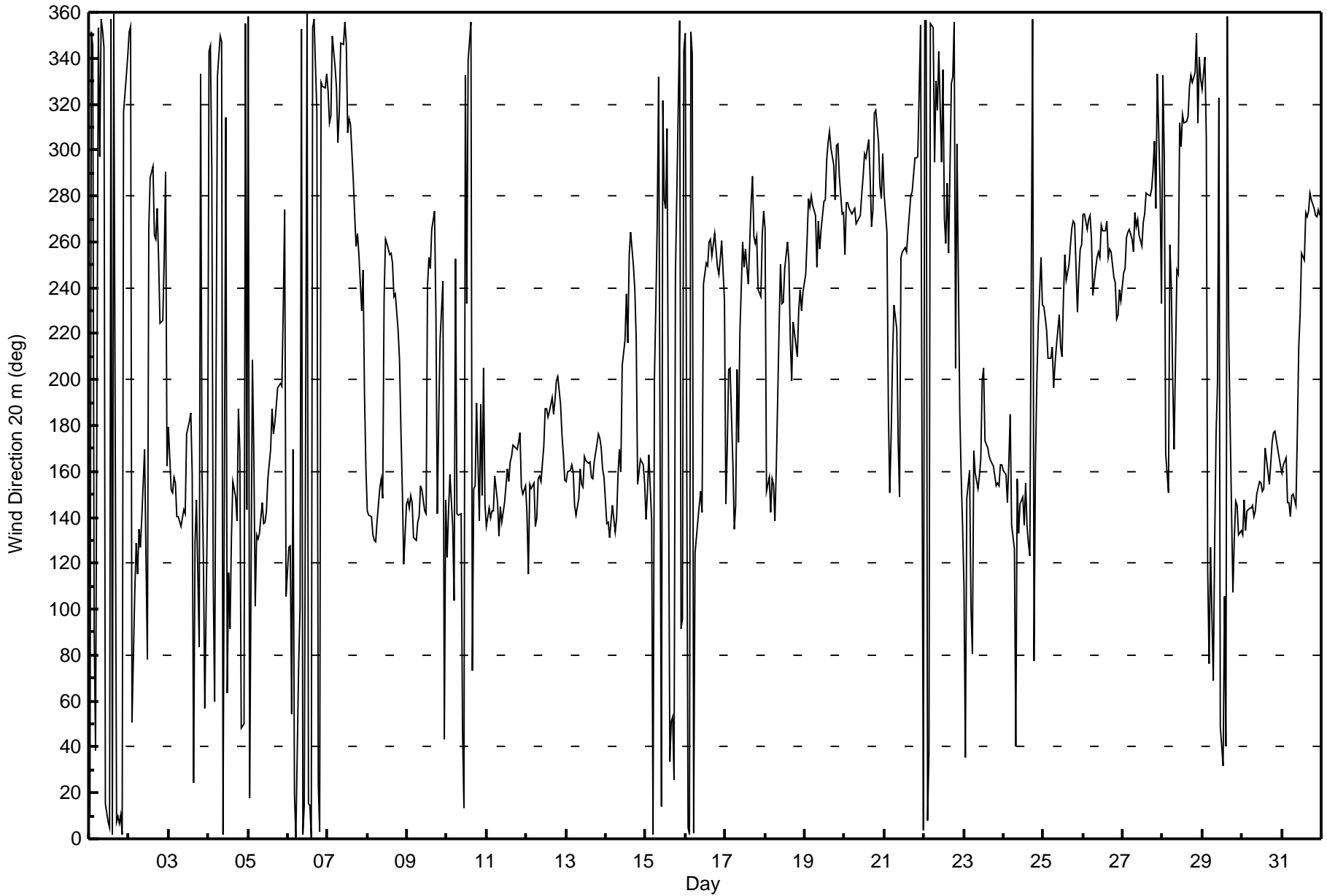
| Direction of Maximum Speed: 243 deg on Aug 25 15:00 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 | | | |
|---|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------------------------|-----|-----|---------------|
| Direction of Maximum Daily Speed Average: 161.5 deg on Aug 13 | | | | | | | | | | | | | | | | | | | | | | Hours of Data: 744 | | | |
| Direction of Minimum Speed: 341 deg on Aug 2 00:00 | | | | | | | | | | | Direction of Minimum Daily Speed Average: 0.7 deg on Aug 15 | | | | | | | | | | | Hours of Missing Data: 0 | | | |
| Monthly Average Direction: 246.0 deg | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 9 | 352 | 346 | 91 | 38 | 353 | 297 | 357 | 352 | 345 | 15 | 7 | 5 | 357 | 2 | 359 | 7 | 10 | 7 | 11 | 2 | 316 | 332 | 341 | 2.3 |
| 2-Aug | 352 | 354 | 51 | 108 | 129 | 115 | 135 | 127 | 140 | 170 | 123 | 78 | 266 | 288 | 293 | 263 | 261 | 275 | 253 | 225 | 226 | 252 | 291 | 162 | 244.5 |
| 3-Aug | 179 | 152 | 151 | 157 | 155 | 140 | 141 | 136 | 140 | 144 | 141 | 176 | 182 | 186 | 159 | 24 | 129 | 148 | 83 | 333 | 159 | 122 | 56 | 151 | 147.4 |
| 4-Aug | 343 | 346 | 291 | 113 | 60 | 332 | 341 | 349 | 347 | 2 | 314 | 63 | 116 | 91 | 131 | 156 | 149 | 139 | 188 | 169 | 48 | 50 | 355 | 144 | 90.9 |
| 5-Aug | 358 | 18 | 209 | 166 | 101 | 133 | 131 | 133 | 146 | 137 | 138 | 143 | 157 | 170 | 187 | 176 | 181 | 188 | 196 | 198 | 197 | 231 | 274 | 106 | 172.9 |
| 6-Aug | 127 | 127 | 54 | 170 | 19 | 0 | 75 | 101 | 352 | 2 | 15 | 359 | 15 | 15 | 0 | 353 | 357 | 317 | 24 | 3 | 330 | 328 | 327 | 333 | 8.5 |
| 7-Aug | 326 | 312 | 315 | 350 | 336 | 327 | 303 | 317 | 346 | 346 | 356 | 347 | 308 | 314 | 311 | 287 | 271 | 258 | 264 | 254 | 230 | 248 | 193 | 162 | 298.8 |
| 8-Aug | 143 | 141 | 140 | 133 | 130 | 129 | 139 | 153 | 157 | 148 | 236 | 261 | 260 | 254 | 255 | 251 | 236 | 237 | 221 | 209 | 178 | 152 | 119 | 146 | 186.8 |
| 9-Aug | 148 | 144 | 149 | 147 | 131 | 130 | 138 | 141 | 154 | 152 | 143 | 142 | 241 | 253 | 248 | 265 | 274 | 228 | 142 | 184 | 218 | 243 | 43 | 148 | 168.8 |
| 10-Aug | 123 | 143 | 159 | 136 | 103 | 253 | 142 | 141 | 142 | 47 | 14 | 333 | 233 | 339 | 355 | 73 | 152 | 154 | 190 | 138 | 189 | 149 | 205 | 146 | 143.7 |
| 11-Aug | 136 | 144 | 140 | 143 | 143 | 158 | 146 | 132 | 144 | 138 | 142 | 146 | 161 | 156 | 164 | 167 | 171 | 170 | 170 | 172 | 177 | 153 | 150 | 154 | 156.8 |
| 12-Aug | 141 | 115 | 154 | 153 | 155 | 136 | 139 | 157 | 158 | 156 | 171 | 188 | 188 | 184 | 186 | 192 | 185 | 191 | 200 | 201 | 189 | 176 | 167 | 156 | 176.4 |
| 13-Aug | 156 | 160 | 160 | 163 | 160 | 145 | 141 | 148 | 161 | 154 | 153 | 167 | 165 | 164 | 164 | 157 | 157 | 164 | 172 | 176 | 174 | 170 | 161 | 158 | 161.5 |
| 14-Aug | 138 | 138 | 131 | 138 | 145 | 133 | 140 | 159 | 170 | 160 | 207 | 217 | 237 | 216 | 255 | 264 | 250 | 239 | 217 | 155 | 160 | 165 | 163 | 155 | 178.1 |
| 15-Aug | 139 | 151 | 167 | 139 | 2 | 201 | 232 | 269 | 332 | 14 | 322 | 278 | 275 | 309 | 34 | 51 | 53 | 25 | 247 | 282 | 356 | 92 | 96 | 343 | 274.7 |
| 16-Aug | 351 | 5 | 2 | 351 | 341 | 2 | 125 | 139 | 145 | 151 | 142 | 241 | 251 | 250 | 260 | 261 | 254 | 264 | 256 | 249 | 246 | 252 | 261 | 234 | 247.3 |
| 17-Aug | 146 | 171 | 204 | 205 | 164 | 135 | 145 | 204 | 173 | 220 | 260 | 249 | 257 | 249 | 242 | 277 | 289 | 262 | 259 | 262 | 239 | 236 | 264 | 273 | 240.4 |
| 18-Aug | 266 | 151 | 157 | 142 | 157 | 154 | 138 | 162 | 223 | 250 | 233 | 234 | 248 | 260 | 251 | 217 | 200 | 225 | 220 | 210 | 230 | 239 | 230 | 238 | 222.8 |
| 19-Aug | 246 | 261 | 279 | 275 | 280 | 276 | 272 | 249 | 269 | 257 | 266 | 278 | 278 | 296 | 304 | 308 | 301 | 294 | 278 | 302 | 303 | 288 | 272 | 273 | 279.2 |
| 20-Aug | 255 | 277 | 277 | 274 | 272 | 274 | 275 | 268 | 269 | 272 | 281 | 288 | 298 | 297 | 305 | 288 | 267 | 274 | 316 | 317 | 303 | 284 | 279 | 299 | 283.1 |
| 21-Aug | 281 | 264 | 188 | 151 | 176 | 209 | 233 | 222 | 173 | 149 | 253 | 256 | 257 | 255 | 264 | 272 | 280 | 282 | 297 | 297 | 297 | 325 | 354 | 4 | 260.4 |
| 22-Aug | 356 | 356 | 8 | 38 | 355 | 353 | 295 | 330 | 317 | 343 | 295 | 335 | 270 | 259 | 286 | 255 | 329 | 332 | 356 | 205 | 303 | 186 | 158 | 136 | 320.9 |
| 23-Aug | 110 | 35 | 148 | 160 | 101 | 81 | 169 | 159 | 153 | 158 | 166 | 200 | 205 | 174 | 170 | 167 | 165 | 164 | 162 | 154 | 155 | 154 | 163 | 163 | 164.6 |
| 24-Aug | 160 | 159 | 147 | 163 | 185 | 137 | 126 | 41 | 157 | 133 | 146 | 149 | 137 | 155 | 136 | 129 | 123 | 357 | 77 | 163 | 199 | 223 | 253 | 232 | 163.2 |
| 25-Aug | 232 | 227 | 222 | 209 | 209 | 214 | 197 | 207 | 215 | 228 | 214 | 210 | 236 | 254 | 243 | 250 | 259 | 266 | 269 | 268 | 230 | 246 | 257 | 259 | 238.8 |
| 26-Aug | 272 | 272 | 266 | 269 | 271 | 262 | 237 | 248 | 253 | 256 | 253 | 267 | 265 | 265 | 269 | 253 | 257 | 256 | 244 | 243 | 227 | 228 | 239 | 234 | 255.9 |
| 27-Aug | 247 | 248 | 262 | 264 | 266 | 261 | 256 | 273 | 267 | 270 | 263 | 258 | 268 | 272 | 281 | 281 | 280 | 283 | 292 | 304 | 275 | 333 | 284 | 233 | 269.6 |
| 28-Aug | 333 | 297 | 168 | 151 | 259 | 241 | 201 | 170 | 248 | 246 | 312 | 301 | 316 | 312 | 312 | 315 | 327 | 332 | 330 | 334 | 351 | 312 | 341 | 331 | 307.9 |
| 29-Aug | 326 | 340 | 305 | 117 | 76 | 127 | 69 | 131 | 177 | 199 | 322 | 49 | 32 | 106 | 40 | 358 | 219 | 143 | 107 | 131 | 147 | 145 | 132 | 134 | 113.8 |
| 30-Aug | 132 | 148 | 134 | 143 | 144 | 144 | 145 | 140 | 143 | 150 | 155 | 155 | 152 | 153 | 170 | 160 | 154 | 164 | 173 | 177 | 178 | 170 | 166 | 162 | 155.4 |
| 31-Aug | 159 | 163 | 166 | 147 | 147 | 141 | 149 | 150 | 145 | 177 | 214 | 229 | 255 | 252 | 273 | 271 | 274 | 281 | 278 | 275 | 272 | 271 | 274 | 271 | 241.2 |
| 200.0 191.6 188.1 180.1 192.2 181.6 171.6 176.4 187.7 195.0 211.8 232.4 241.1 246.1 247.2 242.4 231.2 232.8 228.0 222.5 214.1 213.3 219.5 201.9 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Diurnal Average | | | | | | | | | | | | | | | | | | | | | | | | | |
| All monthly, daily, and diurnal averages have been calculated using vector methods | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction 20 m (WD20m) - deg
Lower Camp Met Tower - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 103 deg on Aug 28 04:00 Minimum Value: 8 deg on Aug 30 23:00 Percentiles: P ₁ = 10 P ₁₀ = 13 Q ₁ = 18 Median = 24 Q ₃ = 41 P ₉₀ = 66 P ₉₉ = 98 | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|---|----|-----|----|----|----|----|----|----|----|----|----|-----|----|----|----|----|----|----|----|----|----|----|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 66 | 62 | 51 | 63 | 63 | 67 | 80 | 39 | 30 | 33 | 33 | 34 | 39 | 31 | 34 | 48 | 37 | 37 | 31 | 27 | 64 | 62 | 59 | 99 | 99 |
| 2-Aug | 46 | 102 | 90 | 57 | 16 | 19 | 15 | 20 | 49 | 41 | 73 | 67 | 36 | 34 | 32 | 43 | 32 | 23 | 17 | 14 | 11 | 20 | 71 | 88 | 102 |
| 3-Aug | 43 | 11 | 19 | 12 | 16 | 23 | 20 | 20 | 21 | 21 | 24 | 42 | 39 | 68 | 59 | 38 | 30 | 60 | 71 | 71 | 65 | 37 | 77 | 80 | 80 |
| 4-Aug | 63 | 35 | 58 | 67 | 42 | 58 | 26 | 98 | 47 | 42 | 36 | 73 | 37 | 65 | 30 | 23 | 21 | 64 | 53 | 23 | 91 | 75 | 56 | 80 | 98 |
| 5-Aug | 23 | 86 | 48 | 85 | 96 | 27 | 16 | 33 | 27 | 26 | 31 | 31 | 34 | 28 | 23 | 21 | 19 | 16 | 14 | 12 | 13 | 31 | 83 | 21 | 96 |
| 6-Aug | 30 | 21 | 78 | 77 | 65 | 40 | 45 | 68 | 26 | 25 | 24 | 21 | 28 | 28 | 27 | 28 | 32 | 39 | 72 | 39 | 19 | 13 | 21 | 12 | 78 |
| 7-Aug | 24 | 30 | 44 | 30 | 32 | 40 | 21 | 36 | 27 | 28 | 30 | 46 | 30 | 35 | 55 | 33 | 24 | 22 | 20 | 15 | 62 | 39 | 49 | 28 | 62 |
| 8-Aug | 9 | 14 | 16 | 16 | 21 | 13 | 18 | 14 | 13 | 23 | 66 | 29 | 26 | 30 | 27 | 28 | 25 | 25 | 17 | 13 | 15 | 29 | 24 | 10 | 66 |
| 9-Aug | 12 | 16 | 14 | 17 | 15 | 13 | 14 | 18 | 12 | 20 | 30 | 37 | 87 | 33 | 26 | 35 | 34 | 84 | 70 | 26 | 12 | 37 | 92 | 14 | 92 |
| 10-Aug | 67 | 39 | 72 | 59 | 61 | 88 | 27 | 19 | 34 | 85 | 59 | 89 | 81 | 43 | 32 | 68 | 19 | 21 | 30 | 20 | 99 | 55 | 85 | 11 | 99 |
| 11-Aug | 28 | 14 | 16 | 17 | 19 | 12 | 18 | 21 | 18 | 24 | 30 | 58 | 26 | 24 | 19 | 19 | 17 | 15 | 13 | 11 | 10 | 14 | 12 | 25 | 58 |
| 12-Aug | 28 | 43 | 34 | 24 | 51 | 39 | 36 | 56 | 15 | 16 | 21 | 22 | 17 | 17 | 17 | 13 | 19 | 15 | 13 | 14 | 10 | 9 | 9 | 9 | 56 |
| 13-Aug | 9 | 9 | 11 | 12 | 16 | 19 | 17 | 20 | 16 | 21 | 18 | 16 | 19 | 20 | 20 | 20 | 18 | 14 | 11 | 12 | 12 | 12 | 10 | 14 | 21 |
| 14-Aug | 18 | 14 | 17 | 16 | 16 | 17 | 19 | 20 | 16 | 26 | 21 | 50 | 60 | 23 | 28 | 19 | 16 | 21 | 25 | 18 | 13 | 11 | 22 | 33 | 60 |
| 15-Aug | 37 | 41 | 55 | 31 | 79 | 50 | 57 | 25 | 53 | 41 | 69 | 28 | 45 | 69 | 39 | 38 | 51 | 50 | 26 | 29 | 67 | 61 | 49 | 68 | 79 |
| 16-Aug | 31 | 28 | 54 | 23 | 49 | 76 | 69 | 26 | 19 | 15 | 24 | 59 | 32 | 24 | 38 | 34 | 26 | 22 | 16 | 12 | 11 | 14 | 13 | 29 | 76 |
| 17-Aug | 41 | 42 | 23 | 23 | 28 | 20 | 16 | 37 | 39 | 53 | 25 | 28 | 27 | 22 | 21 | 54 | 29 | 23 | 28 | 59 | 28 | 18 | 21 | 18 | 59 |
| 18-Aug | 19 | 15 | 12 | 17 | 14 | 12 | 19 | 44 | 23 | 21 | 17 | 18 | 20 | 19 | 21 | 16 | 11 | 12 | 13 | 11 | 11 | 12 | 12 | 11 | 44 |
| 19-Aug | 15 | 21 | 19 | 19 | 20 | 20 | 21 | 17 | 22 | 19 | 21 | 20 | 22 | 22 | 21 | 21 | 22 | 23 | 23 | 22 | 20 | 24 | 31 | 21 | 31 |
| 20-Aug | 22 | 19 | 18 | 19 | 18 | 21 | 25 | 24 | 25 | 23 | 21 | 26 | 24 | 29 | 24 | 26 | 19 | 21 | 18 | 15 | 19 | 20 | 20 | 50 | 50 |
| 21-Aug | 47 | 26 | 67 | 15 | 26 | 44 | 42 | 19 | 43 | 27 | 43 | 18 | 20 | 20 | 21 | 25 | 22 | 34 | 23 | 24 | 48 | 54 | 15 | 17 | 67 |
| 22-Aug | 15 | 16 | 39 | 37 | 15 | 63 | 43 | 50 | 58 | 63 | 57 | 55 | 50 | 66 | 42 | 42 | 94 | 29 | 66 | 53 | 44 | 90 | 48 | 15 | 94 |
| 23-Aug | 67 | 70 | 56 | 56 | 69 | 92 | 73 | 22 | 45 | 19 | 13 | 19 | 12 | 15 | 12 | 12 | 15 | 13 | 15 | 16 | 16 | 19 | 10 | 12 | 92 |
| 24-Aug | 21 | 22 | 21 | 21 | 34 | 49 | 72 | 84 | 28 | 21 | 25 | 25 | 35 | 21 | 28 | 25 | 27 | 40 | 59 | 25 | 26 | 31 | 18 | 19 | 84 |
| 25-Aug | 15 | 12 | 13 | 11 | 11 | 13 | 12 | 13 | 12 | 13 | 13 | 12 | 22 | 17 | 13 | 16 | 18 | 20 | 21 | 21 | 41 | 20 | 17 | 19 | 41 |
| 26-Aug | 20 | 17 | 16 | 19 | 19 | 26 | 19 | 19 | 18 | 20 | 39 | 27 | 25 | 21 | 22 | 21 | 22 | 18 | 14 | 10 | 14 | 11 | 11 | 10 | 39 |
| 27-Aug | 15 | 17 | 18 | 17 | 16 | 18 | 21 | 22 | 24 | 24 | 22 | 18 | 21 | 24 | 23 | 24 | 23 | 22 | 21 | 24 | 40 | 27 | 53 | 27 | 53 |
| 28-Aug | 71 | 72 | 56 | 103 | 41 | 51 | 40 | 32 | 39 | 59 | 52 | 28 | 32 | 26 | 27 | 24 | 25 | 20 | 14 | 12 | 13 | 91 | 68 | 97 | 103 |
| 29-Aug | 61 | 78 | 56 | 61 | 73 | 98 | 81 | 33 | 71 | 54 | 99 | 63 | 43 | 102 | 34 | 65 | 77 | 21 | 73 | 52 | 44 | 50 | 23 | 24 | 102 |
| 30-Aug | 32 | 20 | 17 | 17 | 17 | 18 | 19 | 19 | 20 | 19 | 19 | 18 | 19 | 20 | 15 | 17 | 19 | 13 | 12 | 11 | 12 | 10 | 8 | 10 | 32 |
| 31-Aug | 13 | 9 | 36 | 17 | 10 | 21 | 28 | 27 | 32 | 41 | 25 | 18 | 18 | 19 | 26 | 24 | 21 | 20 | 23 | 17 | 13 | 15 | 17 | 18 | 41 |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction 45 m (WD45m) - deg
Lower Camp Met Tower - August 2017

| | |
|---|--------------------------------|
| Direction of Maximum Speed: 245 deg on Aug 25 14:00 | Hours in Service: 744 |
| Direction of Maximum Daily Speed Average: 268.6 deg on Aug 19 | Hours of Data: 612 |
| Direction of Minimum Speed: 13 deg on Aug 4 08:00 | Hours of Missing Data: 132 |
| Direction of Minimum Daily Speed Average: 1.0 deg on Aug 15 | Percent Operational Time: 82.3 |
| Monthly Average Direction: 237.2 deg | |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average |
|--------|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 6 | 345 | 347 | 128 | 312 | 358 | 329 | 346 | 345 | 336 | 11 | 4 | 0 | 349 | 355 | 352 | 2 | 5 | 4 | 13 | 4 | 347 | 330 | 289 | 356.8 |
| 2-Aug | 333 | 255 | 283 | 178 | 146 | 129 | 129 | 121 | 127 | 156 | 99 | 70 | 258 | 278 | 281 | 256 | 255 | 265 | 245 | 216 | 217 | 238 | 246 | 139 | 233.8 |
| 3-Aug | 177 | 150 | 145 | 146 | 146 | 132 | 134 | 131 | 131 | 135 | 135 | 169 | 175 | 176 | 156 | 18 | 124 | 145 | 67 | 328 | 146 | 109 | 62 | 132 | 138.1 |
| 4-Aug | 335 | 340 | 302 | 93 | 62 | 330 | 337 | 13 | 343 | 360 | 312 | 49 | 104 | 83 | 121 | 142 | 140 | 137 | 190 | 155 | 83 | 49 | 349 | 121 | 76.8 |
| 5-Aug | 354 | 1 | 209 | 205 | 139 | 128 | 127 | 123 | 136 | 129 | 130 | 132 | 144 | 156 | 177 | 165 | 173 | 179 | 185 | 186 | 186 | 219 | 237 | 104 | 163.9 |
| 6-Aug | 120 | 129 | 64 | 166 | 55 | 3 | 59 | 84 | 351 | 358 | 11 | 356 | 12 | 12 | 357 | 347 | 353 | 323 | 17 | 6 | 339 | 338 | 331 | 337 | 6.5 |
| 7-Aug | 347 | 353 | 333 | 334 | 340 | 329 | 311 | 323 | 340 | 339 | 350 | 336 | 304 | 304 | 309 | 277 | 261 | 252 | 257 | 242 | 221 | 238 | 213 | 163 | 292.4 |
| 8-Aug | 138 | 140 | 137 | 131 | 128 | 126 | 131 | 139 | 143 | 137 | 237 | 255 | 254 | 248 | 248 | 243 | 232 | 229 | 213 | 199 | 175 | 165 | 116 | 137 | 181.2 |
| 9-Aug | 139 | 136 | 142 | 140 | 130 | 130 | 134 | 134 | 140 | 139 | 134 | 136 | 229 | 247 | 244 | 256 | 265 | 227 | 149 | 186 | 210 | 226 | 321 | 141 | 164.2 |
| 10-Aug | 116 | 121 | 152 | 145 | 122 | 242 | 135 | 132 | 134 | 41 | 4 | 327 | 241 | 330 | 351 | 59 | 141 | 141 | 180 | 137 | 191 | 180 | 222 | 142 | 138.4 |
| 11-Aug | 134 | 138 | 136 | 136 | 137 | 148 | 138 | 124 | 136 | 134 | 133 | 136 | 150 | 147 | 154 | 158 | 162 | 162 | 159 | 165 | 168 | 150 | 148 | 150 | 148.5 |
| 12-Aug | 141 | 130 | 140 | 142 | 138 | 128 | 133 | 146 | 148 | 144 | 162 | 178 | 178 | 174 | 178 | 183 | 175 | 183 | 191 | 191 | 180 | 168 | 163 | 152 | 166.6 |
| 13-Aug | 144 | 146 | 145 | 147 | 141 | 136 | 132 | 137 | 145 | 141 | 142 | 156 | 153 | 151 | 152 | 146 | 145 | 152 | 164 | 167 | 166 | 161 | 151 | 142 | 149.1 |
| 14-Aug | 130 | 133 | 127 | 131 | 137 | 127 | 132 | 147 | 160 | 149 | 197 | 210 | 233 | 209 | 247 | 254 | 242 | 233 | 208 | 146 | 150 | 154 | 149 | 144 | 169.3 |
| 15-Aug | 134 | 141 | 153 | 129 | 96 | 189 | 223 | 254 | 322 | 10 | 313 | 270 | 267 | 293 | 25 | 41 | 43 | 28 | 244 | 271 | 337 | 65 | 99 | 358 | 264.4 |
| 16-Aug | 346 | 352 | 10 | 358 | 345 | 294 | 184 | 138 | 135 | 140 | 136 | 241 | 245 | 243 | 255 | 255 | 247 | 255 | 249 | 241 | 232 | 242 | 247 | 231 | 242.9 |
| 17-Aug | 169 | 208 | 207 | 208 | 163 | 141 | 146 | 206 | 166 | 218 | 253 | 242 | 250 | 243 | 236 | 268 | 277 | 253 | 248 | 233 | 212 | 223 | 253 | 261 | 235.1 |
| 18-Aug | 257 | 143 | 147 | 138 | 153 | 145 | 136 | 153 | 215 | 243 | 226 | 225 | 241 | 249 | 243 | 210 | 190 | 217 | 212 | 204 | 222 | 231 | 222 | 230 | 216.6 |
| 19-Aug | 238 | 250 | 268 | 265 | 268 | 264 | 260 | 240 | 258 | 248 | 256 | 268 | 268 | 285 | 292 | 298 | 291 | 283 | 269 | 291 | 293 | 277 | 266 | 262 | 268.6 |
| 20-Aug | 247 | 265 | 267 | 265 | 261 | 262 | 264 | 258 | 259 | 261 | 271 | 278 | 289 | 286 | 296 | 278 | 257 | 264 | 308 | 309 | 292 | 273 | 269 | 292 | 272.8 |
| 21-Aug | 295 | 255 | 202 | 149 | 181 | 209 | 227 | 217 | 168 | 138 | 248 | 247 | 248 | 248 | 257 | 263 | 269 | 272 | 287 | 288 | 280 | 317 | 347 | 353 | 255.9 |
| 22-Aug | 350 | 350 | 357 | 0 | 354 | 5 | 313 | 326 | 312 | 328 | 290 | 330 | 266 | 259 | 277 | 250 | 316 | 318 | 341 | 115 | 333 | 113 | 145 | 131 | 326.7 |
| 23-Aug | 132 | 101 | 137 | 143 | 119 | 117 | 148 | 141 | 139 | 148 | 157 | 190 | 196 | 167 | 159 | 155 | 148 | 149 | 147 | 143 | 141 | 139 | 149 | 147 | 150.7 |
| 24-Aug | 140 | 140 | 137 | 150 | 173 | 125 | 115 | 75 | 139 | 126 | 133 | 138 | 129 | 144 | 126 | 120 | 117 | 358 | 95 | 149 | 195 | 217 | 245 | 226 | 149.9 |
| 25-Aug | 225 | 220 | 214 | 201 | 201 | 207 | 186 | 197 | 207 | 221 | 206 | 201 | 229 | 245 | 235 | 241 | 250 | 256 | 258 | 257 | 226 | 238 | 247 | 249 | 231.8 |
| 26-Aug | 261 | 262 | 255 | 259 | 260 | 253 | 231 | 242 | 244 | 248 | 250 | 258 | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- |
| 27-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- |
| 28-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- |
| 29-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- |
| 30-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- |
| 31-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- |

| | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 193.9 | 187.4 | 180.9 | 175.6 | 184.6 | 175.9 | 165.6 | 170.8 | 182.5 | 191.5 | 206.0 | 228.7 | 233.7 | 239.3 | 237.5 | 232.0 | 218.5 | 221.1 | 216.5 | 211.6 | 205.9 | 207.7 | 216.3 | 191.9 |
| Diurnal Average | | | | | | | | | | | | | | | | | | | | | | | |

AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction 45 m (WD45m) - deg
Lower Camp Met Tower - August 2017

| | |
|--|--------------------------------|
| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | Hours in Service: 744 |
| Maximum Value: 104 deg on Aug 4 08:00 | Hours of Data: 612 |
| Minimum Value: 6 deg on Aug 16 21:00 | Hours of Missing Data: 132 |
| | Hours of Calibration: 0 |
| | Percent Operational Time: 82.3 |
| Percentiles: P ₁ = 7 P ₁₀ = 10 Q ₁ = 13 Median = 18 Q ₃ = 32 P ₉₀ = 56 P ₉₉ = 85 | |

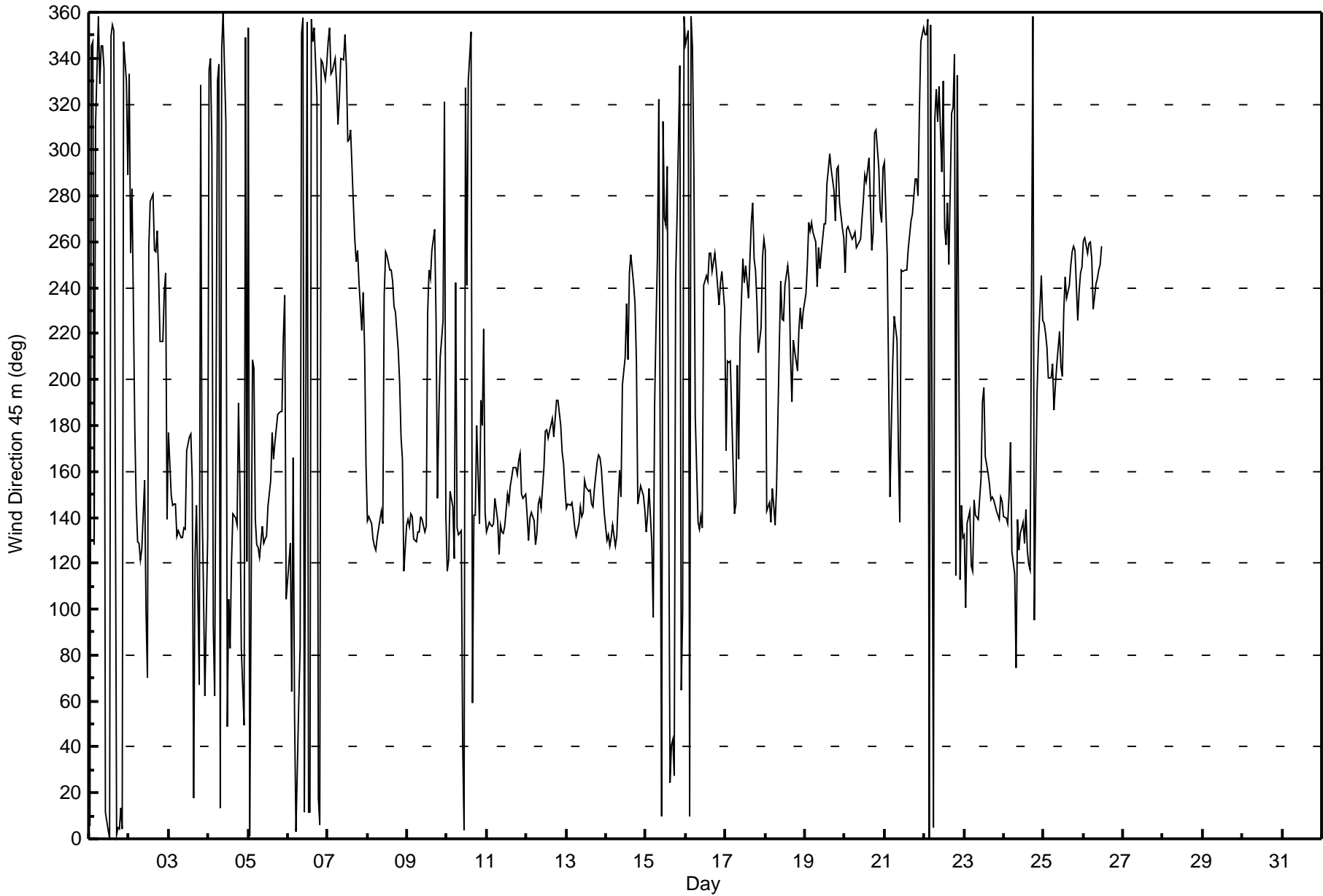
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
|---|-------------------------------|----|----|----|----|----|----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|----|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 63 | 78 | 56 | 87 | 76 | 50 | 64 | 31 | 27 | 24 | 29 | 26 | 29 | 21 | 24 | 38 | 30 | 25 | 25 | 24 | 26 | 33 | 22 | 70 | 87 |
| 2-Aug | 47 | 72 | 99 | 33 | 13 | 14 | 11 | 16 | 38 | 44 | 72 | 64 | 27 | 25 | 25 | 38 | 25 | 16 | 12 | 12 | 10 | 11 | 51 | 50 | 99 |
| 3-Aug | 32 | 9 | 13 | 10 | 13 | 17 | 14 | 14 | 14 | 17 | 19 | 39 | 34 | 62 | 58 | 28 | 28 | 67 | 70 | 60 | 64 | 24 | 58 | 81 | 81 |
| 4-Aug | 52 | 28 | 47 | 53 | 40 | 70 | 17 | 104 | 46 | 35 | 25 | 68 | 36 | 57 | 23 | 19 | 16 | 62 | 50 | 20 | 84 | 67 | 58 | 70 | 104 |
| 5-Aug | 22 | 72 | 34 | 77 | 44 | 19 | 13 | 29 | 23 | 20 | 24 | 23 | 27 | 26 | 21 | 20 | 15 | 13 | 11 | 10 | 10 | 23 | 70 | 18 | 77 |
| 6-Aug | 22 | 13 | 65 | 66 | 70 | 30 | 36 | 53 | 23 | 20 | 17 | 17 | 19 | 20 | 21 | 18 | 24 | 40 | 45 | 26 | 13 | 9 | 13 | 9 | 70 |
| 7-Aug | 15 | 24 | 71 | 20 | 33 | 38 | 15 | 26 | 19 | 19 | 22 | 40 | 25 | 29 | 47 | 29 | 15 | 16 | 14 | 10 | 40 | 21 | 39 | 26 | 71 |
| 8-Aug | 6 | 8 | 12 | 11 | 14 | 9 | 14 | 11 | 10 | 19 | 65 | 21 | 20 | 22 | 19 | 22 | 20 | 19 | 15 | 11 | 7 | 18 | 23 | 9 | 65 |
| 9-Aug | 8 | 10 | 10 | 11 | 9 | 9 | 11 | 12 | 9 | 16 | 25 | 30 | 85 | 28 | 21 | 30 | 27 | 89 | 70 | 18 | 10 | 26 | 101 | 15 | 101 |
| 10-Aug | 62 | 31 | 51 | 65 | 48 | 53 | 22 | 14 | 27 | 83 | 49 | 73 | 76 | 34 | 22 | 65 | 15 | 16 | 23 | 20 | 71 | 73 | 48 | 14 | 83 |
| 11-Aug | 13 | 9 | 11 | 13 | 15 | 11 | 12 | 14 | 13 | 20 | 24 | 51 | 22 | 20 | 16 | 15 | 13 | 11 | 11 | 9 | 7 | 13 | 9 | 16 | 51 |
| 12-Aug | 19 | 31 | 24 | 16 | 30 | 26 | 24 | 44 | 12 | 12 | 18 | 20 | 15 | 15 | 15 | 15 | 10 | 17 | 13 | 10 | 10 | 7 | 8 | 10 | 44 |
| 13-Aug | 6 | 8 | 10 | 11 | 13 | 13 | 11 | 14 | 14 | 16 | 14 | 15 | 17 | 18 | 18 | 17 | 14 | 14 | 9 | 9 | 9 | 10 | 10 | 12 | 18 |
| 14-Aug | 11 | 9 | 11 | 10 | 11 | 10 | 13 | 17 | 13 | 25 | 19 | 48 | 52 | 21 | 24 | 11 | 9 | 16 | 24 | 15 | 11 | 9 | 17 | 21 | 52 |
| 15-Aug | 25 | 31 | 50 | 21 | 95 | 42 | 44 | 17 | 47 | 34 | 52 | 20 | 31 | 64 | 34 | 29 | 30 | 35 | 29 | 25 | 58 | 60 | 45 | 40 | 95 |
| 16-Aug | 17 | 22 | 29 | 18 | 18 | 51 | 44 | 18 | 14 | 11 | 21 | 50 | 25 | 18 | 31 | 26 | 19 | 14 | 11 | 7 | 6 | 7 | 6 | 25 | 51 |
| 17-Aug | 40 | 39 | 21 | 18 | 24 | 15 | 17 | 33 | 36 | 50 | 16 | 19 | 18 | 16 | 17 | 48 | 25 | 16 | 22 | 35 | 13 | 11 | 16 | 11 | 50 |
| 18-Aug | 12 | 16 | 10 | 12 | 14 | 8 | 17 | 41 | 22 | 14 | 13 | 14 | 13 | 11 | 16 | 16 | 11 | 10 | 11 | 11 | 9 | 8 | 9 | 7 | 41 |
| 19-Aug | 8 | 13 | 11 | 10 | 12 | 11 | 13 | 10 | 15 | 13 | 13 | 13 | 14 | 15 | 15 | 15 | 16 | 18 | 16 | 15 | 15 | 19 | 34 | 12 | 34 |
| 20-Aug | 14 | 12 | 10 | 10 | 10 | 12 | 15 | 14 | 16 | 15 | 14 | 19 | 19 | 23 | 16 | 21 | 11 | 15 | 13 | 11 | 12 | 13 | 13 | 50 | 50 |
| 21-Aug | 45 | 16 | 56 | 19 | 26 | 36 | 32 | 17 | 43 | 28 | 35 | 10 | 11 | 14 | 14 | 18 | 16 | 30 | 19 | 21 | 43 | 44 | 9 | 9 | 56 |
| 22-Aug | 11 | 10 | 27 | 23 | 15 | 39 | 33 | 37 | 43 | 57 | 51 | 41 | 45 | 67 | 35 | 38 | 89 | 27 | 29 | 76 | 52 | 59 | 21 | 11 | 89 |
| 23-Aug | 32 | 88 | 32 | 38 | 47 | 96 | 54 | 17 | 36 | 16 | 10 | 18 | 13 | 12 | 11 | 11 | 15 | 12 | 12 | 12 | 13 | 14 | 9 | 11 | 96 |
| 24-Aug | 18 | 17 | 14 | 19 | 32 | 28 | 63 | 82 | 25 | 15 | 20 | 22 | 22 | 16 | 21 | 18 | 18 | 52 | 47 | 20 | 30 | 28 | 13 | 18 | 82 |
| 25-Aug | 11 | 9 | 11 | 11 | 11 | 13 | 10 | 13 | 12 | 10 | 12 | 13 | 19 | 9 | 8 | 9 | 10 | 12 | 13 | 14 | 32 | 14 | 9 | 11 | 32 |
| 26-Aug | 12 | 10 | 9 | 10 | 11 | 17 | 16 | 12 | 10 | 11 | 30 | 20 | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | 30 |
| 27-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- |
| 28-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- |
| 29-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- |
| 30-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- |
| 31-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |
| 63 88 99 87 95 96 64 104 47 83 72 73 85 67 58 65 89 89 70 76 84 73 101 81 | | | | | | | | | | | | | | | | | | | | | | | | | |

AF - Analyzer Failure



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction 45 m (WD45m) - deg
Lower Camp Met Tower - August 2017





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction 100 m (WD100m) - deg
Lower Camp Met Tower - August 2017

| | | | |
|---|--|---------------------------|-------|
| Direction of Maximum Speed: 283 deg on Aug 19 14:00 | | Hours in Service: | 744 |
| Direction of Maximum Daily Speed Average: 146.4 deg on Aug 30 | | Hours of Data: | 744 |
| Direction of Minimum Speed: 351 deg on Aug 2 03:00 | | Hours of Missing Data: | 0 |
| Direction of Minimum Daily Speed Average: 1.2 deg on Aug 15 | | Percent Operational Time: | 100.0 |
| Monthly Average Direction: 235.5 deg | | | |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average |
|--------|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 318 | 341 | 327 | 335 | 229 | 105 | 35 | 330 | 348 | 343 | 16 | 6 | 1 | 350 | 359 | 354 | 5 | 7 | 12 | 27 | 35 | 39 | 32 | 32 | 3.9 |
| 2-Aug | 316 | 1 | 351 | 142 | 159 | 178 | 164 | 137 | 110 | 116 | 116 | 72 | 257 | 274 | 277 | 254 | 254 | 259 | 242 | 216 | 223 | 239 | 223 | 143 | 231.4 |
| 3-Aug | 206 | 188 | 180 | 160 | 159 | 149 | 148 | 136 | 134 | 131 | 138 | 168 | 178 | 183 | 154 | 19 | 132 | 169 | 89 | 356 | 127 | 106 | 81 | 93 | 138.1 |
| 4-Aug | 1 | 349 | 318 | 47 | 114 | 107 | 348 | 106 | 347 | 25 | 327 | 32 | 104 | 89 | 123 | 138 | 133 | 145 | 203 | 152 | 155 | 95 | 101 | 115 | 97.2 |
| 5-Aug | 40 | 5 | 223 | 241 | 152 | 156 | 164 | 125 | 130 | 132 | 132 | 130 | 143 | 151 | 175 | 165 | 176 | 180 | 190 | 191 | 197 | 219 | 205 | 166 | 172.5 |
| 6-Aug | 149 | 158 | 105 | 180 | 192 | 3 | 51 | 52 | 0 | 1 | 13 | 2 | 12 | 13 | 5 | 359 | 6 | 3 | 27 | 11 | 357 | 350 | 344 | 334 | 8.5 |
| 7-Aug | 331 | 337 | 346 | 332 | 324 | 322 | 353 | 355 | 354 | 350 | 351 | 337 | 310 | 304 | 313 | 276 | 260 | 247 | 249 | 234 | 235 | 243 | 246 | 223 | 299.0 |
| 8-Aug | 178 | 180 | 167 | 160 | 159 | 162 | 156 | 148 | 150 | 151 | 244 | 252 | 253 | 246 | 246 | 241 | 233 | 228 | 215 | 208 | 183 | 194 | 145 | 164 | 198.6 |
| 9-Aug | 176 | 159 | 171 | 170 | 174 | 166 | 163 | 164 | 151 | 135 | 139 | 146 | 235 | 248 | 245 | 255 | 258 | 225 | 181 | 193 | 221 | 221 | 248 | 163 | 192.8 |
| 10-Aug | 144 | 115 | 146 | 168 | 173 | 202 | 145 | 133 | 136 | 42 | 8 | 349 | 249 | 333 | 354 | 40 | 140 | 140 | 183 | 176 | 237 | 246 | 230 | 168 | 151.7 |
| 11-Aug | 171 | 178 | 165 | 148 | 148 | 160 | 145 | 133 | 145 | 131 | 137 | 140 | 150 | 148 | 154 | 158 | 161 | 164 | 155 | 165 | 166 | 168 | 175 | 180 | 156.4 |
| 12-Aug | 163 | 149 | 153 | 160 | 144 | 141 | 142 | 150 | 160 | 157 | 167 | 180 | 181 | 176 | 179 | 184 | 175 | 186 | 196 | 193 | 183 | 173 | 174 | 164 | 169.5 |
| 13-Aug | 153 | 153 | 148 | 145 | 143 | 140 | 138 | 141 | 144 | 140 | 143 | 153 | 151 | 150 | 150 | 146 | 145 | 151 | 163 | 167 | 162 | 160 | 156 | 143 | 148.9 |
| 14-Aug | 137 | 139 | 138 | 140 | 140 | 137 | 136 | 145 | 159 | 148 | 197 | 210 | 233 | 209 | 243 | 247 | 239 | 234 | 207 | 149 | 155 | 152 | 148 | 147 | 165.0 |
| 15-Aug | 146 | 144 | 156 | 138 | 136 | 165 | 201 | 247 | 285 | 22 | 292 | 272 | 266 | 284 | 19 | 44 | 46 | 41 | 244 | 274 | 315 | 332 | 311 | 311 | 249.7 |
| 16-Aug | 312 | 302 | 267 | 298 | 267 | 257 | 250 | 211 | 157 | 173 | 162 | 239 | 242 | 243 | 254 | 252 | 243 | 251 | 247 | 248 | 244 | 249 | 251 | 249 | 249.4 |
| 17-Aug | 249 | 245 | 241 | 232 | 215 | 221 | 208 | 224 | 205 | 224 | 245 | 241 | 246 | 239 | 236 | 268 | 275 | 249 | 246 | 226 | 223 | 231 | 251 | 255 | 240.9 |
| 18-Aug | 254 | 158 | 169 | 194 | 209 | 169 | 188 | 193 | 220 | 238 | 226 | 226 | 238 | 247 | 241 | 214 | 195 | 219 | 216 | 213 | 225 | 233 | 226 | 231 | 223.3 |
| 19-Aug | 237 | 248 | 265 | 260 | 264 | 259 | 256 | 241 | 256 | 246 | 253 | 266 | 265 | 283 | 288 | 296 | 291 | 279 | 271 | 287 | 289 | 277 | 276 | 259 | 267.0 |
| 20-Aug | 252 | 256 | 258 | 260 | 256 | 256 | 258 | 254 | 257 | 259 | 268 | 278 | 287 | 283 | 295 | 275 | 254 | 263 | 304 | 306 | 291 | 273 | 271 | 302 | 270.4 |
| 21-Aug | 330 | 252 | 238 | 231 | 234 | 241 | 235 | 224 | 194 | 200 | 246 | 244 | 245 | 246 | 253 | 261 | 264 | 270 | 288 | 293 | 277 | 320 | 342 | 347 | 263.7 |
| 22-Aug | 351 | 352 | 356 | 351 | 350 | 0 | 12 | 343 | 322 | 306 | 303 | 324 | 282 | 266 | 280 | 256 | 285 | 296 | 329 | 78 | 75 | 114 | 132 | 132 | 1.5 |
| 23-Aug | 142 | 137 | 140 | 137 | 141 | 146 | 139 | 142 | 145 | 150 | 160 | 197 | 202 | 177 | 156 | 151 | 145 | 148 | 146 | 144 | 145 | 145 | 154 | 150 | 149.8 |
| 24-Aug | 144 | 143 | 142 | 153 | 183 | 132 | 123 | 121 | 139 | 128 | 131 | 124 | 133 | 144 | 131 | 122 | 120 | 105 | 134 | 145 | 189 | 221 | 245 | 229 | 148.8 |
| 25-Aug | 225 | 223 | 221 | 212 | 213 | 216 | 199 | 207 | 212 | 222 | 210 | 208 | 230 | 243 | 234 | 240 | 248 | 253 | 254 | 254 | 235 | 240 | 245 | 245 | 232.5 |
| 26-Aug | 256 | 256 | 253 | 255 | 256 | 251 | 237 | 240 | 241 | 241 | 244 | 250 | 249 | 252 | 254 | 243 | 243 | 244 | 236 | 239 | 228 | 228 | 233 | 234 | 245.0 |
| 27-Aug | 239 | 240 | 247 | 249 | 252 | 247 | 245 | 261 | 257 | 258 | 251 | 247 | 256 | 262 | 270 | 268 | 267 | 271 | 278 | 292 | 276 | 294 | 285 | 248 | 258.0 |
| 28-Aug | 319 | 315 | 239 | 258 | 251 | 243 | 230 | 213 | 240 | 262 | 302 | 293 | 306 | 301 | 300 | 306 | 315 | 321 | 320 | 324 | 324 | 327 | 303 | 303 | 299.1 |
| 29-Aug | 287 | 317 | 336 | 49 | 184 | 165 | 192 | 190 | 133 | 240 | 288 | 357 | 356 | 89 | 47 | 345 | 209 | 130 | 108 | 93 | 109 | 128 | 138 | 140 | 118.9 |
| 30-Aug | 137 | 139 | 137 | 138 | 138 | 140 | 141 | 137 | 139 | 141 | 143 | 142 | 142 | 142 | 155 | 145 | 143 | 149 | 164 | 174 | 179 | 175 | 170 | 166 | 146.4 |
| 31-Aug | 162 | 172 | 178 | 175 | 202 | 157 | 153 | 153 | 153 | 201 | 217 | 222 | 241 | 240 | 262 | 260 | 260 | 270 | 267 | 262 | 257 | 253 | 255 | 257 | 238.5 |

208.4 198.5 193.4 192.9 199.1 191.7 175.2 174.6 182.6 191.7 204.6 226.2 232.0 237.1 240.1 233.6 222.2 224.8 223.7 224.1 216.2 215.1 218.4 211.3
 Diurnal Average

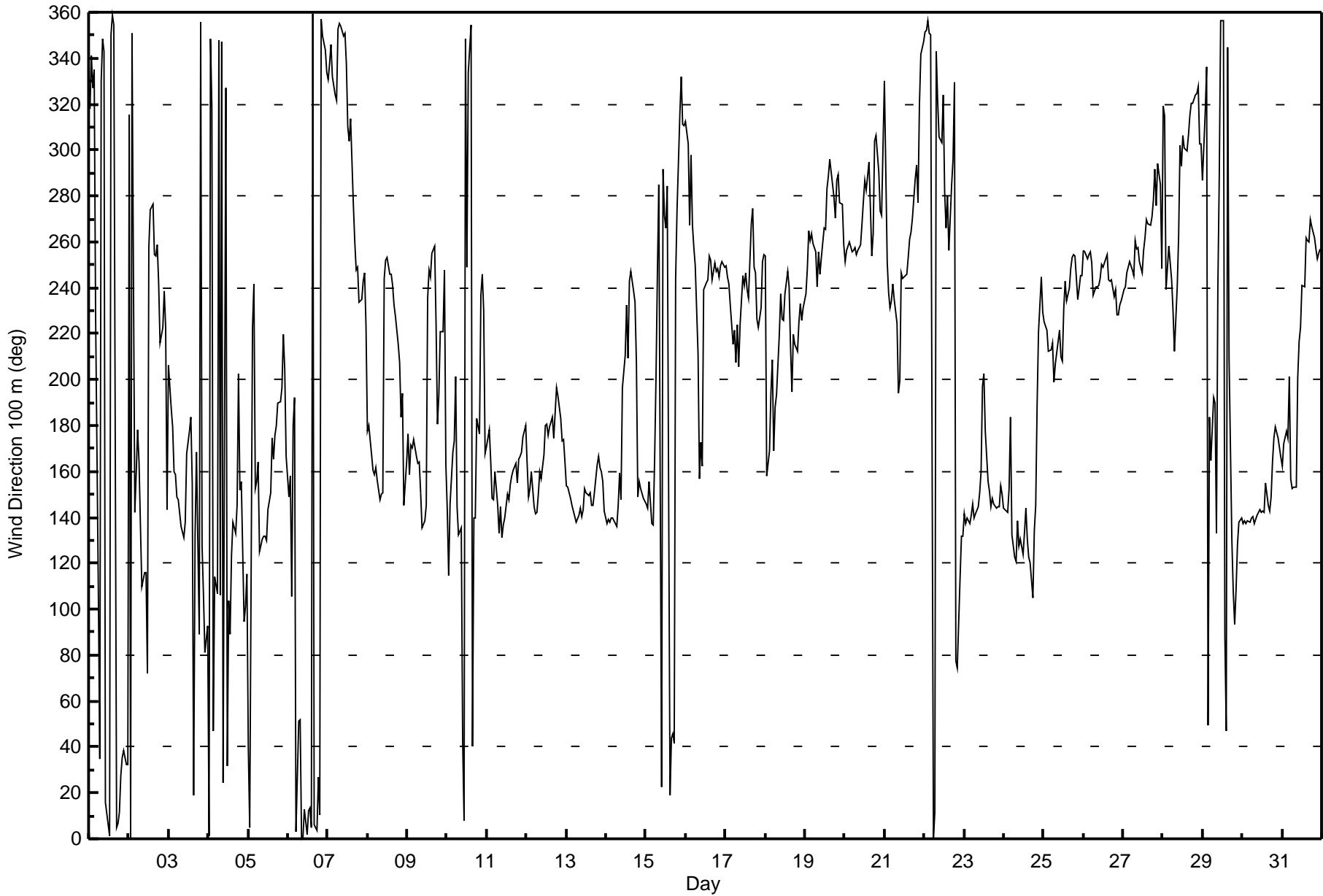
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction 100 m (WD100m) - deg
Lower Camp Met Tower - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 99 deg on Aug 10 13:00 Minimum Value: 2 deg on Aug 16 22:00 Percentiles: P ₁ = 3 P ₁₀ = 5 Q ₁ = 7 Median = 12 Q ₃ = 21 P ₉₀ = 39 P ₉₉ = 81 | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | |
|--|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 19 | 22 | 12 | 51 | 73 | 77 | 41 | 15 | 19 | 19 | 19 | 17 | 18 | 15 | 16 | 25 | 24 | 15 | 16 | 19 | 6 | 7 | 11 | 14 | 77 |
| 2-Aug | 29 | 17 | 84 | 6 | 10 | 15 | 17 | 10 | 26 | 25 | 58 | 61 | 18 | 18 | 20 | 21 | 21 | 11 | 8 | 9 | 11 | 2 | 26 | 34 | 84 |
| 3-Aug | 25 | 16 | 14 | 9 | 7 | 9 | 6 | 7 | 5 | 9 | 12 | 32 | 32 | 62 | 56 | 35 | 25 | 52 | 50 | 43 | 69 | 11 | 26 | 46 | 69 |
| 4-Aug | 27 | 13 | 33 | 51 | 26 | 71 | 9 | 60 | 78 | 26 | 38 | 67 | 22 | 45 | 15 | 7 | 10 | 13 | 35 | 17 | 44 | 70 | 91 | 60 | 91 |
| 5-Aug | 67 | 39 | 28 | 12 | 21 | 25 | 18 | 13 | 10 | 24 | 12 | 10 | 19 | 21 | 20 | 21 | 16 | 11 | 12 | 11 | 13 | 6 | 29 | 44 | 67 |
| 6-Aug | 44 | 17 | 52 | 40 | 60 | 13 | 20 | 22 | 15 | 11 | 9 | 9 | 8 | 10 | 10 | 9 | 12 | 28 | 16 | 11 | 11 | 5 | 5 | 4 | 60 |
| 7-Aug | 3 | 6 | 7 | 8 | 7 | 17 | 8 | 12 | 13 | 15 | 15 | 41 | 18 | 28 | 29 | 27 | 9 | 9 | 9 | 7 | 5 | 6 | 11 | 29 | 41 |
| 8-Aug | 15 | 13 | 9 | 17 | 18 | 10 | 15 | 11 | 12 | 19 | 38 | 12 | 12 | 15 | 15 | 14 | 15 | 14 | 9 | 8 | 7 | 10 | 15 | 21 | 38 |
| 9-Aug | 14 | 7 | 12 | 10 | 11 | 12 | 14 | 17 | 14 | 7 | 12 | 35 | 80 | 27 | 15 | 20 | 20 | 77 | 42 | 20 | 2 | 9 | 41 | 21 | 80 |
| 10-Aug | 51 | 19 | 25 | 76 | 33 | 27 | 7 | 6 | 16 | 85 | 39 | 78 | 99 | 33 | 15 | 57 | 6 | 13 | 17 | 25 | 29 | 28 | 15 | 15 | 99 |
| 11-Aug | 21 | 17 | 11 | 5 | 6 | 17 | 8 | 5 | 10 | 7 | 13 | 48 | 19 | 14 | 14 | 13 | 11 | 9 | 11 | 6 | 5 | 6 | 7 | 7 | 48 |
| 12-Aug | 16 | 8 | 9 | 9 | 6 | 4 | 6 | 11 | 11 | 11 | 16 | 18 | 15 | 15 | 14 | 14 | 10 | 18 | 14 | 11 | 8 | 5 | 5 | 6 | 18 |
| 13-Aug | 7 | 6 | 4 | 2 | 2 | 3 | 3 | 5 | 7 | 5 | 5 | 12 | 13 | 13 | 15 | 11 | 9 | 10 | 7 | 7 | 7 | 7 | 9 | 6 | 15 |
| 14-Aug | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 11 | 11 | 17 | 20 | 45 | 42 | 17 | 18 | 6 | 6 | 10 | 23 | 14 | 10 | 7 | 8 | 9 | 45 |
| 15-Aug | 9 | 13 | 28 | 15 | 24 | 24 | 28 | 22 | 40 | 21 | 49 | 15 | 25 | 63 | 33 | 28 | 14 | 14 | 65 | 20 | 43 | 22 | 57 | 11 | 65 |
| 16-Aug | 21 | 24 | 33 | 19 | 15 | 7 | 15 | 23 | 23 | 18 | 25 | 27 | 16 | 16 | 35 | 23 | 15 | 10 | 9 | 5 | 4 | 2 | 3 | 15 | 35 |
| 17-Aug | 15 | 11 | 8 | 12 | 12 | 11 | 15 | 16 | 24 | 33 | 9 | 13 | 11 | 12 | 12 | 39 | 23 | 8 | 13 | 13 | 6 | 7 | 8 | 5 | 39 |
| 18-Aug | 6 | 24 | 17 | 22 | 17 | 15 | 26 | 35 | 15 | 10 | 10 | 11 | 10 | 8 | 13 | 13 | 12 | 6 | 7 | 6 | 5 | 6 | 5 | 4 | 35 |
| 19-Aug | 5 | 9 | 6 | 5 | 7 | 5 | 8 | 7 | 10 | 9 | 8 | 8 | 10 | 12 | 12 | 10 | 14 | 17 | 12 | 12 | 12 | 14 | 27 | 6 | 27 |
| 20-Aug | 8 | 5 | 4 | 3 | 4 | 5 | 6 | 7 | 9 | 8 | 9 | 15 | 15 | 18 | 11 | 19 | 7 | 12 | 8 | 9 | 8 | 9 | 10 | 43 | 43 |
| 21-Aug | 41 | 7 | 21 | 41 | 14 | 18 | 26 | 15 | 45 | 56 | 14 | 7 | 9 | 11 | 9 | 14 | 9 | 28 | 16 | 11 | 23 | 24 | 5 | 5 | 56 |
| 22-Aug | 7 | 6 | 9 | 8 | 7 | 11 | 28 | 40 | 46 | 29 | 42 | 30 | 42 | 64 | 35 | 42 | 73 | 26 | 39 | 18 | 26 | 13 | 9 | 7 | 73 |
| 23-Aug | 7 | 13 | 5 | 5 | 10 | 13 | 6 | 5 | 11 | 12 | 8 | 17 | 12 | 13 | 11 | 10 | 7 | 6 | 5 | 3 | 4 | 6 | 7 | 6 | 17 |
| 24-Aug | 5 | 5 | 3 | 14 | 29 | 10 | 17 | 22 | 12 | 9 | 11 | 14 | 8 | 12 | 15 | 9 | 10 | 44 | 11 | 11 | 24 | 19 | 8 | 12 | 44 |
| 25-Aug | 8 | 5 | 7 | 7 | 6 | 7 | 12 | 11 | 9 | 7 | 8 | 11 | 15 | 6 | 6 | 7 | 7 | 7 | 7 | 8 | 16 | 7 | 6 | 7 | 16 |
| 26-Aug | 7 | 5 | 4 | 5 | 5 | 10 | 10 | 9 | 7 | 8 | 19 | 14 | 12 | 7 | 9 | 10 | 10 | 8 | 7 | 3 | 6 | 3 | 5 | 3 | 19 |
| 27-Aug | 4 | 5 | 5 | 5 | 4 | 6 | 8 | 8 | 10 | 8 | 8 | 6 | 10 | 13 | 11 | 11 | 10 | 9 | 9 | 6 | 7 | 31 | 24 | 10 | 31 |
| 28-Aug | 26 | 38 | 20 | 25 | 14 | 15 | 20 | 24 | 22 | 59 | 37 | 15 | 19 | 16 | 15 | 13 | 14 | 9 | 5 | 4 | 2 | 9 | 13 | 27 | 59 |
| 29-Aug | 39 | 22 | 27 | 47 | 35 | 19 | 22 | 44 | 90 | 49 | 75 | 77 | 39 | 92 | 35 | 50 | 82 | 12 | 10 | 3 | 13 | 9 | 5 | 9 | 92 |
| 30-Aug | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 5 | 3 | 3 | 5 | 4 | 5 | 4 | 11 | 6 | 4 | 9 | 8 | 8 | 7 | 7 | 7 | 7 | 11 |
| 31-Aug | 9 | 8 | 11 | 15 | 16 | 20 | 15 | 22 | 30 | 39 | 16 | 10 | 8 | 8 | 14 | 14 | 8 | 9 | 13 | 3 | 4 | 6 | 4 | 5 | 39 |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |





| Maximum Value: 0.9 km/h on Aug 30 19:00 | | Maximum Daily Average: 0.3 km/h on Aug 12 | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|---|------|---------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|---------------|---------------|
| Minimum Value: -0.9 km/h on Aug 19 14:00 | | Minimum Daily Average: -0.5 km/h on Aug 20 | | Hours of Data: 744 | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 0.1 km/h at hour 11 | | Minimum Diurnal Average: -0.2 km/h at hour 14 | | Hours of Missing Data: 0 | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: -0.04 km/h | | Percentiles: P ₁ = -0.8 P ₁₀ = -0.5 Q ₁ = -0.2 Median = 0.0 Q ₃ = 0.2 P ₉₀ = 0.4 P ₉₉ = 0.7 | | Hours of Calibration: 0 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0.0 | 0.0 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 | -0.2 | -0.4 | -0.1 | -0.3 | -0.5 | -0.6 | -0.8 | -0.4 | -0.4 | -0.5 | -0.4 | -0.4 | -0.3 | 0.0 | 0.1 | 0.1 | 0.1 | -0.2 | 0.1 |
| 2-Aug | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 0.5 | 0.1 | 0.0 | -0.1 | -0.5 | 0.1 | -0.2 | -0.3 | -0.2 | 0.1 | 0.2 | -0.1 | 0.0 | 0.0 | 0.0 | 0.5 |
| 3-Aug | 0.1 | 0.3 | 0.3 | 0.3 | 0.0 | -0.1 | -0.1 | 0.0 | 0.3 | 0.5 | 0.3 | 0.3 | 0.2 | 0.3 | 0.3 | -0.2 | 0.0 | 0.1 | -0.1 | -0.1 | 0.0 | -0.3 | -0.2 | 0.0 | 0.1 | 0.5 |
| 4-Aug | -0.2 | -0.2 | -0.2 | 0.0 | -0.1 | -0.2 | -0.2 | -0.1 | -0.2 | -0.1 | -0.1 | -0.1 | 0.0 | -0.3 | 0.1 | 0.3 | 0.3 | 0.1 | 0.0 | 0.1 | -0.1 | -0.2 | -0.2 | 0.0 | -0.1 | 0.3 |
| 5-Aug | -0.3 | -0.2 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | -0.2 | -0.1 | 0.2 | 0.4 | 0.4 | 0.3 | 0.2 | 0.5 | 0.5 | 0.6 | 0.7 | 0.4 | 0.2 | 0.2 | 0.2 | 0.0 | -0.1 | 0.2 | 0.7 |
| 6-Aug | 0.0 | 0.2 | 0.0 | 0.1 | -0.1 | -0.2 | -0.3 | 0.1 | -0.4 | -0.5 | -0.7 | -0.7 | -0.5 | -0.8 | -0.4 | -0.3 | -0.2 | -0.1 | -0.2 | -0.2 | -0.2 | -0.2 | -0.1 | -0.2 | -0.2 | 0.2 |
| 7-Aug | -0.1 | 0.0 | 0.1 | 0.0 | -0.1 | -0.3 | -0.1 | -0.1 | -0.2 | -0.2 | -0.5 | -0.2 | -0.4 | -0.4 | -0.3 | -0.5 | -0.2 | -0.2 | -0.1 | -0.1 | 0.0 | 0.0 | 0.1 | 0.3 | -0.2 | 0.3 |
| 8-Aug | 0.2 | 0.0 | 0.1 | 0.1 | 0.0 | -0.2 | 0.2 | 0.2 | -0.2 | 0.2 | 0.3 | -0.2 | -0.3 | 0.1 | -0.2 | 0.0 | -0.1 | -0.1 | 0.3 | 0.2 | 0.6 | 0.4 | 0.1 | 0.2 | 0.1 | 0.6 |
| 9-Aug | 0.4 | 0.2 | 0.4 | 0.4 | 0.0 | -0.1 | 0.2 | 0.2 | -0.1 | 0.6 | 0.8 | 0.2 | 0.0 | -0.4 | -0.3 | -0.2 | -0.1 | 0.0 | 0.1 | 0.3 | 0.4 | 0.1 | -0.1 | 0.0 | 0.1 | 0.8 |
| 10-Aug | -0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | -0.2 | 0.1 | -0.1 | 0.2 | -0.1 | -0.5 | -0.3 | 0.1 | 0.1 | 0.6 | 0.1 | 0.0 | 0.1 | 0.1 | 0.2 | 0.0 | 0.6 |
| 11-Aug | 0.1 | 0.2 | 0.1 | 0.1 | 0.0 | 0.2 | 0.2 | -0.2 | 0.2 | 0.8 | 0.6 | -0.1 | 0.4 | 0.0 | 0.2 | 0.3 | 0.5 | 0.4 | 0.5 | 0.7 | 0.6 | 0.2 | 0.3 | 0.5 | 0.3 | 0.8 |
| 12-Aug | 0.2 | -0.1 | 0.1 | 0.2 | 0.0 | -0.1 | -0.2 | 0.1 | 0.1 | 0.1 | 0.4 | 0.5 | 0.7 | 0.7 | 0.6 | 0.5 | 0.6 | 0.5 | 0.4 | 0.5 | 0.5 | 0.7 | 0.6 | 0.3 | 0.3 | 0.7 |
| 13-Aug | 0.2 | 0.1 | 0.0 | -0.1 | 0.4 | 0.0 | -0.2 | 0.5 | 0.3 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.4 | 0.8 | 0.9 | 0.8 | 0.7 | 0.2 | 0.2 | 0.3 | 0.9 |
| 14-Aug | -0.1 | -0.3 | -0.4 | -0.4 | 0.0 | -0.2 | 0.0 | 0.3 | 0.2 | 0.4 | 0.3 | 0.2 | 0.0 | 0.0 | -0.4 | -0.6 | -0.2 | -0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.1 | 0.0 | 0.4 |
| 15-Aug | -0.1 | 0.0 | 0.0 | 0.0 | -0.1 | 0.2 | 0.1 | 0.0 | -0.1 | -0.1 | 0.1 | -0.2 | 0.2 | -0.2 | -0.1 | -0.1 | -0.2 | -0.2 | 0.0 | -0.3 | -0.2 | -0.1 | -0.1 | 0.0 | -0.1 | 0.2 |
| 16-Aug | -0.3 | -0.2 | -0.1 | -0.2 | -0.1 | 0.0 | 0.1 | 0.0 | 0.2 | 0.0 | 0.5 | 0.1 | 0.1 | -0.2 | -0.1 | 0.1 | -0.2 | -0.2 | -0.2 | -0.1 | -0.2 | -0.1 | -0.3 | 0.0 | -0.1 | 0.5 |
| 17-Aug | 0.2 | 0.1 | 0.2 | 0.3 | 0.3 | 0.1 | 0.2 | 0.2 | 0.1 | 0.2 | -0.2 | 0.1 | -0.1 | -0.2 | -0.2 | -0.1 | -0.3 | -0.3 | -0.1 | 0.0 | 0.1 | 0.1 | -0.3 | -0.5 | 0.0 | 0.3 |
| 18-Aug | -0.4 | 0.2 | 0.4 | 0.3 | 0.4 | 0.3 | 0.1 | -0.1 | 0.0 | 0.0 | 0.0 | -0.2 | -0.3 | -0.6 | -0.3 | -0.2 | 0.4 | -0.1 | 0.2 | 0.3 | -0.1 | -0.3 | -0.1 | -0.2 | 0.0 | 0.4 |
| 19-Aug | -0.2 | -0.4 | -0.7 | -0.6 | -0.6 | -0.5 | -0.4 | -0.3 | -0.6 | -0.3 | -0.4 | -0.8 | -0.6 | -0.9 | -0.8 | -0.9 | -0.6 | -0.6 | -0.5 | -0.3 | -0.3 | -0.3 | -0.2 | -0.4 | -0.5 | -0.2 |
| 20-Aug | -0.1 | -0.6 | -0.7 | -0.5 | -0.6 | -0.6 | -0.4 | -0.2 | -0.1 | -0.5 | -0.9 | -0.6 | -0.4 | -0.5 | -0.7 | -0.9 | -0.8 | -0.6 | -0.6 | -0.5 | -0.5 | -0.5 | -0.4 | -0.3 | -0.5 | -0.1 |
| 21-Aug | -0.1 | -0.2 | 0.2 | 0.1 | 0.5 | 0.2 | 0.1 | 0.2 | 0.1 | 0.3 | -0.3 | -0.3 | -0.4 | -0.3 | -0.6 | -0.4 | -0.2 | -0.5 | -0.4 | -0.4 | -0.2 | -0.1 | -0.1 | -0.3 | -0.1 | 0.5 |
| 22-Aug | -0.3 | -0.2 | -0.2 | 0.0 | -0.1 | 0.0 | 0.0 | -0.2 | 0.1 | -0.1 | 0.3 | -0.2 | 0.0 | 0.4 | 0.2 | 0.1 | 0.0 | -0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | -0.2 | 0.0 | 0.4 |
| 23-Aug | 0.1 | -0.1 | 0.0 | 0.1 | -0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.0 | 0.5 | 0.3 | 0.3 | 0.5 | 0.6 | 0.1 | 0.3 | 0.1 | 0.0 | 0.2 | 0.6 | 0.3 | 0.0 | -0.1 | 0.2 | 0.6 |
| 24-Aug | 0.2 | 0.2 | 0.0 | 0.5 | 0.3 | -0.1 | -0.1 | -0.2 | 0.0 | -0.2 | 0.2 | 0.2 | -0.1 | 0.1 | -0.2 | -0.3 | -0.2 | -0.5 | -0.1 | 0.3 | 0.3 | 0.0 | -0.1 | -0.1 | 0.0 | 0.5 |
| 25-Aug | -0.2 | 0.0 | 0.0 | 0.2 | 0.1 | 0.1 | 0.3 | 0.3 | 0.1 | -0.1 | 0.2 | 0.4 | -0.2 | -0.4 | -0.2 | -0.4 | -0.9 | -0.6 | -0.5 | -0.4 | 0.0 | -0.1 | -0.4 | -0.3 | -0.1 | 0.4 |
| 26-Aug | -0.4 | -0.6 | -0.7 | -0.6 | -0.6 | -0.5 | 0.0 | -0.3 | -0.4 | -0.3 | 0.1 | -0.2 | -0.3 | -0.3 | -0.5 | -0.2 | -0.3 | -0.4 | -0.2 | 0.0 | 0.0 | 0.0 | -0.1 | -0.1 | -0.3 | 0.1 |
| 27-Aug | -0.1 | -0.1 | -0.3 | -0.3 | -0.7 | -0.2 | -0.1 | -0.5 | -0.5 | -0.3 | -0.4 | -0.7 | -0.5 | -0.7 | -0.6 | -0.4 | -0.6 | -0.6 | -0.5 | -0.4 | 0.0 | -0.2 | 0.0 | -0.1 | -0.4 | 0.0 |
| 28-Aug | -0.3 | 0.0 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.2 | 0.0 | 0.2 | -0.1 | -0.4 | -0.6 | -0.7 | -0.4 | -0.4 | -0.4 | -0.5 | -0.5 | -0.3 | 0.0 | 0.0 | 0.0 | 0.1 | -0.2 | 0.2 |
| 29-Aug | -0.1 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.2 | 0.4 | 0.1 | 0.1 | 0.0 | -0.2 | 0.0 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | -0.3 | 0.0 | 0.0 | 0.4 |
| 30-Aug | -0.1 | 0.0 | -0.4 | -0.3 | 0.0 | -0.1 | 0.2 | -0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.5 | 0.7 | 0.7 | 0.3 | 0.5 | 0.4 | 0.9 | 0.7 | 0.6 | 0.6 | 0.7 | 0.4 | 0.9 |
| 31-Aug | 0.2 | 0.6 | 0.6 | 0.1 | 0.2 | 0.1 | 0.0 | 0.0 | -0.1 | 0.1 | 0.1 | 0.0 | -0.4 | -0.2 | -0.3 | -0.5 | -0.5 | -0.7 | -0.6 | -0.6 | -0.5 | -0.4 | -0.4 | -0.6 | -0.1 | 0.6 |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Vertical Wind Speed 20 m (VW20m) - km/h
Lower Camp Met Tower - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 5.7 km/h on Aug 19 14:00 Minimum Value: 0.1 km/h on Aug 2 04:00 Percentiles: P ₁ = 0.1 P ₁₀ = 0.5 Q ₁ = 1.0 Median = 1.6 Q ₃ = 2.3 P ₉₀ = 3.2 P ₉₉ = 4.6 | | | | | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | |
|--|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 0.1 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.4 | 0.9 | 1.5 | 1.8 | 2.2 | 2.2 | 2.6 | 2.5 | 2.3 | 2.2 | 2.2 | 1.7 | 1.4 | 0.9 | 0.2 | 0.1 | 0.1 | 0.1 | 2.6 |
| 2-Aug | 0.1 | 0.1 | 0.2 | 0.1 | 0.3 | 0.4 | 1.1 | 1.4 | 1.2 | 1.4 | 1.4 | 1.5 | 2.2 | 2.2 | 2.4 | 1.9 | 1.8 | 1.6 | 1.5 | 0.8 | 0.8 | 1.0 | 0.7 | 0.7 | 2.4 |
| 3-Aug | 0.6 | 1.0 | 1.2 | 1.4 | 1.3 | 1.5 | 1.7 | 1.9 | 2.1 | 1.8 | 2.4 | 2.0 | 1.8 | 1.8 | 1.7 | 1.1 | 1.3 | 0.9 | 0.6 | 2.3 | 1.2 | 1.5 | 1.1 | 0.6 | 2.4 |
| 4-Aug | 0.4 | 0.4 | 0.3 | 0.4 | 0.3 | 0.5 | 1.0 | 0.5 | 0.7 | 0.8 | 0.9 | 1.0 | 1.5 | 2.2 | 1.6 | 1.5 | 1.1 | 0.4 | 0.7 | 0.7 | 0.6 | 0.4 | 0.4 | 0.6 | 2.2 |
| 5-Aug | 0.5 | 0.8 | 0.6 | 0.3 | 0.2 | 0.4 | 0.6 | 1.2 | 1.5 | 1.6 | 2.0 | 2.0 | 2.1 | 1.9 | 1.9 | 2.1 | 1.7 | 1.7 | 1.6 | 1.4 | 1.1 | 0.9 | 0.8 | 1.1 | 2.1 |
| 6-Aug | 0.7 | 0.7 | 0.5 | 0.6 | 0.3 | 0.4 | 0.8 | 0.9 | 1.6 | 2.0 | 2.7 | 3.1 | 3.1 | 2.4 | 1.9 | 1.5 | 1.2 | 0.7 | 1.2 | 0.9 | 0.5 | 0.3 | 0.2 | 0.3 | 3.1 |
| 7-Aug | 0.2 | 0.3 | 0.2 | 0.2 | 0.3 | 0.5 | 0.6 | 0.9 | 1.2 | 1.4 | 1.8 | 1.5 | 1.9 | 2.0 | 1.9 | 2.0 | 2.2 | 1.6 | 1.1 | 0.6 | 0.4 | 0.4 | 0.6 | 0.8 | 2.2 |
| 8-Aug | 0.6 | 0.7 | 1.1 | 1.2 | 1.1 | 1.3 | 1.6 | 1.6 | 1.6 | 1.7 | 2.0 | 2.2 | 2.2 | 2.1 | 2.0 | 2.0 | 1.5 | 1.4 | 1.4 | 0.9 | 1.0 | 0.9 | 0.6 | 0.6 | 2.2 |
| 9-Aug | 0.9 | 1.2 | 1.7 | 1.8 | 1.2 | 1.2 | 1.4 | 1.8 | 1.7 | 1.9 | 2.0 | 1.7 | 1.9 | 2.0 | 1.8 | 1.8 | 1.7 | 1.1 | 0.9 | 0.9 | 1.1 | 1.0 | 0.8 | 0.9 | 2.0 |
| 10-Aug | 0.8 | 0.8 | 1.5 | 1.1 | 1.0 | 0.4 | 0.8 | 1.7 | 1.7 | 1.0 | 1.5 | 1.6 | 1.4 | 1.7 | 1.9 | 1.9 | 2.7 | 2.5 | 1.4 | 0.7 | 0.4 | 0.5 | 0.3 | 0.6 | 2.7 |
| 11-Aug | 0.7 | 0.8 | 1.2 | 1.3 | 1.3 | 1.1 | 1.9 | 2.0 | 2.1 | 1.8 | 1.8 | 2.0 | 2.4 | 2.4 | 2.1 | 1.9 | 1.8 | 1.7 | 1.9 | 1.7 | 1.4 | 1.1 | 1.2 | 1.0 | 2.4 |
| 12-Aug | 1.3 | 1.1 | 1.5 | 1.4 | 1.3 | 1.6 | 1.6 | 1.6 | 2.4 | 2.7 | 2.5 | 2.4 | 2.5 | 2.5 | 2.5 | 2.3 | 2.2 | 2.1 | 2.0 | 1.6 | 1.3 | 1.3 | 1.4 | 1.6 | 2.7 |
| 13-Aug | 1.6 | 2.1 | 2.2 | 2.0 | 2.3 | 2.7 | 2.9 | 3.3 | 3.0 | 3.6 | 4.7 | 3.9 | 3.8 | 3.7 | 3.5 | 4.0 | 4.3 | 3.9 | 2.8 | 2.4 | 2.0 | 2.0 | 2.1 | 2.2 | 4.7 |
| 14-Aug | 2.3 | 2.2 | 2.2 | 2.4 | 2.2 | 2.1 | 2.7 | 2.7 | 1.8 | 2.0 | 1.7 | 2.0 | 2.2 | 1.9 | 2.9 | 3.2 | 2.4 | 1.3 | 1.0 | 1.3 | 1.5 | 1.6 | 1.7 | 1.5 | 3.2 |
| 15-Aug | 1.2 | 1.3 | 1.0 | 1.1 | 0.6 | 0.7 | 0.9 | 0.8 | 0.5 | 0.8 | 1.0 | 1.5 | 1.5 | 1.8 | 1.5 | 1.0 | 0.9 | 0.7 | 1.0 | 2.4 | 1.1 | 0.5 | 0.3 | 0.4 | 2.4 |
| 16-Aug | 0.8 | 0.5 | 0.3 | 0.4 | 0.3 | 0.3 | 0.5 | 0.8 | 1.4 | 1.5 | 1.7 | 1.7 | 2.0 | 2.0 | 1.8 | 1.7 | 1.8 | 1.9 | 1.5 | 1.1 | 1.0 | 1.1 | 1.3 | 0.8 | 2.0 |
| 17-Aug | 0.5 | 0.8 | 0.7 | 0.8 | 1.1 | 0.7 | 1.0 | 1.2 | 1.1 | 1.6 | 1.9 | 1.9 | 2.0 | 2.2 | 2.3 | 1.9 | 2.0 | 1.9 | 1.6 | 0.5 | 0.4 | 1.1 | 1.9 | 2.2 | 2.3 |
| 18-Aug | 1.8 | 1.0 | 1.0 | 1.3 | 1.3 | 1.4 | 1.2 | 1.5 | 2.1 | 2.5 | 2.2 | 2.5 | 3.6 | 4.0 | 3.5 | 2.7 | 2.1 | 2.4 | 2.1 | 2.0 | 2.5 | 2.6 | 2.4 | 2.5 | 4.0 |
| 19-Aug | 2.8 | 3.4 | 3.1 | 2.9 | 3.2 | 3.3 | 2.9 | 2.6 | 3.5 | 3.9 | 4.3 | 4.4 | 4.6 | 5.7 | 5.0 | 4.8 | 3.3 | 2.3 | 2.2 | 2.4 | 2.1 | 1.8 | 1.0 | 2.3 | 5.7 |
| 20-Aug | 1.6 | 2.9 | 3.1 | 3.3 | 3.3 | 2.7 | 2.5 | 2.6 | 2.8 | 3.2 | 3.9 | 3.6 | 3.7 | 3.7 | 3.9 | 4.4 | 4.6 | 3.6 | 2.4 | 2.1 | 2.8 | 2.6 | 2.8 | 1.8 | 4.6 |
| 21-Aug | 0.5 | 1.2 | 1.0 | 0.8 | 1.1 | 1.0 | 1.2 | 1.3 | 1.4 | 1.4 | 2.1 | 2.8 | 3.1 | 3.1 | 3.0 | 2.5 | 1.9 | 2.2 | 2.1 | 1.3 | 1.0 | 0.5 | 0.5 | 0.9 | 3.1 |
| 22-Aug | 0.6 | 0.7 | 0.8 | 0.3 | 0.3 | 0.6 | 0.5 | 1.2 | 1.2 | 1.1 | 1.4 | 1.6 | 1.4 | 1.9 | 1.4 | 1.2 | 0.8 | 0.5 | 0.2 | 0.1 | 0.4 | 0.4 | 0.7 | 0.9 | 1.9 |
| 23-Aug | 0.5 | 1.0 | 1.6 | 1.2 | 0.7 | 0.7 | 1.2 | 1.8 | 1.4 | 2.2 | 2.0 | 1.9 | 1.4 | 1.4 | 2.1 | 2.0 | 3.2 | 3.2 | 3.5 | 3.5 | 3.3 | 2.4 | 2.2 | 2.5 | 3.5 |
| 24-Aug | 2.1 | 2.2 | 2.9 | 2.6 | 1.8 | 1.4 | 0.9 | 0.7 | 1.4 | 1.7 | 2.0 | 1.3 | 1.6 | 2.0 | 2.6 | 3.1 | 1.6 | 1.2 | 1.5 | 1.6 | 1.0 | 2.2 | 2.6 | 1.6 | 3.1 |
| 25-Aug | 1.8 | 1.7 | 1.4 | 1.5 | 1.5 | 1.8 | 1.7 | 1.8 | 2.0 | 2.1 | 2.0 | 1.9 | 3.6 | 4.7 | 3.7 | 4.3 | 4.6 | 4.4 | 3.2 | 2.8 | 1.1 | 2.2 | 3.3 | 2.5 | 4.7 |
| 26-Aug | 3.2 | 2.9 | 3.4 | 3.3 | 3.4 | 2.6 | 2.0 | 2.4 | 2.4 | 2.1 | 1.8 | 2.3 | 2.5 | 3.3 | 2.9 | 2.9 | 2.5 | 2.4 | 2.3 | 1.1 | 1.4 | 1.9 | 1.5 | 1.3 | 3.4 |
| 27-Aug | 1.5 | 1.8 | 2.3 | 2.8 | 2.8 | 2.5 | 2.3 | 2.6 | 2.6 | 3.0 | 3.5 | 3.9 | 3.8 | 3.7 | 3.6 | 3.5 | 3.5 | 3.1 | 2.4 | 0.9 | 0.5 | 0.4 | 0.3 | 0.7 | 3.9 |
| 28-Aug | 0.9 | 0.5 | 0.4 | 0.6 | 0.7 | 1.0 | 1.0 | 1.0 | 1.2 | 1.5 | 2.4 | 2.7 | 2.8 | 3.1 | 3.2 | 3.0 | 2.7 | 2.1 | 1.2 | 0.6 | 0.2 | 0.1 | 0.2 | 0.3 | 3.2 |
| 29-Aug | 0.3 | 0.3 | 0.2 | 0.3 | 0.2 | 0.2 | 0.2 | 0.6 | 0.9 | 1.2 | 1.3 | 1.7 | 1.7 | 1.6 | 1.6 | 1.3 | 1.2 | 1.2 | 0.7 | 0.2 | 0.5 | 1.1 | 1.1 | 0.9 | 1.7 |
| 30-Aug | 1.4 | 2.5 | 2.6 | 3.2 | 3.0 | 2.9 | 3.3 | 3.7 | 4.2 | 4.2 | 4.4 | 4.4 | 4.7 | 4.8 | 3.2 | 4.2 | 4.1 | 2.7 | 2.1 | 1.7 | 1.5 | 1.6 | 1.6 | 1.7 | 4.8 |
| 31-Aug | 1.6 | 1.3 | 1.2 | 0.6 | 0.6 | 1.7 | 1.8 | 2.0 | 2.1 | 1.5 | 1.5 | 1.8 | 2.6 | 2.8 | 3.5 | 3.3 | 3.5 | 3.5 | 3.1 | 2.7 | 1.5 | 1.4 | 2.3 | 2.6 | 3.5 |
| | 3.2 | 3.4 | 3.4 | 3.3 | 3.4 | 3.3 | 3.3 | 3.7 | 4.2 | 4.2 | 4.7 | 4.4 | 4.7 | 5.7 | 5.0 | 4.8 | 4.6 | 4.4 | 3.5 | 3.5 | 3.3 | 2.6 | 3.3 | 2.6 | |
| | Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | |



| Maximum Value: 1.4 km/h on Aug 13 11:00 Maximum Daily Average: 1.0 km/h on Aug 13 | | | | | | | | | | | | | | | | | | | | | | | | Hours in Service: | 744 | |
|---|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------------------|---------------|---------------|
| Minimum Value: -2.0 km/h on Aug 19 14:00 Minimum Daily Average: -1.0 km/h on Aug 20 | | | | | | | | | | | | | | | | | | | | | | | | Hours of Data: | 612 | |
| Maximum Diurnal Average: 0.2 km/h at hour 10 Minimum Diurnal Average: -0.2 km/h at hour 15 | | | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: | 132 | |
| Monthly Average: 0.08 km/h Percentiles: P ₁ = -1.5 P ₁₀ = -0.6 Q ₁ = -0.2 Median = 0.1 Q ₃ = 0.4 P ₉₀ = 0.8 P ₉₉ = 1.3 | | | | | | | | | | | | | | | | | | | | | | | | Hours of Calibration: | 0 | |
| | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: | 82.3 | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0.0 | 0.1 | -0.1 | 0.1 | 0.0 | 0.0 | 0.0 | -0.2 | -0.5 | -0.3 | -0.2 | -0.6 | -0.5 | -0.8 | -0.6 | -0.3 | -0.4 | -0.3 | -0.4 | -0.2 | 0.0 | 0.0 | 0.0 | 0.0 | -0.2 | 0.1 |
| 2-Aug | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | 0.3 | 0.5 | 0.2 | 0.3 | 0.8 | 1.0 | 0.2 | 0.0 | -0.1 | -0.7 | 0.1 | -0.3 | -0.3 | -0.1 | 0.2 | 0.2 | -0.1 | 0.0 | 0.3 | 0.1 | 1.0 |
| 3-Aug | 0.2 | 1.0 | 1.2 | 0.7 | 0.4 | 0.1 | 0.2 | 0.3 | 0.5 | 0.8 | 0.8 | 0.5 | 0.3 | 0.4 | 0.4 | -0.2 | 0.4 | 0.2 | -0.1 | -0.2 | 0.3 | 0.2 | 0.0 | 0.1 | 0.3 | 1.2 |
| 4-Aug | -0.3 | -0.3 | -0.2 | 0.2 | 0.0 | -0.2 | -0.4 | -0.1 | -0.2 | 0.0 | -0.1 | 0.0 | 0.3 | -0.1 | 0.4 | 0.6 | 0.5 | 0.2 | 0.1 | 0.4 | 0.0 | -0.1 | -0.2 | 0.1 | 0.0 | 0.6 |
| 5-Aug | -0.4 | -0.2 | 0.0 | 0.1 | 0.1 | 0.2 | 0.2 | 0.1 | 0.0 | 0.4 | 0.7 | 0.8 | 0.8 | 0.4 | 0.4 | 0.7 | 0.6 | 0.4 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.8 |
| 6-Aug | 0.3 | 0.7 | 0.1 | 0.2 | 0.1 | -0.2 | -0.2 | 0.3 | -0.5 | -0.6 | -0.8 | -0.9 | -0.6 | -0.6 | -0.5 | -0.4 | -0.1 | -0.2 | -0.1 | -0.1 | -0.4 | -0.2 | -0.1 | -0.3 | -0.2 | 0.7 |
| 7-Aug | -0.1 | -0.1 | 0.1 | -0.1 | -0.2 | -0.3 | -0.3 | -0.1 | -0.3 | -0.4 | -0.6 | 0.1 | -0.7 | -0.7 | -0.2 | -0.6 | -0.4 | -0.1 | -0.2 | 0.1 | 0.0 | 0.0 | 0.1 | 0.4 | -0.2 | 0.4 |
| 8-Aug | 0.9 | 0.6 | 0.7 | 0.6 | 0.5 | 0.4 | 0.6 | 0.5 | 0.2 | 0.5 | 0.4 | -0.1 | -0.5 | 0.0 | -0.1 | -0.2 | -0.1 | -0.2 | 0.3 | 0.1 | 0.7 | 1.1 | 0.5 | 0.7 | 0.3 | 1.1 |
| 9-Aug | 1.0 | 0.7 | 1.2 | 0.8 | 0.4 | 0.3 | 0.6 | 0.6 | 0.5 | 1.0 | 1.3 | 0.6 | 0.0 | -0.3 | -0.4 | -0.4 | -0.1 | -0.1 | 0.4 | 0.4 | 0.2 | 0.1 | -0.1 | 0.3 | 0.4 | 1.3 |
| 10-Aug | 0.1 | 0.2 | 0.4 | 0.4 | 0.2 | 0.1 | 0.2 | 0.6 | 0.5 | -0.2 | 0.2 | -0.2 | 0.3 | -0.1 | -0.6 | -0.1 | 0.6 | 0.7 | 0.4 | 0.6 | 0.1 | 0.0 | 0.0 | 0.8 | 0.2 | 0.8 |
| 11-Aug | 0.5 | 0.7 | 0.6 | 0.5 | 0.4 | 0.5 | 0.5 | 0.2 | 0.6 | 1.0 | 0.8 | 0.2 | 0.7 | 0.5 | 0.6 | 0.6 | 0.7 | 0.7 | 0.9 | 1.0 | 0.8 | 1.1 | 1.4 | 1.4 | 0.7 | 1.4 |
| 12-Aug | 0.6 | 0.2 | 0.5 | 0.5 | 0.2 | 0.2 | 0.3 | 0.5 | 0.8 | 0.8 | 0.8 | 0.4 | 0.7 | 0.8 | 0.4 | 0.4 | 0.5 | 0.4 | 0.1 | 0.0 | 0.2 | 0.8 | 0.9 | 1.0 | 0.5 | 1.0 |
| 13-Aug | 0.7 | 0.5 | 0.4 | 0.3 | 0.8 | 0.7 | 0.6 | 0.9 | 0.9 | 1.2 | 1.4 | 1.3 | 1.1 | 1.1 | 1.2 | 1.2 | 1.1 | 1.4 | 1.1 | 1.0 | 1.2 | 1.2 | 0.8 | 0.6 | 1.0 | 1.4 |
| 14-Aug | 0.6 | 0.4 | 0.3 | 0.4 | 0.6 | 0.4 | 0.6 | 0.8 | 0.5 | 0.6 | 0.1 | 0.1 | 0.0 | 0.0 | -0.5 | -0.6 | 0.0 | 0.1 | 0.3 | 0.5 | 0.6 | 0.6 | 0.5 | 0.4 | 0.3 | 0.8 |
| 15-Aug | 0.2 | 0.3 | 0.0 | 0.2 | -0.1 | 0.2 | 0.4 | -0.1 | -0.2 | -0.1 | 0.2 | -0.3 | 0.3 | -0.1 | 0.0 | -0.1 | 0.0 | 0.2 | 0.1 | 0.3 | -0.7 | -0.2 | 0.0 | 0.1 | 0.0 | 0.4 |
| 16-Aug | -0.4 | -0.4 | -0.2 | -0.2 | -0.2 | 0.0 | 0.2 | 0.3 | 0.4 | 0.4 | 0.8 | 0.1 | 0.0 | -0.3 | -0.1 | 0.1 | -0.2 | -0.1 | -0.2 | 0.0 | 0.0 | 0.0 | -0.3 | 0.0 | 0.0 | 0.8 |
| 17-Aug | 0.2 | 0.0 | 0.2 | 0.3 | 0.5 | 0.5 | 0.6 | 0.3 | 0.5 | 0.3 | -0.3 | 0.2 | -0.2 | 0.0 | -0.2 | 0.1 | -0.4 | 0.0 | 0.1 | 0.0 | 0.0 | 0.3 | -0.6 | -0.7 | 0.1 | 0.6 |
| 18-Aug | -0.6 | 0.7 | 1.0 | 1.2 | 0.8 | 1.1 | 0.5 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | -0.6 | -0.3 | -0.4 | 0.2 | 0.0 | 0.0 | -0.1 | 0.1 | 0.1 | -0.1 | 0.0 | 0.2 | 1.2 |
| 19-Aug | 0.1 | -0.3 | -1.0 | -1.0 | -1.4 | -1.0 | -0.5 | 0.0 | -0.7 | -0.4 | -0.7 | -1.4 | -1.3 | -2.0 | -1.9 | -1.7 | -1.4 | -0.9 | -0.7 | -0.9 | -0.8 | -0.6 | -0.1 | -0.7 | -0.9 | 0.1 |
| 20-Aug | 0.1 | -0.9 | -1.3 | -1.2 | -1.1 | -0.8 | -0.5 | -0.1 | -0.3 | -0.6 | -1.6 | -0.9 | -1.3 | -1.1 | -1.6 | -1.8 | -1.2 | -1.0 | -1.1 | -1.1 | -1.2 | -0.9 | -0.9 | -0.4 | -1.0 | 0.1 |
| 21-Aug | -0.1 | -0.2 | 0.1 | 0.4 | 0.6 | 0.5 | 0.1 | 0.2 | 0.4 | 0.6 | -0.3 | -0.3 | -0.4 | -0.3 | -0.9 | -0.6 | -0.5 | -0.8 | -0.7 | -0.7 | -0.4 | -0.2 | -0.3 | -0.4 | -0.2 | 0.6 |
| 22-Aug | -0.5 | -0.4 | -0.3 | -0.1 | -0.2 | 0.0 | -0.1 | -0.3 | 0.0 | -0.2 | 0.4 | -0.1 | -0.1 | 0.6 | 0.1 | 0.0 | 0.0 | -0.3 | 0.0 | 0.1 | 0.1 | 0.1 | 0.3 | 0.2 | 0.0 | 0.6 |
| 23-Aug | 0.3 | 0.1 | 0.4 | 0.4 | 0.2 | 0.1 | 0.4 | 0.6 | 0.4 | 0.6 | 0.9 | 0.0 | 0.0 | 0.6 | 0.9 | 0.7 | 1.1 | 0.8 | 0.6 | 1.0 | 1.3 | 0.8 | 0.6 | 0.4 | 0.6 | 1.3 |
| 24-Aug | 0.7 | 0.8 | 0.7 | 1.0 | 0.3 | 0.2 | 0.1 | -0.1 | 0.4 | 0.2 | 0.6 | 0.4 | 0.3 | 0.3 | 0.4 | 0.4 | 0.1 | -0.8 | 0.2 | 0.7 | 0.3 | -0.1 | -0.1 | 0.0 | 0.3 | 1.0 |
| 25-Aug | -0.1 | 0.0 | -0.1 | -0.1 | -0.2 | -0.1 | 0.0 | 0.1 | -0.3 | -0.2 | -0.3 | 0.0 | -0.3 | -0.4 | -0.2 | -0.2 | -0.7 | -0.8 | -0.8 | -0.6 | -0.1 | -0.1 | -0.4 | -0.2 | -0.2 | 0.1 |
| 26-Aug | -0.8 | -1.1 | -0.8 | -1.0 | -0.9 | -0.4 | 0.0 | 0.1 | -0.3 | -0.3 | 0.1 | -0.1 | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- | 0.1 |
| 27-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- | -- |
| 28-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- | -- |
| 29-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- | -- |
| 30-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- | -- |
| 31-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- | -- |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| AF - Analyzer Failure | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Vertical Wind Speed 45 m (VW45m) - km/h
Lower Camp Met Tower - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 5.9 km/h on Aug 19 14:00 Minimum Value: 0.1 km/h on Aug 22 20:00 Percentiles: P ₁ = 0.1 P ₁₀ = 0.6 Q ₁ = 1.0 Median = 1.7 Q ₃ = 2.3 P ₉₀ = 3.1 P ₉₉ = 4.7 | | | | | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 612 Hours of Missing Data: 132 Hours of Calibration: 0 Percent Operational Time: 82.3 | |
|---|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 0.2 | 0.2 | 0.3 | 0.2 | 0.1 | 0.2 | 0.5 | 0.9 | 1.7 | 1.9 | 2.3 | 2.2 | 2.7 | 2.5 | 2.5 | 2.4 | 2.3 | 1.8 | 1.5 | 1.0 | 0.2 | 0.2 | 0.2 | 0.1 | 2.7 |
| 2-Aug | 0.2 | 0.1 | 0.2 | 0.1 | 0.2 | 0.4 | 1.1 | 1.4 | 1.3 | 1.6 | 1.5 | 1.6 | 2.5 | 2.5 | 2.5 | 2.1 | 1.9 | 1.8 | 1.4 | 0.8 | 0.8 | 1.1 | 0.9 | 1.1 | 2.5 |
| 3-Aug | 0.9 | 1.1 | 1.3 | 1.4 | 1.3 | 1.6 | 1.7 | 1.9 | 2.0 | 1.9 | 2.3 | 2.1 | 2.0 | 2.0 | 1.7 | 1.2 | 1.3 | 1.0 | 0.7 | 2.9 | 1.5 | 1.6 | 1.4 | 0.7 | 2.9 |
| 4-Aug | 0.4 | 0.5 | 0.4 | 0.5 | 0.3 | 0.6 | 1.0 | 0.5 | 0.7 | 0.9 | 0.8 | 1.0 | 1.5 | 2.3 | 1.7 | 1.5 | 1.1 | 0.5 | 0.8 | 1.0 | 0.7 | 0.4 | 0.4 | 0.6 | 2.3 |
| 5-Aug | 0.5 | 0.9 | 0.6 | 0.5 | 0.2 | 0.4 | 0.6 | 1.2 | 1.5 | 1.5 | 2.1 | 2.1 | 2.3 | 2.0 | 2.3 | 2.3 | 1.8 | 2.0 | 1.7 | 1.4 | 1.0 | 1.0 | 1.1 | 1.3 | 2.3 |
| 6-Aug | 0.9 | 0.8 | 0.6 | 0.6 | 0.4 | 0.5 | 0.8 | 1.0 | 1.7 | 2.1 | 2.7 | 3.1 | 3.1 | 2.7 | 2.0 | 1.6 | 1.4 | 0.8 | 1.4 | 1.1 | 0.7 | 0.3 | 0.2 | 0.2 | 3.1 |
| 7-Aug | 0.3 | 0.4 | 0.2 | 0.4 | 0.4 | 0.5 | 0.5 | 0.9 | 1.4 | 1.5 | 1.7 | 1.8 | 1.9 | 2.2 | 2.3 | 2.2 | 2.3 | 1.7 | 1.2 | 0.6 | 0.5 | 0.7 | 0.8 | 1.1 | 2.3 |
| 8-Aug | 0.6 | 0.8 | 1.2 | 1.2 | 1.1 | 1.2 | 1.6 | 1.6 | 1.6 | 1.8 | 2.1 | 2.3 | 2.3 | 2.3 | 2.4 | 2.0 | 1.7 | 1.5 | 1.4 | 0.8 | 1.1 | 1.2 | 0.8 | 0.8 | 2.4 |
| 9-Aug | 0.9 | 1.2 | 1.6 | 1.8 | 1.1 | 1.1 | 1.5 | 1.7 | 1.4 | 2.0 | 2.1 | 1.7 | 2.2 | 2.3 | 2.0 | 2.0 | 1.8 | 1.2 | 1.2 | 1.0 | 1.2 | 1.1 | 1.0 | 1.2 | 2.3 |
| 10-Aug | 1.1 | 0.9 | 1.7 | 1.4 | 1.2 | 0.6 | 0.9 | 1.8 | 1.6 | 1.0 | 1.6 | 1.7 | 1.8 | 2.0 | 2.0 | 2.0 | 2.5 | 2.6 | 1.6 | 0.8 | 0.6 | 0.7 | 0.4 | 0.7 | 2.6 |
| 11-Aug | 0.8 | 0.9 | 1.3 | 1.4 | 1.4 | 1.1 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 2.1 | 2.4 | 2.3 | 2.3 | 2.0 | 2.0 | 1.8 | 2.0 | 1.9 | 1.4 | 1.0 | 1.2 | 1.2 | 2.4 |
| 12-Aug | 1.6 | 1.4 | 1.8 | 1.6 | 1.6 | 1.8 | 1.7 | 1.9 | 2.6 | 2.7 | 2.8 | 2.9 | 3.2 | 3.1 | 3.1 | 2.7 | 2.7 | 2.5 | 2.2 | 1.6 | 1.3 | 1.3 | 1.5 | 1.5 | 3.2 |
| 13-Aug | 1.5 | 2.0 | 2.3 | 2.2 | 2.6 | 2.7 | 2.7 | 3.4 | 3.1 | 3.9 | 5.0 | 4.1 | 4.1 | 4.1 | 3.8 | 4.2 | 4.4 | 4.2 | 3.4 | 2.9 | 2.3 | 2.3 | 2.2 | 2.3 | 5.0 |
| 14-Aug | 2.1 | 2.0 | 1.9 | 2.1 | 2.2 | 1.9 | 2.4 | 2.8 | 1.8 | 1.9 | 1.8 | 2.1 | 2.6 | 2.2 | 2.9 | 3.1 | 1.9 | 1.4 | 1.1 | 1.2 | 1.5 | 1.6 | 1.9 | 1.7 | 3.1 |
| 15-Aug | 1.4 | 1.5 | 1.1 | 1.2 | 0.7 | 0.9 | 1.0 | 0.9 | 0.6 | 1.0 | 1.2 | 1.6 | 1.6 | 1.8 | 1.6 | 1.0 | 1.0 | 0.8 | 1.1 | 2.4 | 1.3 | 0.5 | 0.3 | 0.5 | 2.4 |
| 16-Aug | 1.1 | 0.7 | 0.5 | 0.4 | 0.4 | 0.5 | 0.6 | 0.8 | 1.5 | 1.4 | 1.7 | 1.9 | 2.2 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | 1.3 | 0.9 | 0.9 | 1.0 | 1.1 | 0.8 | 2.2 |
| 17-Aug | 0.7 | 1.2 | 0.7 | 0.8 | 1.1 | 0.8 | 1.0 | 1.4 | 1.1 | 1.7 | 1.9 | 2.1 | 2.2 | 2.3 | 2.4 | 2.2 | 2.2 | 1.9 | 1.4 | 0.6 | 0.6 | 1.4 | 2.0 | 2.4 | 2.4 |
| 18-Aug | 1.9 | 1.1 | 1.0 | 1.4 | 1.5 | 1.4 | 1.4 | 1.9 | 2.4 | 2.4 | 2.5 | 2.8 | 3.4 | 3.7 | 3.7 | 3.4 | 2.5 | 2.8 | 2.5 | 2.2 | 3.0 | 2.8 | 2.8 | 2.7 | 3.7 |
| 19-Aug | 2.6 | 3.5 | 3.5 | 3.0 | 3.5 | 3.3 | 2.9 | 2.5 | 3.6 | 3.6 | 4.6 | 4.7 | 4.8 | 5.9 | 5.1 | 4.9 | 3.4 | 2.6 | 2.5 | 2.4 | 2.1 | 2.1 | 1.1 | 2.5 | 5.9 |
| 20-Aug | 1.8 | 3.0 | 3.2 | 3.3 | 3.2 | 2.7 | 2.8 | 2.8 | 3.0 | 3.4 | 3.9 | 3.9 | 3.9 | 3.8 | 3.8 | 4.3 | 4.5 | 3.6 | 2.6 | 2.2 | 2.8 | 2.9 | 3.0 | 1.9 | 4.5 |
| 21-Aug | 0.7 | 1.3 | 1.3 | 0.9 | 1.4 | 1.3 | 1.4 | 1.5 | 1.5 | 1.4 | 2.2 | 2.5 | 2.9 | 3.0 | 2.8 | 2.6 | 2.0 | 2.4 | 2.2 | 1.4 | 1.0 | 0.6 | 0.5 | 0.9 | 3.0 |
| 22-Aug | 0.6 | 0.7 | 0.8 | 0.3 | 0.5 | 0.8 | 0.6 | 1.2 | 1.3 | 1.2 | 1.6 | 1.8 | 1.5 | 2.1 | 1.6 | 1.2 | 0.9 | 0.5 | 0.2 | 0.1 | 0.5 | 0.7 | 0.9 | 0.9 | 2.1 |
| 23-Aug | 0.6 | 1.4 | 2.0 | 1.4 | 0.9 | 0.9 | 1.5 | 1.9 | 1.5 | 2.3 | 2.1 | 2.1 | 1.5 | 1.6 | 2.4 | 2.1 | 3.7 | 3.5 | 3.6 | 3.8 | 3.8 | 2.7 | 2.2 | 2.6 | 3.8 |
| 24-Aug | 2.6 | 2.5 | 3.0 | 3.1 | 2.1 | 1.6 | 1.0 | 0.8 | 1.5 | 1.7 | 2.1 | 1.3 | 1.6 | 2.1 | 2.6 | 3.2 | 1.7 | 1.3 | 1.8 | 1.9 | 1.0 | 2.3 | 2.4 | 1.7 | 3.2 |
| 25-Aug | 2.1 | 2.0 | 1.5 | 1.4 | 1.5 | 1.9 | 1.7 | 2.0 | 2.1 | 2.4 | 2.2 | 2.0 | 3.7 | 4.1 | 3.9 | 4.1 | 4.5 | 4.6 | 3.5 | 2.9 | 1.2 | 2.3 | 2.9 | 2.5 | 4.6 |
| 26-Aug | 3.4 | 3.1 | 3.2 | 3.4 | 3.5 | 3.0 | 2.3 | 2.5 | 2.2 | 1.9 | 1.9 | 2.3 | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | 3.5 |
| 27-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- |
| 28-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- |
| 29-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- |
| 30-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- |
| 31-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3.4 3.5 3.5 3.4 3.5 3.3 2.9 3.4 3.6 3.9 5.0 4.7 4.8 5.9 5.1 4.9 4.5 4.6 3.6 3.8 3.8 2.9 3.0 2.7 | | | | | | | | | | | | | | | | | | | | | | | | | |
| AF - Analyzer Failure | | | | | | | | | | | | | | | | | | | | | | | | | |



| Maximum Value: 3.9 km/h on Aug 23 17:00 | | | | | | | | | | | | | | | | | | | | Maximum Daily Average: 2.0 km/h on Aug 13 | | | | | Hours in Service: 744 | | | | |
|--|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|------|------|------|-----------------|--------------------------|---------------|--|--|--|
| Minimum Value: -1.7 km/h on Aug 19 14:00 | | | | | | | | | | | | | | | | | | | | Minimum Daily Average: -0.4 km/h on Aug 28 | | | | | Hours of Data: 744 | | | | |
| Maximum Diurnal Average: 0.6 km/h at hour 22 | | | | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 0.2 km/h at hour 20 | | | | | Hours of Missing Data: 0 | | | | |
| Monthly Average: 0.44 km/h | | | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = -1.0 P ₁₀ = -0.3 Q ₁ = 0.0 Median = 0.3 Q ₃ = 0.7 P ₉₀ = 1.4 P ₉₉ = 3.2 | | | | | Hours of Calibration: 0 | | | | |
| | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | |
| 1-Aug | -0.2 | 0.0 | -0.2 | 0.0 | 0.0 | 0.1 | 0.0 | -0.1 | -0.5 | -0.2 | 0.0 | -0.4 | -0.4 | -0.4 | -0.5 | -0.2 | -0.1 | 0.2 | 0.3 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | -0.1 | 0.3 | | | |
| 2-Aug | 0.0 | 0.0 | 0.0 | 0.3 | 0.2 | 0.0 | 0.3 | 0.4 | 0.4 | 0.9 | 1.4 | 0.2 | 0.1 | 0.7 | -0.7 | -0.1 | 0.1 | -0.1 | 0.2 | 0.5 | 0.7 | 0.8 | 0.3 | 0.6 | 0.3 | 1.4 | | | |
| 3-Aug | -0.1 | 0.0 | 0.3 | 0.8 | 0.7 | 0.7 | -0.1 | -0.1 | 0.4 | 0.2 | 0.5 | 0.8 | 0.4 | 0.5 | 0.3 | -0.7 | 0.3 | 0.7 | 0.1 | 0.1 | 0.3 | 0.6 | 0.4 | 0.3 | 0.3 | 0.8 | | | |
| 4-Aug | -0.3 | -0.2 | 0.0 | 0.1 | 0.2 | 0.1 | -0.3 | 0.1 | -0.2 | 0.0 | 0.0 | -0.1 | 0.3 | 0.5 | 0.7 | 0.9 | 0.4 | 0.2 | 0.6 | 0.3 | 0.3 | 0.0 | 0.1 | 0.3 | 0.2 | 0.9 | | | |
| 5-Aug | 0.0 | -0.2 | 0.4 | 0.0 | 0.3 | 0.3 | 0.0 | 0.4 | 0.4 | 0.2 | 0.5 | 0.5 | 1.4 | 0.7 | 0.1 | 0.7 | -0.1 | -0.5 | 0.1 | 0.4 | 0.4 | 1.4 | 0.6 | 0.4 | 0.3 | 1.4 | | | |
| 6-Aug | -0.2 | 0.2 | 0.3 | 0.2 | 0.1 | -0.1 | 0.0 | -0.1 | 0.0 | 0.2 | 0.1 | 0.2 | 0.1 | 0.3 | 0.3 | 0.2 | 0.1 | 0.1 | 0.3 | 0.2 | 0.0 | -0.3 | -0.2 | -0.4 | 0.1 | 0.3 | | | |
| 7-Aug | -0.3 | -0.3 | 0.0 | 0.1 | -0.4 | -0.3 | -0.2 | 0.1 | -0.1 | -0.1 | -0.2 | 0.3 | -0.4 | 0.0 | -0.4 | -0.2 | 0.0 | 0.3 | 0.1 | 0.4 | 0.1 | 0.3 | 0.6 | -0.4 | 0.0 | 0.6 | | | |
| 8-Aug | 0.0 | -0.1 | 0.0 | 0.2 | 0.2 | 0.2 | 0.8 | 0.4 | 0.3 | 0.5 | 0.2 | -0.1 | -0.6 | 0.3 | -0.1 | -0.2 | -0.3 | -0.2 | 0.6 | 0.1 | 0.7 | 1.1 | 0.9 | 0.0 | 0.2 | 1.1 | | | |
| 9-Aug | 0.2 | 0.5 | 0.3 | 0.2 | -0.3 | 0.0 | 0.3 | 0.4 | 0.5 | 0.5 | 0.8 | 0.4 | 0.3 | -0.1 | -0.3 | -0.3 | 0.4 | 0.0 | 1.0 | 0.5 | 2.0 | 1.9 | 0.2 | -0.3 | 0.4 | 2.0 | | | |
| 10-Aug | 0.2 | 0.3 | 1.0 | 0.4 | 0.3 | 0.1 | 0.4 | 0.5 | 0.5 | -0.4 | -0.2 | -0.2 | 0.9 | 0.4 | -0.5 | 0.0 | 1.1 | 1.9 | 0.3 | 0.1 | 0.1 | -0.1 | 0.0 | 0.2 | 0.3 | 1.9 | | | |
| 11-Aug | 0.2 | -0.1 | 0.2 | 0.2 | 0.8 | 0.5 | 0.5 | 0.2 | 0.6 | 0.3 | 0.6 | 1.5 | 1.1 | 0.6 | 0.7 | 0.4 | 0.4 | 0.2 | 1.9 | 0.1 | 0.0 | 0.8 | 0.5 | 0.7 | 0.5 | 1.9 | | | |
| 12-Aug | 1.1 | 1.7 | 1.8 | 1.8 | 1.8 | 1.8 | 1.4 | 1.5 | 1.2 | 1.2 | 0.9 | 0.0 | 0.3 | 0.2 | 0.0 | -0.1 | -0.4 | 0.7 | 0.2 | 0.1 | 0.0 | 0.4 | 0.1 | 0.5 | 0.8 | 1.8 | | | |
| 13-Aug | 0.9 | 1.4 | 1.5 | 1.7 | 2.5 | 2.3 | 1.8 | 2.1 | 2.6 | 2.9 | 2.8 | 3.1 | 2.8 | 2.7 | 2.1 | 2.6 | 2.8 | 3.6 | 0.2 | 0.0 | 1.1 | 1.1 | 1.4 | 1.8 | 2.0 | 3.6 | | | |
| 14-Aug | 1.5 | 0.9 | 0.9 | 1.1 | 0.9 | 1.0 | 1.4 | 1.9 | 0.6 | 0.8 | 0.5 | 0.6 | -0.1 | 0.8 | 1.0 | 0.5 | 0.6 | 0.2 | 0.4 | 0.5 | 1.2 | 1.8 | 1.3 | 0.9 | 1.9 | 1.9 | | | |
| 15-Aug | 1.0 | 1.0 | 0.1 | 0.6 | 0.8 | 0.5 | 0.5 | 0.0 | 0.2 | 0.5 | 0.5 | -0.2 | 0.8 | 0.1 | 0.0 | -0.1 | 0.2 | -0.1 | 0.7 | -0.1 | 0.1 | -0.2 | -0.1 | -0.6 | 0.3 | 1.0 | | | |
| 16-Aug | -0.6 | -0.6 | 0.0 | -0.2 | 0.1 | 0.6 | 0.1 | -0.1 | 0.2 | 0.2 | 0.2 | -0.1 | 0.2 | -0.4 | -0.1 | -0.3 | 0.0 | 0.5 | 0.3 | 0.5 | 0.5 | 1.1 | 0.5 | 0.4 | 0.1 | 1.1 | | | |
| 17-Aug | 0.3 | 0.6 | 0.3 | 0.6 | 0.1 | 0.0 | 0.0 | 0.4 | 0.5 | 0.4 | 0.0 | 0.2 | -0.2 | -0.1 | 0.5 | 0.5 | 0.3 | 1.0 | 1.0 | 0.8 | 0.6 | 2.0 | 0.2 | 0.6 | 0.4 | 2.0 | | | |
| 18-Aug | 0.1 | 0.2 | 0.3 | 0.3 | 0.3 | 0.2 | -0.2 | 0.3 | 0.8 | 0.7 | 0.5 | 1.0 | 1.0 | 0.7 | 0.9 | 0.8 | 0.1 | 1.2 | 1.0 | 0.4 | 1.8 | 1.5 | 1.7 | 1.4 | 0.7 | 1.8 | | | |
| 19-Aug | 1.2 | 1.2 | -0.6 | -0.1 | -0.3 | 0.1 | 0.5 | 0.8 | 0.4 | 0.6 | 0.7 | -0.5 | -0.3 | -1.7 | -1.1 | -1.0 | -0.6 | -0.7 | -0.4 | -0.4 | -0.7 | 0.0 | 0.3 | 0.4 | -0.1 | 1.2 | | | |
| 20-Aug | 0.9 | 0.3 | -0.2 | -0.4 | 0.0 | 0.5 | 0.4 | 1.1 | 0.9 | 0.4 | -0.9 | -0.5 | -0.6 | -0.3 | -1.0 | -0.5 | 0.8 | 0.1 | -0.9 | -0.8 | -1.0 | -0.3 | -0.4 | 0.5 | -0.1 | 1.1 | | | |
| 21-Aug | 0.2 | 0.7 | 0.7 | 0.5 | 1.2 | 1.3 | 0.8 | 0.3 | 0.8 | 0.2 | 0.4 | 0.1 | 0.0 | 0.7 | 0.0 | 0.0 | -0.1 | -0.2 | -0.4 | -0.6 | -0.2 | -0.2 | -0.4 | -0.2 | 0.2 | 1.3 | | | |
| 22-Aug | -0.3 | -0.1 | -0.2 | -0.1 | -0.3 | 0.0 | -0.1 | -0.1 | 0.0 | -0.2 | 0.9 | 0.3 | 0.0 | 1.2 | 0.4 | -0.2 | 0.2 | -0.2 | 0.0 | 0.1 | 0.3 | 0.3 | 0.6 | 0.2 | 0.1 | 1.2 | | | |
| 23-Aug | 0.6 | 1.1 | 2.2 | 1.8 | 1.1 | 0.5 | 1.9 | 1.4 | 0.9 | 1.0 | 0.3 | -0.4 | 0.0 | 0.3 | 1.6 | 2.3 | 3.9 | 3.7 | 3.8 | 1.8 | 2.7 | 2.2 | 2.5 | 3.3 | 1.7 | 3.9 | | | |
| 24-Aug | 2.9 | 2.7 | 2.5 | 2.0 | 0.6 | 0.9 | 0.6 | 0.0 | 0.8 | 0.6 | 0.7 | 0.5 | 0.8 | 1.1 | 1.2 | 1.2 | 0.3 | -0.1 | 1.2 | 1.9 | 0.5 | 0.4 | 0.7 | 0.6 | 1.0 | 2.9 | | | |
| 25-Aug | 0.7 | 1.1 | 0.9 | 0.4 | 0.4 | 0.7 | 0.1 | 0.4 | 0.0 | 0.4 | 0.0 | 0.5 | 0.7 | 1.4 | 1.5 | 0.9 | 1.1 | 0.7 | 0.4 | 0.6 | 0.3 | 0.8 | 1.1 | 0.6 | 0.7 | 1.5 | | | |
| 26-Aug | 0.2 | 0.3 | 0.7 | 0.6 | 0.4 | 1.3 | 1.2 | 1.2 | 0.1 | 0.2 | 0.5 | 0.6 | 0.4 | -0.2 | 0.2 | 0.3 | 0.4 | 0.5 | 1.0 | 0.3 | 1.1 | 1.4 | 0.9 | 1.0 | 0.6 | 1.4 | | | |
| 27-Aug | 0.6 | 0.9 | 0.8 | 0.9 | 0.4 | 0.9 | 0.7 | -0.4 | 0.5 | 0.6 | 0.4 | 0.3 | 0.9 | -0.6 | -1.1 | -0.8 | -0.5 | -0.8 | -0.8 | -0.6 | -0.1 | -0.3 | 0.0 | -0.4 | 0.1 | 0.9 | | | |
| 28-Aug | -0.5 | -0.1 | 0.1 | 0.2 | -0.1 | 0.2 | -0.2 | 0.0 | 0.1 | 0.0 | 0.1 | -0.9 | -0.5 | -0.8 | -0.9 | -1.1 | -1.2 | -0.8 | -0.7 | -0.5 | -0.4 | -0.2 | -0.2 | -0.1 | -0.4 | 0.2 | | | |
| 29-Aug | 0.1 | -0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.3 | -0.1 | 1.0 | 0.6 | -0.1 | 1.0 | -0.4 | -0.1 | 0.7 | 0.4 | 0.6 | 0.5 | 0.6 | 0.6 | 0.3 | 0.4 | 0.3 | 1.0 | | | |
| 30-Aug | 1.7 | 2.6 | 1.0 | 1.0 | 1.3 | 1.6 | 2.3 | 1.6 | 1.9 | 2.0 | 2.6 | 3.3 | 2.6 | 3.1 | 3.4 | 3.7 | 2.8 | 2.5 | 0.6 | -0.1 | -0.5 | -0.3 | 0.2 | 0.1 | 1.7 | 3.7 | | | |
| 31-Aug | 0.3 | 0.5 | 0.5 | 0.2 | 0.1 | 0.3 | 0.8 | 1.0 | 0.5 | 0.5 | 0.7 | 0.8 | 0.7 | 0.1 | 0.0 | 0.3 | -0.1 | -0.4 | 0.1 | -0.1 | -0.4 | -0.1 | -0.1 | 0.1 | 0.3 | 1.0 | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | |



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Vertical Wind Speed 100 m (VW100m) - km/h
Lower Camp Met Tower - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 5.5 km/h on Aug 19 14:00 Minimum Value: 0.1 km/h on Aug 22 20:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.7 Q ₁ = 1.1 Median = 1.7 Q ₃ = 2.6 P ₉₀ = 3.1 P ₉₉ = 4.3 | | | | | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | |
|---|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 0.3 | 0.2 | 0.3 | 0.2 | 0.2 | 0.2 | 0.4 | 0.9 | 1.9 | 2.3 | 2.3 | 2.5 | 2.6 | 2.9 | 2.8 | 2.7 | 2.6 | 2.1 | 1.8 | 0.9 | 0.4 | 0.3 | 0.3 | 0.2 | 2.9 |
| 2-Aug | 0.4 | 0.3 | 0.3 | 0.3 | 0.5 | 0.5 | 0.8 | 0.9 | 1.4 | 1.8 | 1.8 | 1.9 | 3.0 | 3.4 | 2.8 | 2.7 | 2.5 | 2.0 | 1.8 | 1.2 | 0.9 | 0.6 | 1.4 | 1.6 | 3.4 |
| 3-Aug | 1.2 | 1.0 | 1.1 | 1.1 | 1.0 | 1.2 | 1.1 | 0.9 | 0.9 | 1.0 | 2.0 | 2.7 | 2.8 | 2.6 | 2.0 | 1.1 | 1.5 | 1.2 | 1.1 | 2.8 | 2.1 | 1.1 | 1.8 | 0.9 | 2.8 |
| 4-Aug | 0.6 | 0.4 | 0.6 | 0.5 | 0.5 | 0.5 | 0.7 | 0.6 | 0.5 | 0.8 | 1.0 | 0.9 | 1.4 | 2.7 | 1.3 | 1.0 | 0.8 | 0.5 | 1.1 | 1.4 | 1.0 | 0.4 | 0.4 | 0.7 | 2.7 |
| 5-Aug | 0.6 | 0.7 | 0.9 | 0.7 | 0.4 | 0.5 | 0.4 | 0.8 | 1.0 | 1.1 | 1.5 | 1.8 | 2.4 | 2.4 | 3.0 | 2.9 | 2.2 | 2.1 | 2.0 | 1.5 | 1.3 | 1.1 | 1.8 | 1.6 | 3.0 |
| 6-Aug | 1.1 | 0.9 | 1.0 | 0.7 | 0.4 | 0.5 | 0.9 | 1.2 | 1.3 | 1.8 | 2.5 | 2.7 | 2.9 | 2.6 | 1.9 | 1.6 | 1.2 | 1.0 | 1.7 | 1.2 | 1.1 | 0.4 | 0.3 | 0.2 | 2.9 |
| 7-Aug | 0.2 | 0.5 | 0.5 | 0.4 | 0.4 | 0.6 | 0.6 | 1.0 | 1.4 | 1.7 | 1.9 | 2.2 | 2.4 | 3.1 | 2.6 | 2.4 | 2.3 | 2.0 | 1.5 | 0.7 | 0.9 | 1.1 | 1.4 | 1.4 | 3.1 |
| 8-Aug | 0.8 | 0.8 | 1.0 | 1.2 | 1.1 | 0.9 | 1.3 | 1.2 | 1.2 | 1.2 | 2.3 | 2.9 | 2.9 | 3.0 | 2.8 | 2.6 | 2.5 | 2.5 | 2.1 | 1.2 | 1.1 | 1.1 | 1.4 | 0.9 | 3.0 |
| 9-Aug | 0.9 | 0.8 | 1.1 | 1.3 | 1.0 | 1.2 | 1.4 | 1.1 | 1.1 | 1.0 | 1.4 | 1.5 | 2.7 | 3.0 | 3.0 | 2.5 | 2.4 | 1.6 | 1.6 | 1.0 | 0.8 | 1.5 | 1.3 | 1.6 | 3.0 |
| 10-Aug | 1.3 | 0.8 | 1.6 | 1.8 | 1.9 | 1.3 | 0.9 | 1.0 | 1.1 | 1.0 | 1.7 | 1.9 | 2.1 | 2.6 | 2.1 | 2.3 | 1.7 | 2.0 | 1.6 | 1.1 | 0.8 | 1.1 | 0.5 | 0.8 | 2.6 |
| 11-Aug | 0.8 | 0.7 | 0.9 | 1.0 | 1.3 | 1.1 | 1.3 | 1.2 | 1.1 | 0.9 | 1.4 | 2.3 | 2.6 | 2.9 | 2.7 | 2.6 | 2.7 | 2.1 | 2.4 | 1.6 | 1.3 | 1.2 | 1.2 | 1.2 | 2.9 |
| 12-Aug | 1.2 | 1.2 | 1.6 | 1.8 | 1.5 | 1.3 | 1.4 | 2.0 | 2.5 | 2.7 | 3.2 | 3.4 | 3.7 | 3.6 | 3.5 | 3.3 | 3.1 | 2.8 | 2.5 | 2.0 | 1.4 | 1.2 | 1.4 | 1.5 | 3.7 |
| 13-Aug | 1.7 | 2.0 | 1.6 | 1.3 | 1.6 | 1.3 | 1.5 | 2.4 | 2.5 | 2.7 | 3.7 | 4.3 | 4.3 | 3.9 | 3.8 | 3.8 | 3.5 | 3.8 | 3.2 | 2.7 | 2.8 | 2.8 | 2.7 | 1.8 | 4.3 |
| 14-Aug | 1.3 | 1.1 | 1.3 | 1.4 | 1.5 | 1.4 | 1.7 | 2.7 | 2.3 | 2.1 | 2.6 | 2.7 | 3.2 | 3.1 | 3.1 | 2.7 | 2.0 | 1.7 | 1.2 | 1.0 | 1.7 | 1.6 | 1.8 | 1.4 | 3.2 |
| 15-Aug | 1.4 | 1.6 | 1.2 | 1.1 | 1.2 | 1.1 | 1.0 | 0.9 | 0.9 | 1.2 | 1.4 | 1.8 | 1.9 | 1.9 | 1.5 | 0.8 | 1.1 | 0.8 | 1.4 | 2.0 | 1.7 | 0.9 | 0.7 | 1.3 | 2.0 |
| 16-Aug | 1.9 | 1.1 | 0.8 | 0.5 | 0.8 | 0.8 | 1.0 | 0.7 | 1.0 | 0.9 | 1.3 | 2.1 | 3.0 | 2.6 | 2.5 | 2.5 | 2.3 | 2.1 | 1.2 | 0.8 | 0.5 | 0.5 | 0.5 | 1.1 | 3.0 |
| 17-Aug | 1.1 | 1.7 | 1.0 | 0.8 | 1.3 | 1.2 | 1.2 | 1.5 | 1.2 | 1.7 | 1.9 | 2.6 | 2.5 | 3.3 | 3.1 | 2.8 | 2.2 | 1.9 | 1.3 | 0.8 | 0.6 | 1.1 | 1.7 | 2.0 | 3.3 |
| 18-Aug | 1.6 | 1.3 | 1.2 | 1.5 | 1.7 | 1.7 | 1.6 | 2.5 | 3.2 | 2.9 | 3.1 | 3.8 | 3.7 | 3.4 | 3.5 | 3.7 | 2.6 | 3.4 | 3.2 | 2.9 | 2.7 | 2.8 | 2.1 | 2.7 | 3.8 |
| 19-Aug | 2.7 | 3.3 | 2.7 | 1.9 | 2.8 | 2.5 | 3.0 | 2.9 | 3.4 | 3.6 | 4.2 | 4.0 | 4.4 | 5.5 | 4.9 | 5.3 | 3.6 | 2.8 | 2.9 | 2.7 | 2.1 | 2.6 | 1.6 | 1.9 | 5.5 |
| 20-Aug | 1.7 | 2.1 | 2.1 | 1.7 | 1.9 | 2.1 | 2.3 | 2.9 | 3.0 | 3.3 | 3.8 | 4.4 | 3.9 | 4.0 | 4.0 | 4.1 | 3.7 | 2.9 | 2.7 | 2.2 | 2.6 | 3.2 | 2.7 | 2.5 | 4.4 |
| 21-Aug | 1.4 | 1.5 | 1.7 | 1.4 | 2.0 | 2.1 | 1.8 | 2.0 | 1.8 | 1.5 | 2.2 | 2.9 | 3.1 | 3.6 | 2.9 | 2.9 | 1.8 | 2.5 | 2.0 | 1.0 | 1.4 | 0.9 | 0.7 | 0.6 | 3.6 |
| 22-Aug | 0.7 | 0.6 | 0.9 | 0.4 | 0.5 | 0.7 | 0.7 | 1.1 | 1.3 | 1.1 | 2.0 | 2.1 | 1.5 | 2.8 | 2.3 | 1.5 | 1.1 | 0.8 | 0.3 | 0.1 | 1.1 | 1.5 | 1.2 | 1.1 | 2.8 |
| 23-Aug | 1.1 | 1.6 | 1.3 | 1.1 | 1.5 | 1.4 | 1.6 | 1.6 | 1.7 | 2.1 | 2.3 | 2.5 | 2.0 | 1.7 | 2.4 | 2.4 | 2.6 | 2.6 | 2.7 | 2.3 | 2.3 | 2.0 | 2.4 | 2.1 | 2.7 |
| 24-Aug | 1.8 | 1.7 | 1.8 | 2.8 | 1.9 | 1.2 | 1.2 | 0.9 | 1.6 | 1.4 | 2.1 | 1.4 | 1.5 | 2.1 | 2.1 | 2.7 | 2.0 | 1.6 | 2.3 | 2.1 | 1.3 | 2.1 | 2.1 | 1.9 | 2.8 |
| 25-Aug | 2.7 | 1.8 | 1.7 | 1.9 | 2.1 | 2.4 | 1.7 | 2.5 | 2.9 | 2.5 | 2.8 | 2.7 | 4.0 | 4.0 | 4.6 | 4.8 | 4.3 | 4.5 | 3.4 | 2.6 | 1.4 | 2.5 | 2.9 | 2.6 | 4.8 |
| 26-Aug | 2.8 | 2.4 | 2.7 | 2.8 | 2.8 | 2.9 | 3.0 | 2.8 | 2.5 | 2.2 | 2.2 | 2.7 | 2.8 | 2.7 | 2.8 | 2.9 | 2.7 | 2.2 | 2.5 | 0.8 | 0.9 | 1.3 | 1.4 | 1.3 | 3.0 |
| 27-Aug | 1.7 | 1.9 | 2.1 | 2.2 | 2.0 | 2.1 | 2.4 | 2.6 | 2.9 | 3.0 | 2.8 | 2.9 | 3.5 | 3.5 | 3.3 | 3.2 | 3.1 | 2.9 | 2.2 | 1.0 | 0.6 | 0.7 | 0.5 | 1.6 | 3.5 |
| 28-Aug | 1.4 | 0.7 | 0.9 | 1.6 | 1.6 | 1.9 | 1.2 | 1.3 | 1.7 | 2.0 | 2.9 | 3.0 | 3.5 | 3.6 | 3.6 | 3.1 | 2.9 | 2.1 | 1.2 | 0.6 | 0.3 | 0.3 | 0.6 | 0.6 | 3.6 |
| 29-Aug | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.5 | 1.1 | 1.2 | 1.8 | 1.5 | 1.9 | 2.3 | 1.7 | 2.0 | 1.8 | 1.4 | 0.7 | 0.4 | 1.2 | 2.0 | 1.3 | 2.2 | 2.3 |
| 30-Aug | 1.2 | 1.4 | 1.4 | 1.7 | 1.6 | 1.7 | 2.2 | 2.6 | 2.3 | 2.2 | 3.3 | 3.1 | 3.6 | 3.3 | 4.4 | 3.5 | 2.9 | 2.7 | 3.0 | 1.9 | 1.9 | 1.9 | 1.6 | 1.5 | 4.4 |
| 31-Aug | 1.6 | 1.4 | 1.2 | 0.9 | 1.0 | 1.2 | 1.5 | 1.8 | 1.5 | 1.7 | 2.3 | 2.6 | 2.6 | 3.0 | 3.3 | 3.3 | 2.8 | 3.1 | 2.5 | 1.5 | 1.0 | 1.7 | 1.7 | 1.9 | 3.3 |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |



| Maximum Value: 4.5 km/h on Aug 8 22:00 | | Maximum Daily Average: 2.0 km/h on Aug 13 | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|--|------|--------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|---------------|---------------|
| Minimum Value: -1.2 km/h on Aug 19 16:00 | | Minimum Daily Average: -0.2 km/h on Aug 28 | | Hours of Data: 742 | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 1.2 km/h at hour 22 | | Minimum Diurnal Average: 0.5 km/h at hour 15 | | Hours of Missing Data: 2 | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 0.81 km/h | | Percentiles: P ₁ = -0.9 P ₁₀ = -0.1 Q ₁ = 0.1 Median = 0.6 Q ₃ = 1.4 P ₉₀ = 2.2 P ₉₉ = 3.7 | | Hours of Calibration: 0 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Percent Operational Time: 99.7 | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | -0.1 | -0.1 | 0.0 | -0.1 | 0.0 | 0.0 | -0.1 | 0.1 | -0.2 | -0.1 | 0.4 | -0.5 | -0.4 | -0.6 | -0.5 | 0.2 | -0.2 | 0.6 | 0.5 | 0.1 | 0.4 | 0.2 | 0.2 | 0.1 | 0.0 | 0.6 |
| 2-Aug | 0.2 | 0.0 | 0.3 | 0.1 | 0.3 | 0.6 | 0.6 | 0.4 | 0.6 | 0.7 | 1.5 | 0.0 | 0.3 | 0.5 | -0.9 | -0.2 | 0.0 | 0.0 | 0.5 | 1.0 | 1.4 | 1.1 | 1.0 | 0.3 | 0.4 | 1.5 |
| 3-Aug | 0.6 | 0.5 | 1.1 | 1.0 | 0.7 | 0.3 | -0.1 | 0.0 | 0.4 | -0.1 | 0.1 | 0.8 | 1.0 | 0.4 | 0.3 | -1.2 | 0.2 | 1.4 | 0.3 | 0.9 | 0.4 | 1.0 | 1.8 | 0.9 | 0.5 | 1.8 |
| 4-Aug | -0.1 | -0.1 | 0.2 | 0.1 | 0.3 | 0.5 | -0.1 | 0.2 | 0.1 | 0.1 | 0.0 | 0.2 | 1.1 | 0.8 | 0.8 | 0.4 | 0.0 | 1.1 | 0.4 | 0.4 | 0.2 | 0.2 | 0.4 | 0.3 | 0.3 | 1.1 |
| 5-Aug | 0.1 | 0.0 | 0.5 | 0.6 | 0.6 | 0.5 | 0.2 | 0.3 | 0.5 | 0.2 | 0.3 | 0.6 | 1.6 | 1.1 | 0.6 | 1.0 | 0.2 | 0.2 | 0.8 | 1.2 | 2.0 | 2.5 | 3.3 | 2.1 | 0.9 | 3.3 |
| 6-Aug | -0.1 | 0.3 | 0.1 | 0.5 | 0.1 | 0.0 | 0.4 | -0.2 | 0.2 | 0.3 | 0.3 | 0.5 | 0.2 | 0.6 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.4 | 0.3 | 0.0 | 0.0 | -0.1 | 0.2 | 0.6 |
| 7-Aug | 0.0 | -0.1 | 0.3 | 0.5 | 0.1 | -0.1 | 0.1 | 0.1 | -0.1 | -0.2 | 0.3 | 0.3 | -0.5 | 0.2 | -0.4 | 0.2 | 0.3 | 0.6 | 0.4 | 0.5 | 0.7 | 0.8 | 1.4 | -0.5 | 0.2 | 1.4 |
| 8-Aug | 0.5 | 0.5 | 0.3 | 0.6 | 0.3 | 0.5 | 0.8 | 0.7 | 0.7 | 0.6 | -0.1 | -0.5 | -0.3 | 0.5 | -0.2 | -0.2 | -0.5 | -0.1 | 1.3 | 1.2 | 1.6 | 4.5 | 1.5 | 0.6 | 0.6 | 4.5 |
| 9-Aug | 0.8 | 0.9 | 1.2 | 1.3 | 0.8 | 0.9 | 0.9 | 0.4 | 0.3 | 0.3 | 0.5 | 0.0 | 0.6 | 0.1 | -0.4 | 0.0 | 0.6 | 0.4 | 1.4 | 1.1 | 2.4 | 3.2 | 1.4 | 0.1 | 0.8 | 3.2 |
| 10-Aug | 0.3 | 0.8 | 1.3 | 0.8 | 0.7 | 0.5 | 0.3 | 0.4 | 0.4 | -0.3 | -0.8 | -0.2 | 1.6 | 0.8 | -0.9 | 0.4 | 0.7 | 2.2 | 0.9 | 0.6 | 0.4 | 0.4 | 0.1 | 0.3 | 0.5 | 2.2 |
| 11-Aug | 0.6 | 0.3 | 0.6 | 0.0 | 0.2 | 0.3 | 0.3 | 0.0 | 0.1 | 0.3 | 0.5 | 1.7 | 1.0 | 0.4 | 0.7 | 0.3 | 0.1 | 0.0 | 2.4 | 0.1 | 0.0 | 0.0 | 0.4 | 2.8 | 0.5 | 2.8 |
| 12-Aug | 2.6 | 1.0 | 1.5 | 1.3 | 1.8 | 1.7 | 1.5 | 1.5 | 0.8 | 0.4 | 0.8 | 0.8 | 1.0 | 0.4 | 0.3 | 0.5 | -0.2 | 1.6 | 1.6 | 1.7 | 0.8 | -0.5 | -0.2 | -0.2 | 0.9 | 2.6 |
| 13-Aug | 1.2 | 1.4 | 1.8 | 1.7 | 2.2 | 2.4 | 2.2 | 2.0 | 2.7 | 3.2 | 2.5 | 3.2 | 2.6 | 3.0 | 2.3 | 2.4 | 2.6 | 3.7 | 0.1 | 0.0 | 0.9 | 1.0 | 1.4 | 2.1 | 2.0 | 3.7 |
| 14-Aug | 1.6 | 0.7 | 1.0 | 0.9 | 0.7 | 1.1 | 1.7 | 2.2 | 0.4 | 0.8 | 1.2 | 0.9 | 1.4 | 0.4 | 1.8 | 1.9 | 1.1 | 0.9 | 0.5 | 0.3 | 0.4 | 0.9 | 1.7 | 1.5 | 1.1 | 2.2 |
| 15-Aug | 1.2 | 1.7 | 0.4 | 1.2 | 1.7 | 0.5 | 0.5 | 0.2 | 0.4 | 0.7 | 0.7 | 0.1 | 1.2 | 0.2 | -0.3 | -0.1 | 0.5 | 0.4 | 0.7 | -0.1 | UO | UO | -0.2 | -0.8 | 0.5 | 1.7 |
| 16-Aug | 0.1 | -0.4 | 0.4 | 0.0 | 0.6 | 0.5 | 0.2 | 0.2 | 0.5 | 0.7 | 0.2 | 0.1 | 0.3 | -0.2 | 0.0 | -0.5 | 0.1 | 0.7 | 0.7 | 0.6 | 0.8 | 1.4 | 1.1 | 1.2 | 0.4 | 1.4 |
| 17-Aug | 0.8 | 1.5 | 0.4 | 0.8 | 0.7 | 0.5 | 0.7 | 0.5 | 0.9 | 0.9 | 0.4 | 0.5 | -0.1 | 0.0 | 0.7 | 0.8 | 0.7 | 1.6 | 1.1 | 1.2 | 1.2 | 2.6 | 1.0 | 1.7 | 0.9 | 2.6 |
| 18-Aug | 0.6 | 0.5 | 1.3 | 2.0 | 1.8 | 0.7 | 0.7 | 2.5 | 2.2 | 1.2 | 1.4 | 1.9 | 1.7 | 1.6 | 2.0 | 3.1 | 2.0 | 2.3 | 3.0 | 3.1 | 3.2 | 2.8 | 2.8 | 2.8 | 2.0 | 3.2 |
| 19-Aug | 2.3 | 2.5 | -0.2 | 0.5 | 0.4 | 0.8 | 1.2 | 1.5 | 1.3 | 1.5 | 1.8 | 0.1 | 0.4 | -0.8 | -0.8 | -1.2 | -0.1 | -0.1 | 0.0 | -0.1 | -0.6 | 0.2 | 0.6 | 0.7 | 0.5 | 2.5 |
| 20-Aug | 1.4 | 1.1 | 0.5 | 0.0 | 0.9 | 1.9 | 1.5 | 1.3 | 1.4 | 1.1 | -0.3 | 0.1 | -0.4 | 0.5 | -0.7 | 0.3 | 1.6 | 0.6 | -0.9 | -0.7 | -0.9 | 0.3 | -0.1 | 0.8 | 0.5 | 1.9 |
| 21-Aug | 0.2 | 1.0 | 1.9 | 1.6 | 2.3 | 2.2 | 1.3 | 0.9 | 0.8 | 0.2 | 0.8 | 0.6 | 0.5 | 1.3 | 0.4 | 0.4 | 0.3 | 0.7 | 0.3 | -0.1 | 0.0 | 0.2 | 0.0 | 0.0 | 0.7 | 2.3 |
| 22-Aug | -0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.2 | -0.3 | -0.2 | 0.2 | 0.0 | 0.8 | 0.4 | -0.1 | 1.5 | 0.0 | -0.8 | 0.9 | -0.1 | 0.0 | 0.1 | 0.8 | 1.7 | 1.1 | 0.7 | 0.3 | 1.7 |
| 23-Aug | 0.8 | 1.6 | 2.6 | 2.5 | 2.4 | 1.8 | 2.5 | 1.5 | 1.1 | 0.7 | 0.3 | 0.9 | 1.2 | 0.6 | 2.0 | 2.6 | 4.5 | 4.0 | 3.7 | 1.6 | 2.7 | 2.2 | 2.2 | 3.0 | 2.0 | 4.5 |
| 24-Aug | 3.1 | 2.6 | 2.6 | 2.2 | 2.1 | 1.1 | 1.0 | 0.5 | 1.5 | 0.7 | 0.6 | 0.7 | 1.2 | 1.0 | 1.5 | 2.0 | 0.8 | 0.6 | 1.7 | 2.4 | 1.3 | 2.2 | 1.1 | 1.6 | 1.5 | 3.1 |
| 25-Aug | 1.6 | 1.9 | 1.7 | 2.1 | 2.3 | 2.4 | 2.0 | 2.0 | 1.6 | 1.3 | 1.8 | 1.9 | 2.6 | 2.8 | 3.2 | 2.6 | 2.4 | 1.6 | 1.4 | 1.1 | 0.9 | 1.8 | 2.1 | 1.5 | 1.9 | 3.2 |
| 26-Aug | 1.2 | 1.0 | 1.2 | 1.4 | 1.5 | 3.0 | 2.5 | 2.2 | 0.8 | 0.7 | 1.2 | 1.4 | 1.4 | 0.2 | 0.7 | 1.0 | 1.0 | 1.1 | 1.6 | 0.7 | 1.9 | 2.6 | 2.0 | 2.0 | 1.4 | 3.0 |
| 27-Aug | 1.7 | 2.0 | 1.8 | 1.4 | 1.0 | 1.7 | 1.6 | 0.6 | 1.1 | 1.5 | 0.9 | 1.3 | 1.9 | -0.1 | -0.8 | 0.2 | -0.2 | -0.3 | -0.4 | -0.6 | 0.0 | -0.1 | 0.0 | -0.1 | 0.7 | 2.0 |
| 28-Aug | -0.3 | -0.3 | 0.3 | 0.1 | -0.2 | 0.6 | 0.1 | 0.2 | 0.3 | -0.1 | 0.7 | -0.7 | -0.2 | -0.6 | -0.6 | -1.1 | -1.1 | -0.7 | -0.8 | -0.4 | -0.3 | -0.1 | -0.1 | -0.1 | -0.2 | 0.7 |
| 29-Aug | -0.1 | 0.0 | -0.1 | 0.2 | 0.2 | 0.0 | 0.1 | 0.2 | 0.3 | 0.1 | 1.0 | 0.1 | -0.6 | 1.2 | -0.7 | -0.7 | 0.7 | 0.5 | 1.1 | 1.0 | 1.6 | 1.3 | 0.2 | 1.1 | 0.4 | 1.6 |
| 30-Aug | 1.8 | 2.5 | 1.1 | 1.0 | 1.7 | 1.8 | 2.5 | 2.3 | 1.9 | 1.5 | 2.3 | 3.3 | 1.8 | 2.7 | 3.8 | 3.8 | 2.9 | 2.7 | 0.4 | 0.2 | 0.8 | 0.1 | 0.3 | -0.1 | 1.8 | 3.8 |
| 31-Aug | 0.2 | 1.5 | 1.0 | 0.9 | 0.7 | 0.5 | 0.5 | 1.3 | 0.9 | 1.5 | 1.5 | 1.6 | 1.3 | 0.9 | 0.4 | 0.9 | 0.6 | 0.2 | 0.7 | 0.1 | -0.1 | 0.5 | 0.5 | 0.6 | 0.8 | 1.6 |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| UO - Unstable Operation | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Vertical Wind Speed 167 m (VW167m) - km/h
Lower Camp Met Tower - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 5.5 km/h on Aug 19 16:00 Minimum Value: 0.2 km/h on Aug 22 20:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.6 Q ₁ = 1.0 Median = 1.7 Q ₃ = 2.5 P ₉₀ = 3.1 P ₉₉ = 4.5 | | | | | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7 | |
|---|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 0.4 | 0.3 | 0.2 | 0.4 | 0.2 | 0.4 | 0.3 | 0.8 | 2.0 | 2.4 | 2.6 | 2.9 | 3.1 | 3.4 | 3.3 | 3.0 | 3.1 | 2.8 | 2.1 | 1.0 | 0.5 | 0.2 | 0.2 | 0.2 | 3.4 |
| 2-Aug | 0.3 | 0.3 | 0.4 | 0.2 | 0.3 | 0.5 | 0.6 | 0.6 | 0.7 | 1.2 | 1.6 | 2.8 | 3.2 | 3.5 | 3.0 | 3.0 | 2.7 | 2.0 | 1.7 | 1.1 | 0.9 | 0.3 | 0.9 | 2.1 | 3.5 |
| 3-Aug | 1.1 | 1.1 | 1.1 | 0.9 | 0.7 | 0.8 | 0.6 | 0.7 | 0.7 | 1.0 | 2.3 | 2.7 | 2.9 | 3.0 | 2.4 | 1.4 | 1.7 | 1.5 | 1.2 | 3.7 | 2.5 | 1.0 | 1.5 | 1.3 | 3.7 |
| 4-Aug | 0.8 | 0.4 | 0.7 | 0.6 | 0.5 | 0.6 | 0.7 | 0.6 | 0.5 | 0.6 | 0.6 | 0.9 | 1.7 | 3.0 | 1.3 | 1.0 | 0.9 | 0.7 | 1.1 | 1.4 | 0.9 | 0.6 | 0.7 | 0.7 | 3.0 |
| 5-Aug | 0.5 | 0.7 | 0.8 | 0.8 | 0.4 | 0.5 | 0.4 | 0.4 | 0.8 | 0.9 | 1.5 | 1.9 | 2.4 | 2.6 | 2.8 | 2.7 | 1.9 | 1.3 | 1.4 | 1.0 | 0.9 | 0.7 | 1.7 | 2.2 | 2.8 |
| 6-Aug | 1.5 | 0.9 | 0.9 | 0.7 | 0.6 | 0.5 | 0.9 | 1.4 | 1.4 | 1.9 | 2.4 | 3.1 | 3.0 | 2.6 | 2.0 | 1.8 | 1.3 | 1.0 | 1.6 | 1.2 | 0.7 | 0.4 | 0.4 | 0.3 | 3.1 |
| 7-Aug | 0.3 | 0.3 | 0.3 | 0.5 | 0.3 | 0.7 | 0.7 | 0.9 | 1.1 | 1.4 | 2.3 | 2.4 | 2.4 | 3.4 | 2.8 | 2.7 | 2.3 | 2.1 | 1.5 | 0.8 | 0.6 | 0.9 | 1.5 | 1.3 | 3.4 |
| 8-Aug | 1.1 | 0.7 | 0.8 | 0.9 | 1.1 | 0.8 | 0.8 | 0.9 | 1.0 | 0.9 | 2.1 | 2.9 | 3.0 | 3.4 | 3.0 | 2.9 | 2.6 | 2.8 | 2.3 | 1.1 | 1.2 | 1.3 | 1.5 | 1.5 | 3.4 |
| 9-Aug | 1.4 | 0.8 | 1.0 | 1.2 | 1.3 | 1.1 | 1.1 | 1.0 | 1.1 | 0.9 | 1.1 | 1.5 | 2.9 | 3.2 | 3.1 | 2.7 | 2.6 | 2.0 | 1.9 | 1.2 | 0.3 | 0.8 | 1.4 | 1.4 | 3.2 |
| 10-Aug | 1.0 | 0.9 | 1.5 | 1.4 | 1.5 | 1.3 | 0.7 | 0.9 | 1.0 | 1.0 | 1.3 | 2.0 | 2.1 | 3.1 | 2.3 | 2.7 | 2.1 | 1.9 | 1.3 | 1.2 | 0.8 | 0.6 | 0.4 | 0.5 | 3.1 |
| 11-Aug | 0.8 | 0.6 | 0.7 | 0.6 | 0.6 | 0.6 | 0.8 | 0.7 | 0.8 | 0.9 | 1.2 | 2.3 | 2.5 | 3.0 | 2.6 | 2.5 | 2.5 | 1.8 | 2.7 | 1.2 | 0.6 | 0.7 | 0.9 | 1.5 | 3.0 |
| 12-Aug | 1.9 | 0.9 | 1.0 | 1.0 | 1.3 | 1.4 | 1.6 | 1.7 | 1.9 | 1.9 | 2.5 | 2.9 | 3.1 | 3.1 | 2.7 | 2.5 | 2.3 | 2.6 | 2.0 | 1.3 | 1.2 | 0.7 | 0.9 | 0.9 | 3.1 |
| 13-Aug | 1.9 | 2.1 | 1.9 | 1.7 | 2.3 | 2.1 | 1.9 | 3.0 | 3.1 | 3.2 | 4.6 | 4.6 | 4.7 | 4.1 | 4.2 | 4.4 | 4.0 | 4.1 | 2.3 | 1.8 | 2.2 | 2.5 | 2.5 | 2.0 | 4.7 |
| 14-Aug | 1.7 | 1.3 | 1.2 | 1.5 | 1.5 | 1.8 | 2.0 | 3.0 | 2.2 | 2.1 | 2.8 | 2.4 | 3.3 | 3.2 | 3.1 | 2.1 | 1.6 | 1.6 | 0.8 | 1.1 | 1.1 | 1.3 | 1.6 | 1.6 | 3.3 |
| 15-Aug | 1.3 | 1.9 | 1.3 | 1.3 | 1.5 | 1.1 | 0.8 | 0.6 | 0.9 | 1.2 | 1.5 | 1.8 | 1.9 | 1.9 | 1.3 | 1.0 | 1.1 | 0.7 | 1.5 | 2.0 | UO | UO | 0.5 | 1.3 | 2.0 |
| 16-Aug | 2.1 | 1.4 | 0.9 | 0.6 | 0.8 | 0.8 | 0.7 | 0.6 | 0.9 | 1.0 | 1.2 | 2.5 | 3.4 | 2.9 | 2.8 | 2.5 | 2.4 | 1.7 | 1.0 | 0.7 | 0.3 | 0.4 | 0.7 | 1.1 | 3.4 |
| 17-Aug | 1.3 | 1.3 | 0.8 | 0.6 | 0.9 | 0.7 | 1.0 | 1.5 | 1.3 | 1.5 | 1.6 | 2.5 | 2.6 | 3.3 | 2.9 | 2.8 | 2.1 | 1.3 | 1.2 | 0.6 | 0.4 | 0.8 | 1.4 | 1.0 | 3.3 |
| 18-Aug | 1.1 | 1.3 | 1.1 | 1.3 | 1.3 | 1.5 | 1.8 | 2.6 | 3.1 | 2.9 | 3.3 | 3.8 | 3.6 | 2.8 | 2.9 | 3.2 | 2.2 | 3.6 | 3.0 | 2.7 | 2.4 | 2.4 | 2.0 | 2.3 | 3.8 |
| 19-Aug | 2.4 | 2.9 | 1.5 | 1.5 | 1.8 | 1.7 | 2.3 | 2.5 | 3.3 | 3.1 | 3.7 | 3.9 | 4.3 | 5.2 | 5.0 | 5.5 | 3.9 | 2.9 | 3.0 | 3.0 | 2.0 | 3.0 | 1.8 | 1.4 | 5.5 |
| 20-Aug | 1.6 | 1.4 | 1.4 | 1.1 | 1.3 | 1.3 | 1.7 | 2.0 | 2.5 | 2.9 | 3.6 | 4.4 | 4.1 | 4.4 | 4.3 | 3.9 | 2.6 | 2.6 | 2.6 | 2.4 | 2.6 | 2.7 | 2.7 | 3.0 | 4.4 |
| 21-Aug | 1.7 | 1.2 | 1.6 | 1.4 | 1.6 | 2.2 | 2.0 | 1.8 | 1.6 | 1.7 | 2.0 | 2.6 | 2.9 | 3.4 | 2.9 | 3.1 | 2.1 | 2.6 | 2.1 | 0.9 | 1.5 | 0.9 | 0.9 | 0.6 | 3.4 |
| 22-Aug | 0.9 | 0.7 | 0.6 | 0.8 | 0.7 | 0.6 | 0.8 | 0.9 | 1.0 | 0.7 | 1.9 | 2.2 | 1.8 | 2.7 | 2.2 | 1.4 | 1.4 | 1.0 | 0.3 | 0.2 | 1.1 | 1.7 | 1.2 | 1.2 | 2.7 |
| 23-Aug | 1.4 | 2.0 | 1.6 | 1.4 | 1.1 | 1.1 | 1.8 | 2.0 | 2.0 | 2.0 | 1.8 | 2.1 | 1.8 | 1.3 | 2.6 | 2.5 | 3.0 | 3.3 | 3.3 | 2.6 | 3.0 | 2.5 | 2.5 | 2.5 | 3.3 |
| 24-Aug | 2.4 | 2.2 | 2.5 | 3.0 | 1.8 | 1.4 | 1.3 | 1.1 | 1.8 | 1.4 | 2.4 | 1.6 | 1.7 | 2.2 | 2.0 | 2.6 | 2.1 | 2.1 | 2.6 | 2.3 | 1.3 | 2.0 | 2.0 | 2.1 | 3.0 |
| 25-Aug | 2.7 | 1.8 | 1.8 | 1.7 | 1.9 | 2.4 | 1.7 | 2.6 | 2.8 | 2.6 | 2.8 | 2.6 | 3.7 | 3.8 | 4.1 | 4.4 | 4.3 | 3.8 | 2.8 | 2.2 | 1.5 | 2.3 | 2.6 | 2.3 | 4.4 |
| 26-Aug | 2.6 | 1.9 | 1.8 | 2.2 | 2.3 | 2.2 | 2.3 | 2.4 | 2.1 | 2.1 | 2.2 | 2.6 | 2.8 | 2.2 | 2.6 | 2.7 | 2.7 | 1.9 | 2.2 | 0.7 | 0.7 | 0.8 | 1.2 | 1.0 | 2.8 |
| 27-Aug | 1.3 | 1.6 | 1.8 | 1.9 | 1.6 | 1.7 | 2.1 | 2.2 | 2.4 | 2.5 | 2.3 | 2.5 | 3.1 | 3.2 | 3.3 | 3.0 | 2.9 | 2.6 | 1.9 | 1.3 | 1.1 | 0.6 | 0.5 | 1.1 | 3.3 |
| 28-Aug | 2.0 | 1.1 | 0.9 | 1.7 | 1.3 | 1.5 | 1.2 | 1.1 | 1.8 | 2.0 | 3.8 | 3.5 | 4.1 | 4.3 | 4.0 | 3.1 | 3.0 | 2.2 | 1.2 | 0.6 | 0.4 | 0.3 | 0.7 | 0.8 | 4.3 |
| 29-Aug | 0.4 | 0.6 | 0.5 | 0.5 | 0.3 | 0.2 | 0.2 | 0.4 | 0.7 | 0.7 | 1.9 | 1.6 | 2.1 | 2.7 | 1.6 | 1.7 | 1.9 | 1.7 | 0.7 | 0.4 | 0.9 | 2.5 | 2.0 | 2.4 | 2.7 |
| 30-Aug | 1.9 | 2.5 | 1.8 | 1.7 | 1.4 | 1.7 | 1.9 | 2.2 | 2.4 | 2.4 | 3.9 | 3.9 | 4.3 | 4.1 | 4.6 | 3.9 | 3.3 | 3.0 | 2.3 | 1.3 | 1.2 | 1.3 | 1.0 | 1.0 | 4.6 |
| 31-Aug | 1.0 | 1.2 | 1.0 | 0.7 | 0.9 | 1.1 | 1.2 | 1.5 | 1.4 | 1.9 | 2.2 | 2.6 | 2.5 | 2.9 | 2.9 | 3.1 | 2.5 | 2.5 | 2.1 | 0.7 | 0.7 | 1.1 | 0.9 | 1.3 | 3.1 |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |
| UO - Unstable Operation | | | | | | | | | | | | | | | | | | | | | | | | | |



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 4 BUFFALO VIEWPOINT AUGUST 2017

Operations, Data Collection,
QA/QC, Data Validation and Reporting by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

September 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BUFFALO VIEWPOINT (AMS 4)
AUGUST 2017

MONTHLY SUMMARY for
AMD SECTION III.B.1(c)

| Parameter | Hours of Data | Hours of Calibration | Hours without Data | Operational Time | Maximum 1-Hour Value | 1-Hour Exceedances | Maximum 24-Hour Value | 24-Hour Exceedances |
|-----------------------------------|------------------|-------------------------|-----------------------|---------------------|-------------------------|-----------------------|--------------------------|------------------------|
| SO2 (ppb) Average | 704 | 37 | 40 | 99.6 | 74 | 0 | 8 | 0 |
| H2S (ppb) Average | 707 | 34 | 37 | 99.6 | 3 | 0 | 1 | 0 |
| THC (ppm) Average | 704 | 37 | 40 | 99.6 | 3.8 | - | 2.6 | - |
| O3(ppb) Average | 708 | 34 | 36 | 99.73 | 58 | 0 | 48 | - |
| NO2(ppb) Average | 702 | 37 | 42 | 99.33 | 30 | 0 | 8 | 0 |
| NO(ppb) Average | 702 | 37 | 42 | 99.33 | 42 | - | 10 | - |
| NOX(ppb) Average | 702 | 37 | 42 | 99.33 | 58 | - | 17 | - |
| PM2.5(ug/m3) Average | 665 | 1 | 1 | 100 | 123.5 | - | 27.4 | - |
| Temperature (C) Average | 744 | 0 | 0 | 100 | 30.6 | - | 23.7 | - |
| Relative Humidity (%) Average | 744 | 0 | 0 | 100 | 98 | - | 87 | - |
| Wind Speed 10 m (km/h) Average | 743 | 0 | 1 | 99.87 | 32 | - | 19 | - |
| Wind Direction 10 m (deg) Average | 743 | 0 | 1 | 99.87 | - | - | - | - |

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BUFFALO VIEWPOINT (AMS 4)
AUGUST 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

| Parameter | Number | Mean | StnDev | Total | Percentile | | | | | | |
|-----------------------------------|--------|-------|--------|-------|------------|------|------|--------|-----|------|-------|
| | | | | | Min | P10 | Q1 | Median | Q3 | P90 | Max |
| SO2 (ppb) Average | 704 | 0.9 | 4 | - | 0 | 0 | 0 | 0 | 0 | 1 | 74 |
| H2S (ppb) Average | 707 | 0.3 | 0 | - | 0 | 0 | 0 | 0 | 0 | 1 | 3 |
| THC (ppm) Average | 704 | 2.31 | 0.2 | - | 2.1 | 2.1 | 2.2 | 2.2 | 2.4 | 2.6 | 3.8 |
| O3(ppb) Average | 708 | 25.9 | 11 | - | 2 | 12 | 19 | 25 | 33 | 39 | 58 |
| NO2(ppb) Average | 702 | 2.2 | 4 | - | 0 | 0 | 1 | 1 | 2 | 6 | 30 |
| NO(ppb) Average | 702 | 0.8 | 3 | - | 0 | 0 | 0 | 0 | 0 | 1 | 42 |
| NOX(ppb) Average | 702 | 2.9 | 6 | - | 0 | 0 | 1 | 1 | 2 | 7 | 58 |
| PM2.5(ug/m3) Average | 665 | 8.18 | 10.7 | - | 0.2 | 1.8 | 3 | 5.3 | 8.9 | 15.8 | 123.5 |
| Temperature 2 m (C) Average | 744 | 18.03 | 5 | - | 6.2 | 12.1 | 13.9 | 17.5 | 22 | 24.8 | 30.6 |
| Relative Humidity (%) Average | 744 | 61.9 | 20 | - | 24 | 32 | 45 | 63 | 78 | 89 | 98 |
| Wind Speed 10 m (km/h) Average | 702 | 9.8 | 5 | - | 1 | 4 | 6 | 9 | 12 | 18 | 32 |
| Wind Direction 10 m (deg) Average | 702 | 0 | 0 | - | - | - | - | - | - | - | - |

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BUFFALO VIEWPOINT (AMS 4)
AUGSUT 2017

OPERATIONAL NOTES

| Parameter | Period Start | Period End | Duration (Hours) | Notes |
|----------------------------|-------------------|-------------------|------------------|--|
| H2S, NOX, SO2, THC | 16 Aug 2017 10:00 | 16 Aug 2017 10:00 | 1 | Maintenance - sample manifold cleaning |
| SO2 | 14 Aug 2017 10:00 | 14 Aug 2017 11:00 | 2 | Maintenance - WBEA internal audit |
| H2S | 11 Aug 2017 13:00 | 11 Aug 2017 14:00 | 2 | Maintenance - WBEA internal audit |
| THC | 14 Aug 2017 11:00 | 14 Aug 2017 12:00 | 2 | Maintenance - WBEA internal audit |
| O3 | 14 Aug 2017 13:00 | 14 Aug 2017 14:00 | 2 | Maintenance - WBEA internal audit |
| NO2, NO, NOX | 11 Aug 2017 10:00 | 11 Aug 2017 13:00 | 4 | Maintenance - WBEA internal audit |
| Wind Speed, Wind Direction | 03 Aug 2017 19:00 | 03 Aug 2017 19:00 | 1 | Flat line in sensor output signal |



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb
Buffalo Viewpoint - August 2017

| | | | | |
|---|---|----------|---------------------------|------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 74 ppb on Aug 10 13:00 | Maximum Daily Average: 7.9 ppb on Aug 10 | | Hours of Data: | 704 |
| Minimum Value: 0 ppb on Aug 2 13:00 | Minimum Daily Average: 0.0 ppb on Aug 20 | | Hours of Missing Data: | 40 |
| Maximum Diurnal Average: 3.4 ppb at hour 13 | Minimum Diurnal Average: 0.2 ppb at hour 6 | | Hours of Calibration: | 37 |
| Monthly Average: 0.9 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 14 | | Percent Operational Time: | 99.6 |

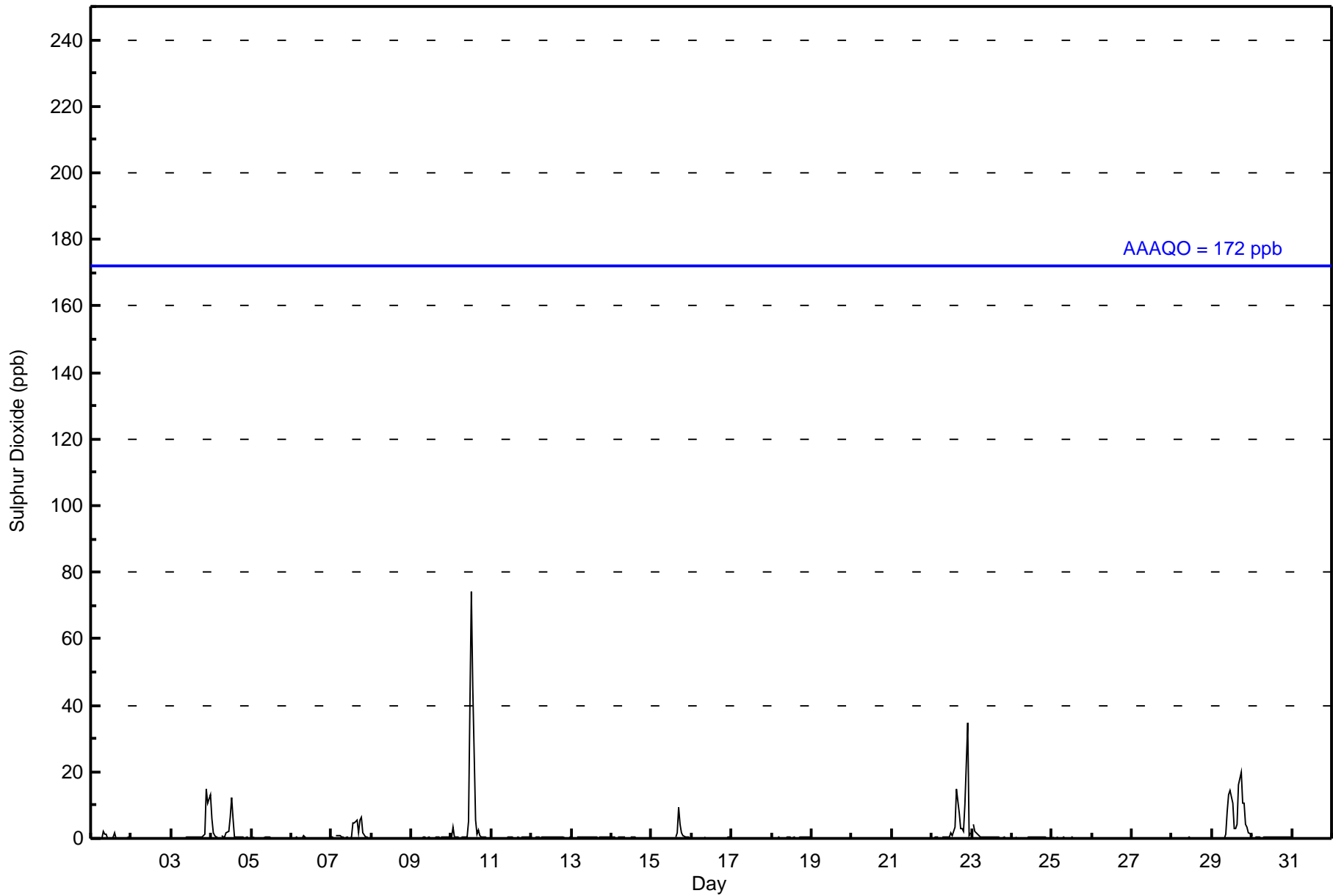
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 2 |
| 2-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 3-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 15 | 11 | 13 | 2.0 | 15 |
| 4-Aug | 6 | 2 | 1 | 1 | 1 | Z | 1 | 0 | 1 | 2 | 2 | 6 | 12 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.8 | 12 |
| 5-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 6-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 |
| 7-Aug | 0 | 0 | Z | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 5 | 5 | 2 | 6 | 6 | 2 | 0 | 0 | 0 | 0 | 0 | 1.6 | 6 |
| 8-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 9-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 10-Aug | 0 | 3 | 1 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 5 | 41 | 74 | 45 | 6 | 1 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 7.9 | 74 |
| 11-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 12-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 13-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 14-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | M | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 15-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | C | C | C | C | C | C | 1 | 2 | 9 | 4 | 2 | 1 | 0 | 0 | 0 | -- | 9 | |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 17-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 18-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 19-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 20-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 21-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 22-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 2 | 3 | 15 | 8 | 3 | 3 | 2 | 10 | 35 | 1 | 2 | 3.9 | 35 |
| 23-Aug | Z | 4 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 4 |
| 24-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 25-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 26-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 27-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 29-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 8 | 13 | 14 | 11 | 3 | 3 | 4 | 16 | 20 | 11 | 11 | 4 | 3 | 2 | 1 | 5.5 | 20 |
| 30-Aug | 1 | Z | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0.4 | 1 |
| 31-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |

Z - zerospan C - Calibration M - Maintenance
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Buffalo Viewpoint - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Buffalo Viewpoint - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 10 | 688 | 97.73 | 97.73 |
| 11 - 20 | 12 | 1.70 | 99.43 |
| 21 - 60 | 3 | 0.43 | 99.86 |
| 61 - 110 | 1 | 0.14 | 100.00 |
| 111 - 172 | 0 | 0.00 | 100.00 |
| > 172 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 704

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Buffalo Viewpoint - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 10 | 23 | 29 | 6 | 5 | 1 | 8 | 27 | 142 | 70 | 59 | 68 | 97 | 82 | 45 | 16 | 9 | 687 |
| 11 - 20 | 0 | 2 | 0 | 1 | 3 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 12 |
| 21 - 60 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 |
| 61 - 110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 111 - 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 23 | 32 | 6 | 6 | 5 | 10 | 29 | 142 | 70 | 59 | 68 | 97 | 84 | 45 | 16 | 11 | 703 |

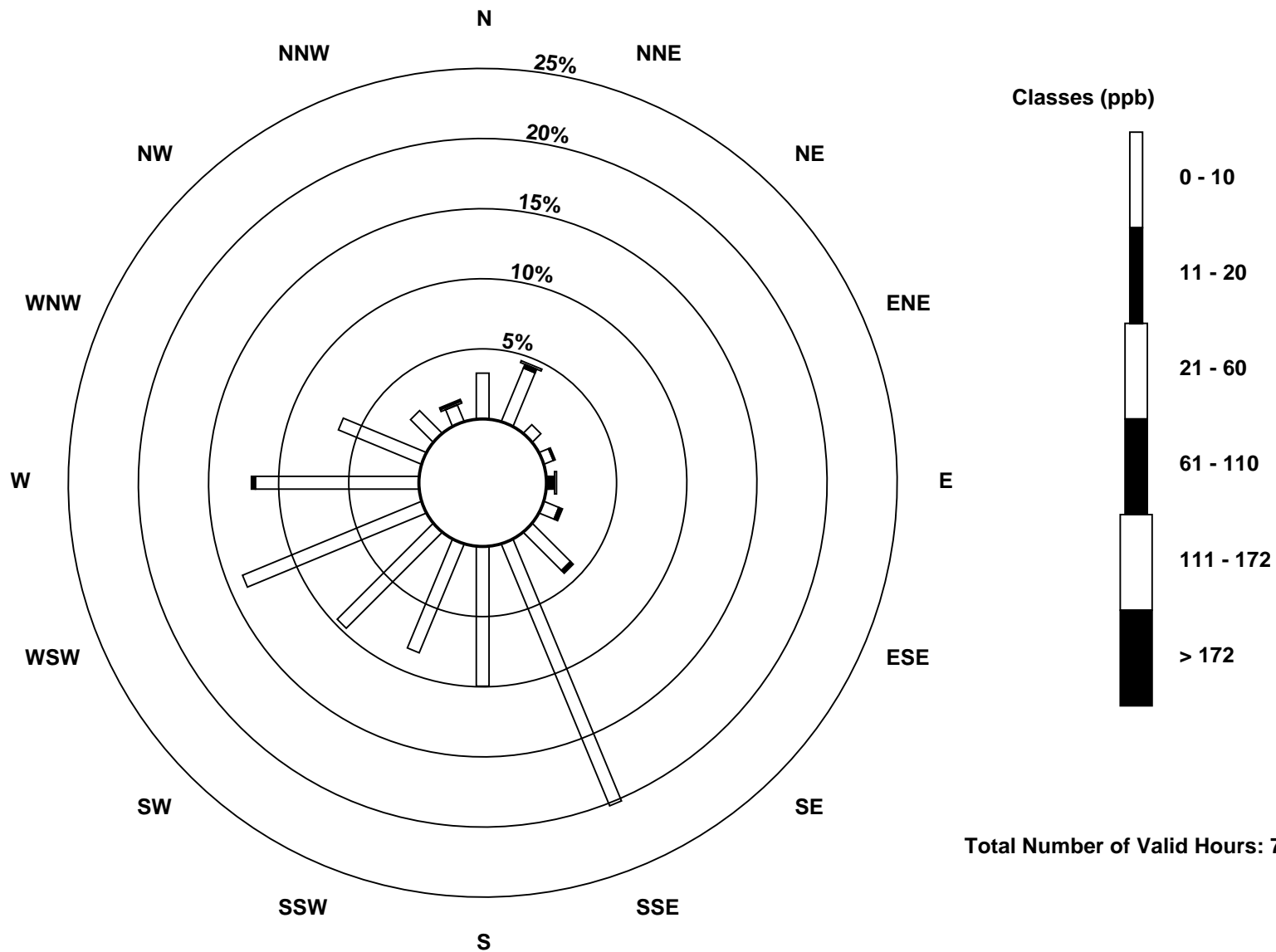
Total Number of Valid Hours: 703

Total Number of Hours: 744

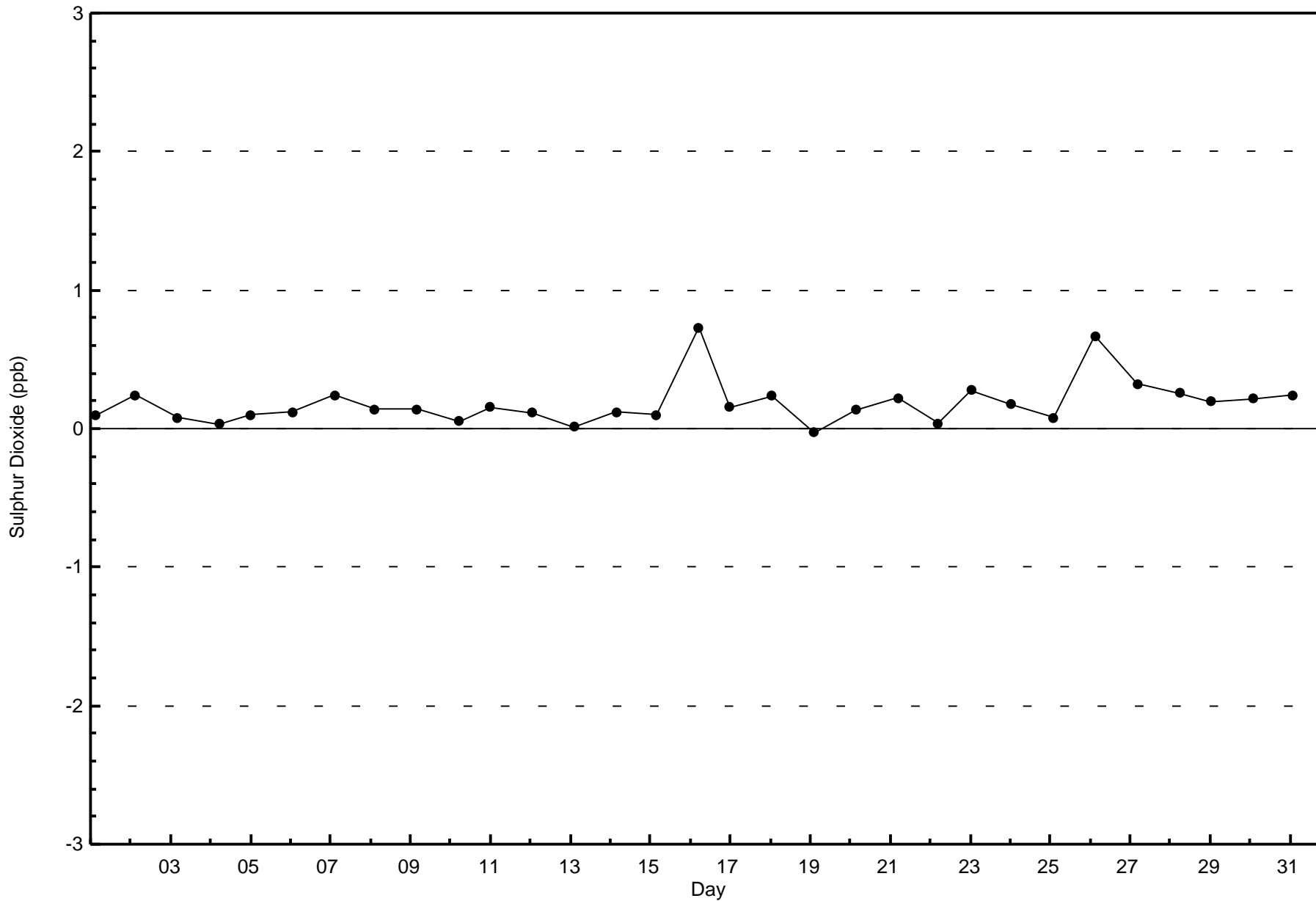


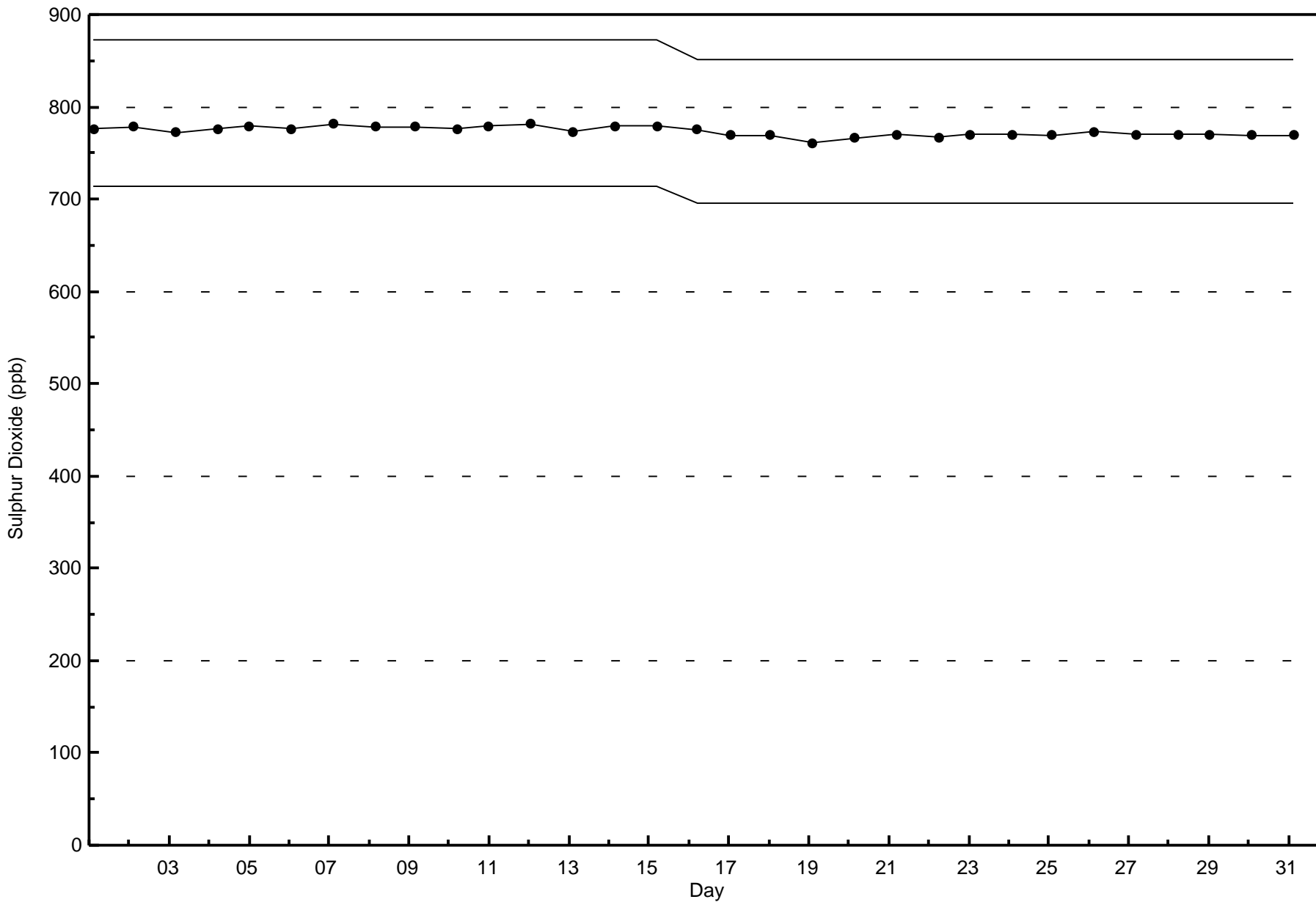
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Sulphur Dioxide (SO₂) - ppb
Buffalo Viewpoint (AMS 4)



Total Number of Valid Hours: 703







Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H₂S) - ppb

Buffalo Viewpoint - August 2017

| | | | | |
|--|--|----------|---------------------------|------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 3 ppb on Aug 22 22:00 | Maximum Daily Average: 0.9 ppb on Aug 29 | | Hours of Data: | 707 |
| Minimum Value: 0 ppb on Aug 7 17:00 | Minimum Daily Average: 0.0 ppb on Aug 8 | | Hours of Missing Data: | 37 |
| Maximum Diurnal Average: 0.5 ppb at hour 6 | Minimum Diurnal Average: 0.1 ppb at hour 16 | | Hours of Calibration: | 34 |
| Monthly Average: 0.3 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 2 | | Percent Operational Time: | 99.6 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
|--------|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|---------------|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 0 | 1 | 1 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.4 | 1 | |
| 2-Aug | 1 | 1 | 2 | Z | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 2 |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 2 | 0.4 | 2 | |
| 4-Aug | 2 | 1 | 1 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0.7 | 2 | |
| 5-Aug | 0 | Z | 1 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 2 | |
| 6-Aug | 0 | 0 | Z | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | |
| 7-Aug | 1 | 1 | 1 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | |
| 8-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | |
| 9-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | |
| 10-Aug | 0 | 1 | 1 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | |
| 11-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | M | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | |
| 12-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | |
| 13-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | |
| 14-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | |
| 15-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 0.4 | 2 | |
| 16-Aug | 0 | 0 | 0 | 1 | 1 | 1 | Z | 1 | 0 | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | |
| 17-Aug | 0 | Z | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | |
| 18-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | |
| 19-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | |
| 20-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.2 | 1 | |
| 22-Aug | 1 | 1 | 1 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 1 | 0 | 0.6 | 3 | |
| 23-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | |
| 24-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | |
| 25-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | |
| 26-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | |
| 28-Aug | 0 | 1 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 1 | 0.4 | 2 | |
| 29-Aug | 0 | Z | 0 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 3 | 1 | 0 | 0.9 | 3 | |
| 30-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | |
| 31-Aug | 0 | 0 | 0 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | |

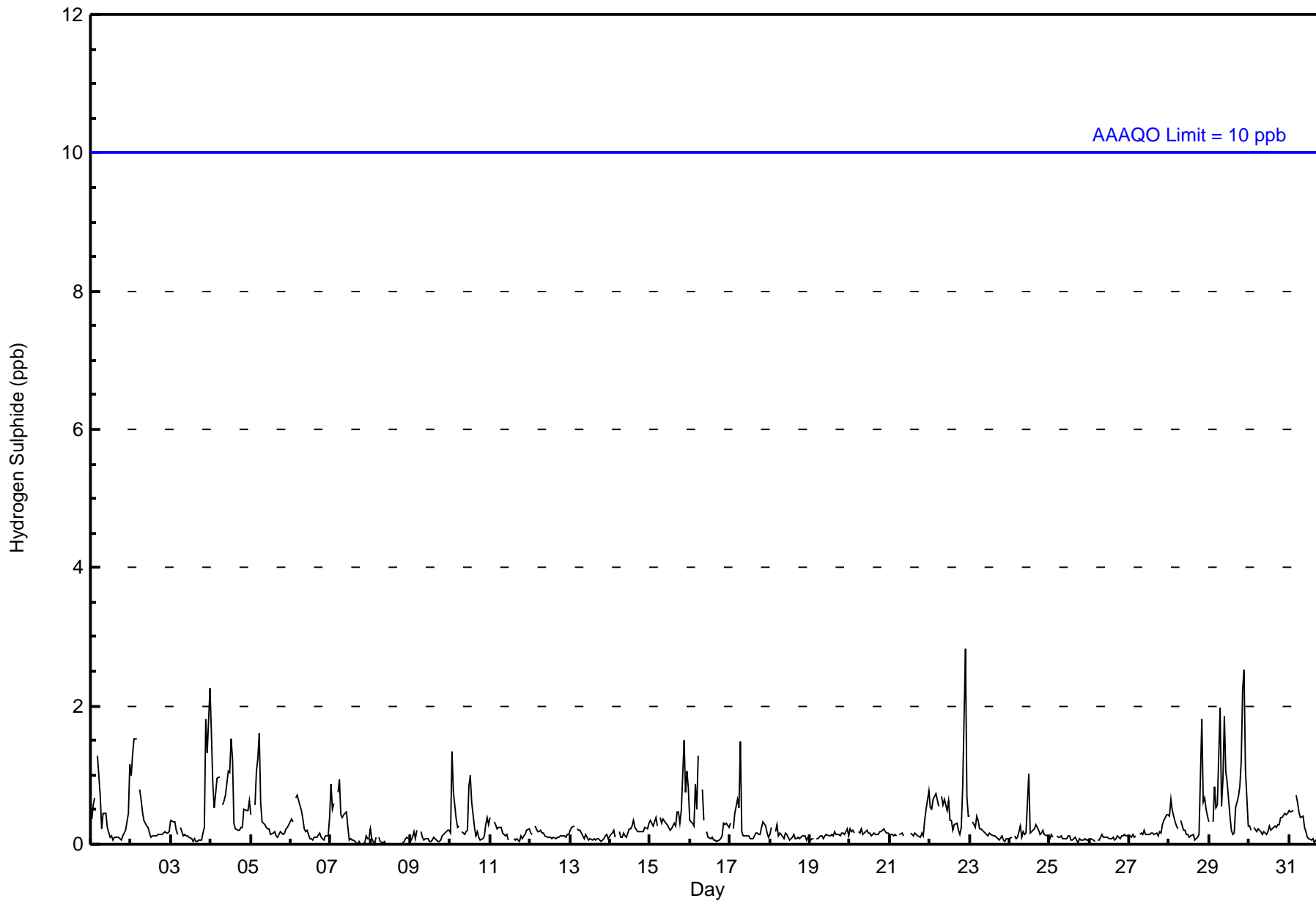
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|--|
| 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.4 | 0.3 | 0.2 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.3 | 0.4 | 0.3 | 0.4 | Diurnal Average | |
| 2 | 1 | 2 | 2 | 1 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 1 | 2 | Diurnal Maximum | |

Z - zerospan C - Calibration M - Maintenance
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb



Wood Buffalo Environmental Association
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Buffalo Viewpoint - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Buffalo Viewpoint - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2 | 705 | 99.72 | 99.72 |
| 3 - 4 | 2 | 0.28 | 100.00 |
| 5 - 7 | 0 | 0.00 | 100.00 |
| 8 - 11 | 0 | 0.00 | 100.00 |
| > 11 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Buffalo Viewpoint - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2 | 24 | 31 | 6 | 6 | 4 | 10 | 27 | 144 | 70 | 56 | 69 | 96 | 83 | 51 | 18 | 9 | 704 |
| 3 - 4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 5 - 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 - 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 24 | 31 | 6 | 6 | 5 | 10 | 27 | 145 | 70 | 56 | 69 | 96 | 83 | 51 | 18 | 9 | 706 |

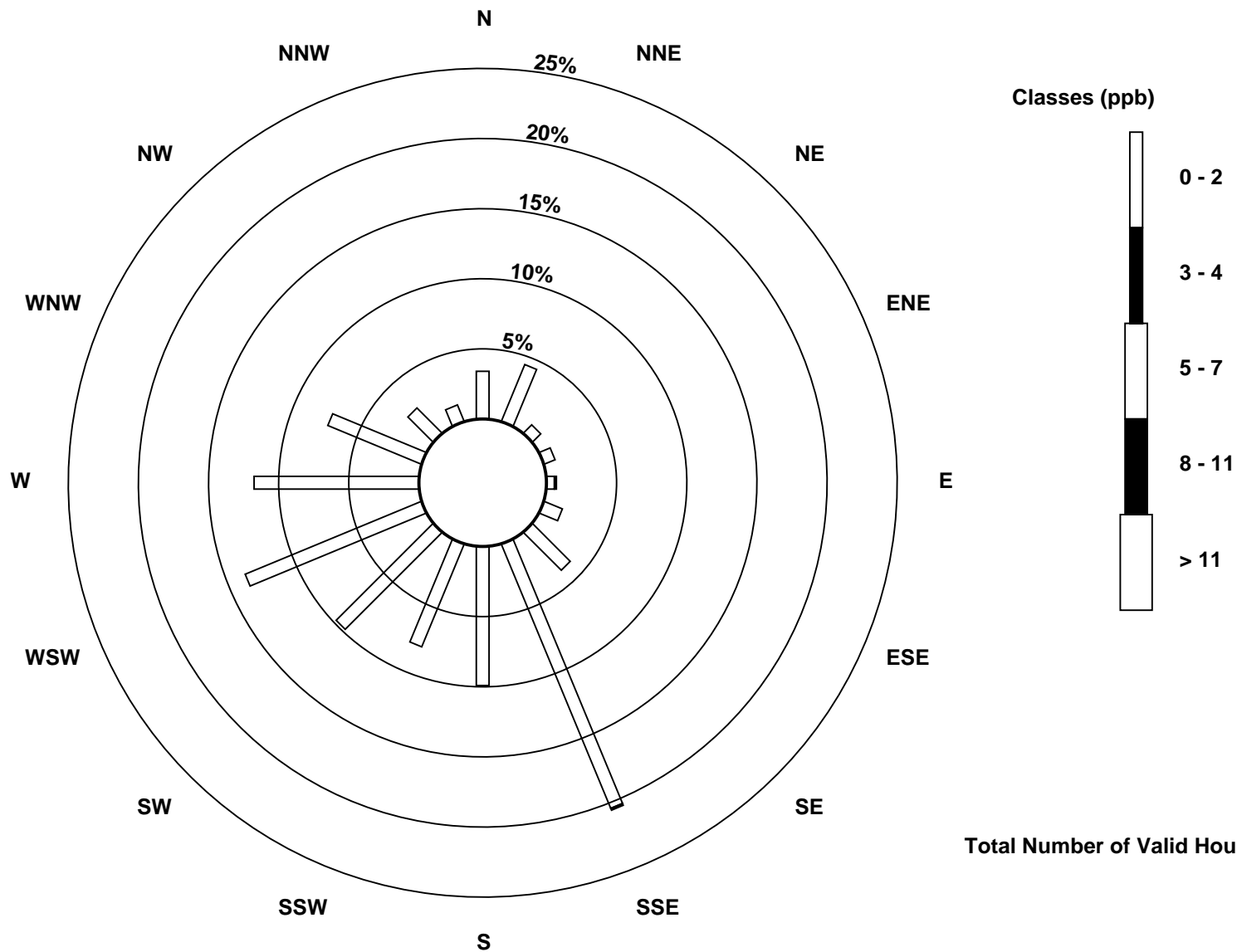
Total Number of Valid Hours: 706

Total Number of Hours: 744

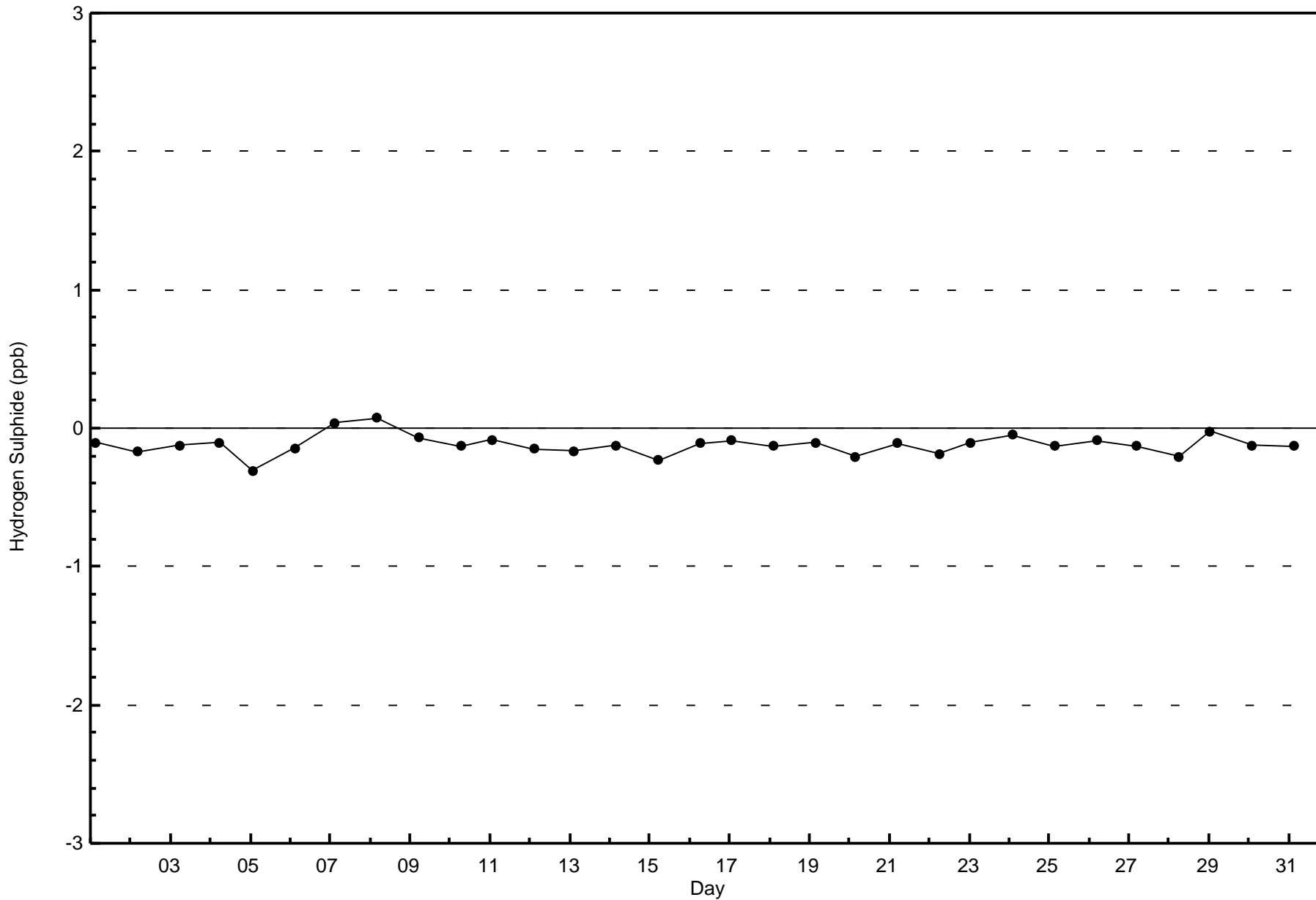


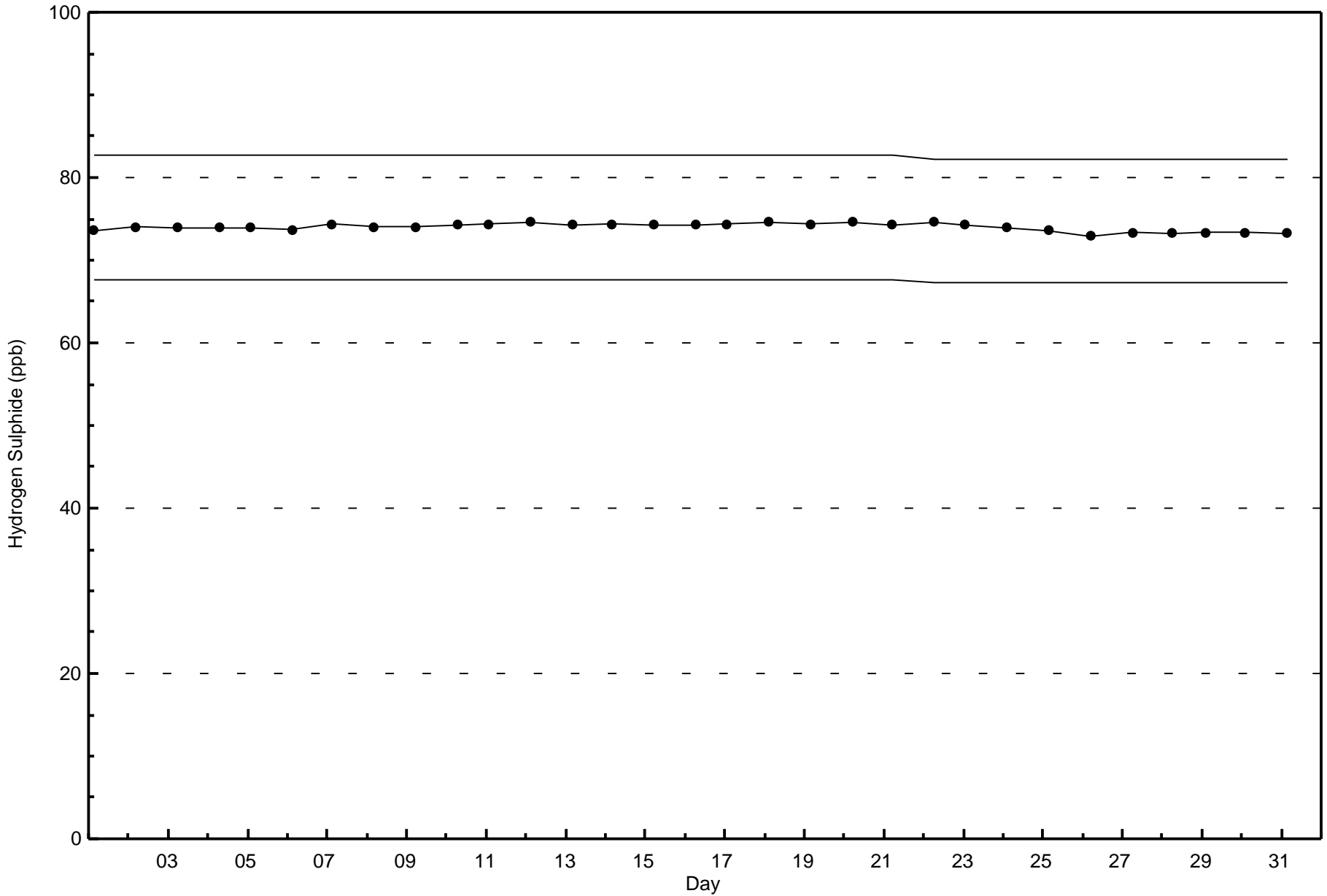
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Hydrogen Sulphide (H₂S) - ppb
Buffalo Viewpoint (AMS 4)



Total Number of Valid Hours: 706







Wood Buffalo Environmental Association
Summary of Hour Averages

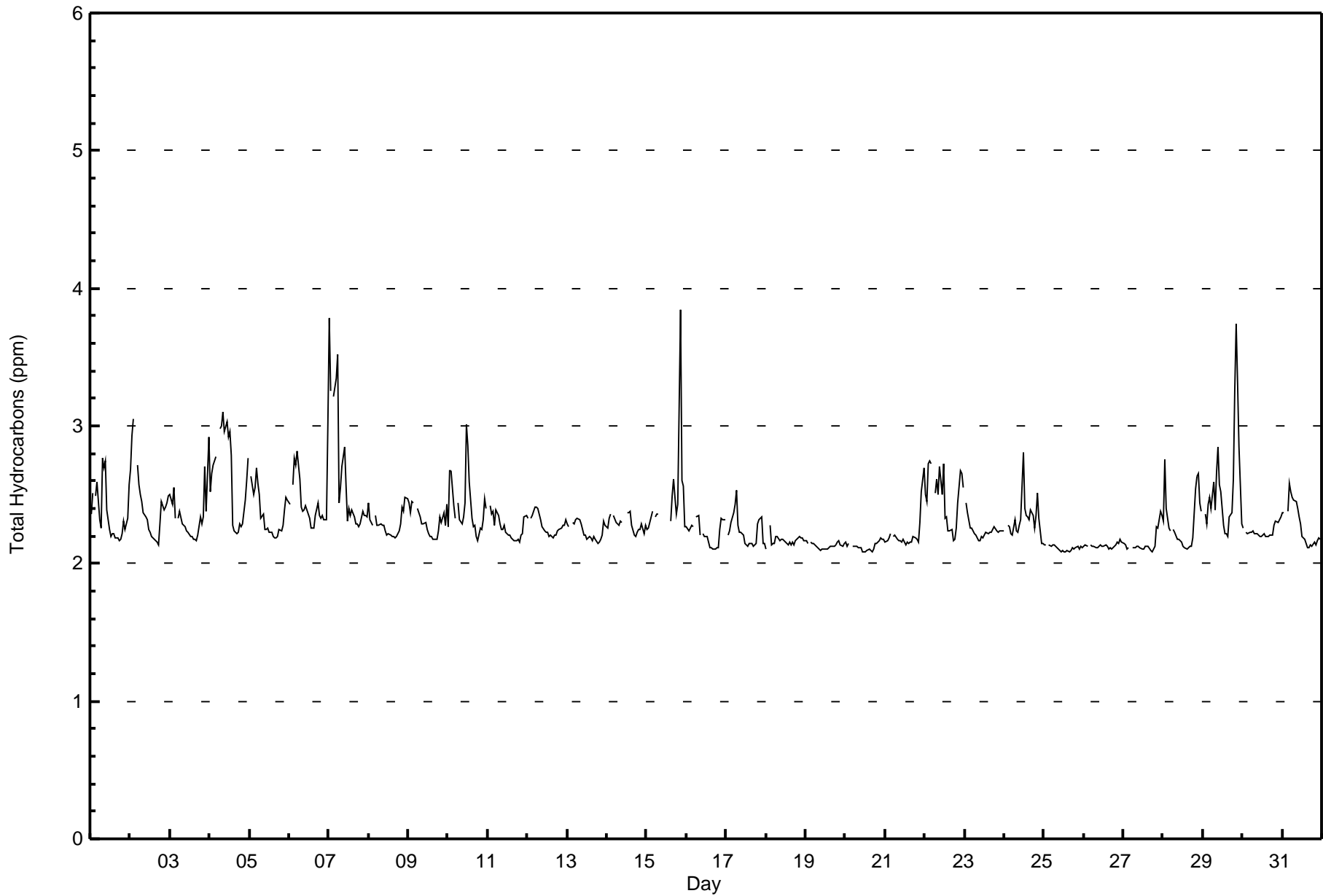
Total Hydrocarbons (THC) - ppm
Buffalo Viewpoint - August 2017

| Maximum Value: 3.8 ppm on Aug 15 21:00 | | Maximum Daily Average: 2.6 ppm on Aug 4 | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|--|-----|--------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|---------------|---------------|-----|
| Minimum Value: 2.1 ppm on Aug 25 14:00 | | Minimum Daily Average: 2.1 ppm on Aug 25 | | Hours of Data: 704 | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 2.4 ppm at hour 5 | | Minimum Diurnal Average: 2.2 ppm at hour 16 | | Hours of Missing Data: 40 | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 2.31 ppm | | Percentiles: P ₁ = 2.1 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.2 Q ₃ = 2.4 P ₉₀ = 2.6 P ₉₉ = 3.2 | | Hours of Calibration: 37 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Percent Operational Time: 99.6 | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 2.4 | 2.5 | Z | 2.5 | 2.6 | 2.3 | 2.3 | 2.8 | 2.7 | 2.7 | 2.4 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.2 | 2.3 | 2.6 | 2.4 | 2.8 | |
| 2-Aug | 2.7 | 2.9 | 3.0 | Z | 2.7 | 2.6 | 2.5 | 2.5 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.3 | 2.5 | 2.4 | 2.4 | 2.4 | 2.5 | 2.4 | 3.0 | |
| 3-Aug | 2.5 | 2.4 | 2.5 | 2.3 | Z | 2.3 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.3 | 2.7 | 2.4 | 2.9 | 2.3 | 2.9 | |
| 4-Aug | 2.5 | 2.7 | 2.7 | 2.8 | 2.8 | Z | 3.0 | 3.0 | 3.1 | 3.0 | 3.0 | 2.9 | 3.0 | 2.8 | 2.3 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.3 | 2.5 | 2.6 | 2.8 | 2.6 | 3.1 | |
| 5-Aug | Z | 2.6 | 2.5 | 2.6 | 2.7 | 2.6 | 2.5 | 2.3 | 2.4 | 2.3 | 2.2 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.4 | 2.5 | 2.5 | 2.4 | 2.7 | |
| 6-Aug | 2.4 | Z | 2.6 | 2.8 | 2.7 | 2.8 | 2.6 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.3 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 3.0 | 2.5 | 3.0 | |
| 7-Aug | 3.8 | 3.3 | Z | 3.2 | 3.3 | 3.5 | 2.4 | 2.6 | 2.7 | 2.8 | 2.6 | 2.3 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.4 | 2.3 | 2.3 | 2.3 | 2.6 | 3.8 | |
| 8-Aug | 2.4 | 2.3 | 2.3 | Z | 2.4 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.4 | 2.4 | 2.5 | 2.5 | 2.3 | 2.5 | |
| 9-Aug | 2.4 | 2.4 | 2.4 | 2.4 | Z | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.4 | 2.3 | 2.4 | 2.3 | 2.4 | |
| 10-Aug | 2.3 | 2.7 | 2.7 | 2.4 | 2.3 | Z | 2.4 | 2.3 | 2.3 | 2.3 | 2.4 | 3.0 | 2.9 | 2.6 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.3 | 2.2 | 2.3 | 2.5 | 2.4 | 2.4 | 3.0 | |
| 11-Aug | Z | 2.4 | 2.4 | 2.4 | 2.3 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.4 | 2.3 | 2.4 | |
| 12-Aug | 2.3 | Z | 2.3 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.4 | |
| 13-Aug | 2.3 | 2.3 | Z | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.2 | 2.3 | |
| 14-Aug | 2.3 | 2.3 | 2.4 | Z | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | M | M | 2.4 | 2.4 | 2.4 | 2.3 | 2.2 | 2.2 | 2.2 | 2.3 | 2.2 | 2.3 | 2.2 | 2.3 | 2.3 | 2.4 | |
| 15-Aug | 2.2 | 2.3 | 2.3 | 2.4 | Z | 2.3 | 2.4 | 2.4 | C | C | C | C | C | C | 2.3 | 2.5 | 2.6 | 2.5 | 2.4 | 2.4 | 3.8 | 2.6 | 2.6 | 2.3 | -- | 3.8 | |
| 16-Aug | 2.3 | 2.2 | 2.3 | 2.3 | 2.3 | Z | 2.3 | 2.3 | 2.2 | M | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.3 | 2.3 | 2.3 | 2.2 | 2.3 | |
| 17-Aug | Z | 2.2 | 2.2 | 2.3 | 2.4 | 2.4 | 2.5 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.3 | 2.3 | 2.3 | 2.1 | 2.1 | 2.2 | 2.5 | |
| 18-Aug | 2.1 | Z | 2.3 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.2 | 2.1 | 2.2 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | |
| 19-Aug | 2.2 | 2.1 | Z | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | |
| 20-Aug | 2.2 | 2.1 | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.2 | |
| 21-Aug | 2.2 | 2.2 | 2.2 | 2.2 | Z | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.2 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.5 | 2.7 | 2.2 | 2.7 | |
| 22-Aug | 2.5 | 2.5 | 2.7 | 2.7 | 2.7 | Z | 2.5 | 2.6 | 2.5 | 2.7 | 2.5 | 2.7 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.4 | 2.7 | 2.7 | 2.5 | 2.7 | |
| 23-Aug | Z | 2.4 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.4 | |
| 24-Aug | 2.2 | Z | 2.3 | 2.3 | 2.2 | 2.2 | 2.3 | 2.2 | 2.2 | 2.3 | 2.3 | 2.8 | 2.4 | 2.3 | 2.3 | 2.3 | 2.4 | 2.3 | 2.3 | 2.3 | 2.5 | 2.3 | 2.1 | 2.1 | 2.3 | 2.8 | |
| 25-Aug | 2.1 | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | |
| 26-Aug | 2.1 | 2.1 | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.2 | |
| 27-Aug | 2.1 | 2.1 | 2.1 | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.3 | 2.3 | 2.4 | 2.4 | 2.2 | 2.4 | |
| 28-Aug | 2.3 | 2.8 | 2.4 | 2.3 | 2.2 | Z | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.5 | 2.6 | 2.7 | 2.4 | 2.4 | 2.3 | 2.8 |
| 29-Aug | Z | 2.4 | 2.3 | 2.4 | 2.5 | 2.4 | 2.6 | 2.4 | 2.7 | 2.9 | 2.6 | 2.5 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.4 | 2.6 | 3.3 | 3.7 | 3.3 | 2.8 | 2.3 | 2.6 | 3.7 |
| 30-Aug | 2.3 | Z | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.3 | |
| 31-Aug | 2.4 | 2.4 | Z | 2.4 | 2.6 | 2.5 | 2.5 | 2.5 | 2.5 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.2 | 2.2 | 2.2 | 2.3 | 2.6 | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | |
| Z - zerospan C - Calibration M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Buffalo Viewpoint - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Buffalo Viewpoint - August 2017**

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2.0 | 0 | 0.00 | 0.00 |
| 2.1 - 3.0 | 694 | 98.58 | 98.58 |
| 3.1 - 10.0 | 10 | 1.42 | 100.00 |
| > 10.0 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 704

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Buffalo Viewpoint - August 2017**

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2.1 - 3.0 | 23 | 32 | 6 | 6 | 4 | 9 | 29 | 141 | 71 | 59 | 68 | 96 | 84 | 44 | 13 | 8 | 693 |
| 3.1 - 10.0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 3 | 10 |
| > 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 23 | 32 | 6 | 6 | 5 | 10 | 29 | 142 | 71 | 59 | 68 | 96 | 84 | 45 | 16 | 11 | 703 |

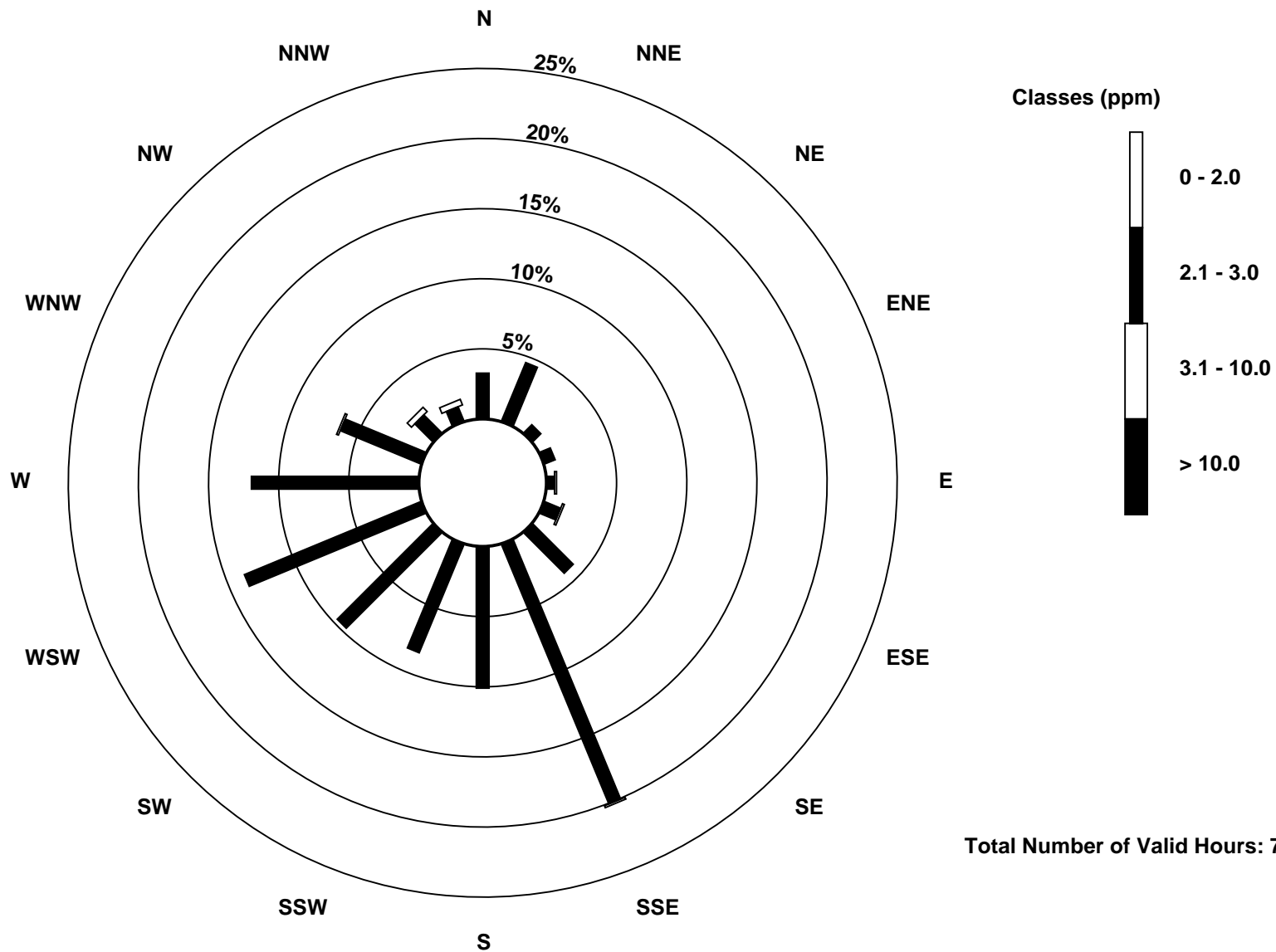
Total Number of Valid Hours: 703

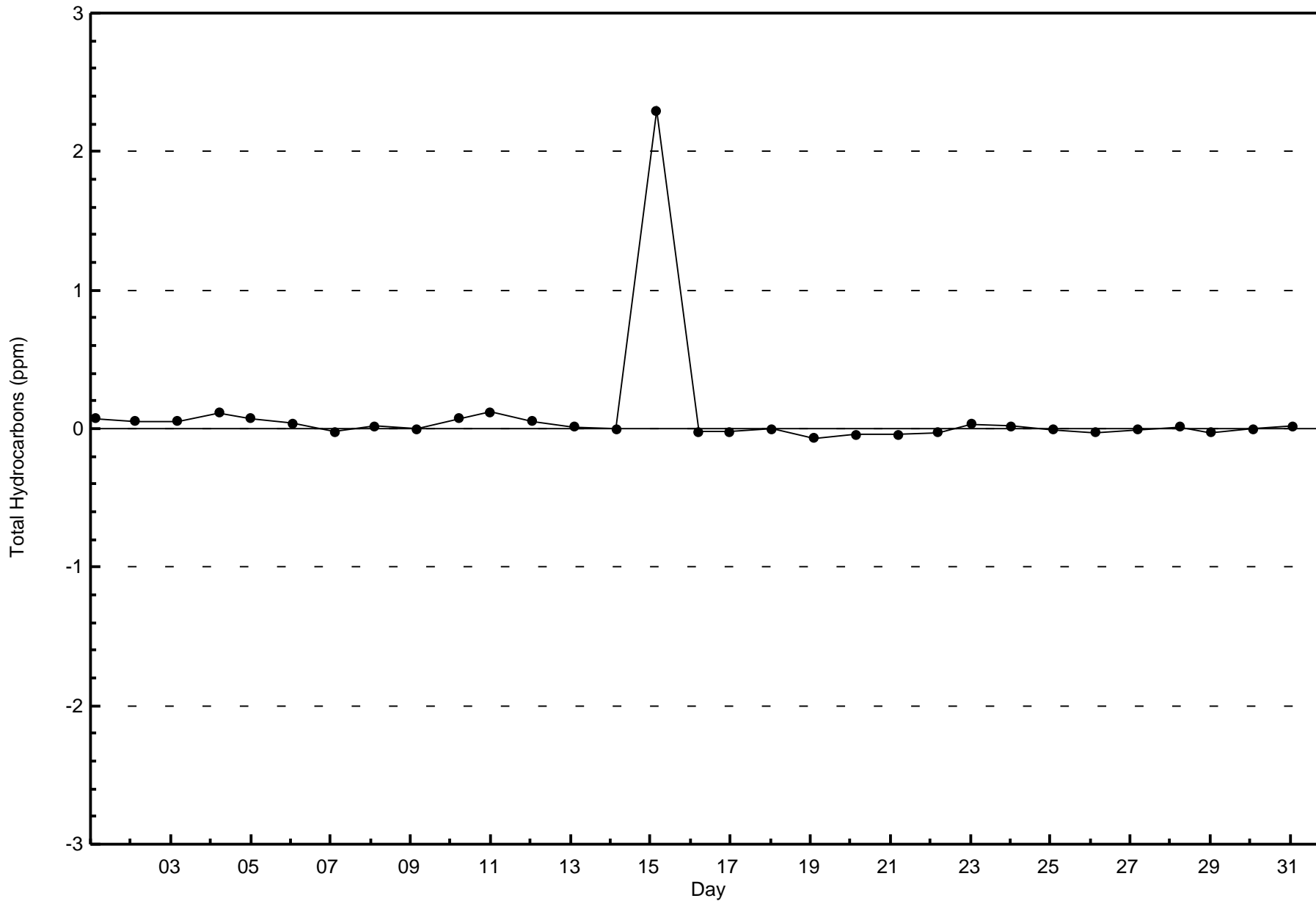
Total Number of Hours: 744

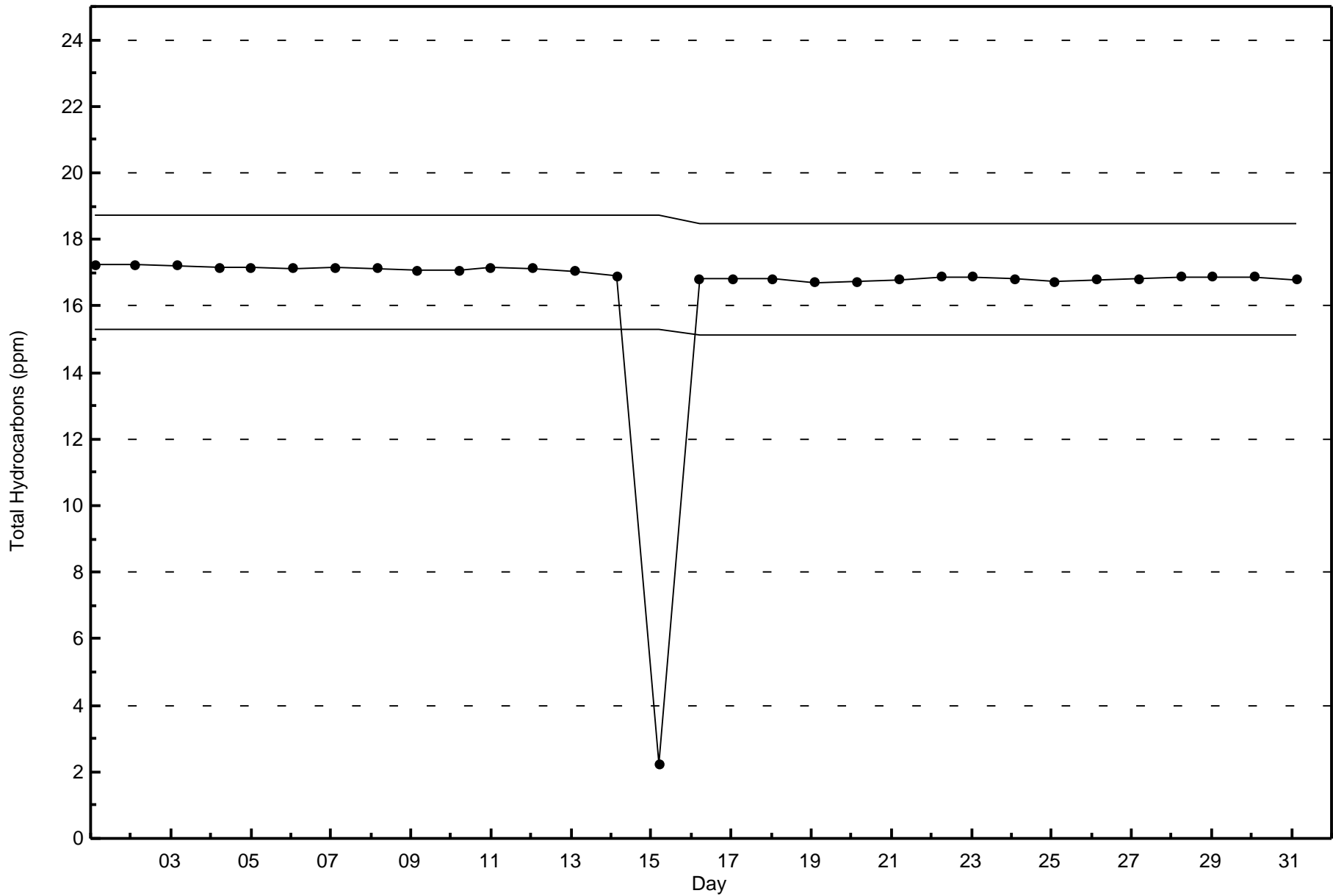


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Total Hydrocarbons (THC) - ppm
Buffalo Viewpoint (AMS 4)









Wood Buffalo Environmental Association

Summary of Hour Averages

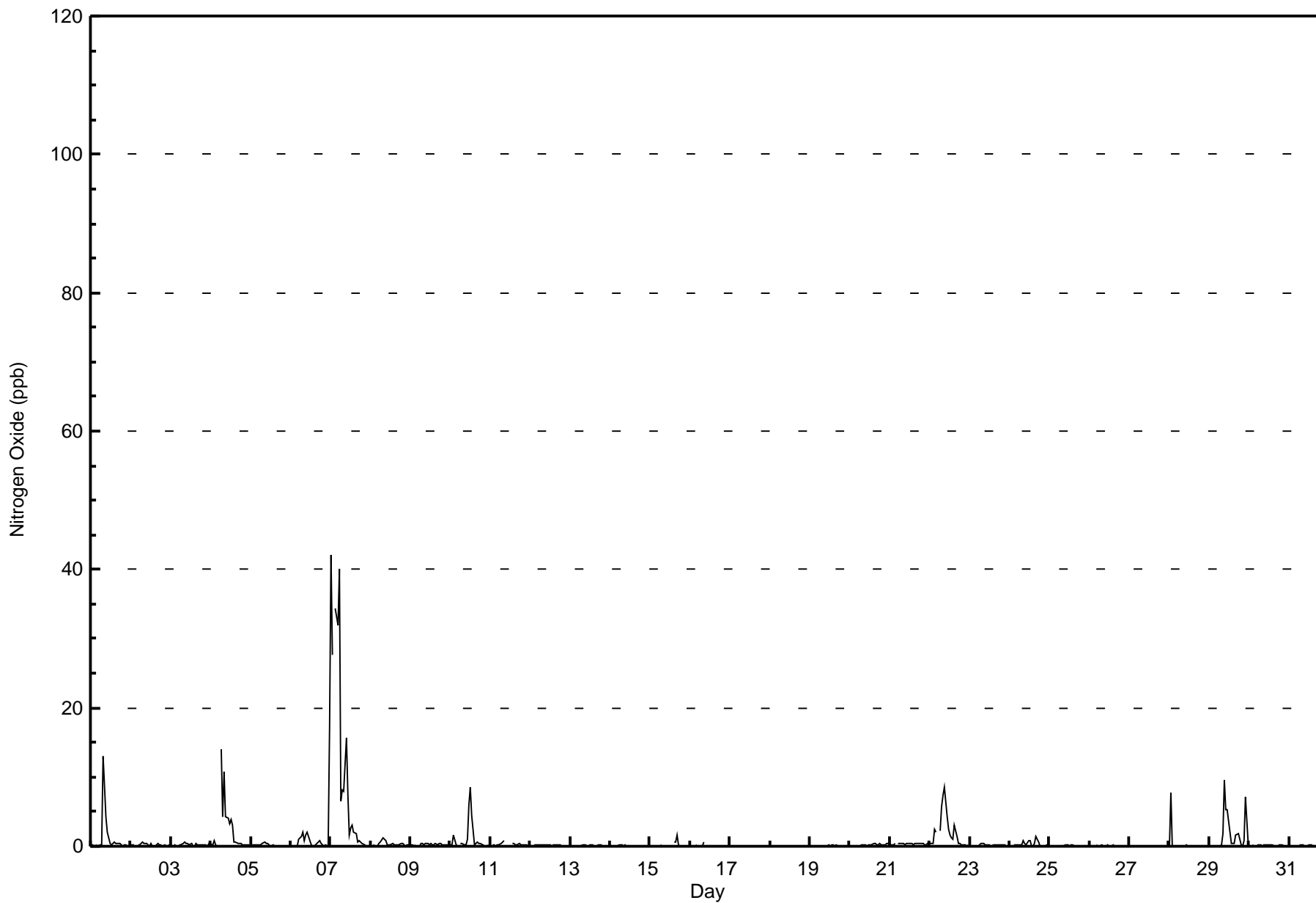
Nitrogen Oxide (NO) - ppb
Buffalo Viewpoint - August 2017

| Maximum Value: 42 ppb on Aug 7 01:00 | | | | | | | | | | | | | | | | | Maximum Daily Average: 10.2 ppb on Aug 7 | | | | | | | | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | |
|---|-------------------------------|----|-----------------|----|----|-----------------|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|------|---------------|---------------|-----|-----|-----|-----|-----|-----|-----|--------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|-----------------|
| Minimum Value: 0 ppb on Aug 2 12:00 | | | | | | | | | | | | | | | | | Minimum Daily Average: 0.0 ppb on Aug 18 | | | | | | | | | | | | | | | | | Hours of Data: 702 | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 1.7 ppb at hour 10 | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 0.1 ppb at hour 21 | | | | | | | | | | | | | | | | | Hours of Missing Data: 42 | | | | | | | | | | | | | | | |
| Monthly Average: 0.8 ppb | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 15 | | | | | | | | | | | | | | | | | Hours of Calibration: 37 | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 99.3 | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 13 | 9 | 4 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.4 | 13 | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 0 | 0 | 1 | 0 | 0 | Z | 14 | 4 | 11 | 4 | 4 | 3 | 4 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.3 | 14 | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 0 | Z | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 1.3 | 17 | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 42 | 28 | Z | 34 | 32 | 40 | 7 | 8 | 8 | 16 | 8 | 2 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 10.2 | 42 | | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 0 | 0 | 0 | Z | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 0 | 0 | 2 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 6 | 9 | 5 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1.1 | 9 | | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | M | M | M | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | C | C | C | C | C | C | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | -- | 2 | | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 1 | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 0 | 0 | 0 | 2 | 2 | Z | 2 | 6 | 7 | 9 | 4 | 3 | 2 | 1 | 1 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2.0 | 9 | | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 0 | 8 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 8 | | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 10 | 5 | 5 | 2 | 0 | 0 | 0 | 2 | 2 | 1 | 0 | 0 | 1 | 7 | 0 | 1.6 | 10 | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 1.7 | 1.5 | 0.2 | 1.5 | 1.4 | 1.7 | 0.9 | 1.3 | 1.5 | 1.7 | 1.0 | 0.8 | 0.8 | 0.5 | 0.3 | 0.3 | 0.4 | 0.3 | 0.2 | 0.1 | 0.1 | 0.1 | 0.3 | 0.7 | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | | | | | | | 42 | 28 | 2 | 34 | 32 | 40 | 14 | 13 | 11 | 16 | 8 | 6 | 9 | 5 | 2 | 3 | 2 | 2 | 2 | 1 | 0 | 0 | 1 | 7 | 17 | Diurnal Maximum |
| Z - zerospan | | | C - Calibration | | | M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxide (NO) - ppb
Buffalo Viewpoint - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Buffalo Viewpoint - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 697 | 99.29 | 99.29 |
| 21 - 40 | 4 | 0.57 | 99.86 |
| 41 - 80 | 1 | 0.14 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 702

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Buffalo Viewpoint - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 23 | 31 | 6 | 6 | 5 | 10 | 28 | 142 | 72 | 58 | 67 | 97 | 84 | 45 | 13 | 9 | 696 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 4 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 23 | 31 | 6 | 6 | 5 | 10 | 28 | 142 | 72 | 58 | 67 | 97 | 84 | 45 | 16 | 11 | 701 |

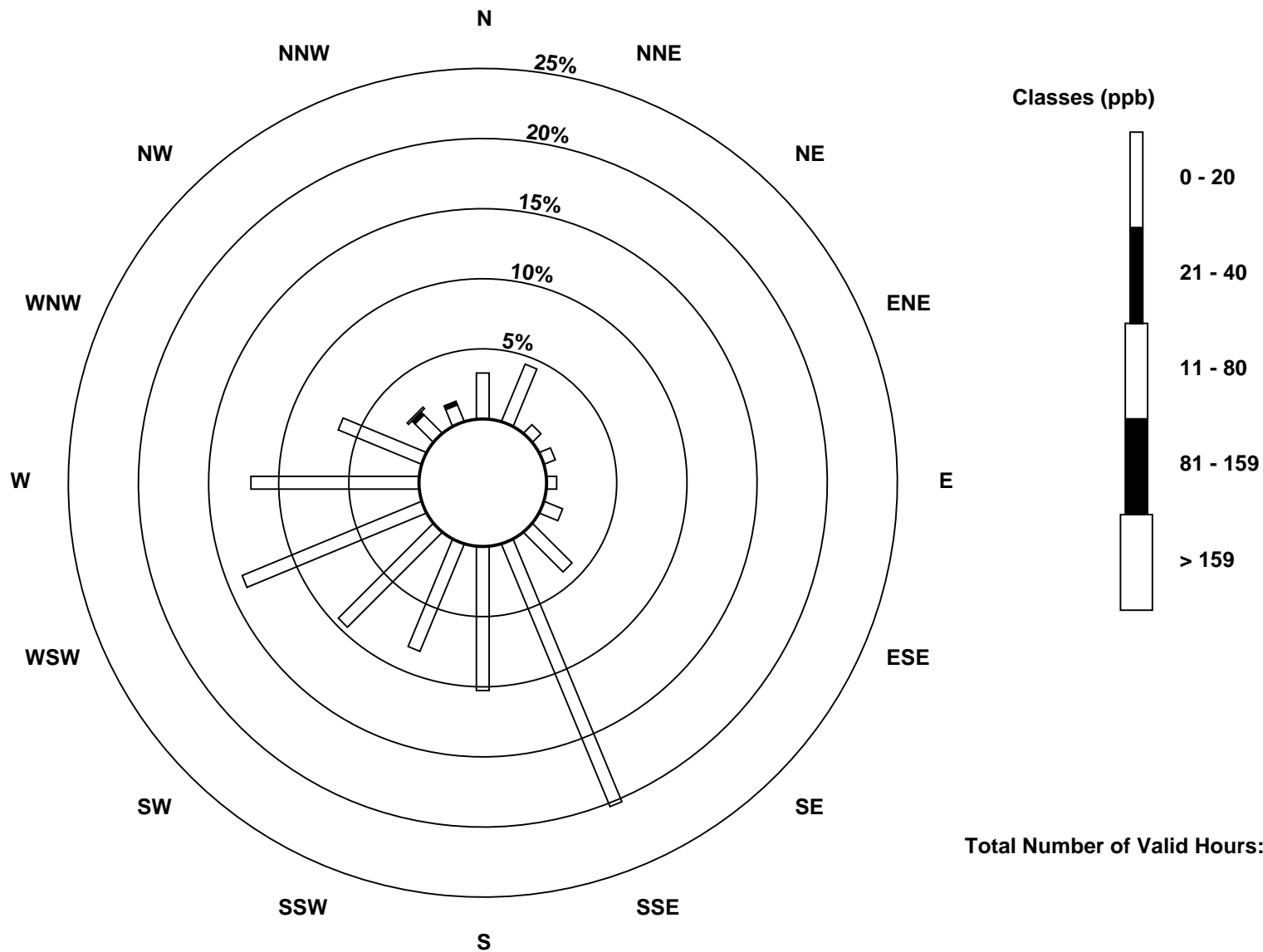
Total Number of Valid Hours: 701

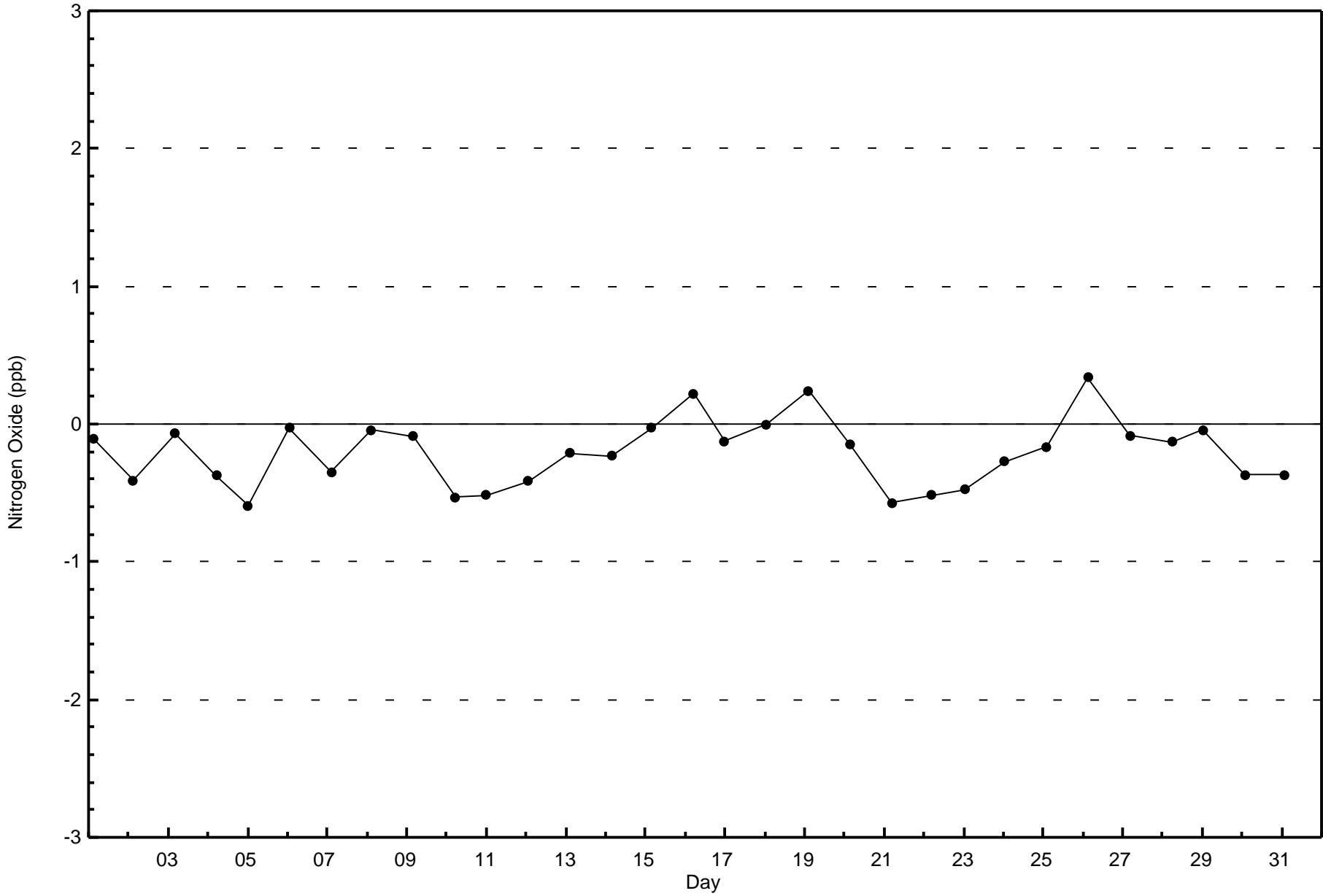
Total Number of Hours: 744

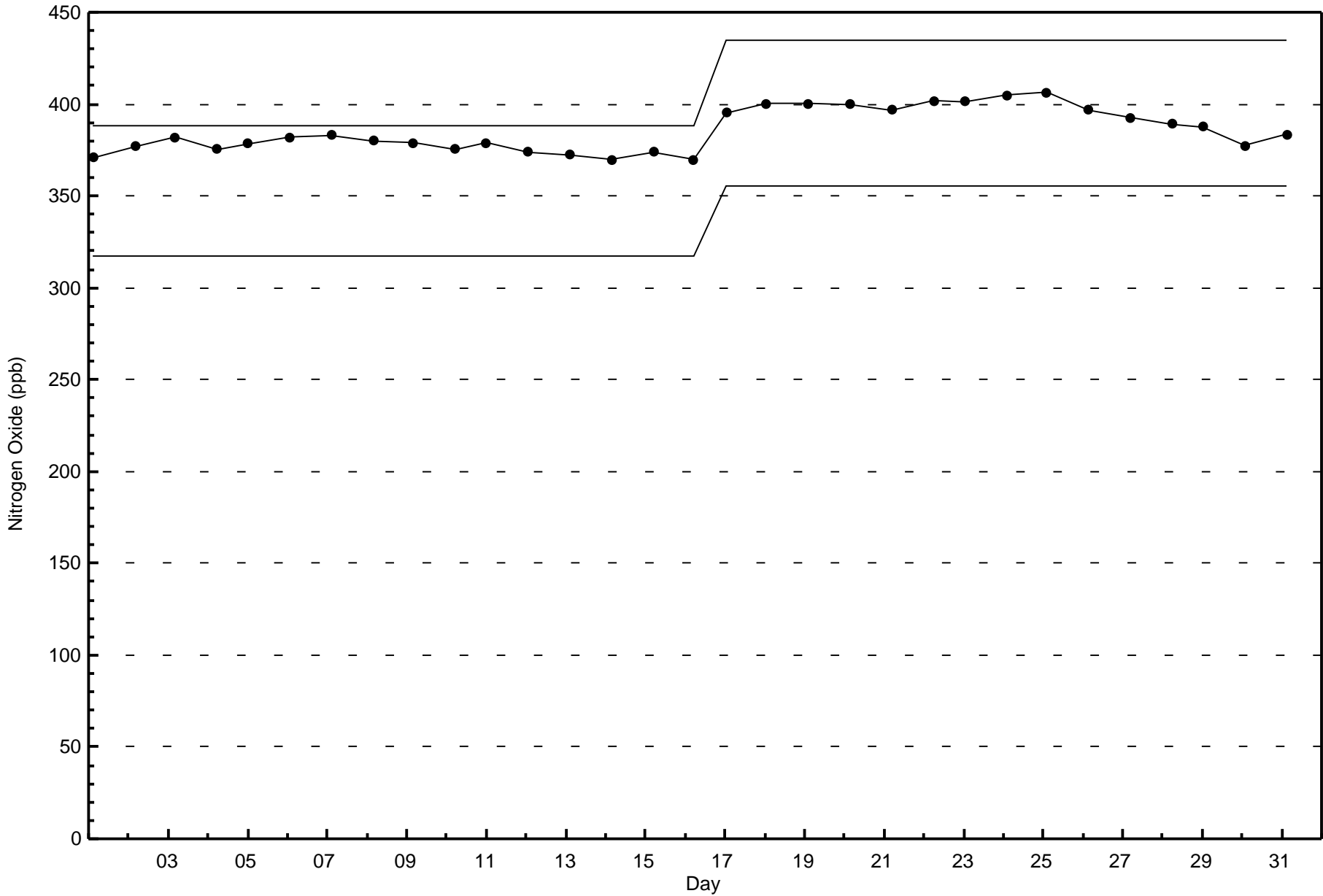


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Oxide (NO) - ppb
Buffalo Viewpoint (AMS 4)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb
Buffalo Viewpoint - August 2017

| | | | | |
|---|---|----------|---------------------------|------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 30 ppb on Aug 10 13:00 | Maximum Daily Average: 8.2 ppb on Aug 22 | | Hours of Data: | 702 |
| Minimum Value: 0 ppb on Aug 2 13:00 | Minimum Daily Average: 0.1 ppb on Aug 20 | | Hours of Missing Data: | 42 |
| Maximum Diurnal Average: 2.9 ppb at hour 10 | Minimum Diurnal Average: 1.1 ppb at hour 15 | | Hours of Calibration: | 37 |
| Monthly Average: 2.2 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 2 P ₉₀ = 6 P ₉₉ = 17 | | Percent Operational Time: | 99.3 |

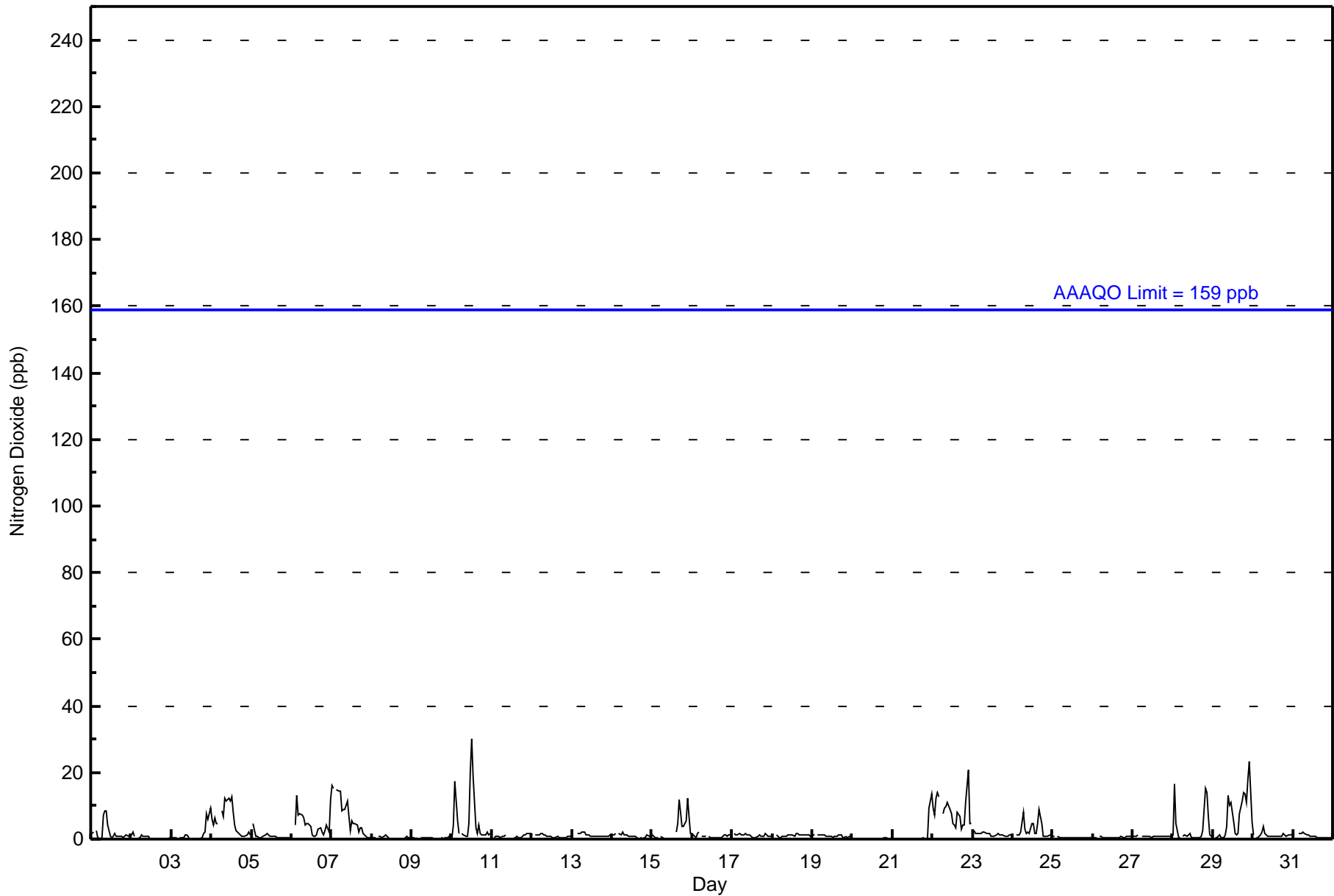
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | |
|--------|-------------------------------|----|----|----|----|----|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|---------------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|--|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 2 | 2 | Z | 3 | 1 | 0 | 1 | 7 | 9 | 9 | 4 | 1 | 0 | 1 | 2 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 2.1 | 9 | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 1 | 2 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 2 | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 1 | 1 | 0 | 0 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 8 | 6 | 9 | 1.5 | 9 | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 6 | 4 | 6 | 5 | 5 | Z | 9 | 7 | 12 | 12 | 12 | 12 | 13 | 8 | 4 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 5.5 | 13 | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | Z | 5 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.9 | 5 | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 1 | Z | 4 | 13 | 7 | 8 | 7 | 6 | 4 | 5 | 5 | 4 | 1 | 1 | 1 | 1 | 3 | 3 | 2 | 1 | 3 | 4 | 2 | 12 | 4.3 | 13 | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 16 | 15 | Z | 15 | 14 | 14 | 8 | 9 | 9 | 12 | 7 | 3 | 6 | 5 | 5 | 4 | 2 | 4 | 4 | 2 | 1 | 1 | 0 | 0 | 6.7 | 16 | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 0 | 0 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0.5 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 0 | 1 | 0 | 1 | Z | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 1 | 4 | 18 | 6 | 2 | Z | 2 | 1 | 1 | 1 | 5 | 20 | 30 | 19 | 3 | 2 | 4 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 5.5 | 30 | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | Z | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | M | M | M | M | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 0.9 | 2 | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 1 | Z | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.9 | 2 | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 1 | 1 | Z | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.2 | 2 | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 1 | 1 | 2 | Z | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1.0 | 2 | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 1 | 1 | 1 | 0 | Z | 1 | 1 | 1 | C | C | C | C | C | C | 2 | 5 | 12 | 8 | 4 | 4 | 6 | 12 | 7 | 2 | -- | 12 | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 2 | 1 | 1 | 2 | 2 | Z | 1 | 1 | 1 | M | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.9 | 2 | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | Z | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1.1 | 2 | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.1 | 2 | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0.9 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 9 | 1.0 | 13 | | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 9 | 7 | 12 | 14 | 13 | Z | 8 | 10 | 10 | 11 | 9 | 8 | 5 | 4 | 3 | 8 | 7 | 3 | 4 | 4 | 11 | 21 | 5 | 5 | 8.2 | 21 | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | Z | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.4 | 2 | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 1 | Z | 1 | 1 | 1 | 2 | 8 | 3 | 2 | 2 | 2 | 5 | 5 | 2 | 2 | 5 | 9 | 5 | 1 | 1 | 1 | 1 | 1 | 1 | 2.6 | 9 | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0.5 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.6 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 1 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.8 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 1 | 17 | 5 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 3 | 15 | 14 | 7 | 1 | 1 | 3.2 | 17 | | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | Z | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 4 | 13 | 10 | 11 | 5 | 2 | 1 | 2 | 8 | 11 | 14 | 13 | 11 | 18 | 23 | 5 | 6.8 | 23 | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 1 | Z | 0 | 1 | 1 | 2 | 4 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1.2 | 4 | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 2 | 2 | Z | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1.0 | 2 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 2.0 | 2.8 | 2.4 | 2.8 | 2.4 | 1.7 | 2.2 | 2.1 | 2.4 | 2.9 | 2.4 | 2.6 | 2.6 | 1.8 | 1.1 | 1.4 | 1.9 | 1.6 | 1.5 | 1.8 | 2.1 | 2.9 | 2.4 | 2.2 | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | | | | | | | 16 | 17 | 18 | 15 | 14 | 14 | 9 | 10 | 12 | 13 | 12 | 20 | 30 | 19 | 5 | 8 | 12 | 11 | 14 | 15 | 14 | 21 | 23 | 13 | Diurnal Maximum | |

Z - zerspan C - Calibration M - Maintenance
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Buffalo Viewpoint - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Buffalo Viewpoint - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 699 | 99.57 | 99.57 |
| 21 - 40 | 3 | 0.43 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 702

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Buffalo Viewpoint - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 23 | 31 | 6 | 6 | 4 | 10 | 28 | 141 | 72 | 58 | 67 | 97 | 84 | 45 | 16 | 10 | 698 |
| 21 - 40 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 23 | 31 | 6 | 6 | 5 | 10 | 28 | 142 | 72 | 58 | 67 | 97 | 84 | 45 | 16 | 11 | 701 |

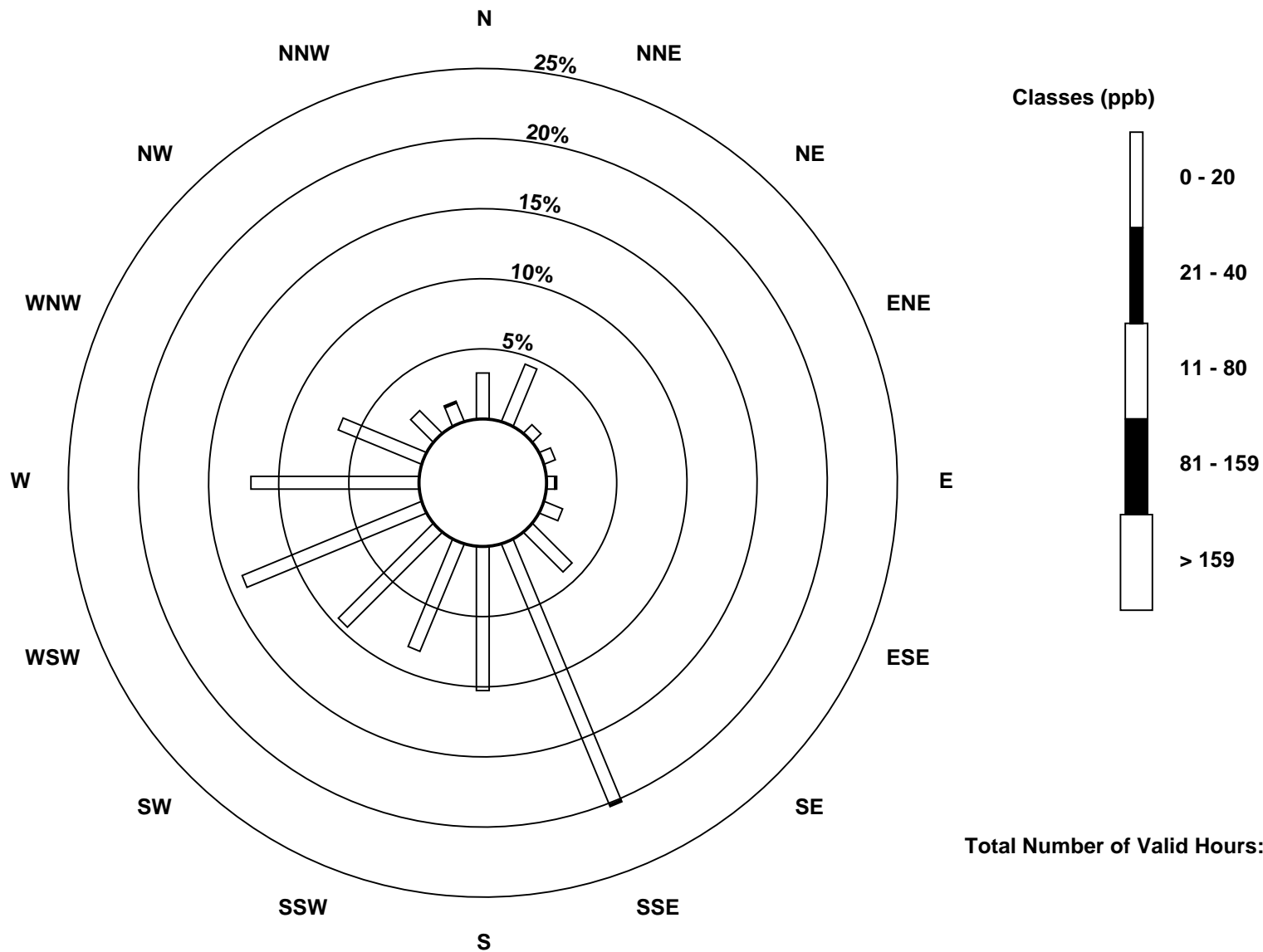
Total Number of Valid Hours: 701

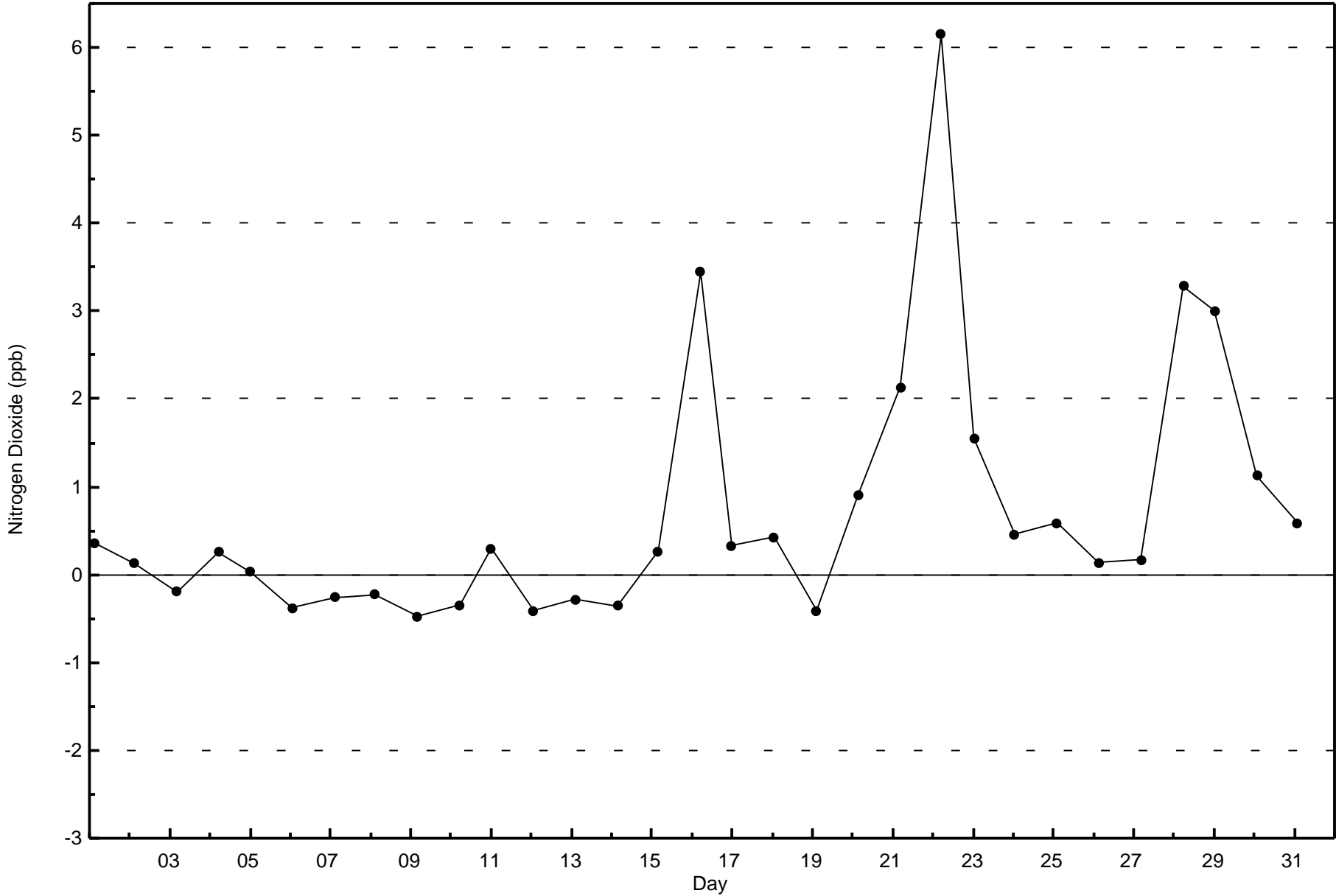
Total Number of Hours: 744

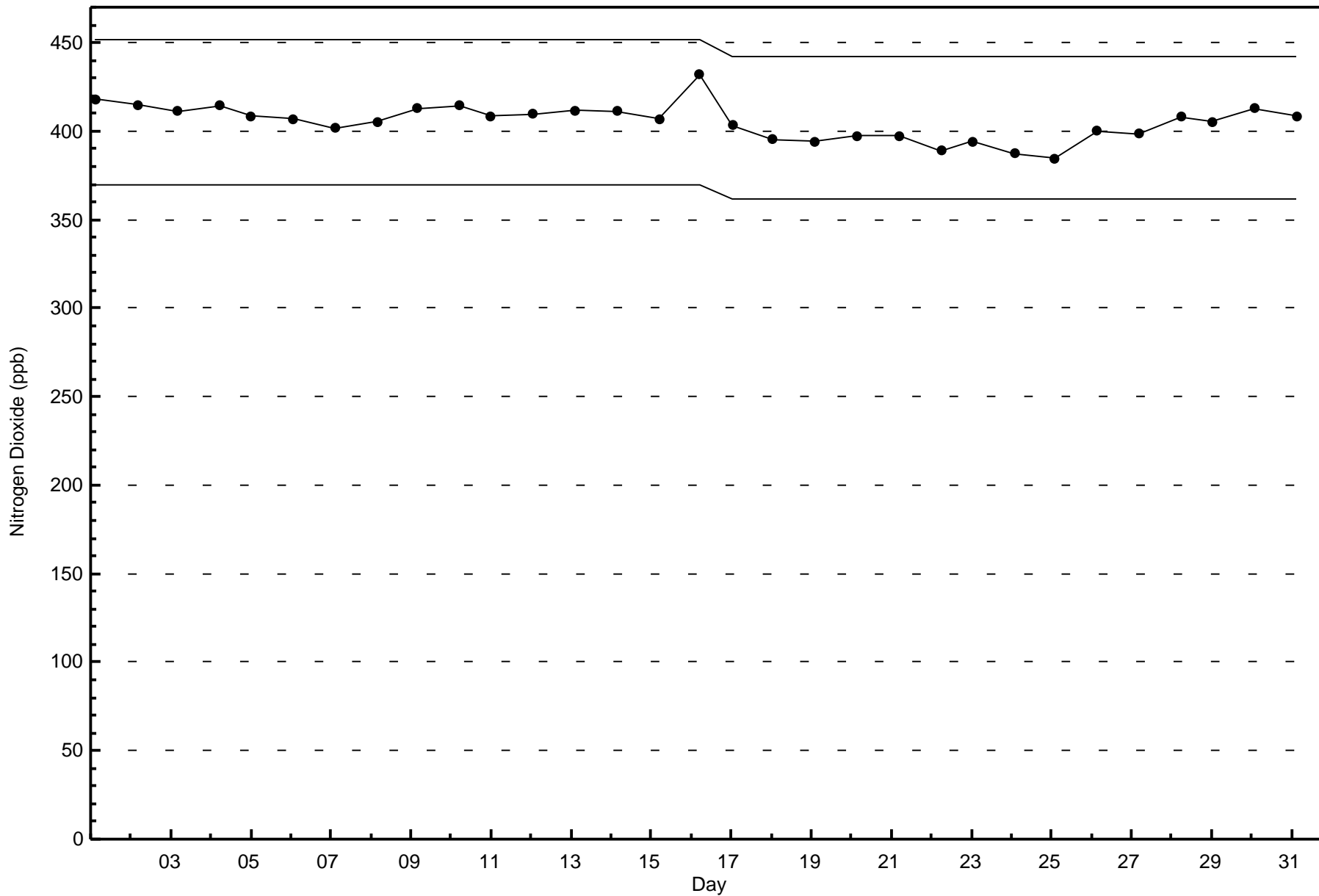


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Dioxide (NO₂) - ppb
Buffalo Viewpoint (AMS 4)









Wood Buffalo Environmental Association

Summary of Hour Averages

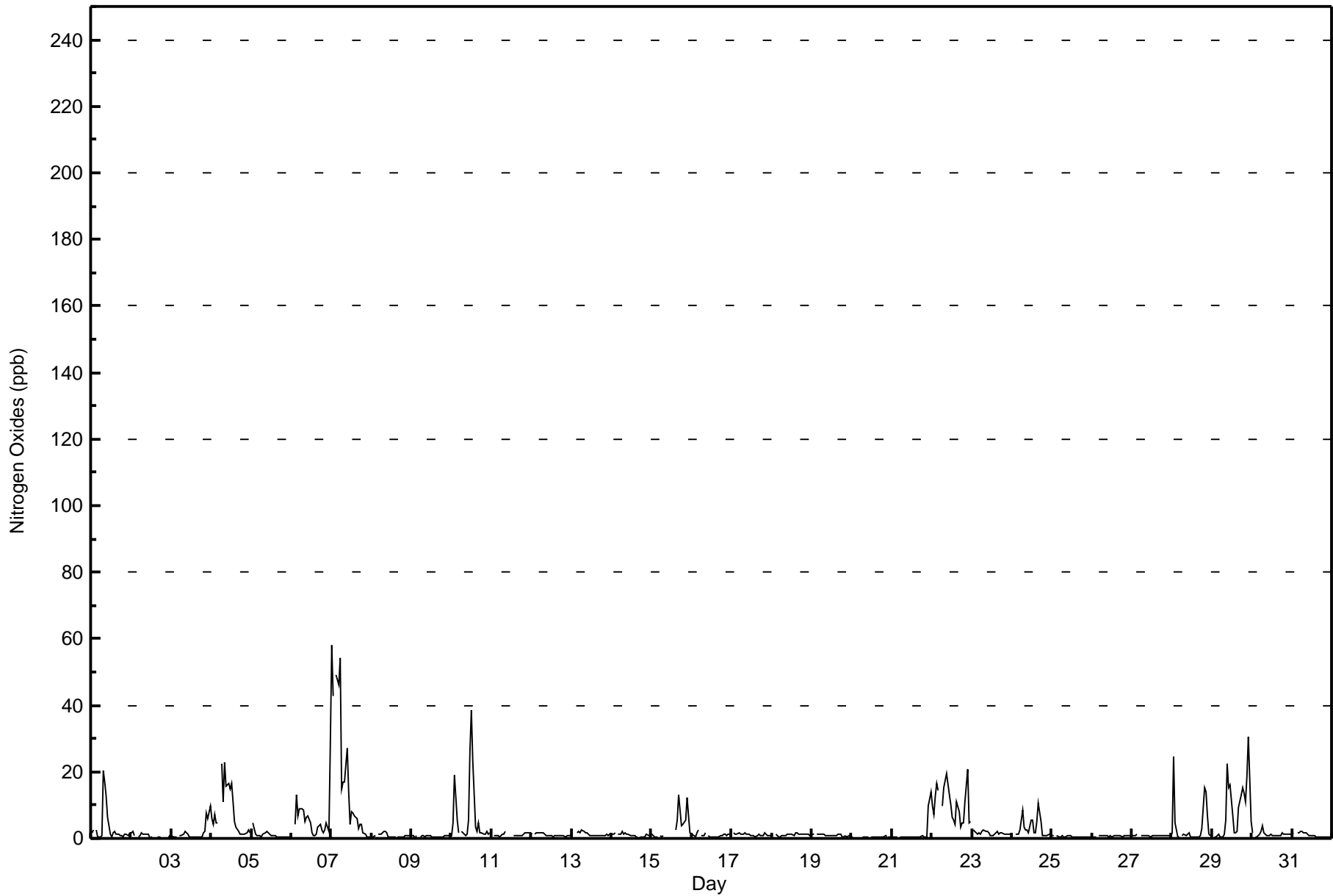
Nitrogen Oxides (NO_x) - ppb
Buffalo Viewpoint - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | | | | | | | | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | |
|---|-------------------------------|----|-----------------|----|----|-----------------|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|-----------------|---------------|---------------|----|
| Maximum Value: 58 ppb on Aug 7 01:00 | | | | | | | | | | | | | | | | | Maximum Daily Average: 16.9 ppb on Aug 7 | | | | | | | | | | |
| Minimum Value: 0 ppb on Aug 2 15:00 | | | | | | | | | | | | | | | | | Hours of Data: 702 | | | | | | | | | | |
| Maximum Diurnal Average: 4.6 ppb at hour 10 | | | | | | | | | | | | | | | | | Hours of Missing Data: 42 | | | | | | | | | | |
| Monthly Average: 2.9 ppb | | | | | | | | | | | | | | | | | Hours of Calibration: 37 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | Percent Operational Time: 99.3 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | Minimum Daily Average: 0.3 ppb on Aug 20 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 1.4 ppb at hour 15 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 O ₃ = 2 P ₉₀ = 7 P ₉₉ = 26 | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 2 | 2 | Z | 3 | 0 | 0 | 1 | 20 | 17 | 13 | 6 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 3.5 | 20 | |
| 2-Aug | 2 | 2 | 1 | Z | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 2 | |
| 3-Aug | 1 | 1 | 1 | 0 | Z | 1 | 1 | 1 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 | 2 | 8 | 6 | 10 | 1.8 | 10 | |
| 4-Aug | 6 | 4 | 7 | 5 | 5 | Z | 23 | 11 | 23 | 16 | 16 | 15 | 17 | 11 | 5 | 3 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 7.8 | 23 | |
| 5-Aug | Z | 5 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.0 | 5 | |
| 6-Aug | 1 | Z | 4 | 13 | 7 | 9 | 9 | 8 | 5 | 6 | 7 | 5 | 2 | 1 | 1 | 1 | 3 | 4 | 3 | 2 | 3 | 5 | 2 | 29 | 5.6 | 29 | |
| 7-Aug | 58 | 43 | Z | 49 | 46 | 54 | 15 | 17 | 17 | 27 | 14 | 4 | 8 | 8 | 7 | 6 | 3 | 4 | 4 | 2 | 1 | 1 | 0 | 0 | 16.9 | 58 | |
| 8-Aug | 0 | 0 | 1 | Z | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0.8 | 2 | |
| 9-Aug | 1 | 1 | 0 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.7 | 1 | |
| 10-Aug | 1 | 4 | 19 | 6 | 2 | Z | 2 | 2 | 1 | 1 | 6 | 26 | 38 | 23 | 4 | 2 | 5 | 2 | 2 | 1 | 1 | 2 | 1 | 2 | 6.7 | 38 | |
| 11-Aug | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | M | M | M | M | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 1.2 | 2 | |
| 12-Aug | 1 | Z | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.0 | 2 | |
| 13-Aug | 1 | 1 | Z | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.3 | 2 | |
| 14-Aug | 1 | 1 | 2 | Z | 1 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1.0 | 2 | |
| 15-Aug | 1 | 1 | 1 | 0 | Z | 1 | 1 | 1 | C | C | C | C | C | C | C | 3 | 5 | 13 | 8 | 4 | 4 | 6 | 12 | 7 | 2 | -- | 13 |
| 16-Aug | 1 | 1 | 1 | 2 | 2 | Z | 1 | 1 | 2 | M | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.0 | 2 | |
| 17-Aug | Z | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1.1 | 2 | |
| 18-Aug | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.1 | 2 | |
| 19-Aug | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0.9 | 1 | |
| 20-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0.3 | 1 | |
| 21-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 10 | 14 | 1.4 | 14 |
| 22-Aug | 10 | 7 | 13 | 16 | 14 | Z | 10 | 15 | 17 | 20 | 13 | 10 | 6 | 6 | 4 | 11 | 8 | 3 | 4 | 5 | 11 | 21 | 5 | 5 | 10.2 | 21 | |
| 23-Aug | Z | 2 | 2 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1.6 | 2 | |
| 24-Aug | 1 | Z | 1 | 1 | 1 | 2 | 8 | 3 | 3 | 3 | 2 | 6 | 5 | 2 | 2 | 5 | 11 | 5 | 1 | 1 | 1 | 1 | 1 | 1 | 2.9 | 11 | |
| 25-Aug | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 1 | |
| 26-Aug | 0 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.7 | 1 | |
| 27-Aug | 1 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.8 | 1 | |
| 28-Aug | 1 | 24 | 5 | 0 | 1 | Z | 1 | 1 | 1 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 3 | 15 | 14 | 7 | 1 | 1 | 3.5 | 24 | |
| 29-Aug | Z | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 6 | 23 | 15 | 16 | 7 | 2 | 2 | 2 | 9 | 13 | 15 | 14 | 11 | 19 | 30 | 5 | 8.4 | 30 | |
| 30-Aug | 2 | Z | 1 | 1 | 1 | 2 | 4 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1.3 | 4 | |
| 31-Aug | 1 | 2 | Z | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1.0 | 2 | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | |
| Z - zerospan | | | C - Calibration | | | M - Maintenance | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Buffalo Viewpoint - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Buffalo Viewpoint - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 686 | 97.72 | 97.72 |
| 21 - 40 | 11 | 1.57 | 99.29 |
| 41 - 80 | 5 | 0.71 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 702

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Buffalo Viewpoint - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 22 | 30 | 6 | 6 | 4 | 10 | 28 | 141 | 72 | 57 | 67 | 97 | 84 | 43 | 13 | 5 | 685 |
| 21 - 40 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 4 | 11 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 5 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 23 | 31 | 6 | 6 | 5 | 10 | 28 | 142 | 72 | 58 | 67 | 97 | 84 | 45 | 16 | 11 | 701 |

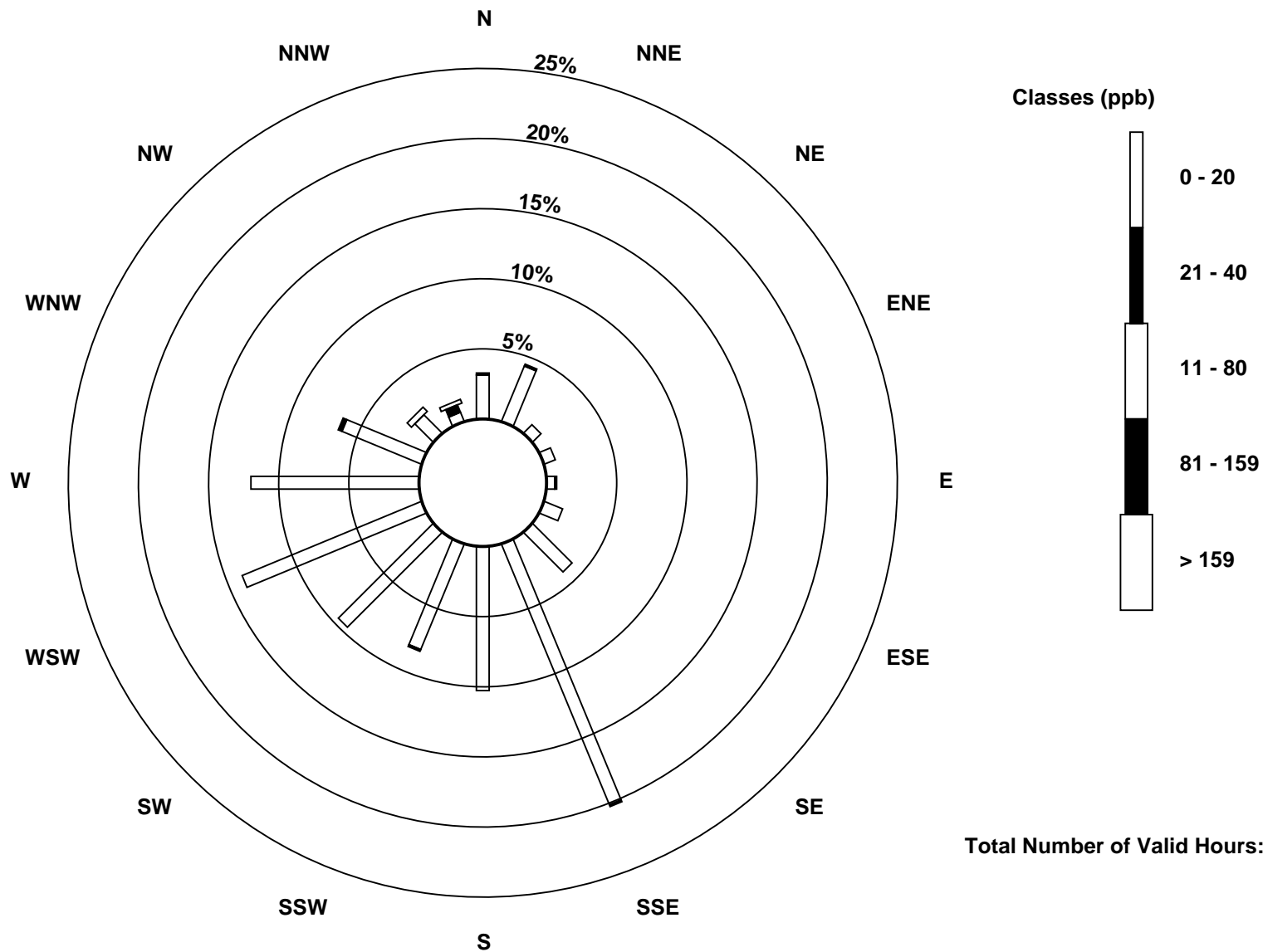
Total Number of Valid Hours: 701

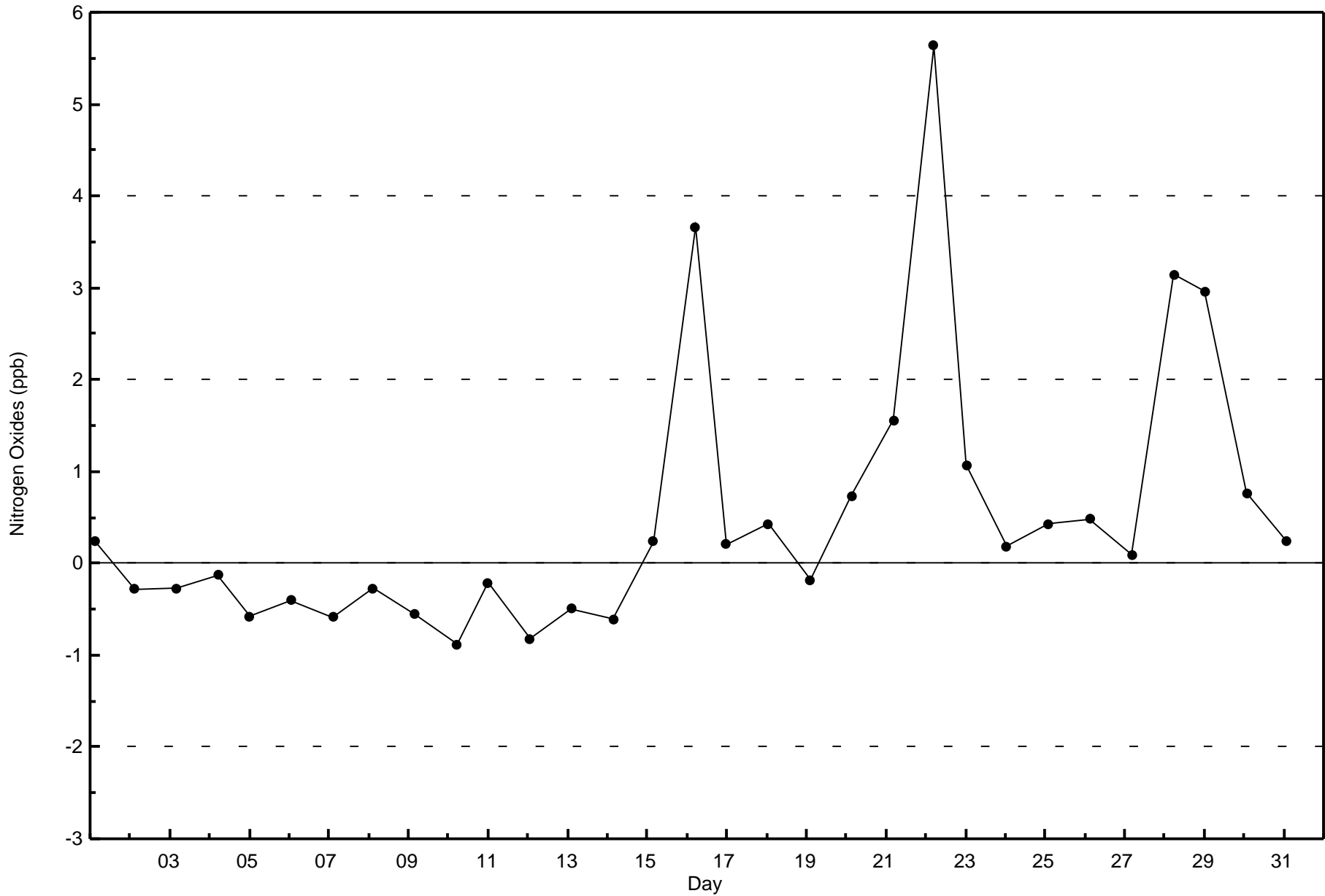
Total Number of Hours: 744

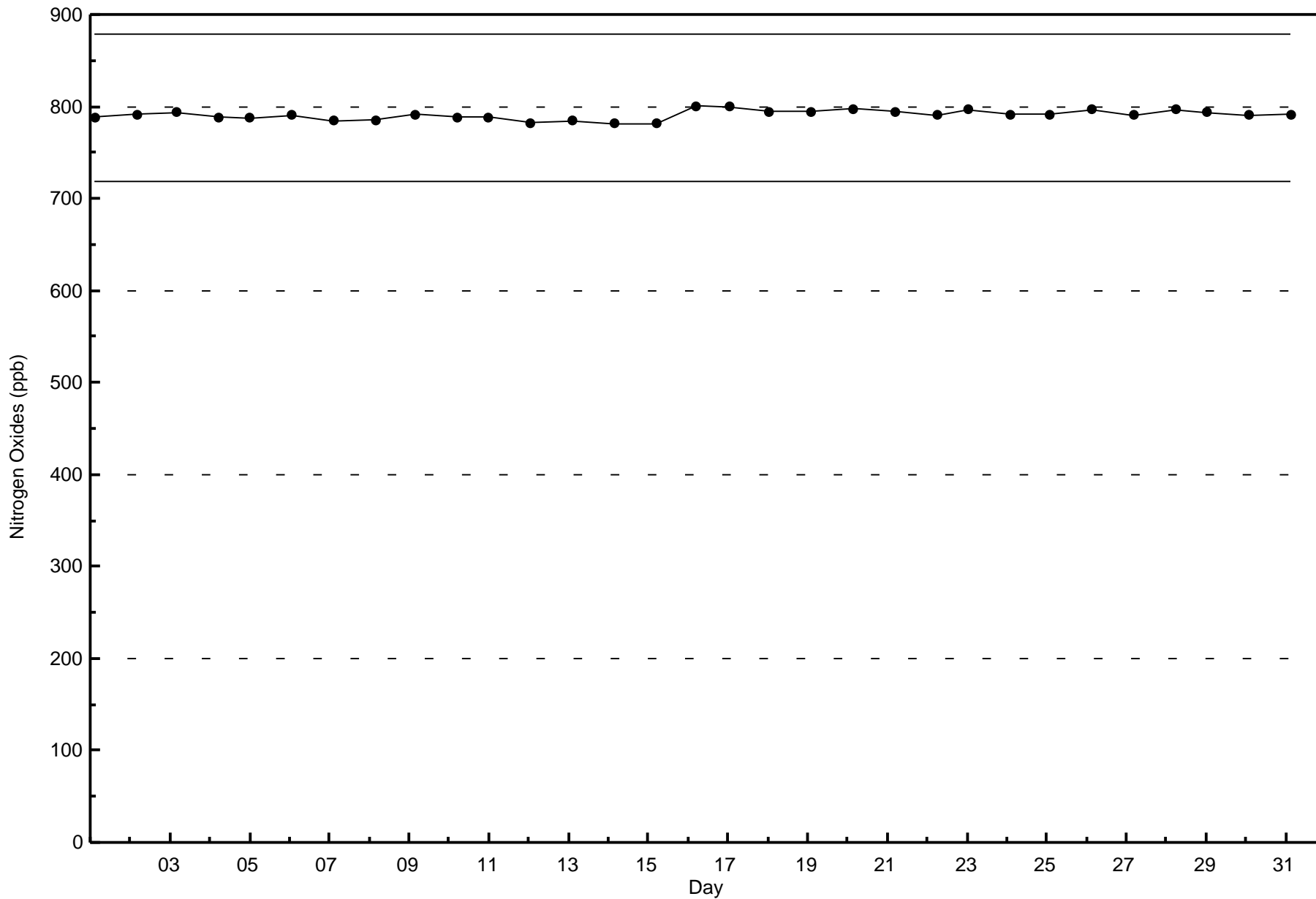


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Oxides (NO_x) - ppb
Buffalo Viewpoint (AMS 4)









Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

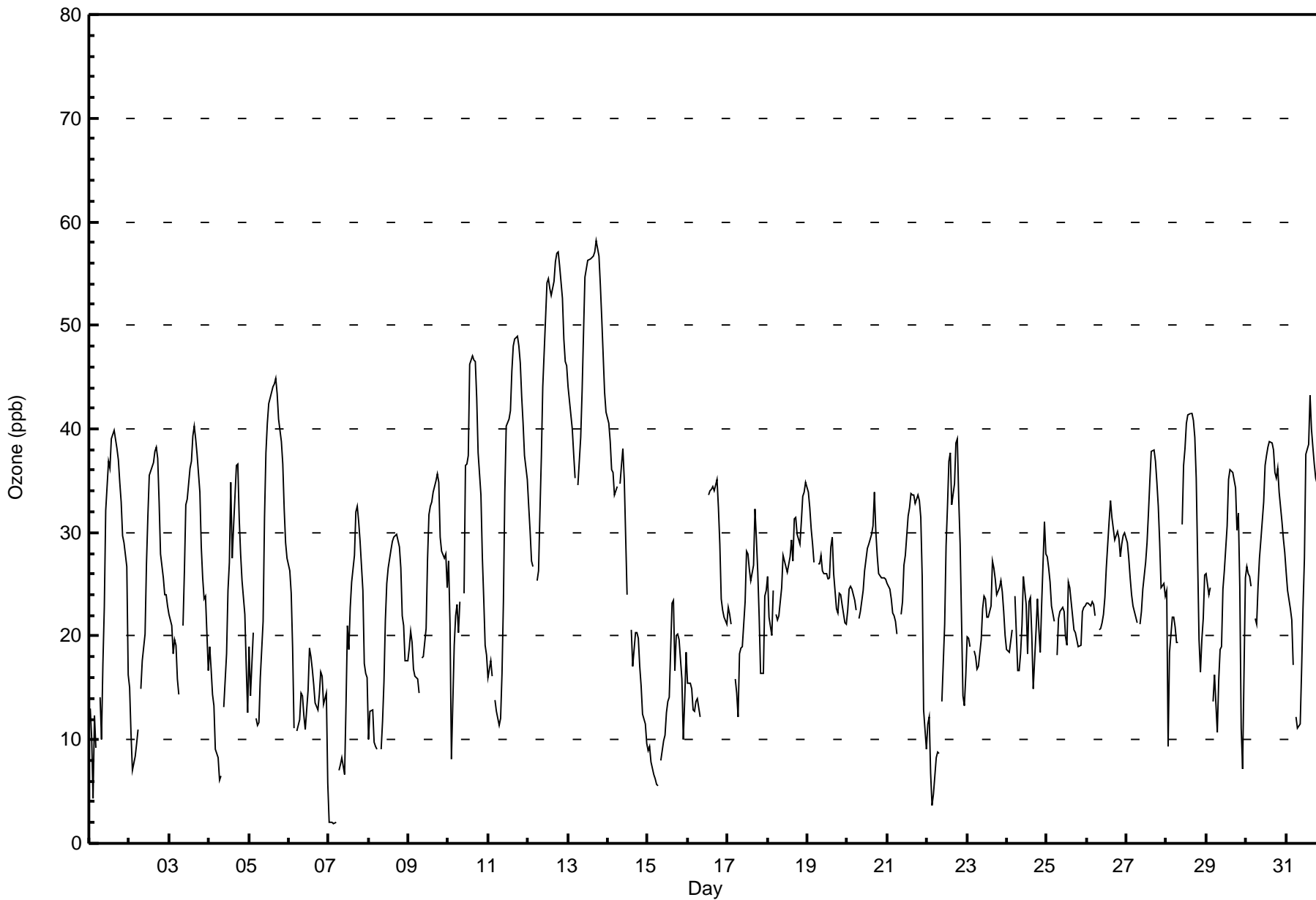
Buffalo Viewpoint - August 2017

| | | | | |
|--|--|----------|---------------------------|------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 58 ppb on Aug 13 18:00 | Maximum Daily Average: 48.3 ppb on Aug 13 | | Hours of Data: | 708 |
| Minimum Value: 2 ppb on Aug 7 04:00 | Minimum Daily Average: 13.1 ppb on Aug 15 | | Hours of Missing Data: | 36 |
| Maximum Diurnal Average: 34.2 ppb at hour 17 | Minimum Diurnal Average: 16.1 ppb at hour 7 | | Hours of Calibration: | 34 |
| Monthly Average: 25.9 ppb | Percentiles: P ₁ = 4 P ₁₀ = 12 Q ₁ = 19 Median = 25 Q ₃ = 33 P ₉₀ = 39 P ₉₉ = 57 | | Percent Operational Time: | 99.7 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 13 | 10 | 4 | 12 | 9 | Z | 14 | 10 | 17 | 23 | 32 | 37 | 36 | 39 | 39 | 40 | 38 | 37 | 35 | 33 | 30 | 29 | 27 | 16 | 25.3 | 40 |
| 2-Aug | 15 | 11 | 7 | 8 | 10 | 11 | Z | 15 | 18 | 20 | 27 | 32 | 35 | 36 | 37 | 38 | 38 | 37 | 33 | 28 | 26 | 24 | 24 | 23 | 24.0 | 38 |
| 3-Aug | 22 | 21 | 18 | 20 | 19 | 16 | 14 | Z | 21 | 26 | 33 | 33 | 36 | 37 | 39 | 40 | 39 | 38 | 34 | 29 | 26 | 24 | 24 | 17 | 27.2 | 40 |
| 4-Aug | 19 | 17 | 14 | 13 | 9 | 8 | 6 | 6 | Z | 13 | 18 | 24 | 27 | 35 | 28 | 31 | 36 | 37 | 31 | 28 | 25 | 22 | 17 | 13 | 20.8 | 37 |
| 5-Aug | 19 | 14 | 20 | Z | 12 | 11 | 12 | 16 | 21 | 31 | 38 | 41 | 42 | 43 | 44 | 44 | 45 | 43 | 41 | 39 | 37 | 32 | 29 | 27 | 30.6 | 45 |
| 6-Aug | 26 | 24 | 19 | 11 | Z | 11 | 12 | 14 | 14 | 12 | 11 | 15 | 19 | 18 | 17 | 15 | 14 | 13 | 14 | 17 | 16 | 13 | 15 | 6 | 15.1 | 26 |
| 7-Aug | 2 | 2 | 2 | 2 | 2 | Z | 7 | 8 | 8 | 7 | 13 | 21 | 19 | 23 | 25 | 28 | 32 | 33 | 31 | 29 | 24 | 17 | 16 | 16 | 16.0 | 33 |
| 8-Aug | 10 | 13 | 13 | 10 | 9 | 9 | Z | 9 | 12 | 16 | 22 | 25 | 27 | 28 | 29 | 30 | 30 | 30 | 29 | 27 | 22 | 21 | 18 | 18 | 19.7 | 30 |
| 9-Aug | 19 | 21 | 19 | 17 | 16 | 16 | 14 | Z | 18 | 18 | 21 | 27 | 32 | 33 | 33 | 34 | 35 | 36 | 35 | 30 | 28 | 28 | 28 | 25 | 25.2 | 36 |
| 10-Aug | 27 | 21 | 8 | 19 | 22 | 23 | 20 | 23 | Z | 24 | 36 | 37 | 37 | 46 | 47 | 47 | 46 | 43 | 38 | 34 | 28 | 24 | 19 | 18 | 29.9 | 47 |
| 11-Aug | 16 | 18 | 16 | Z | 14 | 13 | 11 | 12 | 16 | 23 | 34 | 40 | 41 | 42 | 46 | 48 | 49 | 49 | 48 | 46 | 43 | 41 | 37 | 35 | 32.1 | 49 |
| 12-Aug | 33 | 30 | 27 | 27 | Z | 25 | 26 | 32 | 37 | 44 | 51 | 54 | 54 | 54 | 53 | 54 | 56 | 57 | 57 | 56 | 53 | 49 | 46 | 46 | 44.4 | 57 |
| 13-Aug | 44 | 43 | 40 | 38 | 35 | Z | 35 | 39 | 44 | 49 | 55 | 56 | 56 | 56 | 57 | 57 | 58 | 57 | 54 | 51 | 47 | 44 | 42 | 42 | 48.3 | 58 |
| 14-Aug | 41 | 39 | 36 | 36 | 34 | 34 | Z | 35 | 36 | 38 | 35 | 24 | M | M | 21 | 17 | 20 | 20 | 17 | 15 | 12 | 12 | 10 | 10 | 26.3 | 41 |
| 15-Aug | 9 | 9 | 8 | 7 | 6 | 6 | 6 | Z | 8 | 10 | 10 | 13 | 14 | 14 | 23 | 17 | 20 | 20 | 20 | 20 | 16 | 10 | 14 | 18 | 13.1 | 23 |
| 16-Aug | 15 | 15 | 15 | 13 | 13 | 14 | 14 | 12 | Z | C | C | C | 34 | 34 | 34 | 34 | 34 | 35 | 32 | 29 | 24 | 22 | 22 | 21 | 23.3 | 35 |
| 17-Aug | 23 | 22 | 21 | Z | 16 | 15 | 12 | 18 | 19 | 19 | 23 | 28 | 28 | 26 | 25 | 27 | 32 | 29 | 26 | 22 | 16 | 16 | 24 | 24 | 22.3 | 32 |
| 18-Aug | 26 | 22 | 20 | 24 | Z | 22 | 22 | 22 | 25 | 28 | 27 | 27 | 26 | 28 | 29 | 27 | 31 | 31 | 30 | 29 | 31 | 33 | 34 | 35 | 27.4 | 35 |
| 19-Aug | 34 | 32 | 30 | 29 | 27 | Z | 27 | 27 | 28 | 26 | 26 | 26 | 26 | 26 | 29 | 30 | 26 | 23 | 22 | 24 | 24 | 23 | 21 | 21 | 26.4 | 34 |
| 20-Aug | 22 | 25 | 25 | 25 | 24 | 23 | Z | 22 | 22 | 24 | 26 | 27 | 28 | 29 | 30 | 31 | 34 | 30 | 28 | 26 | 26 | 26 | 26 | 26 | 26.2 | 34 |
| 21-Aug | 25 | 24 | 24 | 22 | 22 | 21 | 20 | Z | 22 | 23 | 27 | 28 | 32 | 32 | 34 | 34 | 34 | 33 | 34 | 33 | 31 | 26 | 13 | 9 | 26.2 | 34 |
| 22-Aug | 12 | 12 | 7 | 4 | 5 | 8 | 9 | 9 | Z | 14 | 21 | 29 | 33 | 37 | 38 | 33 | 35 | 39 | 39 | 33 | 29 | 14 | 13 | 16 | 21.1 | 39 |
| 23-Aug | 20 | 20 | 19 | Z | 19 | 18 | 17 | 17 | 20 | 23 | 24 | 24 | 22 | 22 | 23 | 27 | 27 | 25 | 24 | 25 | 25 | 24 | 22 | 20 | 22.0 | 27 |
| 24-Aug | 19 | 18 | 19 | 21 | Z | 24 | 17 | 17 | 18 | 21 | 26 | 23 | 18 | 23 | 24 | 20 | 15 | 20 | 24 | 21 | 18 | 23 | 31 | 28 | 21.2 | 31 |
| 25-Aug | 28 | 27 | 25 | 23 | 21 | Z | 18 | 22 | 22 | 23 | 22 | 20 | 19 | 25 | 25 | 22 | 21 | 20 | 20 | 19 | 19 | 22 | 23 | 23 | 22.1 | 28 |
| 26-Aug | 23 | 23 | 23 | 23 | 23 | 22 | Z | 21 | 21 | 21 | 22 | 24 | 27 | 31 | 33 | 31 | 30 | 29 | 30 | 29 | 28 | 29 | 30 | 30 | 26.2 | 33 |
| 27-Aug | 29 | 28 | 26 | 24 | 23 | 22 | 21 | Z | 21 | 22 | 25 | 27 | 29 | 32 | 35 | 38 | 38 | 37 | 35 | 32 | 29 | 25 | 25 | 24 | 28.1 | 38 |
| 28-Aug | 24 | 9 | 18 | 22 | 22 | 21 | 19 | 19 | Z | 31 | 36 | 38 | 41 | 41 | 41 | 42 | 41 | 39 | 35 | 20 | 17 | 20 | 22 | 26 | 28.0 | 42 |
| 29-Aug | 26 | 24 | 25 | Z | 14 | 16 | 11 | 16 | 19 | 19 | 25 | 26 | 31 | 35 | 36 | 36 | 36 | 34 | 30 | 32 | 25 | 11 | 7 | 26 | 24.3 | 36 |
| 30-Aug | 27 | 26 | 26 | 25 | Z | 22 | 21 | 25 | 28 | 29 | 33 | 37 | 37 | 38 | 39 | 39 | 38 | 36 | 35 | 36 | 34 | 31 | 29 | 28 | 31.2 | 39 |
| 31-Aug | 26 | 24 | 23 | 22 | 17 | Z | 12 | 11 | 11 | 17 | 23 | 28 | 38 | 38 | 43 | 40 | 38 | 37 | 35 | 34 | 34 | 33 | 33 | 34 | 28.3 | 43 |

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|--|
| 22.4 | 20.8 | 19.3 | 19.0 | 17.0 | 17.2 | 16.1 | 18.3 | 21.0 | 23.2 | 27.4 | 29.6 | 31.4 | 33.4 | 34.0 | 34.0 | 34.2 | 33.8 | 32.3 | 30.0 | 27.4 | 24.9 | 24.0 | 23.2 | Diurnal Average | |
| 44 | 43 | 40 | 38 | 35 | 34 | 35 | 39 | 44 | 49 | 55 | 56 | 56 | 56 | 57 | 57 | 57 | 58 | 57 | 56 | 53 | 49 | 46 | 46 | Diurnal Maximum | |

Z - zerospan C - Calibration M - Maintenance
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ozone (O₃) - ppb
Buffalo Viewpoint - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 219 | 30.93 | 30.93 |
| 21 - 50 | 467 | 65.96 | 96.89 |
| 51 - 82 | 22 | 3.11 | 100.00 |
| > 83 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



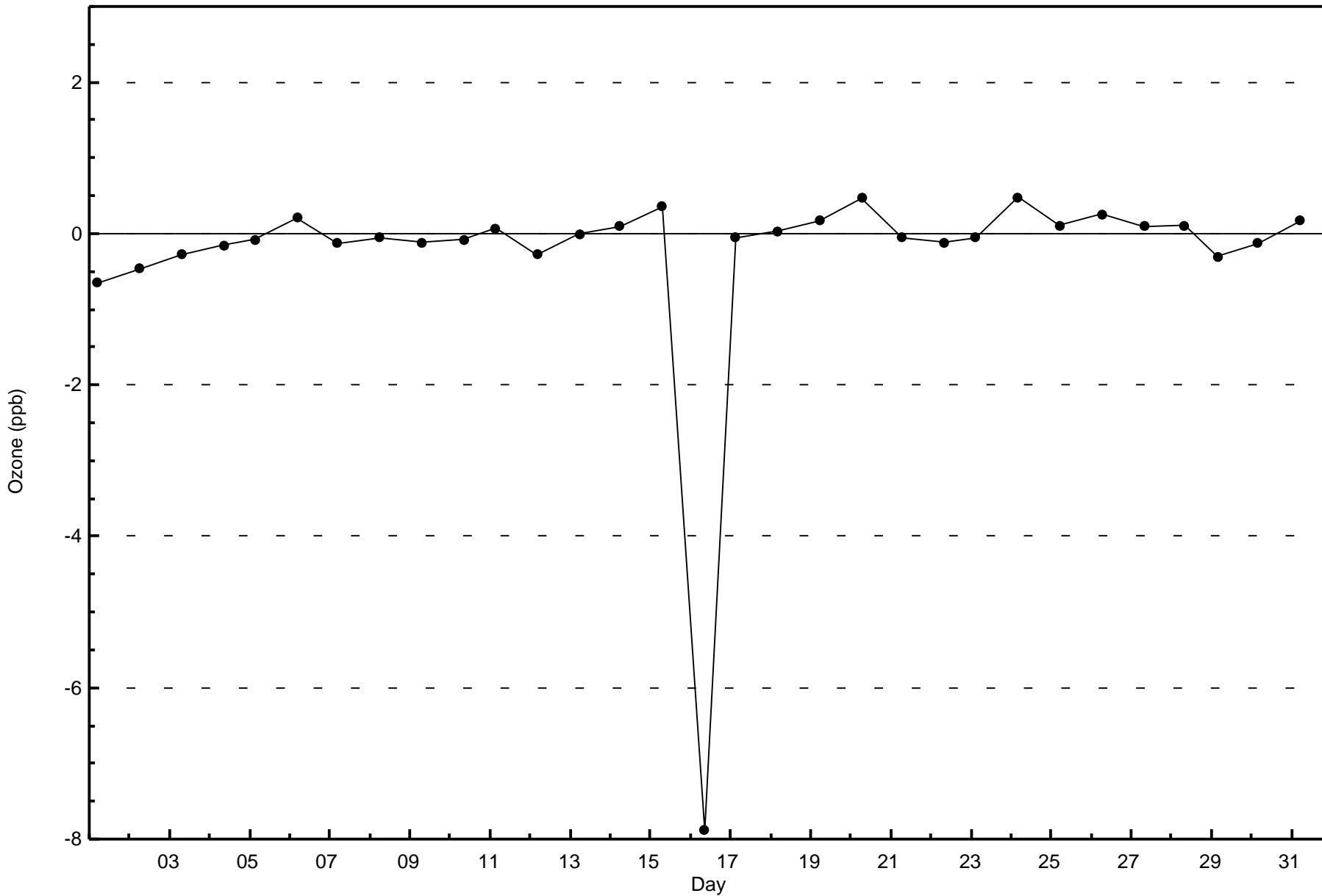
**Wood Buffalo Environmental Association
Frequency Distribution**

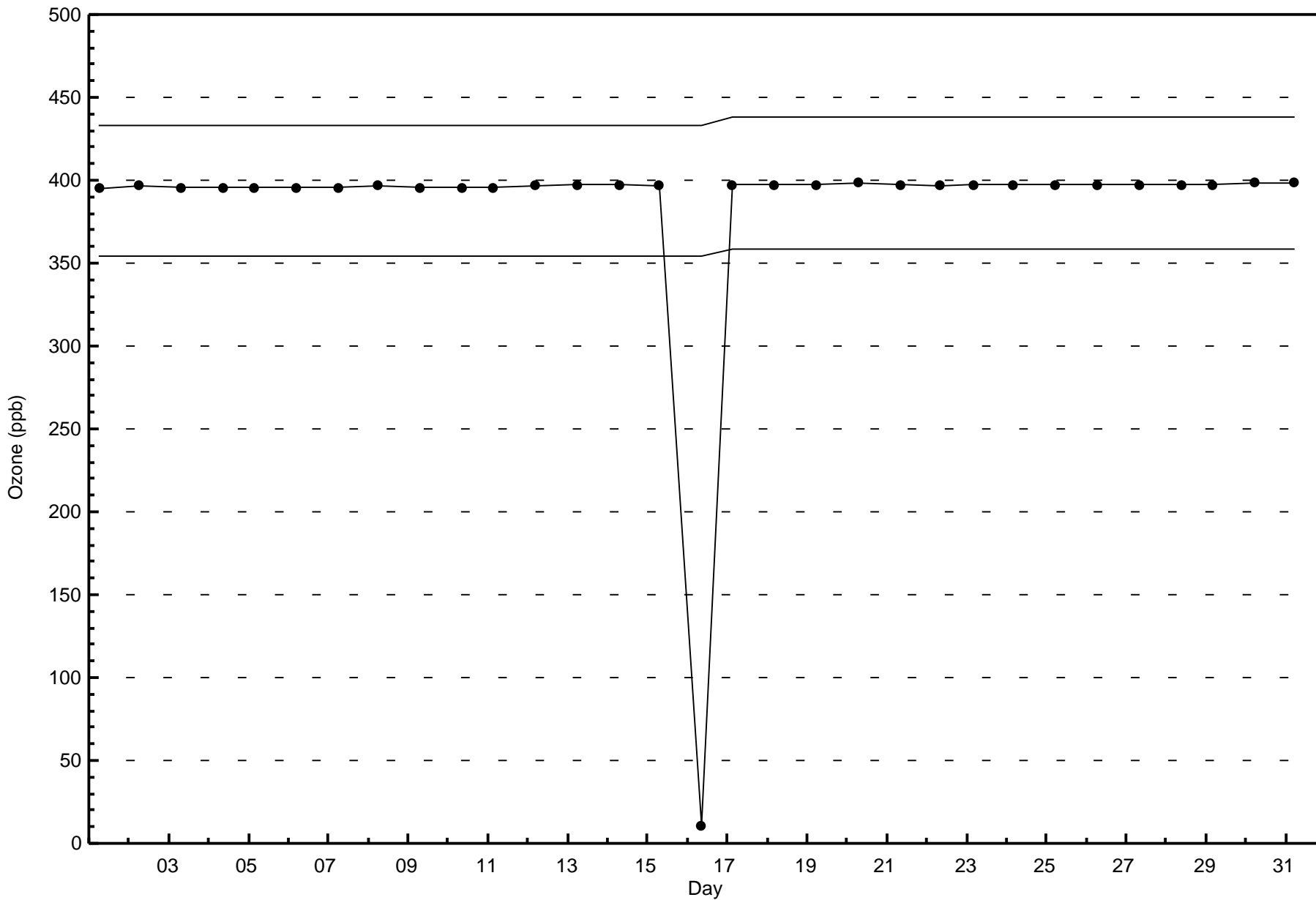
**Ozone (O₃) - ppb
Buffalo Viewpoint - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 20 | 15 | 3 | 2 | 2 | 1 | 10 | 46 | 39 | 15 | 10 | 16 | 9 | 16 | 10 | 5 | 219 |
| 21 - 50 | 4 | 17 | 3 | 4 | 3 | 8 | 18 | 85 | 30 | 35 | 53 | 82 | 77 | 34 | 8 | 5 | 466 |
| 51 - 82 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 5 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 22 |
| > 83 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 24 | 32 | 6 | 6 | 5 | 9 | 28 | 142 | 74 | 56 | 63 | 98 | 86 | 50 | 18 | 10 | 707 |

Total Number of Valid Hours: 707

Total Number of Hours: 744







Wood Buffalo Environmental Association

Summary of Hour Averages

PM_{2.5} (PM_{2.5}) - µg/m³

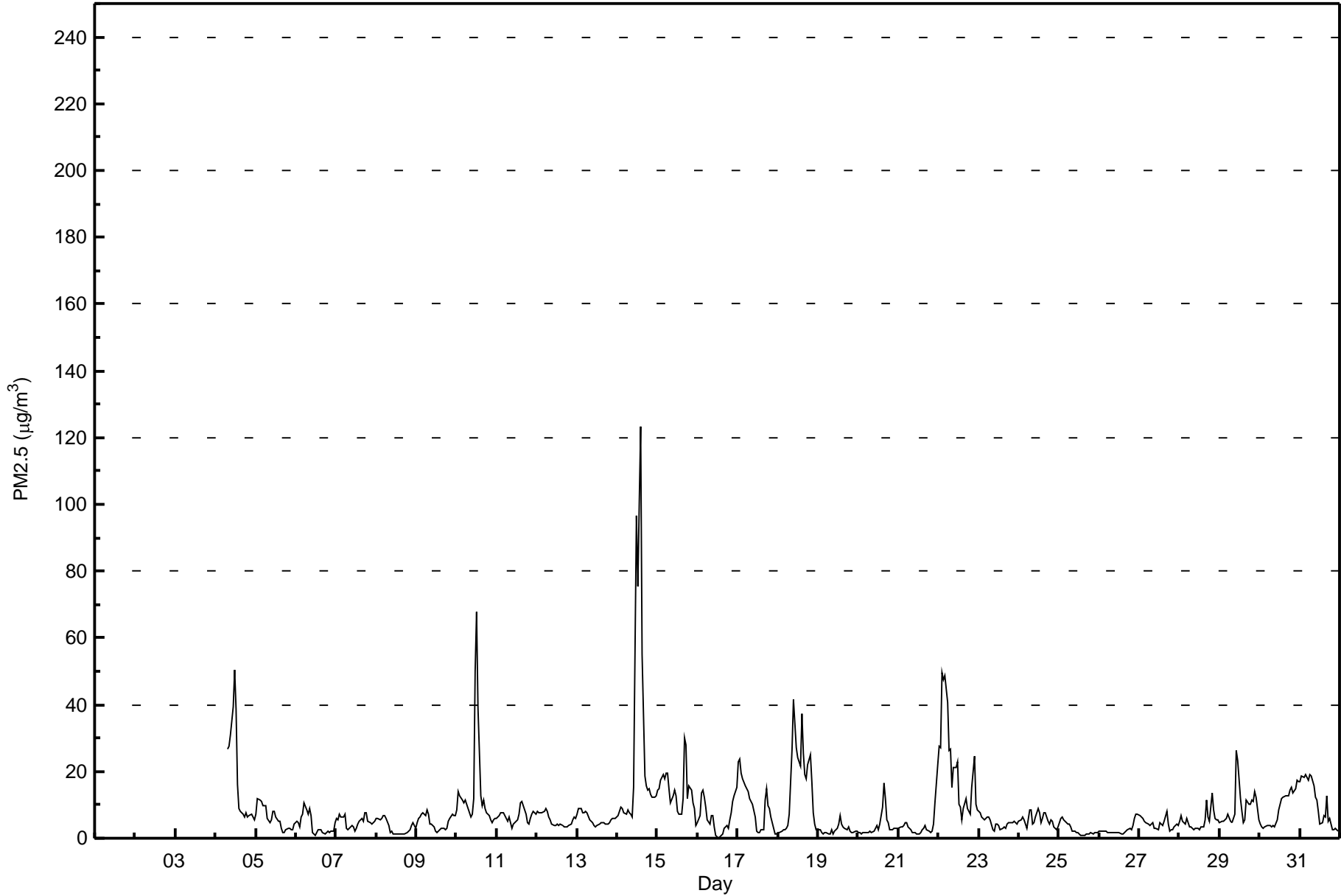
Buffalo Viewpoint - August 2017

| Number of Exceedences (AAAQO): | | 24-hr: 0 | | Hours in Service: 666 | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|--|------|---------------------------------|------|------|------|------|------|------|------|------|------|-------|-------|-------|------|------|------|------|------|------|------|------|---------------|-----------------|--|
| Maximum Value: 123.5 µg/m ³ on Aug 14 15:00 | | Maximum Daily Average: 27.4 µg/m ³ on Aug 14 | | Hours of Data: 665 | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum Value: 0.2 µg/m ³ on Aug 16 13:00 | | Minimum Daily Average: 2.5 µg/m ³ on Aug 19 | | Hours of Missing Data: 1 | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 12.8 µg/m ³ at hour 12 | | Minimum Diurnal Average: 6.2 µg/m ³ at hour 19 | | Hours of Calibration: 1 | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 8.18 µg/m ³ | | Percentiles: P ₁ = 0.9 P ₁₀ = 1.8 Q ₁ = 3.0 Median = 5.3 Q ₃ = 8.9 P ₉₀ = 15.8 P ₉₉ = 49.6 | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | -- | -- | |
| 2-Aug | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | -- | -- | |
| 3-Aug | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | -- | -- | |
| 4-Aug | NS | NS | NS | NS | NS | NS | C | 26.7 | 27.6 | 31.1 | 39.2 | 50.3 | 38.7 | 16.1 | 8.9 | 8.0 | 7.1 | 6.4 | 7.7 | 6.2 | 6.6 | 7.0 | 6.4 | 5.6 | -- | 50.3 | |
| 5-Aug | 7.1 | 11.9 | 11.4 | 11.2 | 9.8 | 9.9 | 9.9 | 6.0 | 4.6 | 5.7 | 8.1 | 8.2 | 6.4 | 5.2 | 5.3 | 3.0 | 1.9 | 1.7 | 2.5 | 2.8 | 3.0 | 2.6 | 2.5 | 4.3 | 6.0 | 11.9 | |
| 6-Aug | 4.9 | 4.6 | 3.3 | 6.3 | 7.2 | 10.5 | 8.5 | 7.4 | 9.0 | 6.7 | 1.6 | 1.0 | 1.5 | 2.6 | 2.7 | 2.6 | 1.7 | 1.4 | 1.5 | 2.1 | 1.5 | 2.2 | 2.3 | 4.8 | 4.1 | 10.5 | |
| 7-Aug | 5.9 | 5.6 | 7.4 | 6.3 | 6.2 | 7.3 | 2.8 | 2.6 | 3.1 | 3.8 | 3.2 | 2.0 | 2.8 | 4.1 | 4.9 | 5.8 | 4.9 | 7.5 | 7.7 | 5.0 | 4.8 | 4.4 | 4.7 | 5.2 | 4.9 | 7.7 | |
| 8-Aug | 5.7 | 6.1 | 5.7 | 6.0 | 6.7 | 6.7 | 5.9 | 3.9 | 1.7 | 2.0 | 1.4 | 1.2 | 1.2 | 1.4 | 1.3 | 1.3 | 1.2 | 1.4 | 1.7 | 2.0 | 2.6 | 4.0 | 4.5 | 3.1 | 3.3 | 6.7 | |
| 9-Aug | 4.6 | 6.0 | 6.2 | 7.2 | 7.6 | 7.0 | 8.4 | 7.2 | 4.3 | 4.2 | 3.3 | 2.0 | 1.9 | 2.2 | 2.6 | 2.8 | 2.8 | 2.5 | 3.0 | 4.9 | 6.1 | 7.0 | 6.9 | 7.0 | 4.9 | 8.4 | |
| 10-Aug | 8.3 | 14.1 | 12.7 | 11.6 | 10.8 | 11.4 | 10.0 | 9.1 | 6.2 | 7.2 | 11.8 | 49.8 | 67.9 | 39.1 | 12.7 | 9.9 | 11.6 | 9.0 | 7.8 | 6.9 | 5.5 | 4.5 | 5.3 | 5.9 | 14.5 | 67.9 | |
| 11-Aug | 6.0 | 6.8 | 7.6 | 7.6 | 7.7 | 6.8 | 5.1 | 6.4 | 4.9 | 2.9 | 4.4 | 4.8 | 5.6 | 7.4 | 10.8 | 11.0 | 9.8 | 7.2 | 4.7 | 4.3 | 6.1 | 7.2 | 7.9 | 7.3 | 6.7 | 11.0 | |
| 12-Aug | 8.0 | 7.4 | 7.5 | 7.8 | 8.0 | 9.1 | 8.0 | 6.3 | 5.7 | 4.3 | 3.9 | 3.8 | 4.0 | 3.9 | 4.1 | 3.7 | 3.4 | 3.4 | 3.4 | 3.7 | 4.2 | 5.7 | 6.2 | 5.8 | 5.5 | 9.1 | |
| 13-Aug | 7.4 | 8.7 | 8.8 | 7.7 | 7.6 | 8.0 | 7.8 | 5.5 | 4.9 | 4.5 | 3.9 | 3.6 | 3.8 | 4.2 | 4.5 | 4.7 | 4.7 | 4.2 | 4.2 | 4.7 | 5.6 | 6.0 | 5.9 | 5.7 | 5.7 | 8.8 | |
| 14-Aug | 6.8 | 7.9 | 9.1 | 8.9 | 7.8 | 7.0 | 8.6 | 7.5 | 7.3 | 6.4 | 15.3 | 96.5 | 75.5 | 100.3 | 123.5 | 54.9 | 18.7 | 15.8 | 14.4 | 15.0 | 13.1 | 12.2 | 12.3 | 12.6 | 27.4 | 123.5 | |
| 15-Aug | 14.2 | 14.8 | 17.2 | 19.2 | 18.0 | 19.6 | 19.5 | 14.7 | 10.4 | 12.8 | 14.4 | 12.7 | 8.2 | 7.1 | 7.1 | 11.9 | 29.9 | 28.1 | 11.7 | 15.6 | 14.6 | 10.6 | 8.9 | 4.0 | 14.4 | 29.9 | |
| 16-Aug | 4.6 | 6.6 | 13.6 | 14.5 | 12.3 | 9.2 | 5.5 | 4.2 | 7.0 | 6.8 | 3.6 | 0.8 | 0.2 | 0.5 | 0.8 | 1.2 | 2.8 | 3.7 | 2.9 | 5.3 | 7.8 | 11.0 | 12.8 | 15.2 | 6.4 | 15.2 | |
| 17-Aug | 23.0 | 23.8 | 19.6 | 17.6 | 15.6 | 14.6 | 13.8 | 12.0 | 11.1 | 10.2 | 6.2 | 2.1 | 1.5 | 1.7 | 2.4 | 2.4 | 11.4 | 14.8 | 9.6 | 9.1 | 6.2 | 3.1 | 1.3 | 1.3 | 9.8 | 23.8 | |
| 18-Aug | 1.6 | 1.7 | 1.9 | 2.6 | 2.7 | 3.0 | 3.9 | 7.1 | 26.8 | 41.5 | 34.2 | 27.1 | 24.1 | 21.7 | 37.3 | 25.6 | 19.3 | 17.9 | 22.0 | 24.9 | 16.9 | 7.7 | 4.3 | 2.4 | 15.8 | 41.5 | |
| 19-Aug | 2.6 | 2.6 | 1.8 | 1.3 | 1.7 | 1.5 | 1.4 | 1.3 | 2.3 | 1.2 | 2.0 | 3.0 | 4.1 | 6.7 | 4.0 | 3.5 | 2.8 | 2.6 | 3.2 | 2.0 | 1.7 | 1.8 | 2.1 | 2.2 | 2.5 | 6.7 | |
| 20-Aug | 1.9 | 1.5 | 1.5 | 1.6 | 1.7 | 1.8 | 1.8 | 2.0 | 1.7 | 2.2 | 2.8 | 3.8 | 2.6 | 4.4 | 9.4 | 16.5 | 12.0 | 5.6 | 4.7 | 2.5 | 2.5 | 3.0 | 3.1 | 2.9 | 3.9 | 16.5 | |
| 21-Aug | 2.9 | 3.2 | 3.5 | 3.8 | 4.6 | 4.6 | 3.5 | 2.6 | 1.6 | 1.7 | 1.9 | 1.4 | 1.2 | 1.6 | 2.6 | 2.8 | 3.7 | 2.4 | 2.0 | 1.8 | 2.3 | 4.3 | 10.6 | 22.0 | 3.9 | 22.0 | |
| 22-Aug | 27.5 | 27.1 | 49.4 | 47.3 | 48.9 | 40.7 | 26.3 | 26.6 | 15.4 | 21.4 | 21.3 | 23.0 | 10.3 | 9.4 | 5.7 | 8.9 | 11.8 | 9.1 | 8.0 | 7.1 | 15.3 | 24.4 | 10.2 | 8.4 | 21.0 | 49.4 | |
| 23-Aug | 8.1 | 7.5 | 6.6 | 5.5 | 5.9 | 6.3 | 6.3 | 5.5 | 2.7 | 2.2 | 4.1 | 4.0 | 3.9 | 2.4 | 2.9 | 3.5 | 3.1 | 4.1 | 4.8 | 4.8 | 4.8 | 5.2 | 4.6 | 4.2 | 4.7 | 8.1 | |
| 24-Aug | 5.0 | 5.4 | 6.2 | 5.6 | 4.1 | 3.0 | 8.6 | 8.5 | 4.4 | 4.5 | 6.3 | 8.9 | 7.5 | 4.5 | 5.9 | 7.5 | 7.5 | 5.2 | 4.3 | 5.7 | 5.2 | 3.5 | 2.4 | 3.3 | 5.5 | 8.9 | |
| 25-Aug | 4.6 | 5.9 | 6.2 | 5.5 | 4.6 | 4.4 | 4.1 | 3.2 | 2.3 | 2.0 | 1.8 | 1.7 | 1.2 | 0.8 | 0.8 | 1.0 | 1.3 | 1.4 | 1.4 | 1.5 | 1.5 | 1.6 | 1.6 | 1.5 | 2.6 | 6.2 | |
| 26-Aug | 1.9 | 2.3 | 2.3 | 2.3 | 2.0 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.5 | 1.6 | 1.6 | 1.5 | 1.3 | 1.7 | 2.2 | 2.6 | 2.9 | 2.7 | 3.6 | 5.8 | 7.2 | 7.4 | 2.7 | 7.4 | |
| 27-Aug | 6.9 | 6.5 | 5.9 | 5.2 | 4.7 | 4.3 | 4.0 | 4.1 | 4.5 | 3.1 | 2.8 | 2.7 | 4.8 | 4.1 | 4.0 | 5.1 | 7.8 | 4.4 | 2.0 | 2.3 | 2.7 | 3.3 | 4.0 | 3.9 | 4.3 | 7.8 | |
| 28-Aug | 5.2 | 6.6 | 4.9 | 4.2 | 5.8 | 4.7 | 3.4 | 3.4 | 2.7 | 3.1 | 3.0 | 3.1 | 2.7 | 3.5 | 3.3 | 5.3 | 11.5 | 6.2 | 5.0 | 13.4 | 8.6 | 5.8 | 5.3 | 5.3 | 5.3 | 13.4 | |
| 29-Aug | 4.8 | 5.1 | 5.2 | 5.4 | 5.7 | 7.0 | 5.0 | 4.7 | 5.8 | 7.1 | 26.3 | 23.4 | 11.8 | 8.0 | 4.7 | 5.4 | 11.6 | 10.3 | 10.3 | 11.4 | 11.0 | 14.1 | 12.3 | 5.6 | 9.3 | 26.3 | |
| 30-Aug | 4.3 | 3.2 | 2.9 | 3.2 | 3.8 | 3.9 | 3.7 | 3.4 | 3.6 | 3.4 | 5.6 | 8.4 | 10.4 | 11.9 | 12.4 | 12.9 | 12.5 | 12.9 | 14.3 | 15.3 | 13.6 | 14.9 | 17.5 | 17.1 | 9.0 | 17.5 | |
| 31-Aug | 17.0 | 18.8 | 18.0 | 18.9 | 18.4 | 17.3 | 19.2 | 18.7 | 15.6 | 12.4 | 11.2 | 8.2 | 4.0 | 4.7 | 6.7 | 6.2 | 12.8 | 4.9 | 5.9 | 2.5 | 2.5 | 2.8 | 2.5 | 2.2 | 10.5 | 19.2 | |
| | | 7.4 | 8.2 | 9.1 | 9.0 | 8.9 | 8.6 | 7.7 | 7.6 | 7.1 | 7.7 | 8.8 | 12.8 | 11.1 | 10.0 | 10.5 | 8.2 | 8.3 | 7.0 | 6.2 | 6.6 | 6.4 | 6.6 | 6.3 | 6.3 | Diurnal Average | |
| | | 27.5 | 27.1 | 49.4 | 47.3 | 48.9 | 40.7 | 26.3 | 26.7 | 27.6 | 41.5 | 39.2 | 96.5 | 75.5 | 100.3 | 123.5 | 54.9 | 29.9 | 28.1 | 22.0 | 24.9 | 16.9 | 24.4 | 17.5 | 22.0 | Diurnal Maximum | |
| C - Calibration | | NS - Not in Service | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): | | 24-hr | | 30 µg/m ³ | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

PM2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Buffalo Viewpoint - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**PM2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Buffalo Viewpoint - August 2017**

| Concentration Ranges ($\mu\text{g}/\text{m}^3$) | Number of Hours | % | Cumulative % |
|---|------------------------|----------|---------------------|
| 1 - 5 | 332 | 49.92 | 49.92 |
| 6 - 15 | 257 | 38.65 | 88.57 |
| 16 - 25 | 39 | 5.86 | 94.44 |
| 26 - 80 | 28 | 4.21 | 98.65 |
| > 81.0 | 3 | 0.45 | 99.10 |

Total Number of Valid Hours: 665

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

PM2.5 (PM_{2.5}) - μg/m³
Buffalo Viewpoint - August 2017

| Concentration Ranges (μg/m ³) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|--|----------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 1 - 5 | 9 | 13 | 2 | 0 | 0 | 0 | 7 | 53 | 20 | 35 | 33 | 71 | 62 | 24 | 2 | 1 | 332 |
| 6 - 15 | 7 | 3 | 2 | 2 | 2 | 8 | 15 | 85 | 37 | 18 | 18 | 12 | 19 | 13 | 11 | 5 | 257 |
| 16 - 25 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 3 | 13 | 1 | 5 | 5 | 1 | 5 | 0 | 1 | 39 |
| 26 - 80 | 7 | 3 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 6 | 2 | 2 | 1 | 1 | 2 | 28 |
| > 81.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 3 |
| Totals | 24 | 20 | 4 | 3 | 4 | 9 | 24 | 141 | 70 | 55 | 63 | 92 | 84 | 43 | 14 | 9 | 659 |

Total Number of Valid Hours: 665

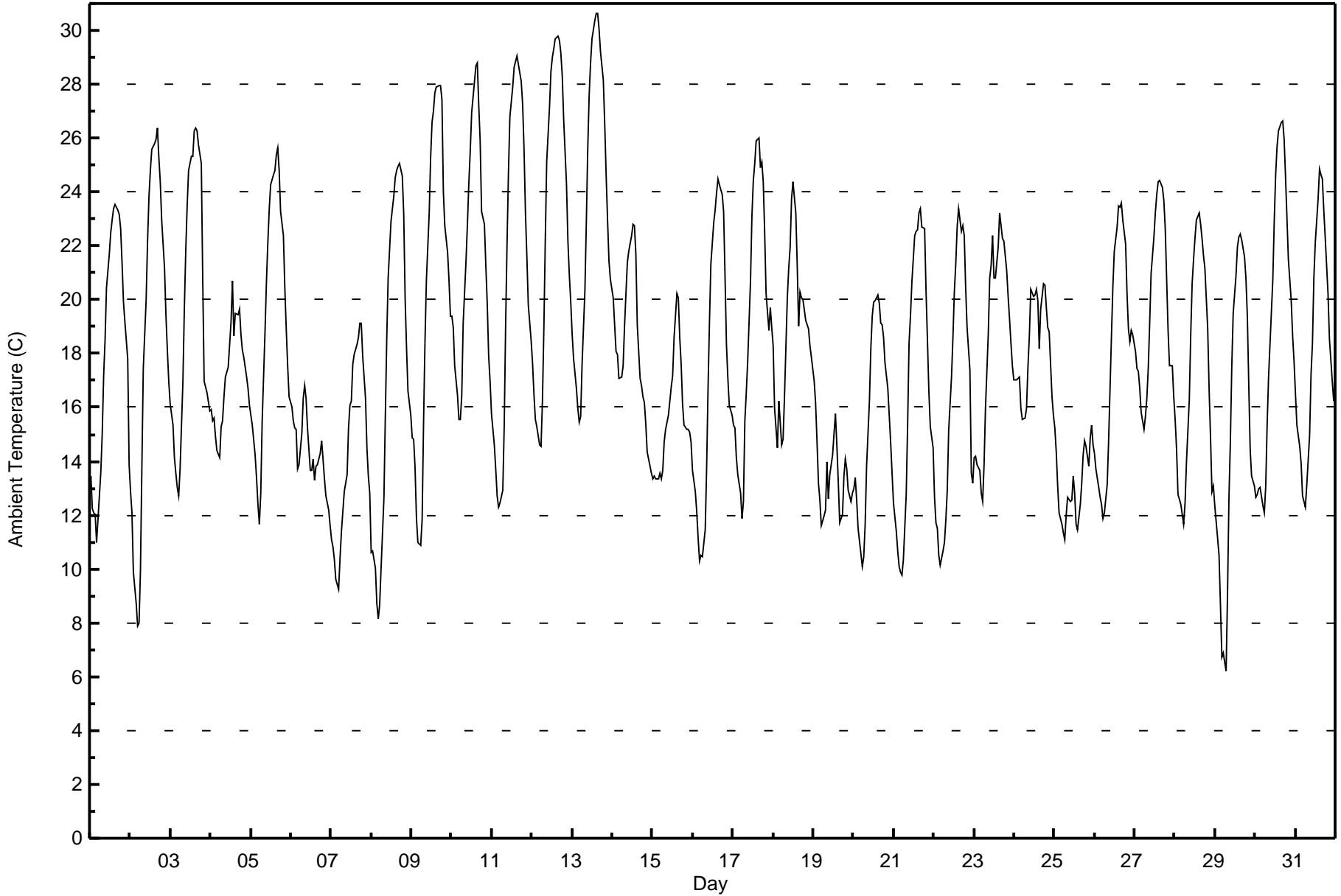
Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

Ambient Temperature (AT) - C
Buffalo Viewpoint - August 2017

| Maximum Value: 30.6 C on Aug 13 15:00 Maximum Daily Average: 23.7 C on Aug 13 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 | | | | |
|---|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|------|------|---------------|---------------|
| Minimum Value: 6.2 C on Aug 29 07:00 Minimum Daily Average: 13.2 C on Aug 25 | | | | | | | | | | | | | | | | | | | | | | Hours of Data: 744 | | | | |
| Maximum Diurnal Average: 22.9 C at hour 15 Minimum Diurnal Average: 12.3 C at hour 6 | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: 0 | | | | |
| Monthly Average: 18.03 C Percentiles: P₁ = 8.7 P₁₀ = 12.1 Q₁ = 13.9 Median = 17.5 Q₃ = 22.0 P₉₀ = 24.8 P₉₉ = 29.7 | | | | | | | | | | | | | | | | | | | | | | Hours of Calibration: 0 | | | | |
| | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 13.4 | 12.3 | 12.1 | 12.0 | 11.0 | 12.7 | 13.6 | 15.0 | 17.2 | 18.5 | 20.4 | 21.7 | 22.5 | 23.0 | 23.4 | 23.5 | 23.3 | 23.2 | 22.6 | 21.4 | 19.9 | 19.2 | 17.8 | 13.9 | 18.1 | 23.5 |
| 2-Aug | 12.9 | 12.1 | 9.9 | 8.7 | 7.9 | 8.0 | 9.9 | 13.8 | 17.4 | 20.0 | 22.1 | 23.8 | 24.8 | 25.6 | 25.8 | 26.0 | 26.4 | 25.3 | 24.4 | 22.9 | 21.2 | 19.4 | 18.1 | 17.0 | 18.5 | 26.4 |
| 3-Aug | 16.1 | 15.4 | 14.1 | 13.6 | 13.0 | 12.7 | 13.7 | 17.0 | 19.7 | 21.8 | 23.5 | 24.8 | 25.3 | 25.3 | 26.3 | 26.4 | 26.2 | 25.7 | 25.1 | 20.7 | 17.0 | 16.8 | 16.5 | 15.9 | 19.7 | 26.4 |
| 4-Aug | 15.9 | 15.5 | 15.6 | 14.9 | 14.4 | 14.2 | 15.3 | 15.5 | 16.4 | 17.1 | 17.5 | 18.3 | 19.2 | 20.7 | 18.7 | 19.5 | 19.5 | 19.7 | 18.7 | 18.1 | 17.8 | 17.1 | 16.7 | 16.1 | 17.2 | 20.7 |
| 5-Aug | 15.7 | 15.3 | 14.3 | 13.4 | 12.4 | 11.7 | 12.8 | 15.5 | 18.8 | 20.6 | 22.1 | 23.4 | 24.3 | 24.6 | 24.8 | 25.4 | 25.7 | 24.8 | 23.3 | 22.4 | 20.4 | 18.9 | 17.6 | 16.4 | 19.4 | 25.7 |
| 6-Aug | 16.0 | 15.5 | 15.2 | 15.2 | 13.7 | 13.9 | 15.0 | 16.3 | 16.8 | 16.4 | 15.3 | 13.7 | 13.7 | 14.1 | 13.3 | 13.8 | 13.9 | 14.3 | 14.7 | 14.1 | 13.3 | 12.7 | 12.2 | 11.6 | 14.4 | 16.8 |
| 7-Aug | 11.1 | 10.8 | 10.3 | 9.6 | 9.3 | 10.4 | 11.4 | 12.1 | 12.9 | 13.5 | 15.2 | 16.1 | 16.2 | 17.6 | 17.9 | 18.3 | 18.6 | 19.1 | 19.1 | 17.9 | 16.4 | 14.5 | 13.5 | 12.8 | 14.4 | 19.1 |
| 8-Aug | 10.6 | 10.7 | 10.0 | 8.7 | 8.1 | 8.7 | 10.1 | 12.6 | 15.7 | 18.6 | 20.8 | 21.9 | 22.9 | 23.8 | 24.5 | 24.8 | 24.9 | 25.1 | 24.6 | 23.2 | 20.0 | 18.2 | 16.6 | 15.7 | 17.5 | 25.1 |
| 9-Aug | 14.9 | 14.8 | 13.7 | 11.9 | 11.0 | 10.9 | 11.8 | 15.4 | 18.4 | 20.7 | 23.2 | 25.3 | 26.6 | 27.0 | 27.7 | 27.9 | 27.9 | 28.0 | 27.4 | 24.0 | 22.7 | 21.7 | 20.7 | 19.4 | 20.5 | 28.0 |
| 10-Aug | 19.4 | 19.0 | 17.6 | 16.5 | 15.6 | 15.5 | 16.4 | 19.1 | 21.5 | 22.8 | 24.3 | 25.5 | 26.9 | 27.5 | 28.7 | 28.8 | 27.2 | 25.9 | 23.3 | 22.8 | 21.3 | 19.9 | 17.9 | 17.0 | 21.7 | 28.8 |
| 11-Aug | 15.8 | 14.6 | 13.7 | 12.7 | 12.3 | 12.5 | 12.9 | 15.4 | 19.1 | 22.1 | 24.8 | 26.8 | 27.9 | 28.6 | 28.8 | 29.1 | 28.8 | 28.1 | 27.3 | 25.6 | 23.2 | 21.6 | 19.8 | 18.5 | 21.2 | 29.1 |
| 12-Aug | 17.7 | 16.5 | 15.6 | 15.3 | 14.6 | 14.6 | 16.2 | 18.9 | 22.2 | 25.1 | 27.2 | 28.5 | 29.0 | 29.3 | 29.7 | 29.8 | 29.6 | 29.2 | 28.3 | 26.7 | 24.3 | 22.2 | 20.9 | 19.9 | 23.0 | 29.8 |
| 13-Aug | 18.7 | 17.8 | 16.7 | 16.0 | 15.5 | 15.7 | 17.6 | 20.3 | 22.9 | 25.6 | 27.6 | 28.8 | 29.7 | 30.4 | 30.6 | 30.6 | 30.1 | 29.2 | 28.1 | 26.5 | 24.7 | 23.0 | 21.4 | 20.7 | 23.7 | 30.6 |
| 14-Aug | 20.1 | 19.1 | 18.1 | 18.0 | 17.1 | 17.1 | 17.5 | 19.0 | 20.2 | 21.4 | 21.8 | 22.4 | 22.8 | 22.8 | 21.7 | 19.1 | 17.1 | 16.8 | 16.4 | 16.2 | 15.4 | 14.3 | 13.8 | 13.5 | 18.4 | 22.8 |
| 15-Aug | 13.4 | 13.5 | 13.3 | 13.3 | 13.6 | 13.3 | 13.7 | 14.7 | 15.2 | 15.7 | 16.2 | 16.8 | 17.2 | 18.6 | 20.2 | 20.1 | 18.6 | 17.6 | 16.1 | 15.3 | 15.2 | 15.2 | 15.1 | 14.7 | 15.7 | 20.2 |
| 16-Aug | 13.6 | 12.9 | 12.1 | 11.2 | 10.3 | 10.5 | 10.5 | 11.5 | 13.8 | 16.7 | 19.2 | 21.4 | 22.9 | 23.3 | 23.9 | 24.5 | 24.3 | 23.9 | 23.3 | 20.9 | 18.4 | 17.1 | 16.1 | 15.7 | 17.4 | 24.5 |
| 17-Aug | 15.4 | 15.2 | 14.1 | 13.5 | 12.8 | 11.9 | 12.5 | 15.5 | 16.5 | 17.7 | 20.7 | 23.1 | 24.4 | 25.0 | 25.9 | 26.0 | 24.9 | 25.1 | 24.4 | 22.5 | 20.2 | 18.8 | 19.7 | 19.0 | 19.4 | 26.0 |
| 18-Aug | 18.3 | 16.0 | 14.5 | 16.2 | 15.4 | 14.6 | 14.8 | 16.4 | 20.1 | 21.2 | 22.0 | 23.8 | 24.4 | 23.2 | 21.3 | 19.0 | 20.3 | 20.0 | 20.0 | 19.2 | 19.1 | 18.9 | 18.3 | 17.9 | 19.0 | 24.4 |
| 19-Aug | 17.0 | 16.1 | 14.7 | 13.2 | 12.6 | 11.6 | 12.0 | 12.2 | 14.0 | 12.6 | 13.5 | 14.3 | 15.0 | 15.8 | 14.6 | 13.3 | 11.7 | 12.0 | 13.4 | 14.1 | 13.7 | 12.9 | 12.5 | 12.8 | 13.6 | 17.0 |
| 20-Aug | 13.0 | 13.4 | 12.5 | 11.5 | 10.6 | 10.1 | 10.4 | 11.7 | 13.8 | 16.2 | 18.2 | 19.4 | 19.9 | 20.0 | 20.2 | 19.9 | 19.1 | 19.0 | 18.6 | 17.6 | 16.7 | 15.7 | 14.7 | 13.6 | 15.7 | 20.2 |
| 21-Aug | 12.5 | 11.4 | 10.7 | 10.1 | 9.9 | 9.8 | 10.3 | 12.8 | 15.3 | 18.4 | 19.4 | 20.6 | 22.4 | 22.6 | 22.6 | 23.2 | 23.4 | 22.7 | 22.6 | 20.3 | 18.5 | 16.6 | 15.3 | 14.5 | 16.9 | 23.4 |
| 22-Aug | 12.7 | 11.7 | 11.5 | 10.5 | 10.2 | 10.7 | 11.0 | 11.8 | 12.9 | 15.1 | 17.1 | 18.6 | 20.3 | 21.3 | 22.7 | 23.4 | 22.6 | 22.8 | 22.4 | 20.4 | 18.9 | 17.4 | 13.6 | 13.2 | 16.4 | 23.4 |
| 23-Aug | 14.1 | 14.2 | 13.8 | 13.7 | 12.8 | 12.5 | 13.9 | 16.0 | 18.8 | 20.8 | 21.3 | 22.4 | 20.8 | 22.0 | 23.2 | 22.7 | 22.3 | 22.2 | 21.1 | 20.1 | 19.3 | 18.4 | 17.5 | 18.5 | 23.2 | |
| 24-Aug | 17.0 | 17.0 | 17.1 | 17.1 | 16.0 | 15.5 | 15.6 | 16.0 | 17.5 | 18.7 | 20.4 | 20.1 | 20.2 | 20.4 | 20.0 | 18.2 | 19.6 | 20.6 | 20.6 | 19.7 | 19.0 | 18.8 | 16.4 | 15.7 | 18.2 | 20.6 |
| 25-Aug | 15.2 | 14.4 | 13.1 | 12.1 | 11.7 | 11.4 | 11.1 | 12.0 | 12.7 | 12.5 | 13.4 | 12.8 | 11.6 | 11.4 | 12.4 | 13.2 | 14.2 | 14.8 | 14.6 | 13.8 | 13.8 | 14.9 | 15.4 | 14.6 | 13.2 | 15.4 |
| 26-Aug | 14.3 | 13.7 | 13.0 | 12.7 | 12.4 | 11.9 | 12.1 | 13.1 | 14.7 | 16.7 | 18.6 | 20.5 | 21.8 | 22.7 | 23.5 | 23.4 | 23.6 | 23.0 | 22.1 | 20.2 | 18.9 | 18.4 | 18.9 | 18.7 | 17.9 | 23.6 |
| 27-Aug | 18.1 | 17.5 | 17.3 | 16.7 | 15.8 | 15.2 | 15.6 | 16.4 | 17.5 | 19.1 | 21.0 | 22.3 | 23.2 | 23.9 | 24.4 | 24.4 | 24.2 | 23.7 | 22.7 | 20.7 | 18.9 | 17.6 | 17.5 | 16.4 | 19.6 | 24.4 |
| 28-Aug | 15.6 | 14.5 | 12.8 | 12.4 | 12.0 | 11.7 | 12.5 | 14.0 | 16.3 | 18.7 | 20.6 | 21.5 | 22.3 | 23.0 | 23.2 | 22.8 | 22.3 | 21.6 | 21.2 | 18.9 | 16.7 | 14.9 | 12.9 | 13.1 | 17.3 | 23.2 |
| 29-Aug | 12.4 | 11.1 | 10.5 | 8.7 | 6.7 | 6.9 | 6.2 | 9.1 | 12.6 | 14.7 | 17.5 | 19.5 | 20.9 | 22.0 | 22.3 | 22.4 | 22.2 | 21.6 | 20.8 | 19.4 | 16.8 | 14.4 | 13.4 | 13.1 | 15.2 | 22.4 |
| 30-Aug | 12.6 | 12.8 | 13.0 | 13.0 | 12.4 | 12.1 | 13.1 | 15.4 | 17.1 | 18.3 | 20.8 | 22.9 | 24.7 | 25.7 | 26.3 | 26.6 | 26.6 | 25.9 | 24.6 | 23.0 | 21.5 | 19.9 | 18.7 | 17.7 | 19.4 | 26.6 |
| 31-Aug | 16.5 | 15.3 | 14.5 | 13.9 | 12.7 | 12.5 | 12.3 | 13.1 | 15.0 | 17.2 | 18.4 | 20.8 | 22.1 | 23.7 | 24.8 | 24.6 | 24.5 | 23.3 | 22.3 | 20.2 | 18.5 | 17.8 | 17.0 | 16.3 | 18.2 | 24.8 |
| | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | |
| | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | |





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Buffalo Viewpoint - August 2017**

| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 17 | 2.28 | 2.28 |
| 10 - 20 | 468 | 62.90 | 65.19 |
| > 20 | 259 | 34.81 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744

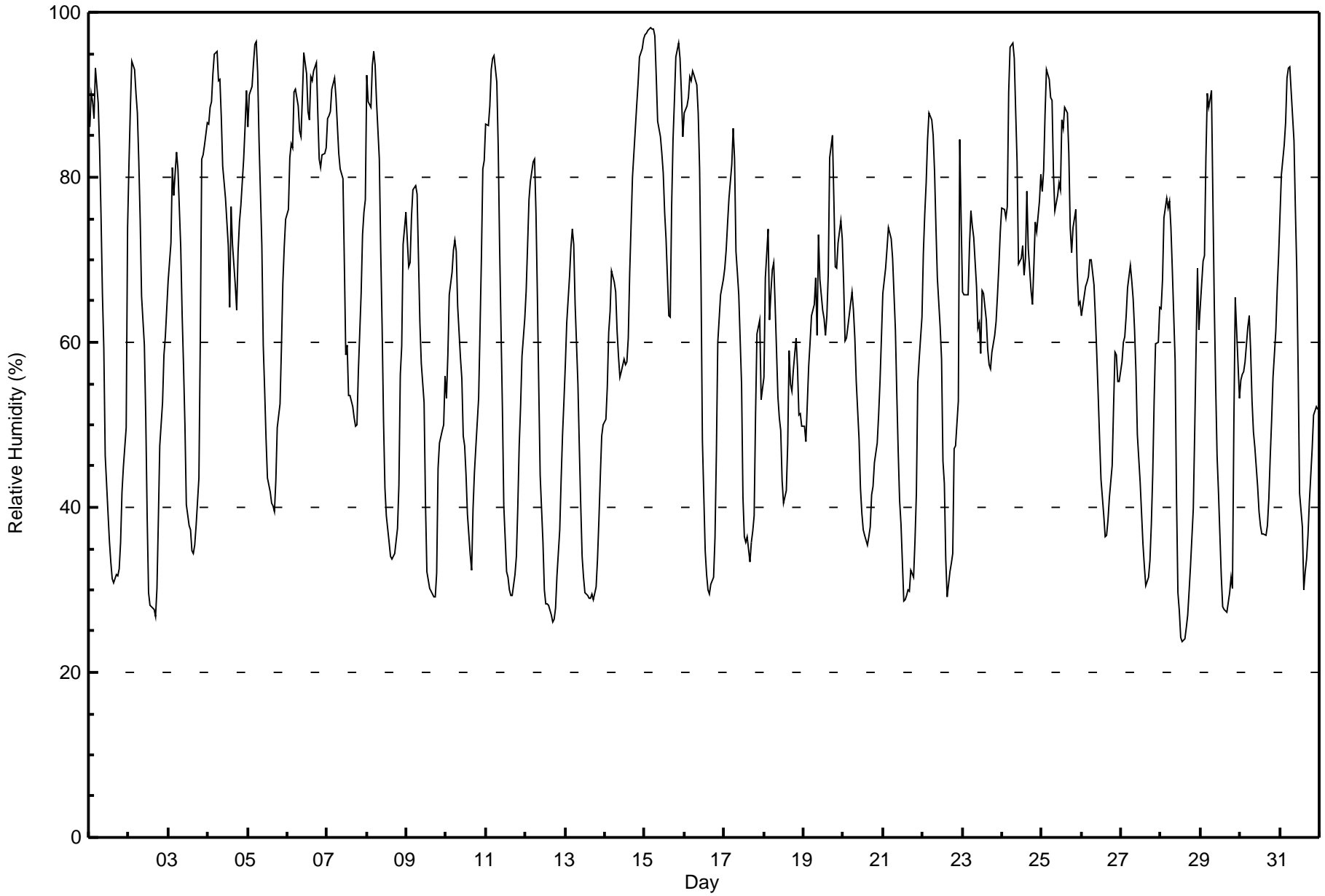


Wood Buffalo Environmental Association

Summary of Hour Averages

**Relative Humidity (RH) - %
Buffalo Viewpoint - August 2017**

| Maximum Value: 98 % on Aug 15 04:00 Maximum Daily Average: 87.3 % on Aug 15 | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|---------------|---------------|
| Minimum Value: 24 % on Aug 28 14:00 Minimum Daily Average: 45.7 % on Aug 13 Maximum Diurnal Average: 82.3 % at hour 6 Minimum Diurnal Average: 43.6 % at hour 15 Monthly Average: 61.9 % Percentiles: P ₁ = 27 P ₁₀ = 32 Q ₁ = 45 Median = 63 O ₃ = 78 P ₉₀ = 89 P ₉₉ = 97 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 86 | 90 | 89 | 87 | 93 | 89 | 83 | 75 | 66 | 59 | 46 | 39 | 36 | 33 | 31 | 31 | 32 | 32 | 32 | 36 | 42 | 45 | 50 | 74 | 57.4 | 93 |
| 2-Aug | 82 | 89 | 94 | 93 | 90 | 88 | 82 | 75 | 66 | 60 | 51 | 39 | 30 | 28 | 28 | 28 | 27 | 30 | 38 | 47 | 53 | 59 | 61 | 64 | 58.3 | 94 |
| 3-Aug | 67 | 72 | 81 | 78 | 80 | 83 | 81 | 71 | 63 | 57 | 50 | 40 | 38 | 37 | 35 | 34 | 35 | 38 | 43 | 60 | 82 | 83 | 84 | 87 | 61.8 | 87 |
| 4-Aug | 87 | 88 | 89 | 92 | 95 | 95 | 92 | 92 | 87 | 81 | 78 | 75 | 72 | 64 | 76 | 72 | 67 | 64 | 71 | 75 | 77 | 82 | 86 | 90 | 81.1 | 95 |
| 5-Aug | 86 | 90 | 91 | 94 | 96 | 97 | 93 | 84 | 72 | 60 | 54 | 48 | 44 | 42 | 40 | 40 | 39 | 43 | 50 | 53 | 59 | 67 | 72 | 75 | 66.2 | 97 |
| 6-Aug | 76 | 82 | 84 | 84 | 90 | 91 | 89 | 86 | 85 | 90 | 95 | 93 | 88 | 87 | 92 | 92 | 93 | 94 | 88 | 82 | 81 | 83 | 83 | 84 | 87.1 | 95 |
| 7-Aug | 87 | 87 | 88 | 91 | 92 | 90 | 86 | 83 | 81 | 80 | 70 | 59 | 60 | 53 | 54 | 52 | 51 | 50 | 50 | 56 | 66 | 73 | 76 | 77 | 71.3 | 92 |
| 8-Aug | 92 | 89 | 88 | 94 | 95 | 94 | 89 | 82 | 71 | 62 | 50 | 42 | 39 | 36 | 34 | 34 | 34 | 34 | 38 | 43 | 56 | 59 | 72 | 76 | 62.7 | 95 |
| 9-Aug | 72 | 69 | 70 | 75 | 79 | 79 | 78 | 70 | 62 | 57 | 53 | 40 | 32 | 31 | 30 | 30 | 29 | 29 | 32 | 45 | 48 | 49 | 50 | 56 | 52.8 | 79 |
| 10-Aug | 53 | 58 | 66 | 68 | 71 | 72 | 71 | 64 | 58 | 56 | 49 | 47 | 44 | 39 | 34 | 32 | 40 | 44 | 47 | 53 | 61 | 70 | 81 | 82 | 56.8 | 82 |
| 11-Aug | 86 | 86 | 89 | 93 | 94 | 95 | 92 | 84 | 72 | 62 | 52 | 40 | 32 | 32 | 30 | 29 | 29 | 32 | 34 | 40 | 48 | 52 | 58 | 63 | 59.3 | 95 |
| 12-Aug | 66 | 72 | 77 | 80 | 82 | 82 | 76 | 66 | 55 | 44 | 36 | 30 | 28 | 28 | 28 | 27 | 26 | 26 | 28 | 32 | 37 | 43 | 49 | 53 | 48.8 | 82 |
| 13-Aug | 57 | 62 | 68 | 72 | 74 | 72 | 65 | 55 | 47 | 40 | 34 | 32 | 30 | 29 | 29 | 30 | 29 | 30 | 34 | 38 | 44 | 49 | 50 | 50 | 45.7 | 74 |
| 14-Aug | 51 | 55 | 61 | 64 | 69 | 67 | 66 | 61 | 58 | 56 | 56 | 58 | 57 | 58 | 61 | 68 | 80 | 83 | 86 | 89 | 91 | 95 | 96 | 97 | 70.1 | 97 |
| 15-Aug | 97 | 98 | 98 | 98 | 98 | 98 | 97 | 92 | 87 | 85 | 83 | 81 | 76 | 72 | 63 | 63 | 76 | 85 | 89 | 95 | 96 | 94 | 90 | 85 | 87.3 | 98 |
| 16-Aug | 88 | 89 | 90 | 92 | 92 | 93 | 92 | 91 | 88 | 81 | 68 | 48 | 35 | 32 | 30 | 30 | 31 | 32 | 36 | 47 | 60 | 63 | 66 | 68 | 64.1 | 93 |
| 17-Aug | 69 | 71 | 74 | 77 | 82 | 86 | 82 | 71 | 68 | 66 | 55 | 41 | 36 | 36 | 37 | 33 | 36 | 37 | 39 | 51 | 61 | 63 | 53 | 54 | 57.5 | 86 |
| 18-Aug | 56 | 68 | 74 | 63 | 66 | 69 | 70 | 65 | 53 | 51 | 49 | 43 | 40 | 42 | 48 | 59 | 55 | 54 | 57 | 61 | 57 | 51 | 51 | 50 | 56.3 | 74 |
| 19-Aug | 50 | 48 | 52 | 57 | 60 | 63 | 65 | 68 | 61 | 73 | 68 | 64 | 63 | 61 | 63 | 68 | 82 | 85 | 77 | 69 | 69 | 72 | 75 | 73 | 66.1 | 85 |
| 20-Aug | 67 | 60 | 61 | 62 | 65 | 66 | 64 | 61 | 55 | 48 | 42 | 39 | 37 | 37 | 35 | 36 | 38 | 42 | 43 | 45 | 48 | 51 | 55 | 61 | 50.8 | 67 |
| 21-Aug | 66 | 69 | 71 | 74 | 73 | 73 | 70 | 62 | 54 | 47 | 41 | 38 | 29 | 29 | 29 | 30 | 30 | 32 | 32 | 36 | 42 | 55 | 58 | 63 | 50.0 | 74 |
| 22-Aug | 71 | 76 | 79 | 85 | 88 | 87 | 85 | 81 | 74 | 68 | 62 | 58 | 46 | 43 | 34 | 29 | 32 | 33 | 34 | 47 | 48 | 53 | 85 | 75 | 61.3 | 88 |
| 23-Aug | 66 | 66 | 66 | 66 | 72 | 76 | 74 | 73 | 67 | 62 | 62 | 59 | 66 | 66 | 63 | 59 | 57 | 57 | 59 | 61 | 63 | 66 | 69 | 73 | 65.3 | 76 |
| 24-Aug | 76 | 76 | 75 | 76 | 90 | 96 | 96 | 94 | 88 | 82 | 69 | 70 | 72 | 68 | 70 | 78 | 71 | 66 | 65 | 69 | 75 | 73 | 77 | 80 | 77.3 | 96 |
| 25-Aug | 78 | 81 | 88 | 93 | 92 | 90 | 89 | 81 | 76 | 78 | 79 | 78 | 87 | 86 | 88 | 88 | 83 | 74 | 71 | 74 | 76 | 68 | 65 | 65 | 80.3 | 93 |
| 26-Aug | 63 | 64 | 67 | 67 | 68 | 70 | 70 | 67 | 63 | 58 | 54 | 48 | 43 | 39 | 36 | 37 | 38 | 41 | 45 | 52 | 59 | 59 | 55 | 55 | 55.0 | 70 |
| 27-Aug | 58 | 60 | 61 | 63 | 67 | 69 | 67 | 65 | 61 | 56 | 49 | 43 | 39 | 36 | 33 | 30 | 32 | 34 | 38 | 44 | 53 | 60 | 60 | 64 | 51.8 | 69 |
| 28-Aug | 64 | 68 | 75 | 77 | 76 | 77 | 74 | 69 | 58 | 41 | 30 | 27 | 24 | 24 | 24 | 25 | 27 | 30 | 33 | 40 | 49 | 59 | 69 | 62 | 50.1 | 77 |
| 29-Aug | 64 | 70 | 70 | 82 | 90 | 88 | 91 | 78 | 65 | 55 | 46 | 42 | 32 | 28 | 28 | 28 | 27 | 30 | 31 | 30 | 50 | 65 | 61 | 53 | 54.4 | 91 |
| 30-Aug | 55 | 56 | 56 | 58 | 62 | 63 | 59 | 53 | 49 | 47 | 43 | 40 | 38 | 37 | 37 | 37 | 38 | 41 | 46 | 51 | 56 | 61 | 66 | 71 | 50.8 | 71 |
| 31-Aug | 75 | 80 | 84 | 87 | 92 | 93 | 93 | 90 | 84 | 76 | 69 | 56 | 42 | 38 | 30 | 32 | 34 | 37 | 41 | 47 | 51 | 52 | 52 | 52 | 62.0 | 93 |
| 71.4 73.9 76.7 78.7 81.7 82.3 80.0 74.5 67.6 62.5 56.2 50.3 46.2 44.2 43.6 43.9 45.1 46.3 48.5 53.6 59.7 63.6 66.9 68.7 | | | | | | | | | | | | | | | | | | Diurnal Average | | | | | | | | |
| 97 98 98 98 98 98 97 94 88 90 95 93 88 87 92 92 93 94 89 95 96 95 96 96 97 | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | | | | |





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Buffalo Viewpoint - August 2017

| | | |
|--|---|--------------------------------|
| Maximum Speed: 32 km/h on Aug 19 15:00 | Maximum Daily Speed Average: 18.4 km/h on Aug 20 | Hours in Service: 744 |
| Minimum Speed Value: 1 km/h on Aug 4 09:00 | Minimum Daily Speed Average: 1.0 km/h on Aug 29 | Hours of Data: 743 |
| Maximum Diurnal Speed Average: 7.3 km/h at hour 15 | Minimum Diurnal Speed Average: 4.0 km/h at hour 7 | Hours of Missing Data: 1 |
| Monthly Average Velocity: 5.0 km/h 226.4 deg | Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 6 Median = 9 Q ₃ = 12 P ₉₀ = 18 P ₉₉ = 24 | Percent Operational Time: 99.9 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | NW6 | WSW2 | NW6 | W5 | WSW4 | WNW5 | WNW7 | NW7 | N8 | NNE8 | NNE11 | NNE9 | NNE12 | NNE12 | N12 | NNE13 | NNE12 | NNE11 | NNE10 | NNE11 | NE6 | ENE5 | ENE4 | SW4 | N5.9 | NNE13 |
| 2-Aug | WSW3 | WSW3 | S5 | SSE7 | SSE8 | S8 | SSE6 | SSE4 | S3 | NW1 | WNW3 | WNW5 | WNW9 | WNW8 | WNW8 | SW7 | WNW9 | WSW7 | SW5 | SSW5 | SW7 | SSW8 | SSW9 | S9 | SW4.2 | WNW9 |
| 3-Aug | S7 | SSE7 | SSE8 | SSE4 | SSE6 | S6 | SSE5 | SE5 | SE4 | SE5 | SW8 | S6 | SSE3 | WSW3 | W1 | SW5 | SSW1 | AF | NNE10 | SE6 | E9 | ENE9 | ESE2 | SSE3.3 | NNE10 | |
| 4-Aug | NE5 | NNW4 | WNW6 | SSE3 | SSE5 | WSW2 | NNW4 | SSW3 | WNW1 | N1 | W3 | NW3 | SE6 | ESE8 | ESE7 | ESE5 | SE7 | S4 | S5 | SSE2 | SW2 | W1 | SSW2 | SE3 | SSE1.3 | ESE8 |
| 5-Aug | N3 | W1 | SSW5 | S6 | S7 | SSE7 | SSE6 | SSE5 | SE5 | SE5 | SSE5 | SSE6 | SSE10 | S9 | SSE10 | S10 | SSW10 | SSE12 | SSW8 | S7 | SSW5 | SSW7 | SSW8 | S8 | S6.3 | SSE12 |
| 6-Aug | S6 | SSE7 | N3 | WSW5 | SSW4 | N5 | NE8 | ENE8 | NNE10 | NNE13 | NNE17 | NNE22 | NNE17 | N18 | NNE13 | N10 | NNE8 | NE5 | NNE8 | NNE10 | N12 | NNE11 | N11 | NNW10 | NNE8.1 | NNE22 |
| 7-Aug | NW10 | NW10 | NW8 | NNW7 | NW8 | NNW7 | N11 | NNE9 | N8 | N8 | NNE10 | NE8 | N4 | NW6 | NNW10 | W10 | WSW8 | WSW7 | WSW6 | SW5 | SW6 | SW8 | SW9 | SSW7 | NW4.2 | N11 |
| 8-Aug | SE9 | SE7 | S7 | S8 | SSE8 | SSE8 | SSE7 | S6 | S6 | SSW5 | WSW8 | W10 | W8 | W8 | W7 | W6 | SW8 | SSW7 | SSW6 | SSW6 | SSE6 | SSE7 | SSE8 | SSE9 | SSW5.2 | W10 |
| 9-Aug | SSE9 | SSE7 | S8 | S8 | SSE9 | SSE9 | SSE7 | S6 | S7 | S7 | SSE6 | SSW6 | SW6 | SW8 | W6 | SW7 | WSW6 | SSW5 | SSW4 | SSW5 | SSW6 | SSW7 | WSW7 | S8 | S5.7 | SSE9 |
| 10-Aug | S4 | ESE5 | S7 | S6 | S7 | SW5 | SE4 | SE6 | ESE2 | NNW5 | NW4 | NNE6 | NNW1 | NNW4 | N7 | NE9 | SE8 | SSE11 | SSE7 | SSW5 | SW3 | WSW5 | SSE4 | S6 | SSE2.2 | SSE11 |
| 11-Aug | S6 | S7 | S8 | S8 | S7 | S7 | SSE8 | SSE6 | SE5 | SE4 | NNE4 | SW3 | SSW10 | S10 | SSW11 | S9 | SSE10 | SSE11 | SSE10 | SSE9 | SSE8 | SSE6 | S5 | SSE6 | S6.8 | SSE11 |
| 12-Aug | SSE6 | SSE6 | S7 | SSE9 | SSE10 | SSE9 | SSE10 | SSE11 | SSE11 | S12 | S15 | S17 | SSW19 | SSW18 | SSW18 | S17 | SSW17 | SSW16 | SSW13 | S10 | S8 | SSE8 | SSE9 | SSE10 | S11.5 | SSW19 |
| 13-Aug | SSE9 | SSE10 | SSE9 | SSE9 | SSE9 | SSE9 | SSE10 | SSE11 | SSE13 | SSE15 | SSE18 | SSE20 | SSE21 | SSE19 | SSE19 | SSE17 | SSE19 | SSE21 | SSE19 | SSE15 | SSE12 | SSE11 | SSE9 | SSE10 | SSE13.9 | SSE21 |
| 14-Aug | SSE8 | SSE8 | SSE8 | SSE10 | SE9 | SSE10 | SSE10 | SSE12 | SSE10 | S9 | S9WSW10 | SW11 | SW11 | WSW14 | WSW13 | WSW9 | WSW7 | S5 | SSE6 | SSE6 | SSE6 | SSE7 | SSE7 | S6.9 | WSW14 | |
| 15-Aug | SSE7 | SSE8 | S7 | SE6 | S6 | S6 | S3 | SW3 | WNW4 | WNW2 | WNW6 | WNW7 | W8 | WNW7 | WNW6 | N3 | ENE7 | E3 | WSW9 | WNW8 | NNW8 | NW8 | WNW9 | WNW9 | W2.6 | WNW9 |
| 16-Aug | WNW10 | W8 | W11 | WNW7 | W7 | WNW10 | SSW5 | SSW5 | SSE6 | SSE5 | SW6 | WSW7 | WSW10 | W10 | W9 | W6 | W9 | WSW10 | WSW8 | WSW8 | SW9 | SW10 | SW9 | SSW6 | WSW6.5 | W11 |
| 17-Aug | WNW4 | WNW11 | WSW6 | SW6 | S5 | S6 | SSE5 | WSW6 | SW7 | WSW7 | WSW7 | W9 | WSW8 | WSW9 | WSW11 | W8 | W11 | W9 | WSW5 | SSW6 | SSW7 | SSW9 | WSW15 | WSW15 | WSW7.0 | WSW15 |
| 18-Aug | WSW11 | S8 | SSE9 | SW13 | SW12 | SSW9 | SSW9 | SSW10 | SW12 | SW11 | SW11 | SW16 | WSW20 | WSW24 | WSW22 | SW21 | SSW16 | SW16 | SW14 | SW15 | SW18 | SW18 | SW15 | SW17 | SW13.5 | WSW24 |
| 19-Aug | WSW16 | WSW18 | W18 | WSW15 | W18 | WSW17 | WSW15 | WSW14 | WSW21 | WSW19 | W25 | W27 | W26 | W25 | WNW32 | WNW26 | WNW16 | W13 | W12 | WNW13 | W9 | W9 | WSW8 | WSW11 | W16.8 | WNW32 |
| 20-Aug | WSW11 | WSW16 | WSW17 | WSW20 | WSW18 | W19 | W19 | W15 | W16 | W20 | W21 | W23 | WNW21 | WNW20 | WNW23 | W30 | W28 | W21 | WNW15 | WNW12 | W13 | W18 | W18 | W15 | W18.4 | W30 |
| 21-Aug | W9 | WSW6 | W9 | WNW10 | W13 | W13 | W13 | WSW8 | SW7 | WSW6 | W15 | WSW12 | W17 | W18 | W18 | W13 | W15 | W12 | W13 | WSW10 | W8 | WNW7 | N10 | N11 | W10.2 | W18 |
| 22-Aug | N12 | N11 | N11 | N8 | N8 | N8 | NNE7 | NNE6 | N3 | WNW4 | NNW3 | WNW5 | N3 | WSW4 | SW2 | W6 | NW5 | NW2 | ENE3 | SSE3 | ESE4 | E6 | S5 | S5 | N3.0 | N12 |
| 23-Aug | SSE2 | S4 | SSE5 | SSE5 | SSE6 | SSE6 | S7 | SSE7 | SSE10 | SSE12 | SSE11 | SSW12 | SSW9 | S10 | SSE11 | SSE12 | SSE14 | SSE12 | SSE11 | SSE13 | SSE11 | SSE8 | SSE9 | SSE10 | SSE8.9 | SSE14 |
| 24-Aug | S10 | SSE10 | SSE11 | SSE13 | SSE8 | SE7 | SE5 | S4 | SSE9 | SE8 | SE12 | ESE8 | S3 | SE6 | SE10 | SE3 | SE5 | SSE5 | S5 | SSW5 | SW10 | WSW12 | SW12 | SSE6.3 | SSE13 | |
| 25-Aug | SW13 | SW11 | SW9 | SSW9 | SSW10 | SSW10 | SSW9 | SSW14 | SW17 | SW15 | SSW15 | SW16 | WSW20 | WSW25 | SW22 | WSW24 | WSW24 | WSW23 | WSW20 | WSW13 | SW9 | WSW17 | WSW18 | WSW16 | SSW15.0 | WSW25 |
| 26-Aug | WSW20 | WSW18 | WSW18 | WSW20 | WSW21 | WSW18 | SW7 | W14 | W11 | WSW10 | SW11 | SW11 | WSW16 | WSW17 | WSW16 | WSW16 | WSW14 | WSW14 | SW13 | SW10 | SW9 | SW11 | SW13 | SW12 | WSW13.9 | WSW21 |
| 27-Aug | SW13 | WSW14 | WSW15 | WSW16 | WSW17 | WSW16 | WSW19 | W24 | W23 | W21 | W21 | W23 | W24 | W23 | W22 | W21 | WNW19 | W16 | WNW9 | W7 | SW6 | WNW5 | WSW6 | SW6 | W15.4 | W24 |
| 28-Aug | WNW7 | WNW6 | SW6 | WSW8 | W8 | W7 | SW4 | SSW3 | WSW7 | NW10 | WNW14 | WNW15 | WNW15 | WNW15 | WNW17 | WNW17 | NW16 | NW13 | NW10 | NW8 | WNW6 | W5 | WSW6 | W5 | WNW8.6 | WNW17 |
| 29-Aug | WSW5 | W6 | W5 | SSW4 | SSW4 | SW3 | S5 | S3 | SW1 | SSW4 | W3 | NNE6 | NNE8 | NNW7 | NNE9 | NNE8 | E3 | SE7 | ESE5 | E8 | SE6 | SSE5 | SSE7 | SSE7 | SE1.0 | NNE9 |
| 30-Aug | SSE8 | SSE10 | SSE10 | SSE10 | SSE10 | SSE11 | SSE12 | SSE14 | SSE17 | SSE16 | SSE17 | SSE18 | SSE17 | SSE19 | SSE19 | SSE19 | SSE18 | SSE15 | SSE12 | S12 | S10 | S11 | S10 | S12 | SSE13.6 | SSE19 |
| 31-Aug | SSE9 | S6 | S6 | S6 | S7 | SSE6 | S7 | S9 | SSE8 | SSW8 | SSW9 | SW9 | WSW13 | WSW17 | W25 | W23 | W21 | W18 | W19 | W15 | WSW11 | WSW13 | WSW15 | WSW17 | WSW9.8 | W25 |

| | | | | | | |
|-------------------------------|---------------------|----------------------------|-----------------------------------|---------------------------------|--------------------------|-----------------|
| SW4.4 SW4.2 SW4.9 | SSW5.3 SSW5.7 SW4.8 | SSW4.0 SSW4.3 SSW4.2 SW4.0 | SW4.5 WSW5.6 WSW6.7 WSW7.3 WSW7.3 | WSW6.5 WSW6.4 SW5.7 SW5.3 SW4.0 | SSW4.3 SW4.9 SW5.3 SW5.8 | Diurnal Average |
| WSW20 WSW18 WSW18 WSW20 WSW21 | W19 W19 W24 W23 W21 | W25 W27 W26 W25 | WNW32 W30 W28 | WSW23 WSW20 SW15 SW18 | W18 WSW18 WSW17 | Diurnal Maximum |

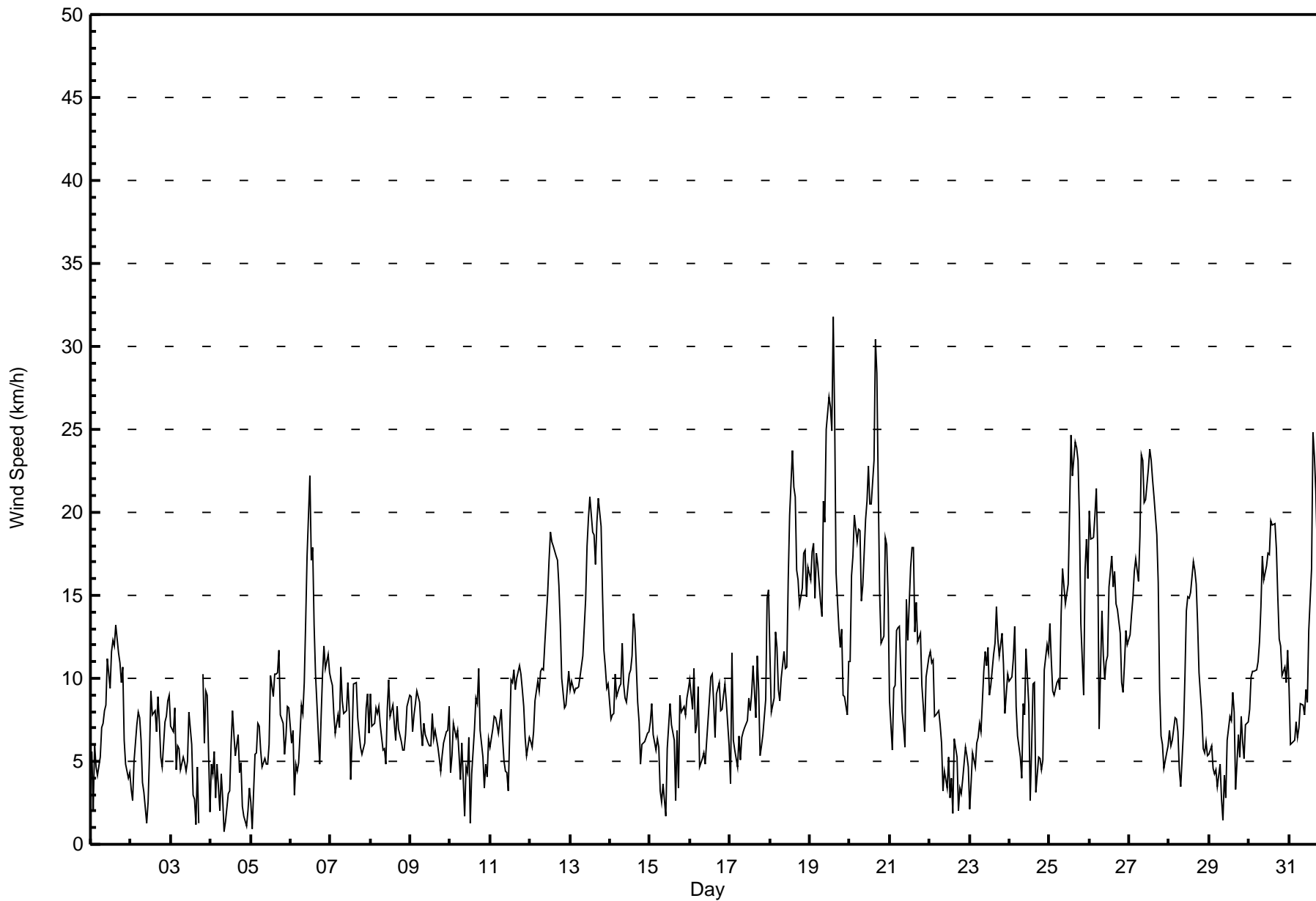
AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Buffalo Viewpoint - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Aug 19 15:00 Minimum Value: 1 km/h on Aug 2 06:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 7 | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9 | | | | | | | |
|--|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|--|----|----|----|----|----|----|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 3 | 2 | 3 | 3 | 4 | 5 | 4 | 4 | 4 | 4 | 3 | 2 | 1 | 1 | 2 | 2 | 5 |
| 2-Aug | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 4 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 4 |
| 3-Aug | 1 | 1 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 1 | AF | 7 | 3 | 3 | 2 | 2 | 7 | |
| 4-Aug | 2 | 2 | 2 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | |
| 5-Aug | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 4 | 3 | 4 | 3 | 2 | 1 | 1 | 1 | 4 | |
| 6-Aug | 2 | 2 | 2 | 2 | 3 | 4 | 2 | 2 | 3 | 3 | 4 | 5 | 4 | 4 | 3 | 2 | 2 | 2 | 4 | 2 | 2 | 2 | 2 | 5 | |
| 7-Aug | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 3 | |
| 8-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 4 | |
| 9-Aug | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 2 | 3 | |
| 10-Aug | 3 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 3 | 3 | 3 | 1 | 2 | 1 | 2 | 4 | |
| 11-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 1 | 2 | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 2 | 2 | 1 | 1 | 4 | |
| 12-Aug | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 4 | 5 | 5 | 5 | 6 | 5 | 5 | 4 | 4 | 3 | 2 | 2 | 2 | 6 | |
| 13-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 5 | 6 | 6 | 7 | 6 | 6 | 5 | 6 | 6 | 6 | 5 | 3 | 2 | 2 | 7 | |
| 14-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 2 | 2 | 1 | 2 | 4 | |
| 15-Aug | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 3 | |
| 16-Aug | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 4 | |
| 17-Aug | 3 | 4 | 3 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 4 | 2 | 2 | 1 | 1 | 1 | 4 | 4 | |
| 18-Aug | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 5 | 6 | 7 | 6 | 6 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 7 | |
| 19-Aug | 4 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 5 | 6 | 6 | 6 | 7 | 7 | 9 | 7 | 4 | 4 | 5 | 3 | 2 | 2 | 2 | 9 | |
| 20-Aug | 3 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 6 | 6 | 6 | 6 | 8 | 6 | 5 | 5 | 3 | 3 | 4 | 4 | 8 | |
| 21-Aug | 3 | 2 | 4 | 2 | 3 | 3 | 3 | 2 | 2 | 3 | 4 | 3 | 5 | 5 | 4 | 4 | 4 | 2 | 3 | 2 | 1 | 1 | 2 | 5 | |
| 22-Aug | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 1 | 1 | 2 | 1 | 2 | 1 | 3 | |
| 23-Aug | 2 | 1 | 1 | 2 | 2 | 1 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 5 | 3 | 3 | 4 | 3 | 2 | 2 | 5 | |
| 24-Aug | 2 | 2 | 3 | 4 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 4 | 6 | 3 | 4 | 3 | 2 | 1 | 2 | 6 | 5 | 6 | |
| 25-Aug | 4 | 3 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 8 | 7 | 6 | 7 | 6 | 6 | 6 | 3 | 5 | 5 | 8 | |
| 26-Aug | 5 | 4 | 5 | 5 | 5 | 6 | 3 | 5 | 4 | 3 | 3 | 3 | 5 | 5 | 4 | 5 | 4 | 5 | 4 | 1 | 1 | 2 | 3 | 6 | |
| 27-Aug | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 4 | 5 | 4 | 5 | 6 | 6 | 6 | 5 | 5 | 5 | 4 | 3 | 2 | 1 | 1 | 1 | 6 | |
| 28-Aug | 3 | 2 | 1 | 2 | 3 | 3 | 2 | 2 | 2 | 3 | 4 | 4 | 5 | 5 | 4 | 5 | 4 | 4 | 2 | 2 | 1 | 1 | 1 | 5 | |
| 29-Aug | 2 | 2 | 1 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 3 | |
| 30-Aug | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 5 | 4 | 3 | 3 | 3 | 2 | 6 | |
| 31-Aug | 3 | 1 | 1 | 1 | 1 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 4 | 5 | 6 | 6 | 6 | 4 | 5 | 4 | 2 | 3 | 4 | 6 | |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |
| AF - Analyzer Failure | | | | | | | | | | | | | | | | | | | | | | | | | |





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Buffalo Viewpoint - August 2017**

| Wind Speed Ranges (km/h) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 5 | 143 | 19.25 | 19.25 |
| 6 - 11 | 392 | 52.76 | 72.01 |
| 12 - 19 | 161 | 21.67 | 93.67 |
| 20 - 28 | 45 | 6.06 | 99.73 |
| 29 - 38 | 2 | 0.27 | 100.00 |
| > 38 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 743

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Buffalo Viewpoint - August 2017**

| Wind Speed Ranges (km/h) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-----------------------------|----------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 5 | 8 | 1 | 2 | 3 | 2 | 6 | 13 | 18 | 16 | 20 | 13 | 11 | 9 | 10 | 5 | 6 | 143 |
| 6 - 11 | 13 | 22 | 4 | 3 | 3 | 4 | 15 | 101 | 55 | 29 | 35 | 37 | 30 | 25 | 11 | 5 | 392 |
| 12 - 19 | 4 | 8 | 0 | 0 | 0 | 0 | 1 | 31 | 6 | 10 | 20 | 40 | 27 | 12 | 2 | 0 | 161 |
| 20 - 28 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 2 | 14 | 21 | 4 | 0 | 0 | 45 |
| 29 - 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 2 |
| > 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 25 | 32 | 6 | 6 | 5 | 10 | 29 | 153 | 77 | 59 | 70 | 102 | 88 | 52 | 18 | 11 | 743 |

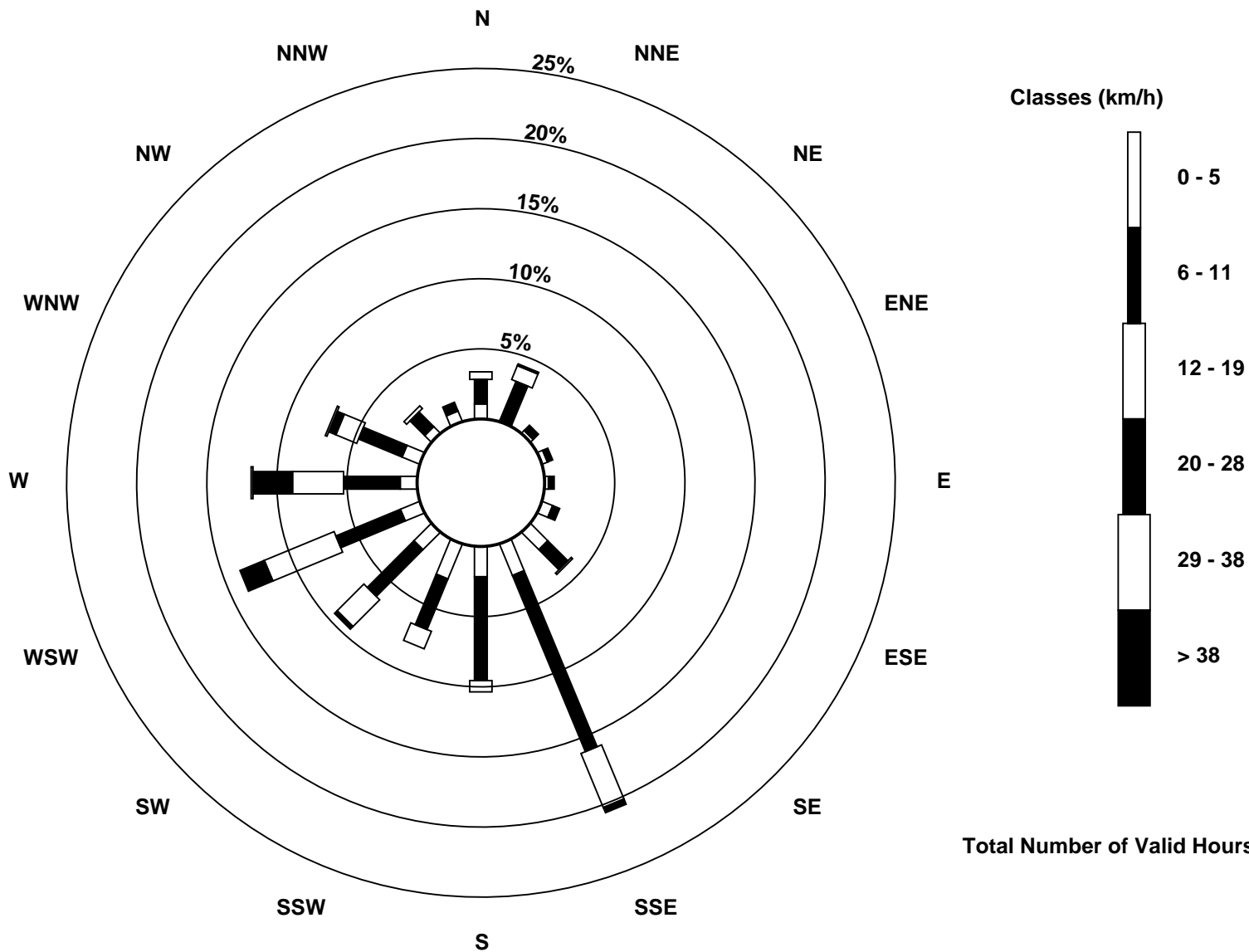
Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Wind Speed (WS) - km/h
Buffalo Viewpoint (AMS 4)



Total Number of Valid Hours: 743



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Buffalo Viewpoint - August 2017

| | | | |
|---|--|---------------------------|------|
| Direction of Maximum Speed: 291 deg on Aug 19 15:00 | | Hours in Service: | 744 |
| Direction of Maximum Daily Speed Average: 270.3 deg on Aug 20 | | Hours of Data: | 743 |
| Direction of Minimum Speed: 283 deg on Aug 4 09:00 | | Hours of Missing Data: | 1 |
| Direction of Minimum Daily Speed Average: 1.0 deg on Aug 29 | | Percent Operational Time: | 99.9 |
| Monthly Average Direction: 230.9 deg | | | |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average |
|--------|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 309 | 257 | 311 | 279 | 243 | 288 | 297 | 315 | 11 | 21 | 13 | 18 | 25 | 14 | 10 | 18 | 29 | 27 | 33 | 30 | 47 | 57 | 77 | 233 | 7.6 |
| 2-Aug | 252 | 251 | 180 | 162 | 168 | 170 | 158 | 164 | 183 | 305 | 295 | 285 | 283 | 283 | 234 | 283 | 257 | 227 | 201 | 222 | 206 | 203 | 184 | 223.3 | |
| 3-Aug | 185 | 154 | 148 | 159 | 166 | 176 | 165 | 136 | 138 | 143 | 146 | 221 | 189 | 148 | 242 | 276 | 224 | 200 | AF | 22 | 136 | 84 | 64 | 119 | 149.7 |
| 4-Aug | 40 | 340 | 282 | 149 | 162 | 252 | 344 | 195 | 283 | 354 | 269 | 309 | 139 | 122 | 107 | 111 | 146 | 181 | 191 | 149 | 229 | 268 | 193 | 141 | 153.9 |
| 5-Aug | 357 | 262 | 201 | 179 | 170 | 162 | 167 | 152 | 140 | 142 | 155 | 163 | 163 | 174 | 152 | 186 | 194 | 166 | 204 | 176 | 195 | 194 | 196 | 188 | 175.0 |
| 6-Aug | 174 | 152 | 351 | 250 | 198 | 11 | 45 | 68 | 20 | 12 | 18 | 14 | 22 | 9 | 12 | 7 | 12 | 35 | 28 | 22 | 10 | 13 | 3 | 338 | 16.5 |
| 7-Aug | 324 | 326 | 326 | 331 | 326 | 334 | 10 | 16 | 8 | 8 | 19 | 39 | 8 | 313 | 291 | 266 | 254 | 247 | 238 | 226 | 226 | 224 | 218 | 203 | 311.7 |
| 8-Aug | 140 | 145 | 171 | 170 | 158 | 156 | 153 | 172 | 181 | 208 | 257 | 272 | 260 | 264 | 261 | 261 | 228 | 209 | 201 | 193 | 167 | 168 | 152 | 152 | 193.4 |
| 9-Aug | 150 | 147 | 177 | 169 | 156 | 160 | 164 | 191 | 185 | 174 | 159 | 202 | 226 | 236 | 271 | 225 | 238 | 210 | 208 | 198 | 193 | 210 | 253 | 175 | 190.8 |
| 10-Aug | 170 | 110 | 182 | 170 | 173 | 227 | 136 | 134 | 116 | 336 | 305 | 20 | 328 | 345 | 4 | 42 | 145 | 149 | 168 | 193 | 222 | 245 | 163 | 171 | 158.0 |
| 11-Aug | 189 | 174 | 169 | 173 | 172 | 191 | 152 | 153 | 143 | 142 | 18 | 221 | 198 | 178 | 206 | 172 | 158 | 147 | 155 | 161 | 164 | 166 | 178 | 168 | 169.4 |
| 12-Aug | 167 | 167 | 173 | 158 | 158 | 157 | 156 | 162 | 164 | 179 | 190 | 184 | 199 | 198 | 193 | 186 | 198 | 202 | 196 | 187 | 172 | 165 | 164 | 162 | 180.8 |
| 13-Aug | 165 | 165 | 165 | 163 | 160 | 159 | 157 | 153 | 154 | 150 | 150 | 154 | 159 | 156 | 157 | 155 | 147 | 151 | 159 | 162 | 160 | 156 | 154 | 156 | 156.2 |
| 14-Aug | 156 | 152 | 151 | 148 | 145 | 155 | 161 | 162 | 166 | 173 | 182 | 243 | 220 | 224 | 247 | 248 | 240 | 251 | 188 | 151 | 158 | 154 | 164 | 160 | 185.6 |
| 15-Aug | 162 | 160 | 172 | 145 | 187 | 175 | 182 | 217 | 287 | 284 | 288 | 282 | 270 | 287 | 289 | 5 | 62 | 97 | 240 | 291 | 344 | 319 | 293 | 294 | 260.9 |
| 16-Aug | 285 | 277 | 273 | 289 | 270 | 289 | 206 | 194 | 152 | 161 | 215 | 239 | 248 | 272 | 271 | 280 | 261 | 254 | 246 | 237 | 218 | 220 | 214 | 206 | 248.0 |
| 17-Aug | 302 | 282 | 253 | 222 | 180 | 191 | 168 | 255 | 233 | 251 | 255 | 266 | 248 | 247 | 239 | 263 | 266 | 264 | 256 | 201 | 194 | 200 | 249 | 255 | 244.1 |
| 18-Aug | 241 | 173 | 150 | 235 | 218 | 195 | 194 | 202 | 223 | 228 | 221 | 230 | 245 | 257 | 243 | 215 | 206 | 221 | 216 | 216 | 227 | 230 | 225 | 232 | 223.6 |
| 19-Aug | 239 | 250 | 260 | 255 | 261 | 257 | 249 | 241 | 257 | 250 | 260 | 269 | 271 | 279 | 291 | 303 | 291 | 276 | 276 | 290 | 277 | 261 | 248 | 256 | 267.4 |
| 20-Aug | 242 | 255 | 253 | 257 | 257 | 266 | 267 | 264 | 268 | 267 | 275 | 279 | 287 | 291 | 282 | 272 | 265 | 268 | 285 | 286 | 279 | 266 | 272 | 275 | 270.3 |
| 21-Aug | 273 | 245 | 262 | 296 | 270 | 278 | 269 | 257 | 224 | 248 | 259 | 243 | 261 | 271 | 269 | 275 | 273 | 267 | 271 | 257 | 266 | 296 | 353 | 358 | 271.3 |
| 22-Aug | 8 | 4 | 6 | 4 | 358 | 11 | 16 | 23 | 7 | 290 | 332 | 293 | 5 | 242 | 232 | 271 | 313 | 309 | 67 | 162 | 114 | 79 | 189 | 189 | 356.0 |
| 23-Aug | 164 | 178 | 163 | 159 | 160 | 166 | 170 | 165 | 167 | 166 | 165 | 199 | 193 | 178 | 162 | 161 | 162 | 160 | 157 | 153 | 161 | 162 | 161 | 164 | 166.1 |
| 24-Aug | 170 | 162 | 156 | 162 | 164 | 138 | 134 | 171 | 149 | 135 | 128 | 116 | 184 | 143 | 128 | 132 | 128 | 140 | 163 | 185 | 211 | 225 | 253 | 229 | 162.2 |
| 25-Aug | 231 | 225 | 222 | 202 | 208 | 208 | 192 | 212 | 215 | 221 | 210 | 215 | 240 | 249 | 236 | 246 | 254 | 258 | 258 | 250 | 231 | 241 | 244 | 242 | 234.2 |
| 26-Aug | 252 | 250 | 248 | 251 | 252 | 253 | 236 | 263 | 270 | 239 | 226 | 235 | 239 | 258 | 247 | 248 | 245 | 250 | 236 | 232 | 216 | 220 | 228 | 233 | 244.8 |
| 27-Aug | 235 | 238 | 247 | 249 | 254 | 252 | 256 | 269 | 269 | 266 | 262 | 261 | 271 | 272 | 269 | 281 | 286 | 281 | 291 | 263 | 233 | 284 | 257 | 231 | 263.6 |
| 28-Aug | 287 | 300 | 226 | 250 | 267 | 267 | 231 | 199 | 258 | 304 | 295 | 295 | 297 | 287 | 302 | 301 | 308 | 316 | 315 | 323 | 292 | 265 | 247 | 267 | 289.0 |
| 29-Aug | 252 | 269 | 267 | 200 | 198 | 223 | 179 | 177 | 219 | 207 | 266 | 26 | 24 | 334 | 15 | 18 | 82 | 139 | 112 | 99 | 124 | 149 | 152 | 164 | 141.6 |
| 30-Aug | 158 | 156 | 153 | 152 | 149 | 154 | 153 | 152 | 151 | 152 | 153 | 156 | 150 | 152 | 158 | 157 | 166 | 160 | 165 | 185 | 183 | 170 | 169 | 171 | 158.5 |
| 31-Aug | 168 | 170 | 172 | 177 | 177 | 160 | 170 | 174 | 167 | 210 | 207 | 216 | 238 | 249 | 266 | 266 | 273 | 278 | 269 | 260 | 244 | 245 | 252 | 256 | 239.0 |

220.7 216.0 216.2 211.1 209.5 214.7 196.9 202.0 208.4 219.9 232.8 244.4 243.6 252.5 254.1 249.4 240.3 229.7 226.6 218.4 210.8 217.2 222.6 217.3
 Diurnal Average

AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

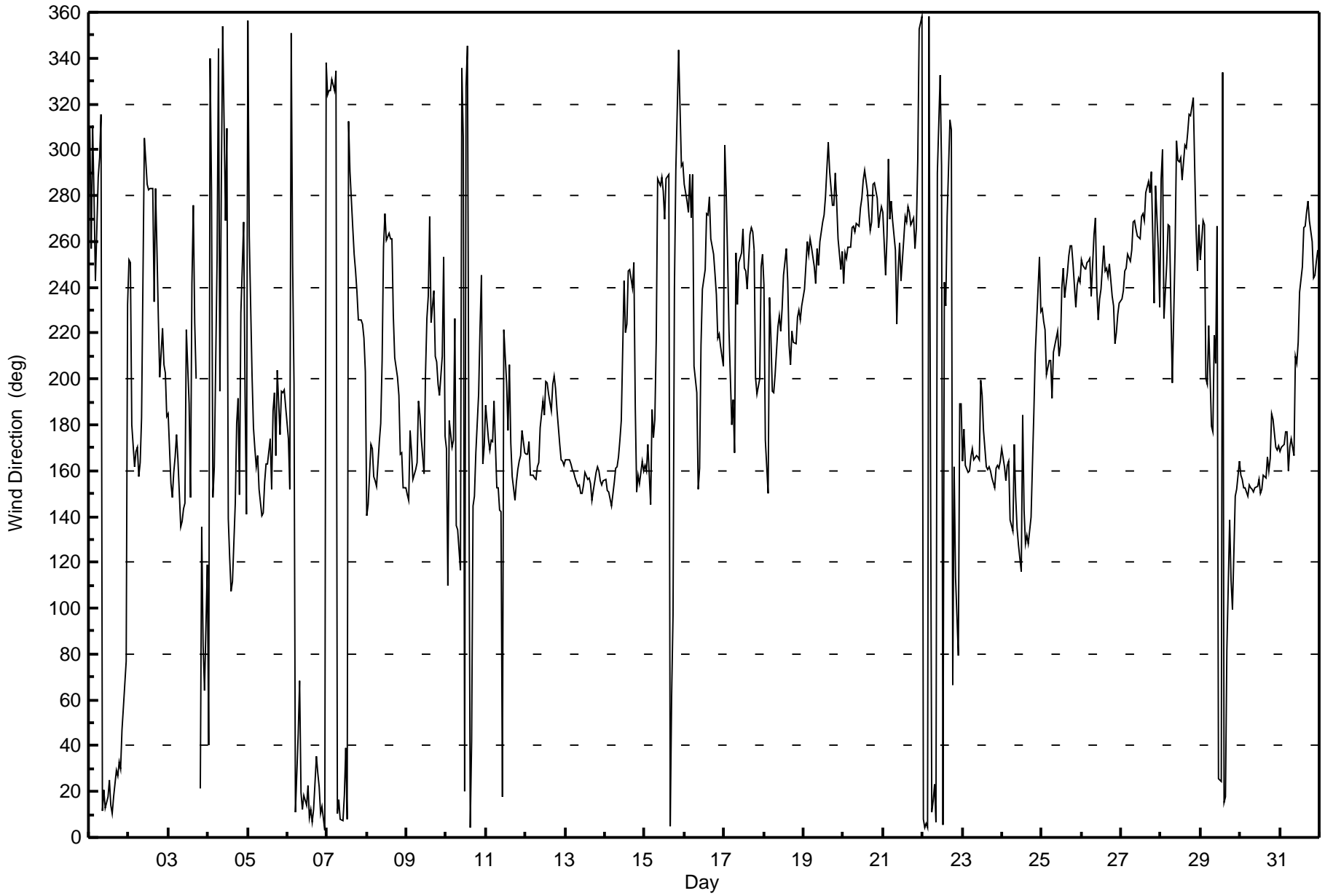
Wind Direction (WD) - deg
Buffalo Viewpoint - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 101 deg on Aug 22 15:00 Minimum Value: 7 deg on Aug 2 05:00 Percentiles: P ₁ = 9 P ₁₀ = 14 Q ₁ = 17 Median = 22 Q ₃ = 29 P ₉₀ = 46 P ₉₉ = 81 | | Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9 | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|--|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|----|----|----|----|----|----|----|----|---------------|--|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 14 | 59 | 15 | 40 | 20 | 16 | 20 | 24 | 24 | 19 | 25 | 30 | 27 | 32 | 31 | 28 | 28 | 25 | 21 | 14 | 13 | 9 | 51 | 49 | 59 | |
| 2-Aug | 32 | 25 | 23 | 11 | 7 | 10 | 18 | 31 | 47 | 84 | 80 | 54 | 35 | 57 | 45 | 43 | 28 | 23 | 19 | 11 | 14 | 10 | 12 | 13 | 84 | |
| 3-Aug | 18 | 26 | 16 | 17 | 16 | 15 | 21 | 26 | 37 | 43 | 58 | 36 | 52 | 75 | 80 | 91 | 31 | 50 | AF | 78 | 41 | 23 | 17 | 82 | 91 | |
| 4-Aug | 44 | 17 | 34 | 67 | 39 | 65 | 36 | 46 | 75 | 74 | 49 | 65 | 29 | 37 | 21 | 25 | 29 | 27 | 19 | 45 | 59 | 68 | 56 | 74 | 75 | |
| 5-Aug | 70 | 82 | 25 | 16 | 18 | 12 | 15 | 28 | 32 | 47 | 53 | 51 | 35 | 37 | 31 | 41 | 26 | 29 | 24 | 21 | 17 | 12 | 8 | 9 | 82 | |
| 6-Aug | 33 | 15 | 82 | 35 | 47 | 39 | 20 | 22 | 29 | 18 | 17 | 18 | 18 | 18 | 21 | 17 | 27 | 32 | 18 | 16 | 14 | 14 | 17 | 82 | | |
| 7-Aug | 11 | 13 | 12 | 12 | 11 | 16 | 16 | 17 | 19 | 23 | 22 | 32 | 58 | 48 | 26 | 27 | 36 | 25 | 19 | 12 | 9 | 16 | 12 | 27 | 58 | |
| 8-Aug | 9 | 9 | 17 | 15 | 16 | 8 | 13 | 22 | 29 | 49 | 34 | 37 | 43 | 38 | 56 | 53 | 30 | 22 | 19 | 12 | 21 | 12 | 10 | 9 | 56 | |
| 9-Aug | 13 | 18 | 18 | 16 | 12 | 8 | 10 | 21 | 28 | 35 | 40 | 47 | 57 | 50 | 53 | 52 | 40 | 27 | 19 | 24 | 13 | 27 | 27 | 23 | 57 | |
| 10-Aug | 77 | 47 | 26 | 23 | 24 | 34 | 53 | 23 | 97 | 44 | 60 | 40 | 95 | 66 | 44 | 37 | 31 | 24 | 23 | 19 | 48 | 36 | 37 | 19 | 97 | |
| 11-Aug | 24 | 12 | 15 | 10 | 12 | 18 | 14 | 20 | 33 | 40 | 57 | 86 | 31 | 35 | 24 | 37 | 29 | 25 | 24 | 22 | 21 | 18 | 16 | 86 | | |
| 12-Aug | 15 | 19 | 24 | 23 | 22 | 22 | 22 | 24 | 24 | 26 | 24 | 26 | 24 | 23 | 23 | 27 | 22 | 21 | 21 | 21 | 21 | 21 | 21 | 20 | 27 | |
| 13-Aug | 21 | 22 | 22 | 22 | 22 | 21 | 23 | 24 | 23 | 25 | 26 | 26 | 24 | 27 | 27 | 27 | 25 | 24 | 22 | 23 | 22 | 20 | 19 | 21 | 27 | |
| 14-Aug | 22 | 21 | 21 | 20 | 20 | 24 | 24 | 24 | 25 | 27 | 35 | 30 | 25 | 20 | 19 | 19 | 19 | 21 | 27 | 21 | 21 | 21 | 21 | 21 | 35 | |
| 15-Aug | 22 | 24 | 25 | 24 | 29 | 23 | 41 | 34 | 25 | 67 | 23 | 23 | 18 | 38 | 31 | 67 | 21 | 67 | 26 | 45 | 18 | 26 | 22 | 12 | 67 | |
| 16-Aug | 12 | 12 | 10 | 20 | 16 | 16 | 40 | 35 | 33 | 41 | 32 | 37 | 35 | 36 | 31 | 38 | 31 | 19 | 17 | 14 | 8 | 13 | 13 | 26 | 41 | |
| 17-Aug | 75 | 17 | 30 | 33 | 39 | 13 | 17 | 23 | 17 | 29 | 33 | 26 | 35 | 32 | 21 | 47 | 16 | 16 | 19 | 9 | 11 | 13 | 17 | 15 | 75 | |
| 18-Aug | 18 | 23 | 22 | 17 | 12 | 15 | 17 | 18 | 25 | 19 | 22 | 21 | 22 | 18 | 21 | 19 | 20 | 17 | 17 | 16 | 14 | 14 | 15 | 15 | 25 | |
| 19-Aug | 16 | 18 | 13 | 15 | 13 | 14 | 18 | 18 | 17 | 18 | 15 | 13 | 17 | 18 | 20 | 19 | 19 | 20 | 21 | 20 | 21 | 19 | 17 | 16 | 21 | |
| 20-Aug | 17 | 16 | 16 | 16 | 16 | 13 | 15 | 18 | 16 | 16 | 20 | 21 | 20 | 24 | 22 | 17 | 13 | 13 | 21 | 17 | 17 | 10 | 13 | 16 | 24 | |
| 21-Aug | 20 | 24 | 21 | 18 | 18 | 15 | 13 | 18 | 25 | 46 | 16 | 21 | 21 | 20 | 18 | 28 | 19 | 13 | 15 | 15 | 14 | 21 | 17 | 18 | 46 | |
| 22-Aug | 15 | 15 | 14 | 14 | 17 | 18 | 22 | 28 | 45 | 33 | 56 | 38 | 80 | 64 | 101 | 39 | 25 | 31 | 25 | 67 | 34 | 46 | 14 | 19 | 101 | |
| 23-Aug | 54 | 25 | 21 | 34 | 26 | 24 | 24 | 25 | 26 | 25 | 24 | 22 | 22 | 22 | 25 | 27 | 24 | 24 | 23 | 24 | 23 | 22 | 21 | 20 | 54 | |
| 24-Aug | 21 | 22 | 22 | 23 | 24 | 25 | 36 | 51 | 22 | 24 | 22 | 26 | 40 | 54 | 23 | 34 | 59 | 37 | 28 | 45 | 28 | 36 | 20 | 18 | 59 | |
| 25-Aug | 18 | 15 | 19 | 19 | 17 | 18 | 20 | 17 | 18 | 16 | 18 | 18 | 25 | 18 | 16 | 18 | 17 | 16 | 16 | 19 | 21 | 16 | 17 | 17 | 25 | |
| 26-Aug | 16 | 17 | 17 | 17 | 18 | 19 | 46 | 23 | 25 | 24 | 17 | 22 | 22 | 20 | 22 | 20 | 20 | 19 | 15 | 10 | 11 | 12 | 13 | 14 | 46 | |
| 27-Aug | 14 | 15 | 17 | 17 | 16 | 17 | 17 | 12 | 13 | 14 | 16 | 17 | 16 | 15 | 17 | 19 | 19 | 17 | 17 | 17 | 12 | 40 | 19 | 20 | 40 | |
| 28-Aug | 41 | 38 | 29 | 28 | 30 | 22 | 41 | 49 | 30 | 23 | 22 | 22 | 24 | 27 | 22 | 21 | 22 | 20 | 19 | 17 | 21 | 25 | 20 | 34 | 49 | |
| 29-Aug | 28 | 27 | 27 | 58 | 37 | 43 | 25 | 68 | 77 | 52 | 72 | 34 | 26 | 37 | 21 | 24 | 67 | 18 | 15 | 10 | 22 | 17 | 19 | 21 | 77 | |
| 30-Aug | 20 | 21 | 20 | 21 | 21 | 21 | 21 | 23 | 22 | 23 | 25 | 24 | 27 | 25 | 24 | 26 | 25 | 25 | 23 | 22 | 23 | 20 | 21 | 21 | 27 | |
| 31-Aug | 21 | 16 | 16 | 18 | 17 | 38 | 36 | 22 | 33 | 35 | 17 | 24 | 19 | 20 | 14 | 14 | 15 | 19 | 15 | 13 | 16 | 16 | 16 | 15 | 38 | |
| | | 77 | 82 | 82 | 67 | 47 | 65 | 53 | 68 | 97 | 84 | 80 | 86 | 95 | 75 | 101 | 91 | 67 | 67 | 32 | 78 | 59 | 68 | 56 | 82 | |
| | | Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | |
| AF - Analyzer Failure | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Buffalo Viewpoint - August 2017





Wood Buffalo Environmental Association

SO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-------------------|-----------------|---------------|
| Station Name: | Buffalo Viewpoint | Station number: | AMS 04 |
| Calibration Date: | August 15, 2017 | Last Cal Date: | July 17, 2017 |
| Start time (MST): | 8:30 | End time (MST): | 13:26 |
| Reason: | Routine | | |

Calibration Standards

| | | | | |
|-----------------------|-----------------|-----|------------------|-------------------|
| Cal Gas Concentration | <u>49.7</u> | ppm | Cal Gas Exp Date | September 8, 2019 |
| Cal Gas Cylinder # | <u>LL107929</u> | | | |
| Calibrator Make/Model | API T700 | | Serial Number | 3060 |
| ZAG Make/Model | API 701 | | Serial Number | 4297 |

Analyzer Information

| | | | | | |
|----------------------|--------------|--------------------|--------------|---------------|--------|
| Analyzer make: | Thermo 43i | Analyzer serial #: | JC1327300932 | | |
| | <u>Start</u> | <u>Finish</u> | <u>Start</u> | <u>Finish</u> | |
| Analyzer Range | 0 - 1000 ppb | | PMT voltage | -576.1 | -576.1 |
| Calculated slope | 1.006346 | 0.995006 | Lamp voltage | 827 | 827 |
| Calculated intercept | 0.406536 | 1.594502 | Pressure | 687.7 | 687.7 |
| Analyzer Background | 11.6 | 11.3 | Flow | 0.500 | 0.500 |
| Analyzer Coefficient | 0.990 | 0.973 | Intensity | 85 | 85 |

SO₂ Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|----------------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5008 | 0.0 | 0.0 | 0.3 | ---- |
| as found span | 4936 | 78.8 | 781.0 | 797.7 | 0.979 |
| calibrator zero | 5000 | 0.0 | 0.0 | -0.2 | ---- |
| high point | 4936 | 78.8 | 781.0 | 784.2 | 0.996 |
| second point | 4976 | 39.4 | 390.4 | 389.4 | 1.003 |
| third point | 4997 | 19.8 | 196.2 | 194.6 | 1.008 |
| as left zero | 5008 | 0.0 | 0.0 | 0.3 | ---- |
| as left span | 4936 | 78.8 | 781.0 | 781.9 | 0.999 |
| Average Correction Factor | | | | | 1.002 |
| Corrected As found | 797.40 | Previous response | 775.63 | *% change | -2.7% |

** = > +/-5% change initiates investigation*

Notes:

No maintenance done; span adjusted

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

SO₂ Calibration Summary

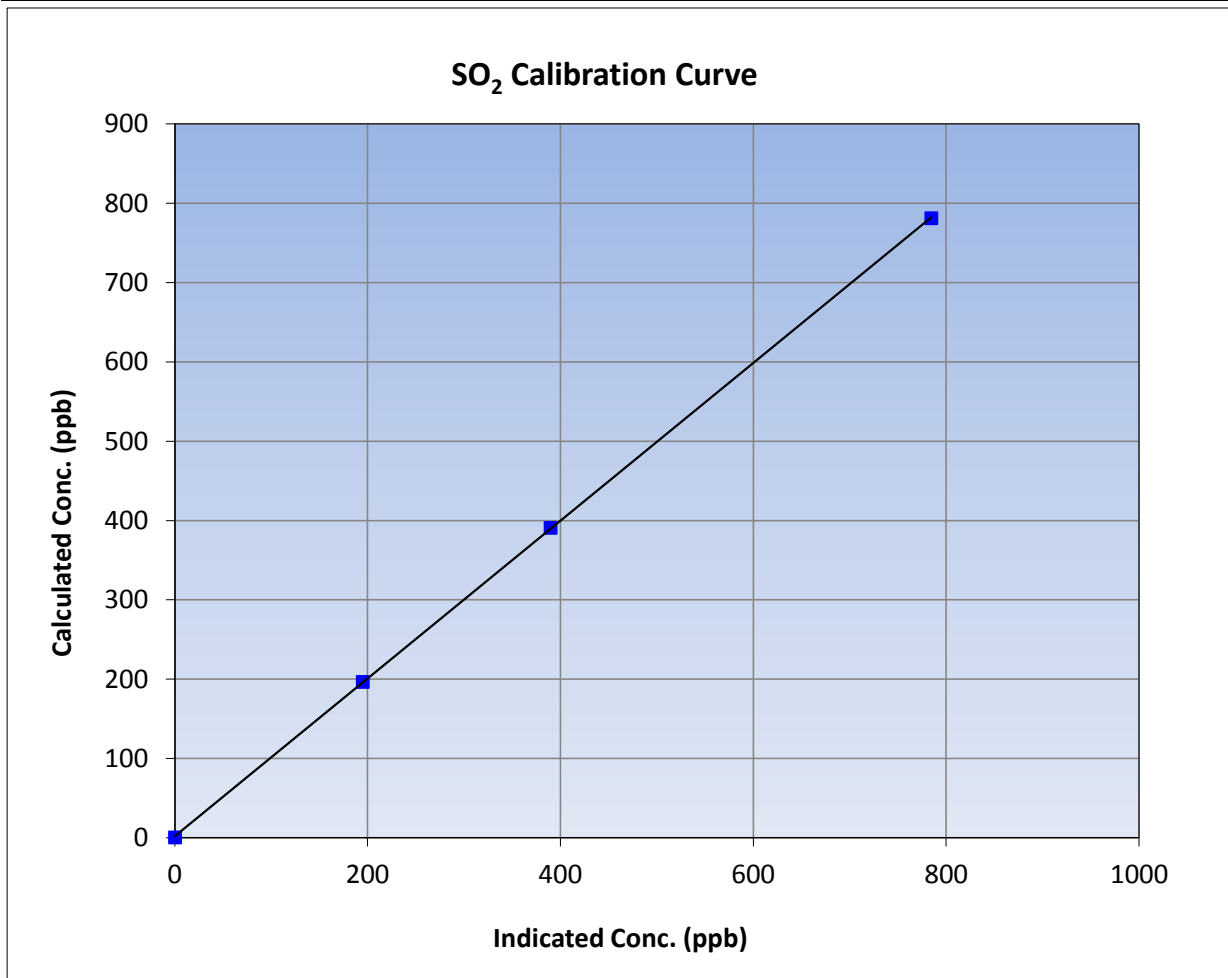
Version-03-2017

Station Information

| | | | |
|------------------|-------------------|----------------------|---------------|
| Calibration Date | August 15, 2017 | Previous Calibration | July 17, 2017 |
| Station Name | Buffalo Viewpoint | Station Number | AMS 04 |
| Start Time (MST) | 8:30 | End Time (MST) | 13:26 |
| Analyzer make | Thermo 43i | Analyzer serial # | JC1327300932 |

Calibration Data

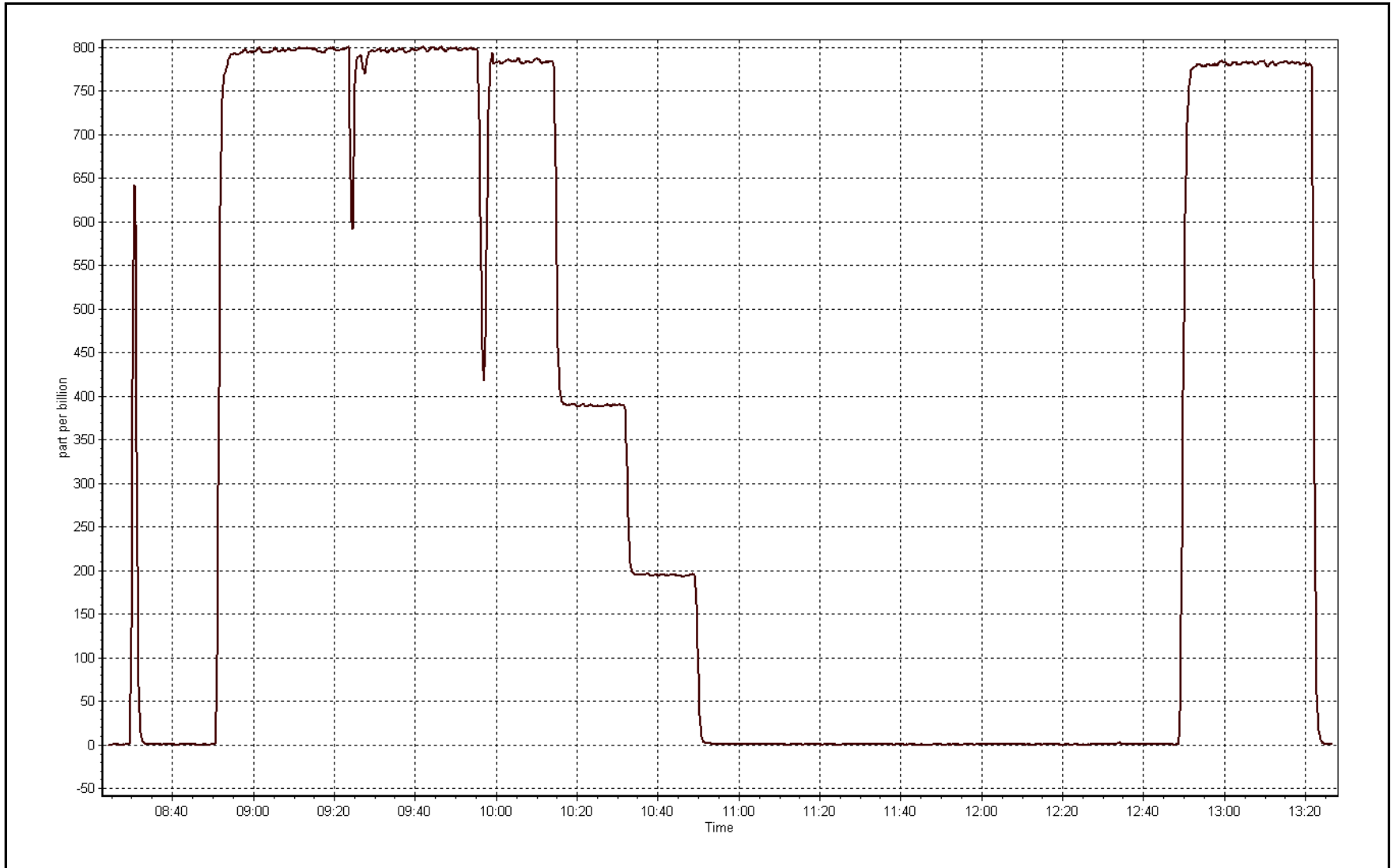
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-------------|
| 0.0 | -0.2 | ---- | Correlation Coefficient | ≥0.995 |
| 781.0 | 784.2 | 0.9959 | | |
| 390.4 | 389.4 | 1.0027 | Slope | 0.90 - 1.10 |
| 196.2 | 194.6 | 1.0080 | | |
| | | | Intercept | +/-30 |



SO2 Calibration Plot

Date: August 15, 2017

Location: Buffalo Viewpoint





Wood Buffalo Environmental Association

H₂S Calibration Summary

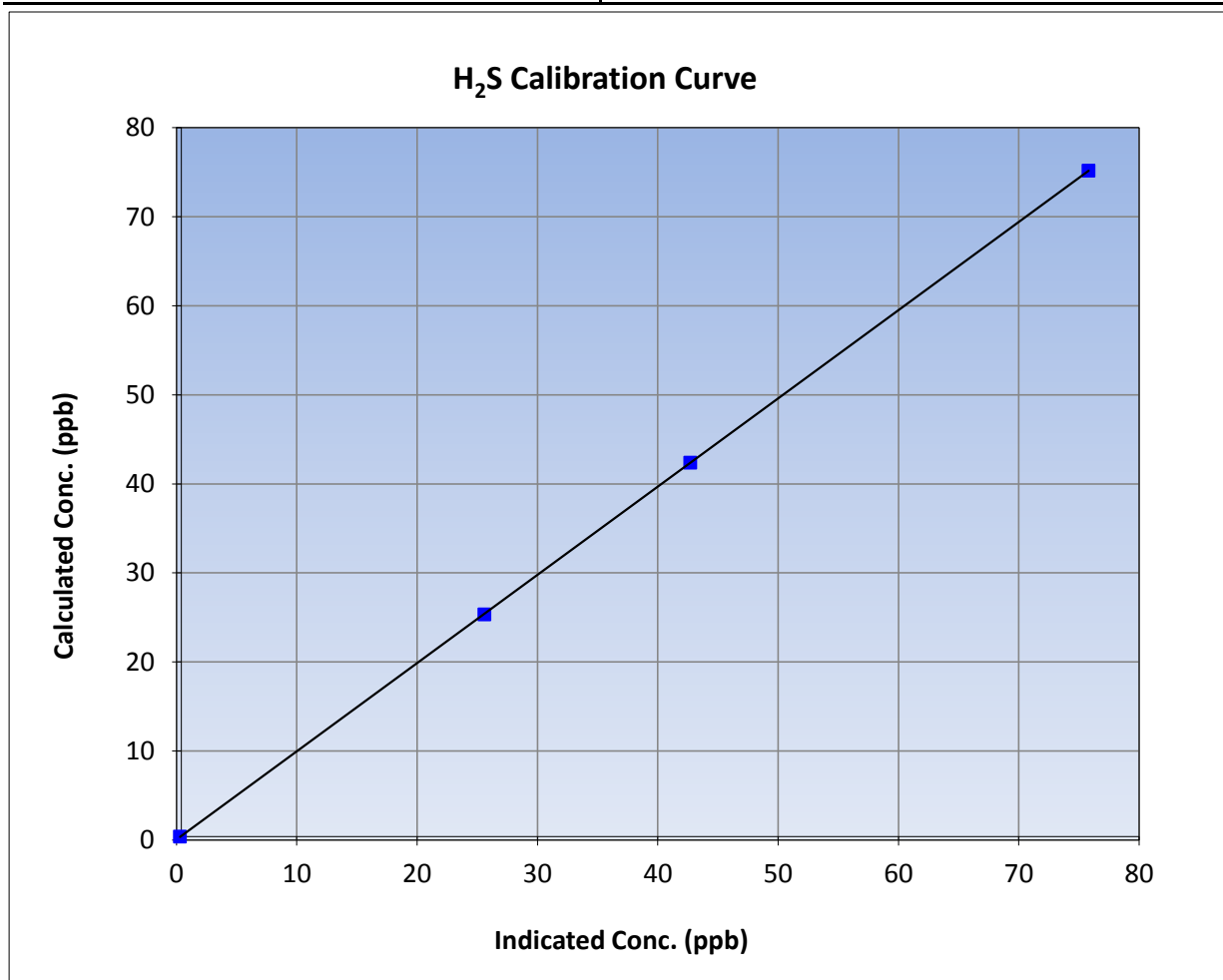
Version-03-2017

Station Information

| | | | |
|------------------|-------------------|----------------------|---------------|
| Calibration Date | August 21, 2017 | Previous Calibration | July 17, 2017 |
| Station Name | Buffalo Viewpoint | Station Number | AMS 04 |
| Start Time (MST) | 9:16 | End Time (MST) | 11:46 |
| Analyzer make | Thermo 450i | Analyzer serial # | 1336160094 |

Calibration Data

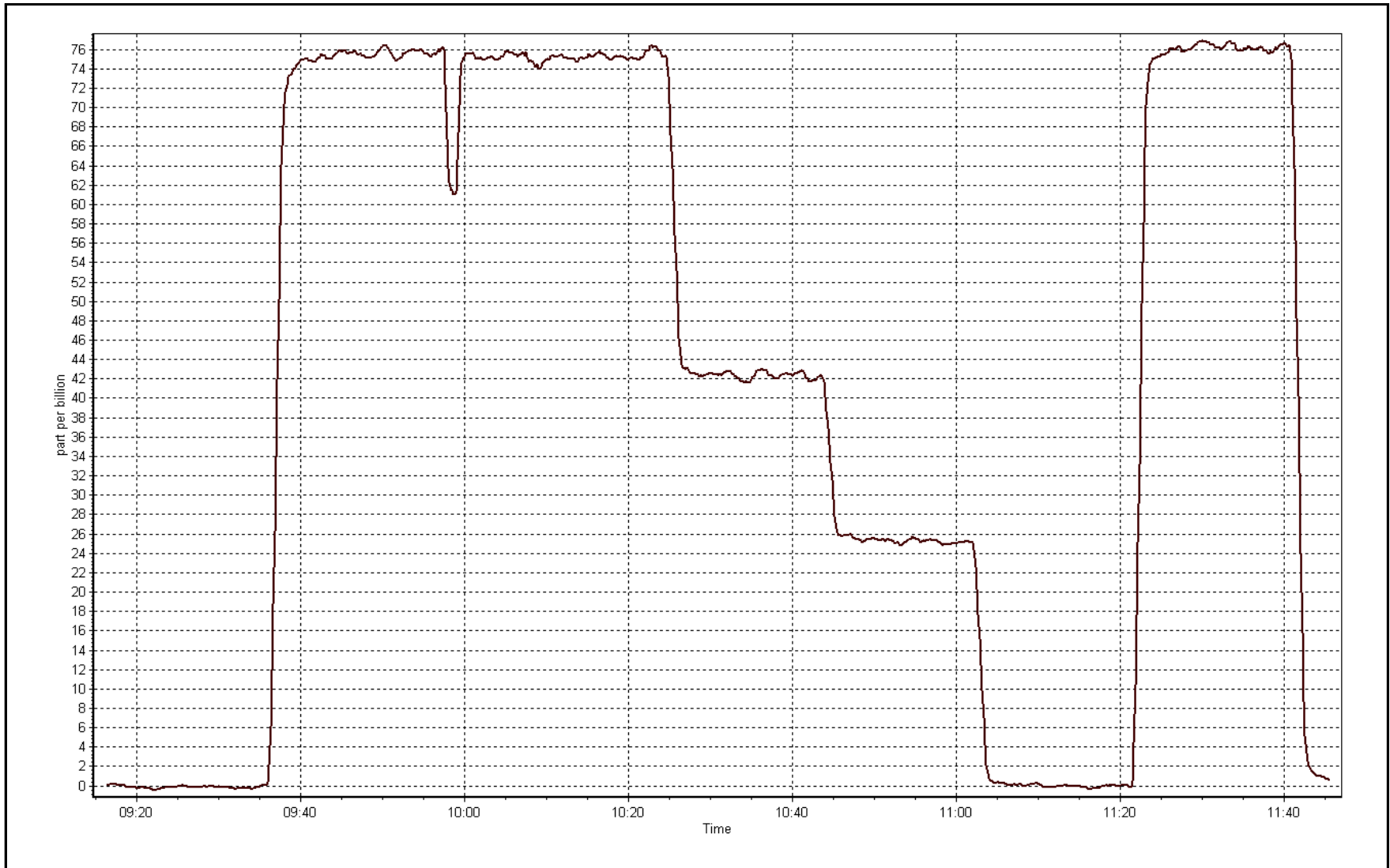
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|-------------|
| 0.0 | -0.1 | ---- | Correlation Coefficient | 0.999997 | ≥0.995 |
| 74.8 | 75.4 | 0.9920 | | | |
| 42.0 | 42.3 | 0.9926 | Slope | 0.991070 | 0.90 - 1.10 |
| 25.0 | 25.2 | 0.9902 | | | |
| | | | Intercept | 0.053564 | +/-3 |



H₂S Calibration Plot

Date: August 21, 2017

Location: Buffalo Viewpoint





Wood Buffalo Environmental Association

THC Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-------------------|-----------------|---------------|
| Station Name: | Buffalo Viewpoint | Station number: | AMS 04 |
| Calibration Date: | August 15, 2017 | Last Cal Date: | July 17, 2017 |
| Start time (MST): | 8:30 | End time (MST): | 13:25 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|-----------------------|------------------|---------------------|-----------------|
| Gas Cert Reference | LL107929 | Cal Gas Expiry Date | September-08-18 |
| CH4 Cal Gas Conc. | <u>514.0</u> ppm | CH4 Equiv Conc. | 1061.3 ppm |
| C3H8 Cal Gas Conc. | <u>199.0</u> ppm | Station temp. | 22 Deg C |
| Calibrator Make/Model | API T700 | Serial Number | 3060 |
| ZAG Make/Model | API 701 | Serial Number | 4297 |

Analyzer Information

| | | | |
|----------------------|---------------|---------------------|--------------|
| Analyzer make: | Thermo 51i-LT | Analyzer serial #: | 1170050149 |
| | <u>Start</u> | <u>Finish</u> | <u>Start</u> |
| Analyzer Range | 0 - 25 ppm | Bias voltage supply | -287.7 |
| Calculated slope | 1.002395 | Sample pressure | 8.7 |
| Calculated intercept | 0.020298 | Fuel pressure | 19.3 |
| Analyzer Background | 3.450 | Air pressure | 34.6 |
| Analyzer Coefficient | 3.899 | Flame temperature | 147.2 |

THC Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5008 | 0.0 | 0.00 | -0.02 | ---- |
| as found span | 4936 | 78.8 | 16.68 | 16.78 | 0.994 |
| calibrator zero | 5000 | 0.0 | 0.00 | -0.03 | ---- |
| high point | 4936 | 78.8 | 16.68 | 16.66 | 1.001 |
| second point | 4976 | 39.4 | 8.34 | 8.30 | 1.004 |
| third point | 4997 | 19.8 | 4.19 | 4.18 | 1.002 |
| as left zero | 5008 | 0.0 | 0.00 | 0.05 | ---- |
| as left span | 4936 | 78.8 | 16.68 | 16.80 | 0.993 |
| Average Correction Factor | | | | | 1.002 |
| Corrected As found | 16.80 | Previous response | 16.62 | *% change | -1.1% |

* = > +/-5% change initiates investigation

Notes: No maintenance done; span adjusted

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

THC Calibration Summary

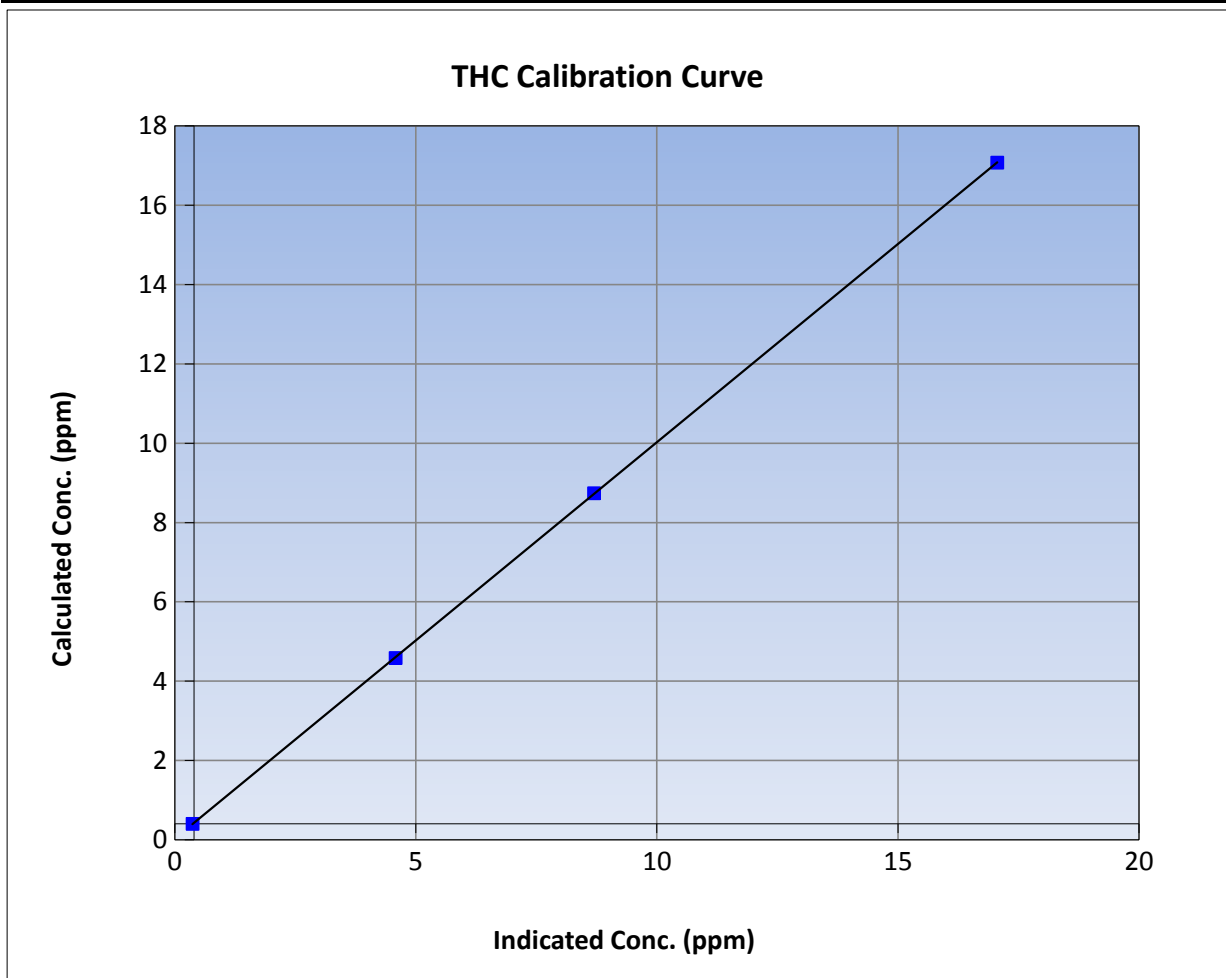
Version-03-2017

Station Information

| | | | |
|------------------|-------------------|----------------------|---------------|
| Calibration Date | August 15, 2017 | Previous Calibration | July 17, 2017 |
| Station Name | Buffalo Viewpoint | Station Number | AMS 04 |
| Start Time (MST) | 8:00 | End Time (MST) | 13:25 |
| Analyzer make | Thermo 51i-LT | Analyzer serial # | 1170050149 |

Calibration Data

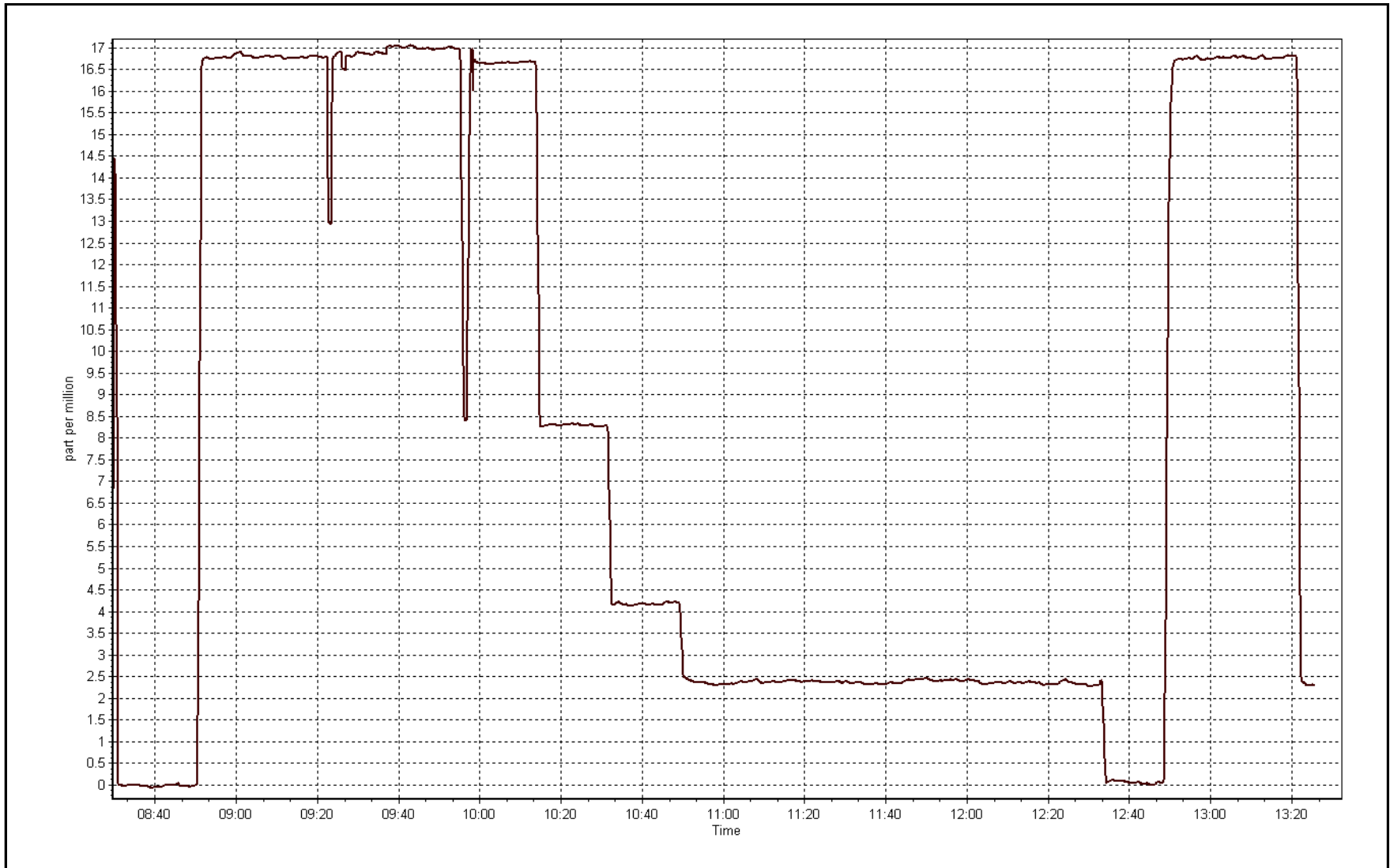
| Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (lc) | Correction factor (Cc/lc) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | 0.999997 | ≥0.995 |
| 16.7 | 16.7 | 1.0010 | | | |
| 8.3 | 8.3 | 1.0045 | Slope | 0.999618 | 0.90 - 1.10 |
| 4.2 | 4.2 | 1.0020 | | | |
| | | | Intercept | 0.025629 | +/-1.5 |



THC Calibration Plot

Date: August 15, 2017

Location: Buffalo Viewpoint





Wood Buffalo Environmental Association

O₃ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-------------------|-----------------|--------|
| Station Name: | Buffalo Viewpoint | Station number: | AMS 04 |
| Calibration Date: | July 26, 2017 | Last Cal Date: | NA |
| Start time (MST): | 7:50 | End time (MST): | 10:50 |
| Reason: | Install | | |

Calibration Standards

| | | | |
|------------------------|------------|--------------------|------------|
| O3 generation mode: | Photometer | O3 reference Date: | Photometer |
| Calibrator Make/Model: | API T700 | Serial Number: | 3060 |
| ZAG Make/Model: | API T701 | Serial Number: | 60 |

Analyzer Information

Analyzer make: API T400

Analyzer serial #: 2961

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|----------------------|--------------|---------------|------------------|--------------|---------------|
| Analyzer Range | 0 - 500 ppb | | Pressure | 26.2 | 26.6 |
| Calculated slope | NA | 0.999403 | Flow cell A | 815 | 826 |
| Calculated intercept | NA | 0.404219 | Flow cell B | 815 | 826 |
| Analyzer Background | 0.0 | -3.1 | Cell A Intensity | 4419.2 | 4403.7 |
| Analyzer Coefficient | 0.986 | 1.036 | Cell B Intensity | 4419.8 | 4403.6 |

O₃ Calibration Data

| Set Point | Total air flow rate (scm) | Calibrator Lamp Voltage Drive | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|---------------------------|---------------------------|-------------------------------|-------------------------------------|------------------------------------|---|
| as found zero | | | | | |
| as found span | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.5 | ---- |
| high point | 5000 | 1292.7 | 400.0 | 400.4 | 0.999 |
| second point | 5000 | 973.0 | 200.0 | 198.9 | 1.006 |
| third point | 5000 | 820.1 | 100.0 | 99.0 | 1.010 |
| as left zero | 5000 | 0.0 | 0.0 | -0.8 | ---- |
| as left span | 5000 | 1292.7 | 400.0 | 395.7 | 1.011 |
| Average Correction Factor | | | | | 1.005 |
| Corrected As found | NA | Previous response | NA | *% change | NA |

* = > +/-8% change initiates investigation

Notes:

Installation calibration. Zero and span adjusted.

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

O₃ Calibration Summary

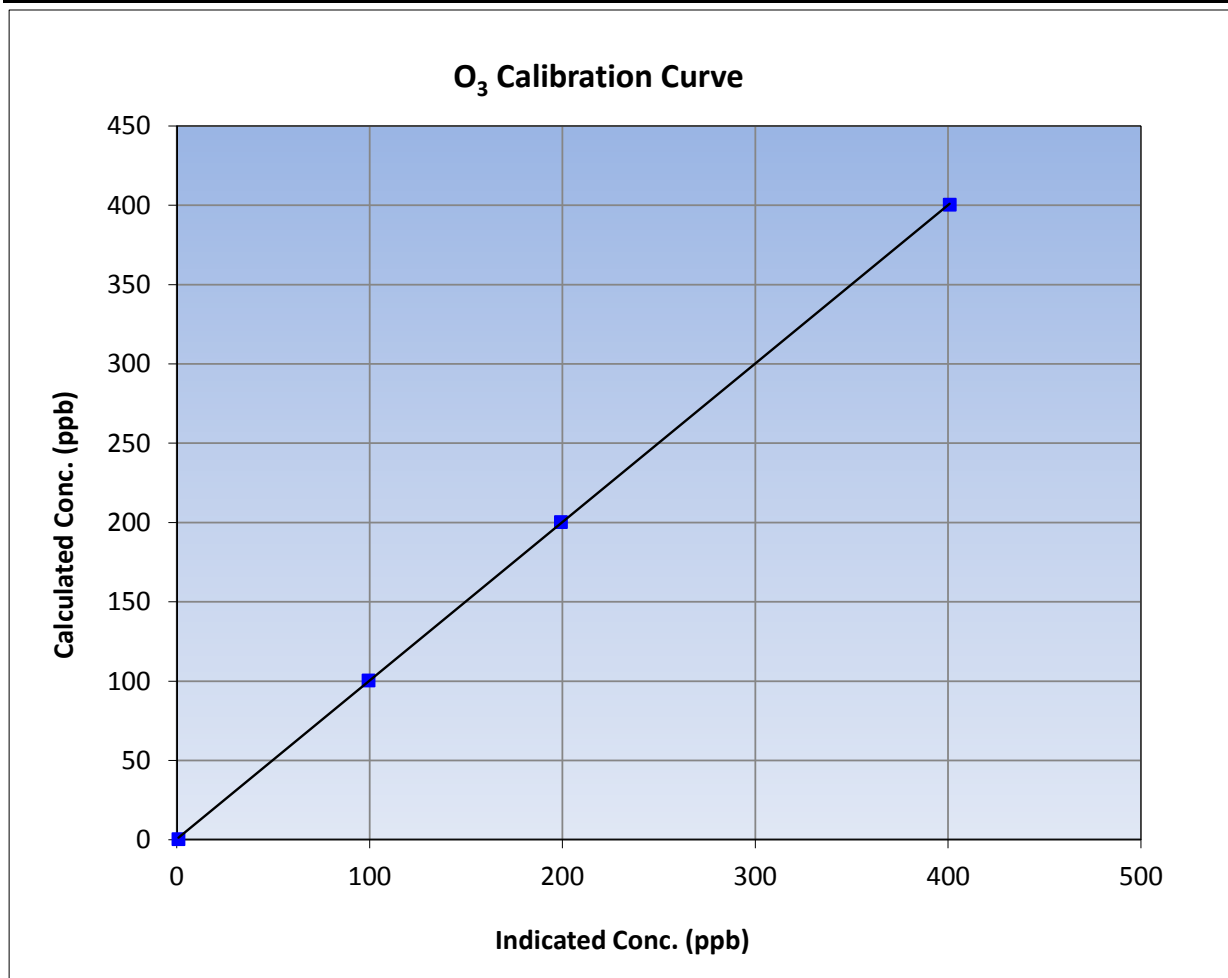
Version-03-2017

Station Information

| | | | |
|------------------|-------------------|----------------------|--------|
| Calibration Date | July 26, 2017 | Previous Calibration | NA |
| Station Name | Buffalo Viewpoint | Station Number | AMS 04 |
| Start Time (MST) | 7:50 | End Time (MST) | 10:50 |
| Analyzer make | API T400 | Analyzer serial # | 2961 |

Calibration Data

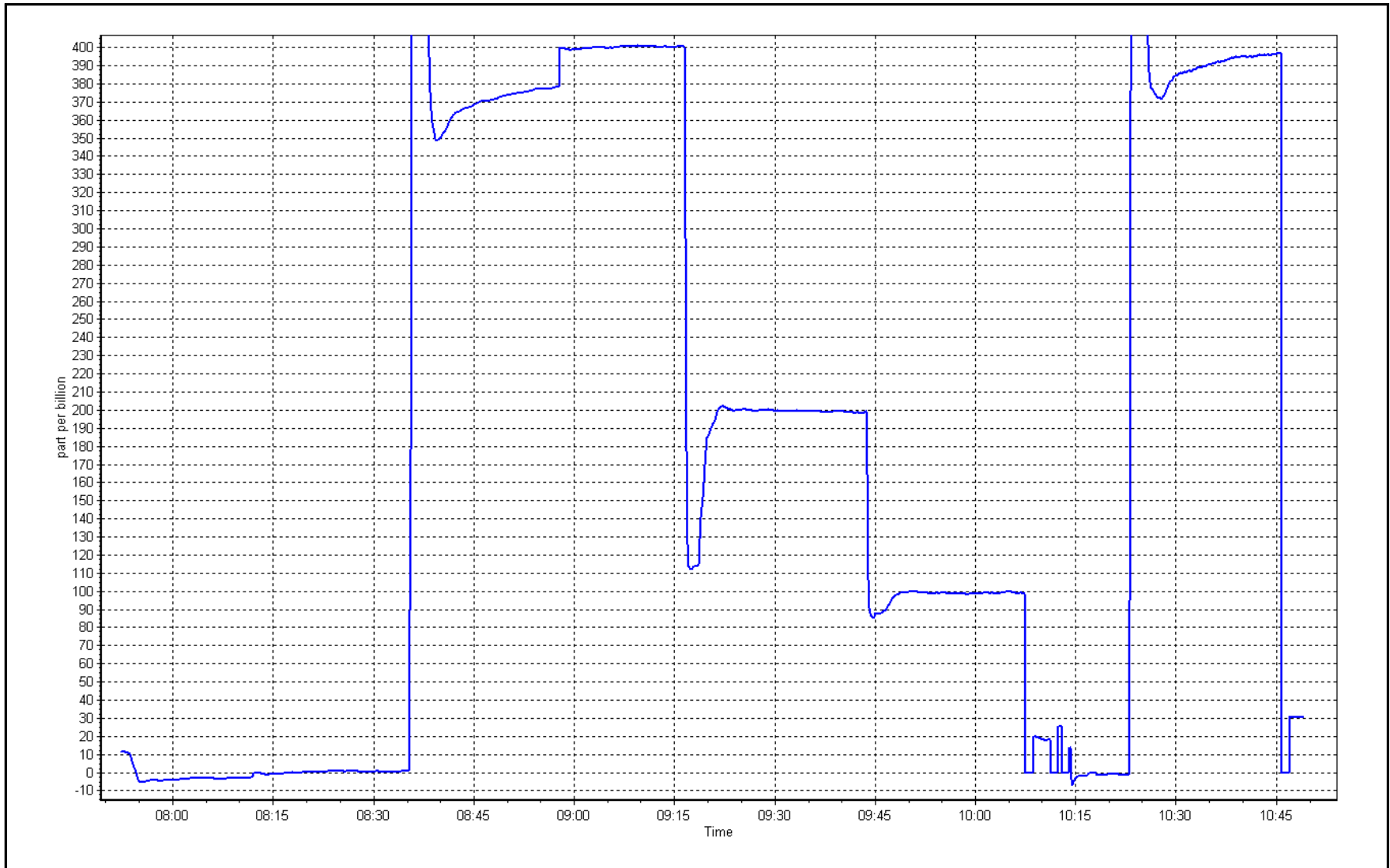
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|-------------|
| 0.0 | 0.5 | ---- | Correlation Coefficient | 0.999975 | ≥0.995 |
| 400.0 | 400.4 | 0.9990 | | | |
| 200.0 | 198.9 | 1.0055 | Slope | 0.999403 | 0.90 - 1.10 |
| 100.0 | 99.0 | 1.0101 | | | |
| | | | Intercept | 0.404219 | +/- 10 |



O₃ Calibration Plot

Date: July 26, 2017

Location: Buffalo Viewpoint





Wood Buffalo Environmental Association

O₃ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-------------------|-----------------|---------------|
| Station Name: | Buffalo Viewpoint | Station number: | AMS 04 |
| Calibration Date: | August 16, 2017 | Last Cal Date: | July 26, 2017 |
| Start time (MST): | 8:57 | End time (MST): | 11:23 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|------------------------|------------|--------------------|------------|
| O3 generation mode: | Photometer | O3 reference Date: | Photometer |
| Calibrator Make/Model: | API T700 | Serial Number: | 3060 |
| ZAG Make/Model: | API T701 | Serial Number: | 60 |

Analyzer Information

Analyzer make: API T400

Analyzer serial #: 2961

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|----------------------|--------------|---------------|------------|--------------|---------------|
| Analyzer Range | 0 - 500 ppb | | Pressure | 26.3 | 26.3 |
| Calculated slope | 0.999403 | 1.002175 | Flow | 819 | 819 |
| Calculated intercept | 0.404219 | -0.480353 | O3 Measure | 4345.3 | 4345.3 |
| Analyzer Background | -3.1 | -3.1 | | | |
| Analyzer Coefficient | 1.036 | 1.036 | | | |

O₃ Calibration Data

| Set Point | Total air flow rate (sccm) | Calibrator Lamp Voltage Drive | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|---------------------------|----------------------------|-------------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5000 | 0.0 | 0.0 | 0.9 | ---- |
| as found span | 5000 | 1078.3 | 397.0 | 395.1 | 1.005 |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.9 | ---- |
| high point | 5000 | 1078.3 | 399.0 | 398.7 | 1.001 |
| second point | 5000 | 875.4 | 200.0 | 200.2 | 0.999 |
| third point | 5000 | 763.4 | 100.0 | 99.6 | 1.004 |
| as left zero | 5000 | 0.0 | 0.0 | 0.8 | ---- |
| as left span | 5000 | 1078.3 | 399.0 | 400.0 | 0.998 |
| Average Correction Factor | | | | | 1.001 |

| | | | | | |
|--------------------|--------|-------------------|--------|-----------|------|
| Corrected As found | 394.20 | Previous response | 396.83 | *% change | 0.7% |
|--------------------|--------|-------------------|--------|-----------|------|

* = > +/-8% change initiates investigation

Notes:

No adjustments or maintenance done

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

O₃ Calibration Summary

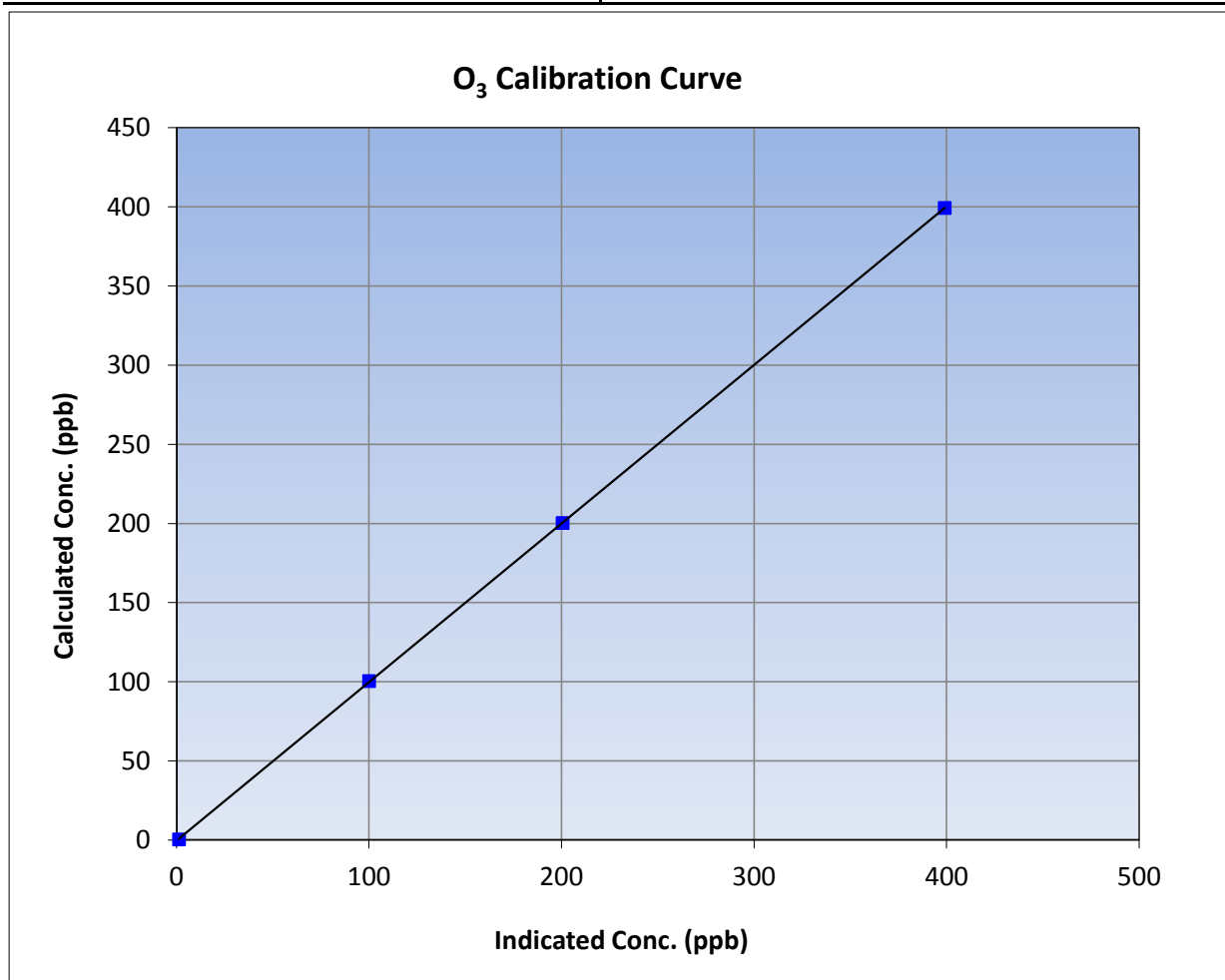
Version-03-2017

Station Information

| | | | |
|------------------|-------------------|----------------------|---------------|
| Calibration Date | August 16, 2017 | Previous Calibration | July 26, 2017 |
| Station Name | Buffalo Viewpoint | Station Number | AMS 04 |
| Start Time (MST) | 8:57 | End Time (MST) | 11:23 |
| Analyzer make | API T400 | Analyzer serial # | 2961 |

Calibration Data

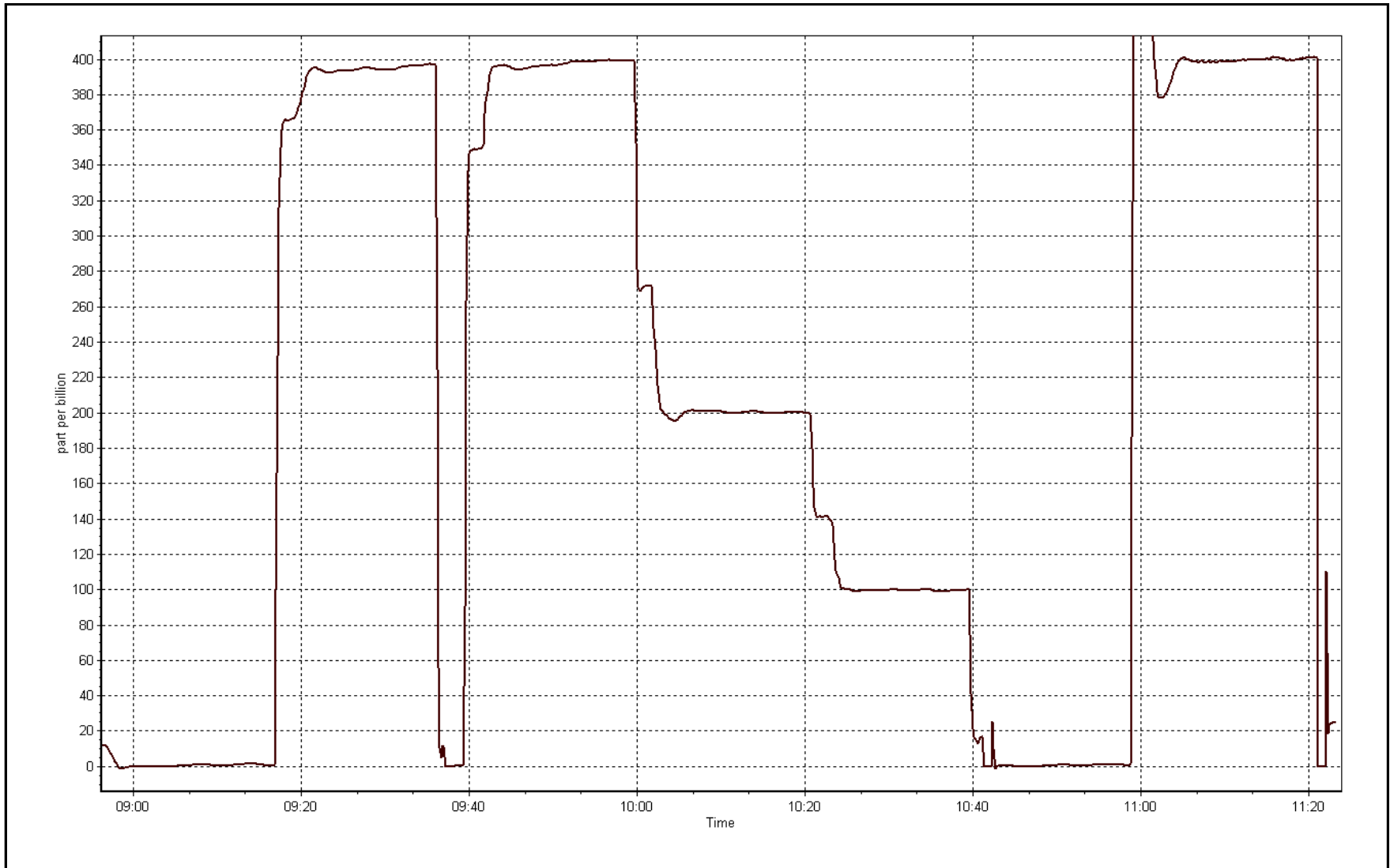
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.9 | ---- | Correlation Coefficient | 0.999993 | |
| 399.0 | 398.7 | 1.0008 | | | ≥0.995 |
| 200.0 | 200.2 | 0.9990 | Slope | 1.002175 | |
| 100.0 | 99.6 | 1.0040 | | | 0.90 - 1.10 |
| | | | Intercept | -0.480353 | +/- 10 |



O₃ Calibration Plot

Date: August 16, 2017

Location: Buffalo Viewpoint





Wood Buffalo Environmental Association

NO_x - NO - NO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-------------------|-----------------|--------|
| Station Name: | Buffalo Viewpoint | Station number: | AMS 04 |
| Calibration Date: | July 27, 2017 | Last Cal Date: | NA |
| Start time (MST): | 7:45 | End time (MST): | 12:20 |
| Reason: | Install | | |

Calibration Standards

| | | | |
|-------------------|-----------------|---------------------|-----------------|
| NO Gas Cylinder # | LL107929 | Cal Gas Expiry Date | August-09-18 |
| NOX Cal Gas Conc. | <u>50.8</u> ppb | NO Cal Gas Conc. | <u>50.8</u> ppb |
| Calibrator Model | API T700 | Serial Number | 3060 |
| ZAG make/model | API T701 | Serial Number | 60 |

Analyzer Information

| | | | | | |
|-------------------------|--------------|---------------|-------------------------|--------------|---------------|
| Analyzer make: API T200 | | | Analyzer serial #: 1035 | | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| NO coefficient | NA | 1.139 | NOX Range (ppb) | 0 - 1000 ppb | |
| NOX coefficient | NA | 1.138 | PMT Temperature | 7.4 | 7.4 |
| NO2 coefficient | NA | 1.000 | Reaction cell Press | 4.4 | 4.3 |
| NO bkgrnd | NA | -0.1 | Sample Flow | 496 | 494 |
| NOX bkgrnd | NA | 1.4 | PMT Voltage | 750 | 750 |

Calibration Statistics

| | | |
|----------------------------|--------------|---------------|
| | <u>Start</u> | <u>Finish</u> |
| NO _x Cal Slope | NA | 0.999396 |
| NO _x Cal Offset | NA | 3.197432 |
| NO Cal Slope | NA | 0.998120 |
| NO Cal Offset | NA | 3.714554 |
| NO ₂ Cal Slope | NA | 0.996786 |
| NO ₂ Cal Offset | NA | -0.536180 |



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Version-03-2017

Dilution Calibration Data

| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|----------------------------------|---------------------------|-----------------------------|---|--|---|--|---------------------------------------|--|---|--|
| as found zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | -1.0 | -0.2 | -0.7 | ---- | ---- |
| as found span | 4933 | 78.8 | 798.7 | 798.7 | 0.0 | 797.2 | 798.7 | -1.6 | 1.0019 | 1.0000 |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | -1.0 | -0.2 | -0.7 | ---- | ---- |
| high point | 4933 | 78.8 | 798.7 | 798.7 | 0.0 | 797.2 | 798.7 | -1.6 | 1.0019 | 1.0000 |
| second point | 4977 | 39.4 | 399.0 | 399.0 | 0.0 | 394.6 | 392.8 | 1.7 | 1.0111 | 1.0158 |
| third point | 4996 | 19.8 | 200.5 | 200.5 | 0.0 | 195.5 | 194.7 | 0.8 | 1.0258 | 1.0300 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | 0.0 | -0.1 | ---- | ---- |
| as left span | 4933 | 78.8 | 798.7 | 379.9 | 418.8 | 793.5 | 365.8 | 427.7 | 1.0066 | 1.0385 |
| Average Correction Factor | | | | | | | | | 1.0129 | 1.0153 |

| | | | | |
|--------------------|-----------------------------|----------------|-----------------|----------------------|
| Corrected As found | NO _x = 798.2 ppb | NO = 798.9 ppb | *Percent Change | NO _x = NA |
| Previous Response | NO _x = NA ppb | NO = NA ppb | *Percent Change | NO = NA |

* = > +/-5% change initiates investigation

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO drop conc (ppb) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | Converter Efficiency <i>Limit = 96-104%</i> |
|----------------------------------|------------------------------|---|--|---------------------------------------|--|---|--|---|--|
| 1st NO ref point | | 0.0 | 798.3 | 793.8 | 4.5 | 1.0005 | 1.0062 | ---- | ---- |
| 1st NO2 (400 ppb O3) | 379.9 | 413.9 | 795.7 | 379.9 | 415.8 | 1.0038 | ---- | 0.9954 | 100.5% |
| 2nd NO2 (200 ppb O3) | 520.5 | 273.3 | 793.9 | 520.5 | 273.4 | 1.0061 | ---- | 0.9996 | 100.0% |
| 3rd NO2 (100 ppb O3) | 659.6 | 134.2 | 797.3 | 659.6 | 137.7 | 1.0018 | ---- | 0.9746 | 102.6% |
| 2nd NO ref point | ---- | 0.0 | 793.7 | 793.4 | 0.3 | 1.0063 | 1.0067 | ---- | ---- |
| Average Correction Factor | | | | | | 1.0045 | 1.0065 | 0.9899 | 101.0% |

Notes:

Installation calibration. Span adjusted.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

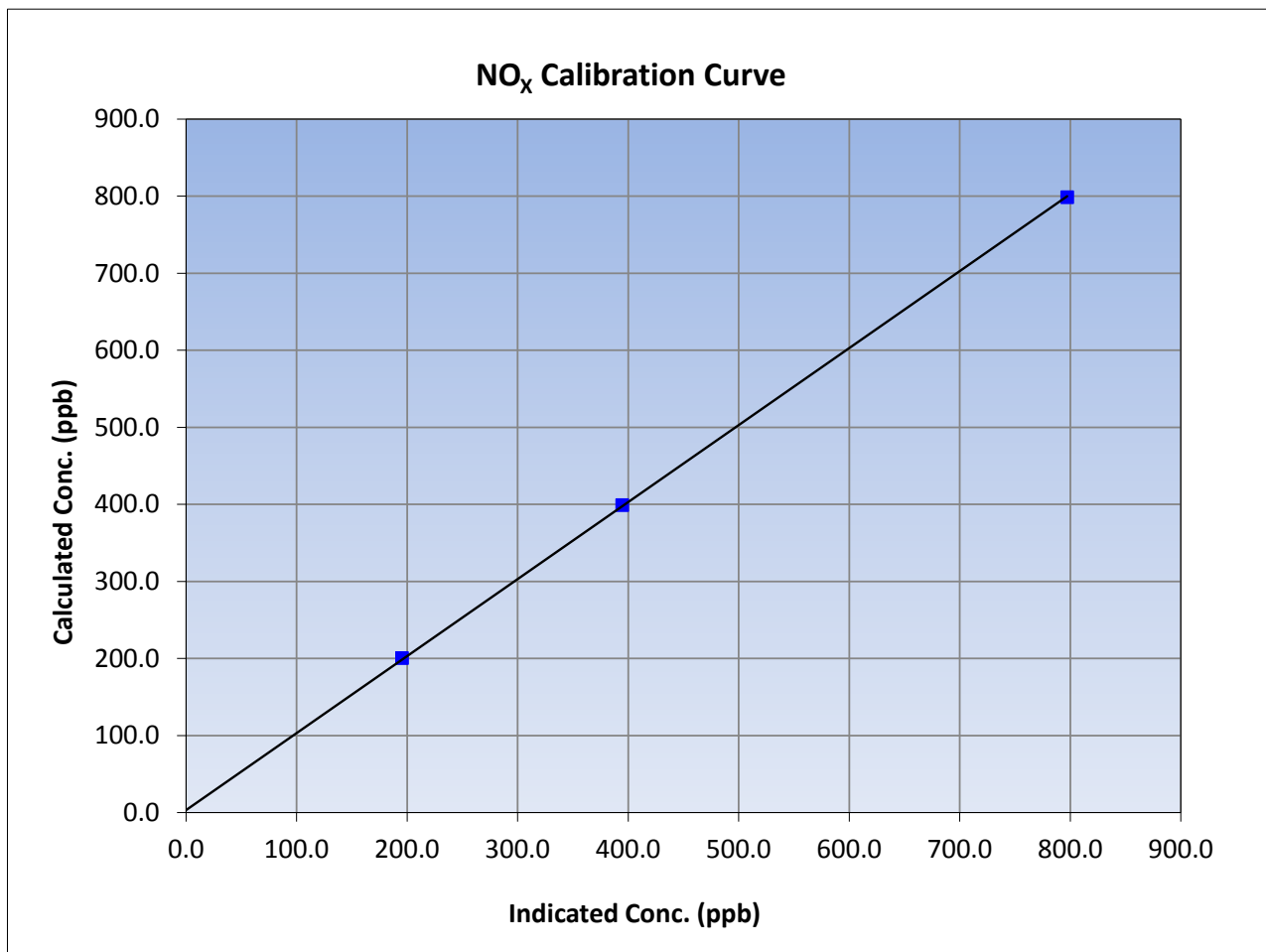
Version-03-2017

Station Information

| | | | |
|------------------|-------------------|----------------------|--------|
| Calibration Date | July 27, 2017 | Previous Calibration | NA |
| Station Name | Buffalo Viewpoint | Station Number | AMS 04 |
| Start Time (MST) | 7:45 | End Time (MST) | 12:20 |
| Analyzer make | API T200 | Analyzer serial # | 1035 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|
| 0.0 | -1.0 | ---- | Correlation Coefficient | ≥0.995 |
| 798.7 | 797.2 | 1.0019 | | |
| 399.0 | 394.6 | 1.0111 | Slope | 0.90 - 1.10 |
| 200.5 | 195.5 | 1.0258 | | |
| | | | Intercept | +/-20 |





Wood Buffalo Environmental Association

NO Calibration Summary

Version-03-2017

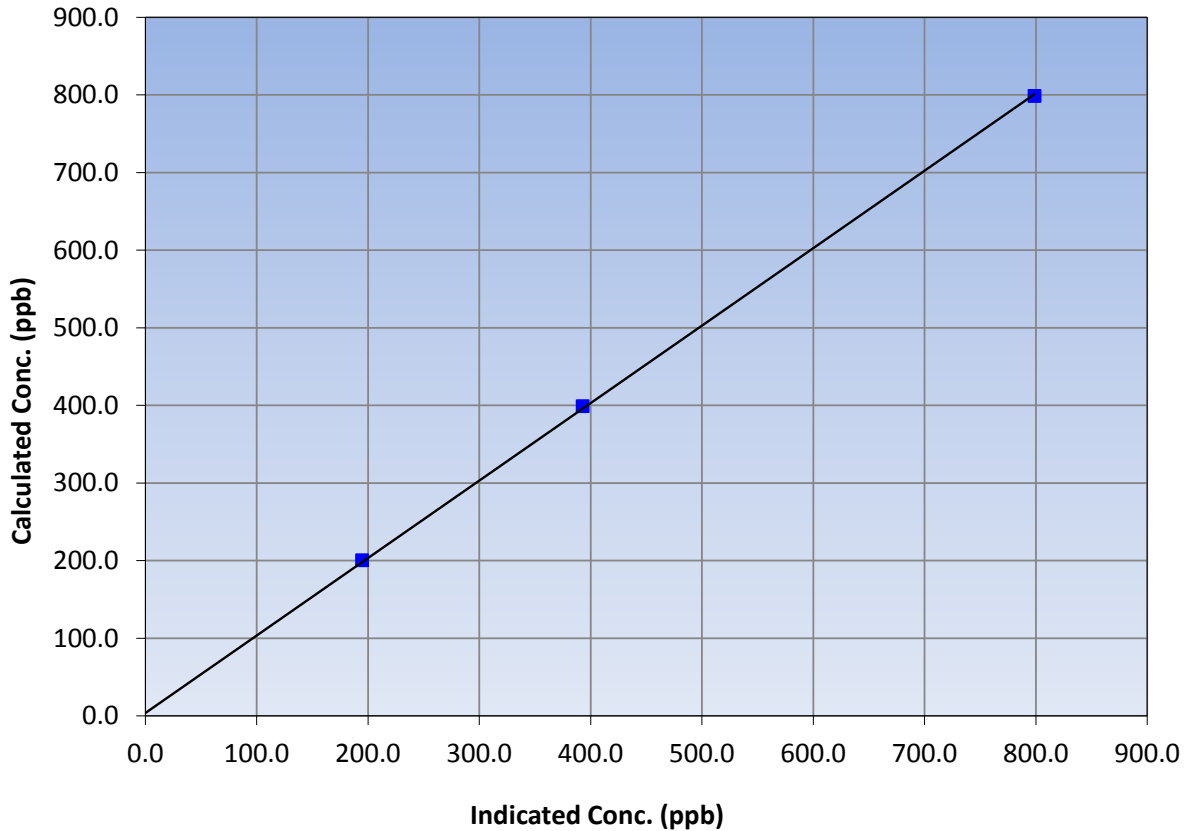
Station Information

| | | | |
|------------------|-------------------|----------------------|--------|
| Calibration Date | July 27, 2017 | Previous Calibration | NA |
| Station Name | Buffalo Viewpoint | Station Number | AMS 04 |
| Start Time (MST) | 7:45 | End Time (MST) | 12:20 |
| Analyzer make | API T200 | Analyzer serial # | 1035 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|-------------|
| 0.0 | -0.2 | ---- | Correlation Coefficient | 0.999903 | ≥0.995 |
| 798.7 | 798.7 | 1.0000 | | | |
| 399.0 | 392.8 | 1.0158 | Slope | 0.998120 | 0.90 - 1.10 |
| 200.5 | 194.7 | 1.0300 | | | |
| | | | Intercept | 3.714554 | +/-20 |

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

Version-03-2017

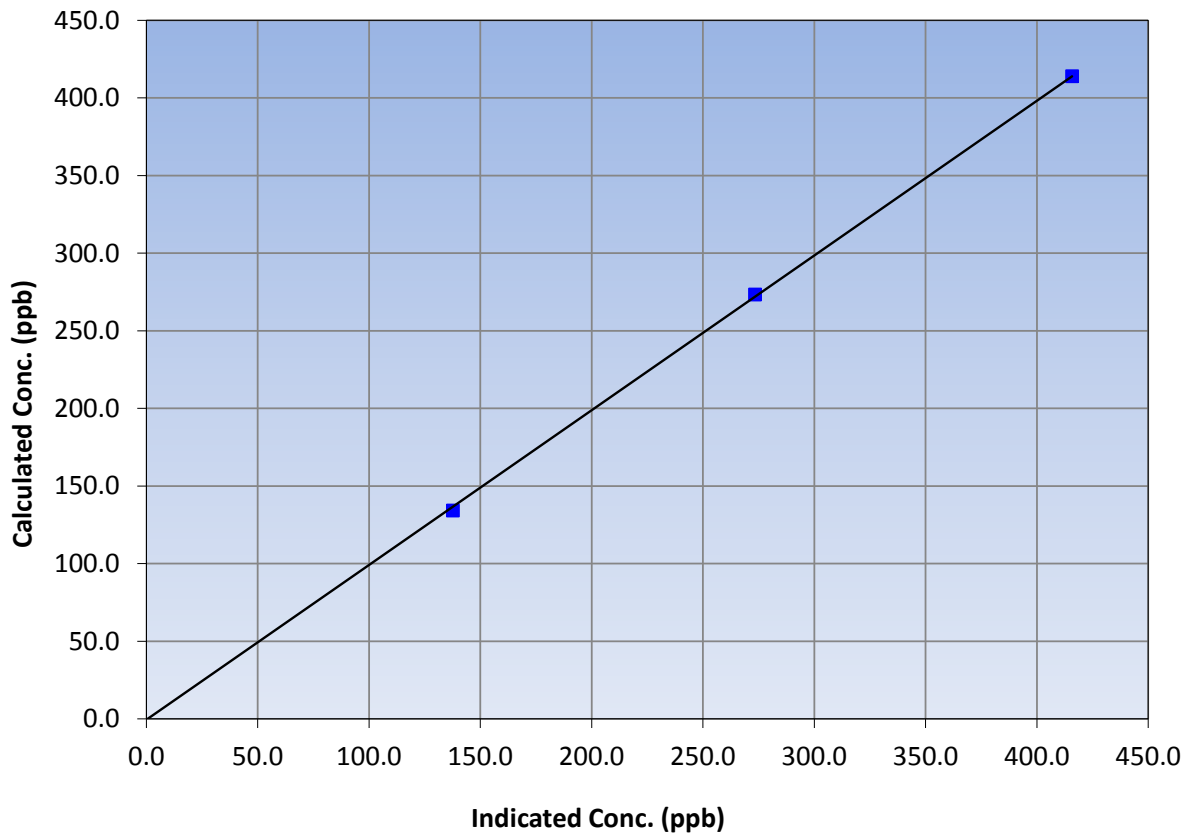
Station Information

| | | | |
|------------------|-------------------|----------------------|--------|
| Calibration Date | July 27, 2017 | Previous Calibration | NA |
| Station Name | Buffalo Viewpoint | Station Number | AMS 04 |
| Start Time (MST) | 7:45 | End Time (MST) | 12:20 |
| Analyzer make | API T200 | Analyzer serial # | 1035 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | -0.7 | ---- | Correlation Coefficient | ≥0.995 | |
| 413.9 | 415.8 | 0.9954 | | | |
| 273.3 | 273.4 | 0.9996 | | | |
| 134.2 | 137.7 | 0.9746 | | | |
| | | | Slope | 0.996786 | 0.90 - 1.10 |
| | | | Intercept | -0.536180 | +/-20 |

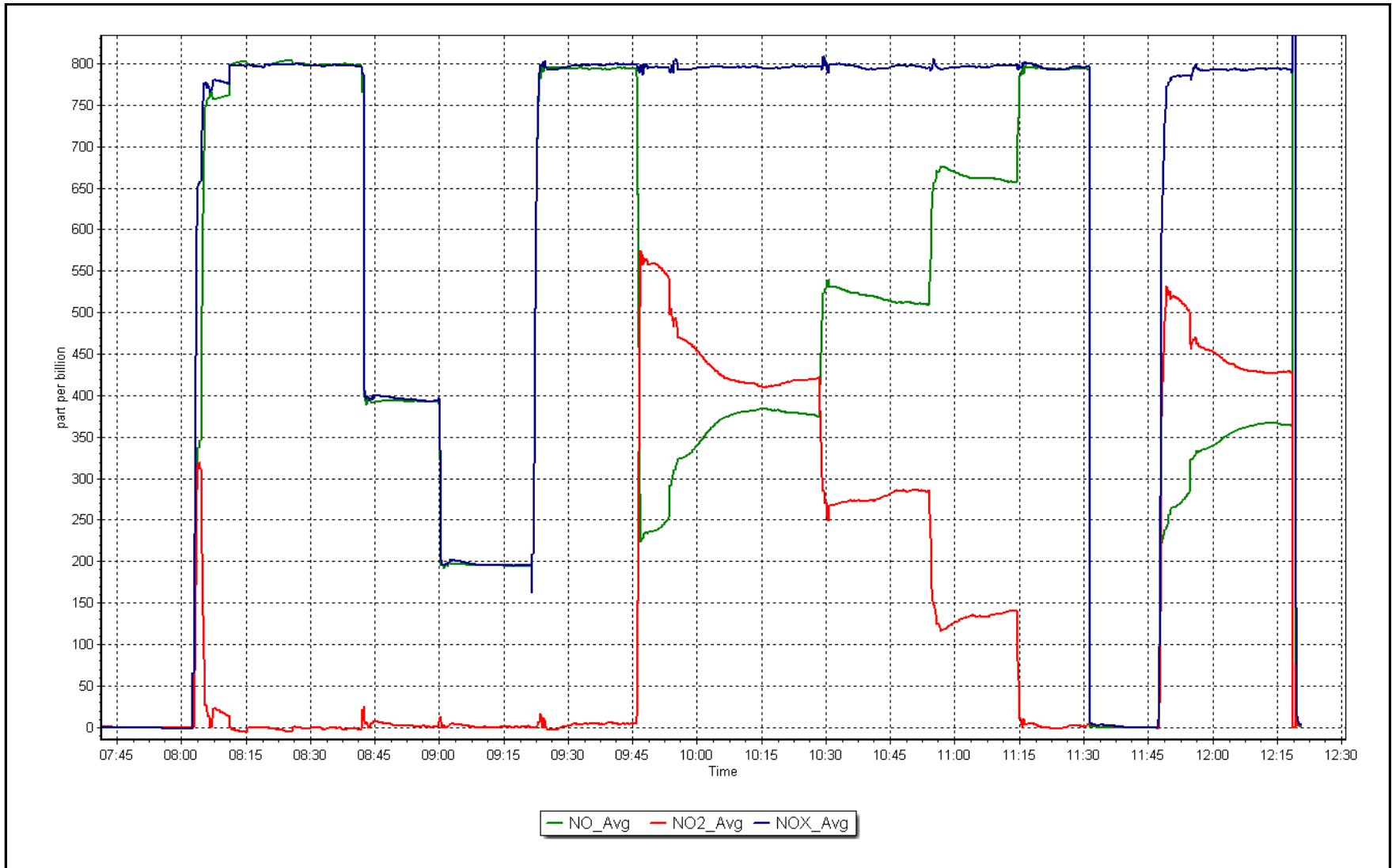
NO₂ Calibration Curve



NO_x Calibration Plot

Date: July 27, 2017

Location: Buffalo Viewpoint





Wood Buffalo Environmental Association

NO_x - NO - NO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-------------------|-----------------|---------------|
| Station Name: | Buffalo Viewpoint | Station number: | AMS 04 |
| Calibration Date: | August 15, 2017 | Last Cal Date: | July 27, 2017 |
| Start time (MST): | 8:30 | End time (MST): | 13:25 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|-------------------|-----------------|---------------------|-----------------|
| NO Gas Cylinder # | LL107929 | Cal Gas Expiry Date | August-09-18 |
| NOX Cal Gas Conc. | <u>50.8</u> ppb | NO Cal Gas Conc. | <u>50.8</u> ppb |
| Calibrator Model | API T700 | Serial Number | 3060 |
| ZAG make/model | API T701 | Serial Number | 60 |

Analyzer Information

| | | | |
|-----------------------------|--------------|-------------------------|------------------------------|
| Analyzer make: API T200 | | Analyzer serial #: 1035 | |
| | <u>Start</u> | <u>Finish</u> | |
| NO coefficient | 1.139 | 1.161 | NOX Range (ppb) 0 - 1000 ppb |
| NOX coefficient | 1.138 | 1.164 | PMT Temperature 7.4 7.4 |
| NO ₂ coefficient | 1.000 | 1.000 | Reaction cell Press 4.4 4.4 |
| NO bkgrnd | -0.1 | -0.1 | Sample Flow 485 485 |
| NOX bkgrnd | 1.4 | 1.4 | PMT Voltage 750 750 |

Calibration Statistics

| | | |
|----------------------------|--------------|---------------|
| | <u>Start</u> | <u>Finish</u> |
| NO _x Cal Slope | 0.999396 | 1.001731 |
| NO _x Cal Offset | 3.197432 | 1.527388 |
| NO Cal Slope | 0.998120 | 1.001723 |
| NO Cal Offset | 3.714554 | 2.356721 |
| NO ₂ Cal Slope | 0.996786 | 0.993190 |
| NO ₂ Cal Offset | -0.536180 | 0.576259 |



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Version-03-2017

Dilution Calibration Data

| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|----------------------------------|---------------------------|-----------------------------|---|--|---|--|---------------------------------------|--|---|--|
| as found zero | 5008 | 0.0 | 0.0 | 0.0 | 0.0 | -0.5 | -0.2 | -0.3 | ---- | ---- |
| as found span | 4936 | 78.8 | 798.2 | 798.2 | 0.0 | 778.8 | 781.2 | -2.5 | 1.0250 | 1.0218 |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | -0.5 | -0.2 | -0.3 | ---- | ---- |
| high point | 4936 | 78.8 | 798.2 | 798.2 | 0.0 | 795.7 | 795.6 | 0.1 | 1.0032 | 1.0033 |
| second point | 4976 | 39.4 | 399.1 | 399.1 | 0.0 | 396.8 | 394.9 | 1.9 | 1.0057 | 1.0106 |
| third point | 4997 | 19.8 | 200.5 | 200.5 | 0.0 | 197.3 | 195.7 | 1.6 | 1.0162 | 1.0245 |
| as left zero | 5008 | 0.0 | 0.0 | 0.0 | 0.0 | -0.3 | 0.5 | -0.8 | ---- | ---- |
| as left span | 4936 | 78.8 | 798.2 | 397.5 | 400.7 | 795.8 | 370.3 | 425.6 | 1.0031 | 1.0735 |
| Average Correction Factor | | | | | | | | | 1.0084 | 1.0128 |

| | | | | | |
|--|-----------------------------|----------------|--|-----------------|------------------------|
| Corrected As found | NO _x = 779.3 ppb | NO = 781.4 ppb | | *Percent Change | NO _x = 2.1% |
| Previous Response | NO _x = 795.5 ppb | NO = 796.0 ppb | | *Percent Change | NO = 1.9% |
| * = > +/-5% change initiates investigation | | | | | |

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO drop conc (ppb) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | Converter Efficiency <i>Limit = 96-104%</i> |
|----------------------------------|------------------------------|---|--|---------------------------------------|--|---|--|---|--|
| 1st NO ref point | | 0.0 | 799.0 | 796.2 | 2.8 | 0.9991 | 1.0026 | ---- | ---- |
| 1st NO2 (400 ppb O3) | 397.5 | 398.7 | 798.3 | 397.5 | 400.9 | 0.9999 | ---- | 0.9945 | 100.6% |
| 2nd NO2 (200 ppb O3) | 510.3 | 285.9 | 797.9 | 510.3 | 287.5 | 1.0004 | ---- | 0.9944 | 100.6% |
| 3rd NO2 (100 ppb O3) | 646.4 | 149.8 | 796.1 | 646.4 | 149.7 | 1.0028 | ---- | 1.0007 | 99.9% |
| 2nd NO ref point | ---- | 0.0 | 797.8 | 793.1 | 4.6 | 1.0006 | 1.0065 | ---- | ---- |
| Average Correction Factor | | | | | | 1.0009 | 1.0045 | 0.9965 | 100.3% |

Notes: No maintenance done. Span adjusted. During asleft span the NO concentration was low by 20ppb than GPT 1 NO2 point

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

Version-03-2017

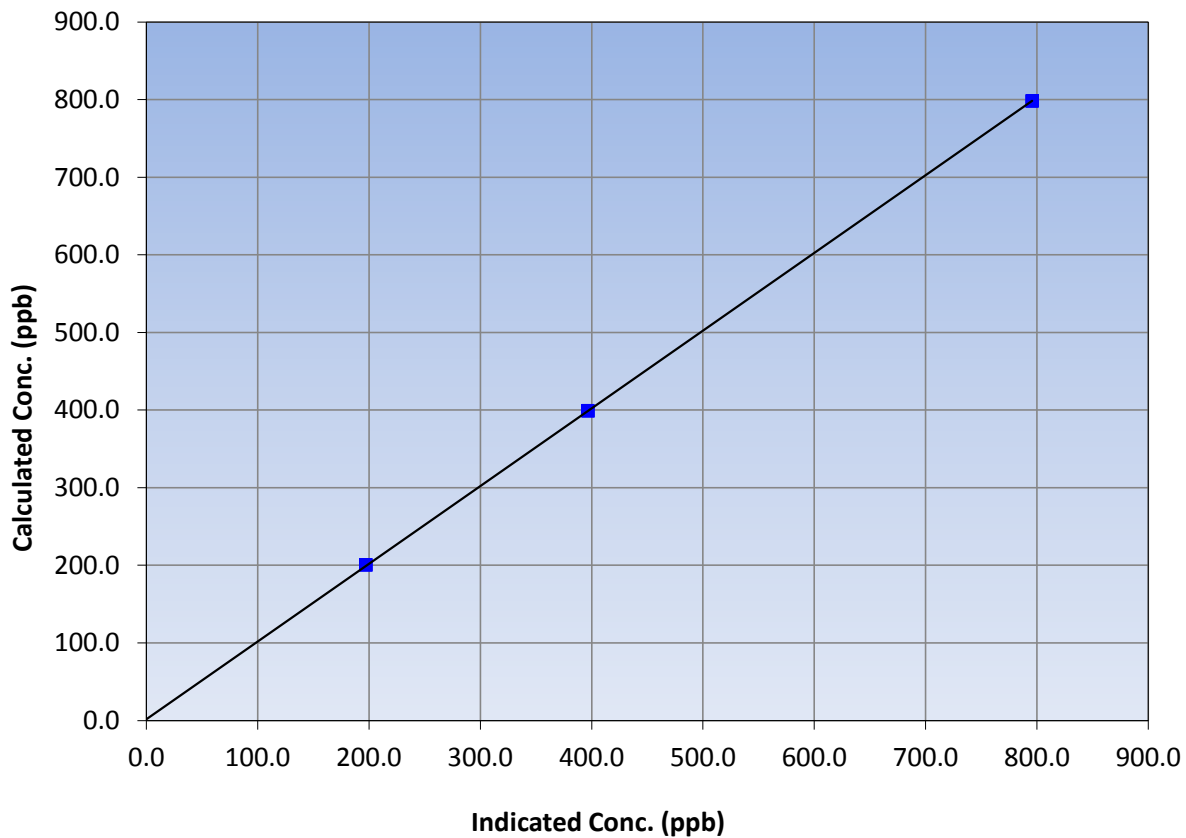
Station Information

| | | | |
|------------------|-------------------|----------------------|---------------|
| Calibration Date | August 15, 2017 | Previous Calibration | July 27, 2017 |
| Station Name | Buffalo Viewpoint | Station Number | AMS 04 |
| Start Time (MST) | 8:30 | End Time (MST) | 13:25 |
| Analyzer make | API T200 | Analyzer serial # | 1035 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | -0.5 | ---- | Correlation Coefficient | ≥0.995 | |
| 798.2 | 795.7 | 1.0032 | | | |
| 399.1 | 396.8 | 1.0057 | | | |
| 200.5 | 197.3 | 1.0162 | | | |
| | | | Slope | 1.001731 | 0.90 - 1.10 |
| | | | Intercept | 1.527388 | +/-20 |

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

Version-03-2017

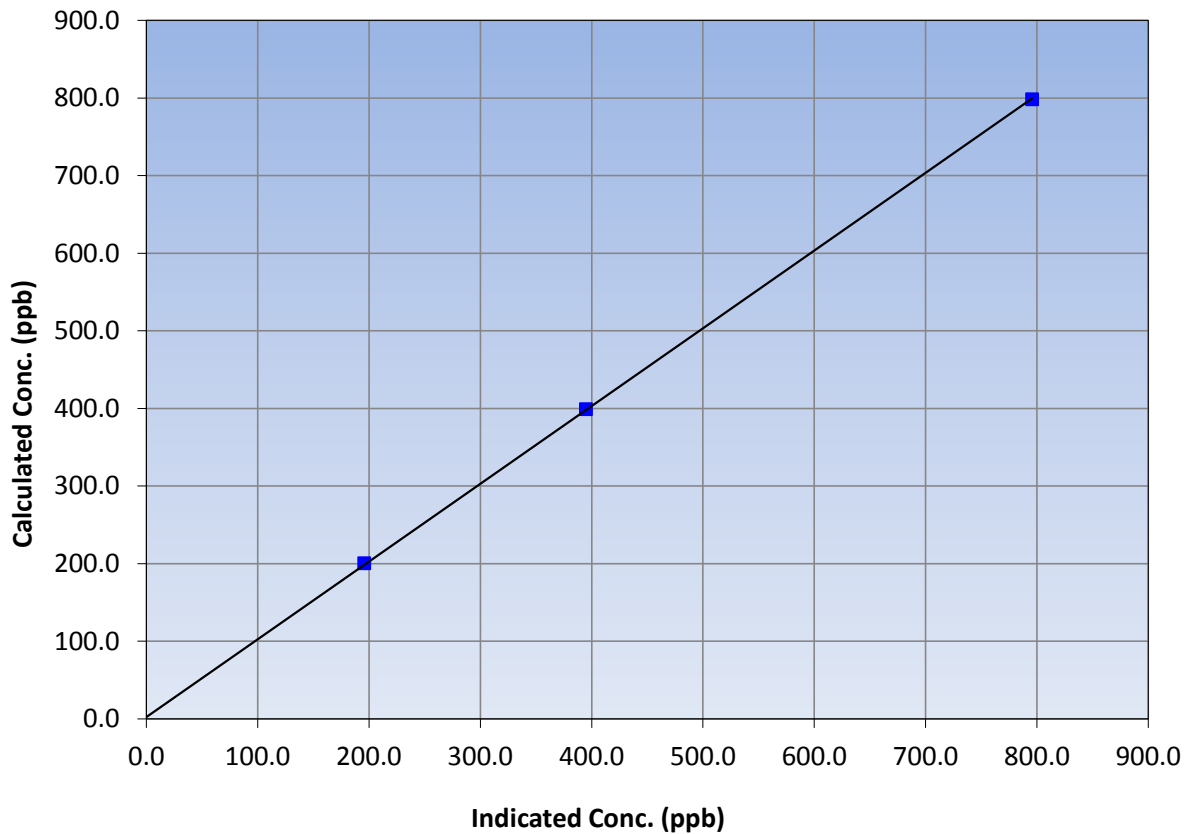
Station Information

| | | | |
|------------------|-------------------|----------------------|---------------|
| Calibration Date | August 15, 2017 | Previous Calibration | July 27, 2017 |
| Station Name | Buffalo Viewpoint | Station Number | AMS 04 |
| Start Time (MST) | 8:30 | End Time (MST) | 13:25 |
| Analyzer make | API T200 | Analyzer serial # | 1035 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|-------------|
| 0.0 | -0.2 | ---- | Correlation Coefficient | 0.999967 | ≥0.995 |
| 798.2 | 795.6 | 1.0033 | | | |
| 399.1 | 394.9 | 1.0106 | Slope | 1.001723 | 0.90 - 1.10 |
| 200.5 | 195.7 | 1.0245 | | | |
| | | | Intercept | 2.356721 | +/-20 |

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

Version-03-2017

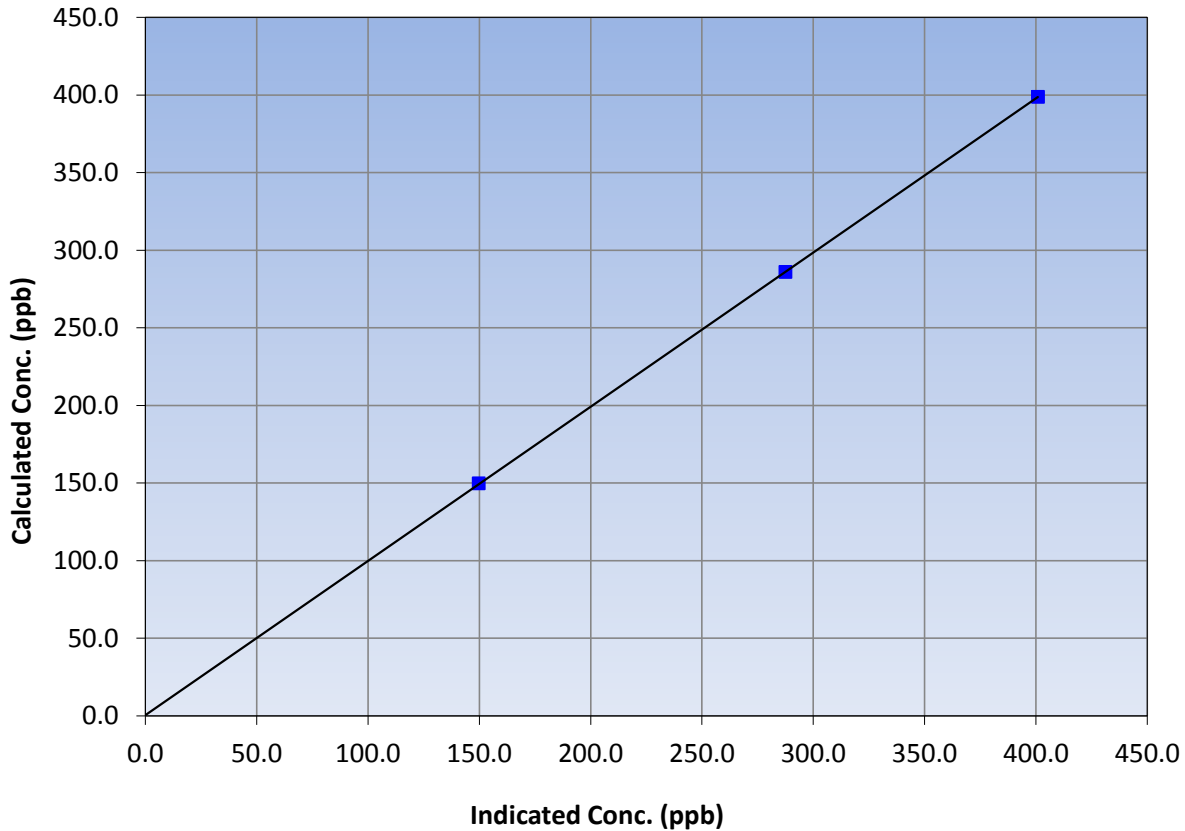
Station Information

| | | | |
|------------------|-------------------|----------------------|---------------|
| Calibration Date | August 15, 2017 | Previous Calibration | July 27, 2017 |
| Station Name | Buffalo Viewpoint | Station Number | AMS 04 |
| Start Time (MST) | 8:30 | End Time (MST) | 13:25 |
| Analyzer make | API T200 | Analyzer serial # | 1035 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | -0.3 | ---- | Correlation Coefficient | ≥0.995 | |
| 398.7 | 400.9 | 0.9945 | | | |
| 285.9 | 287.5 | 0.9944 | | | |
| 149.8 | 149.7 | 1.0007 | | | |
| | | | Slope | 0.993190 | 0.90 - 1.10 |
| | | | Intercept | 0.576259 | +/-20 |

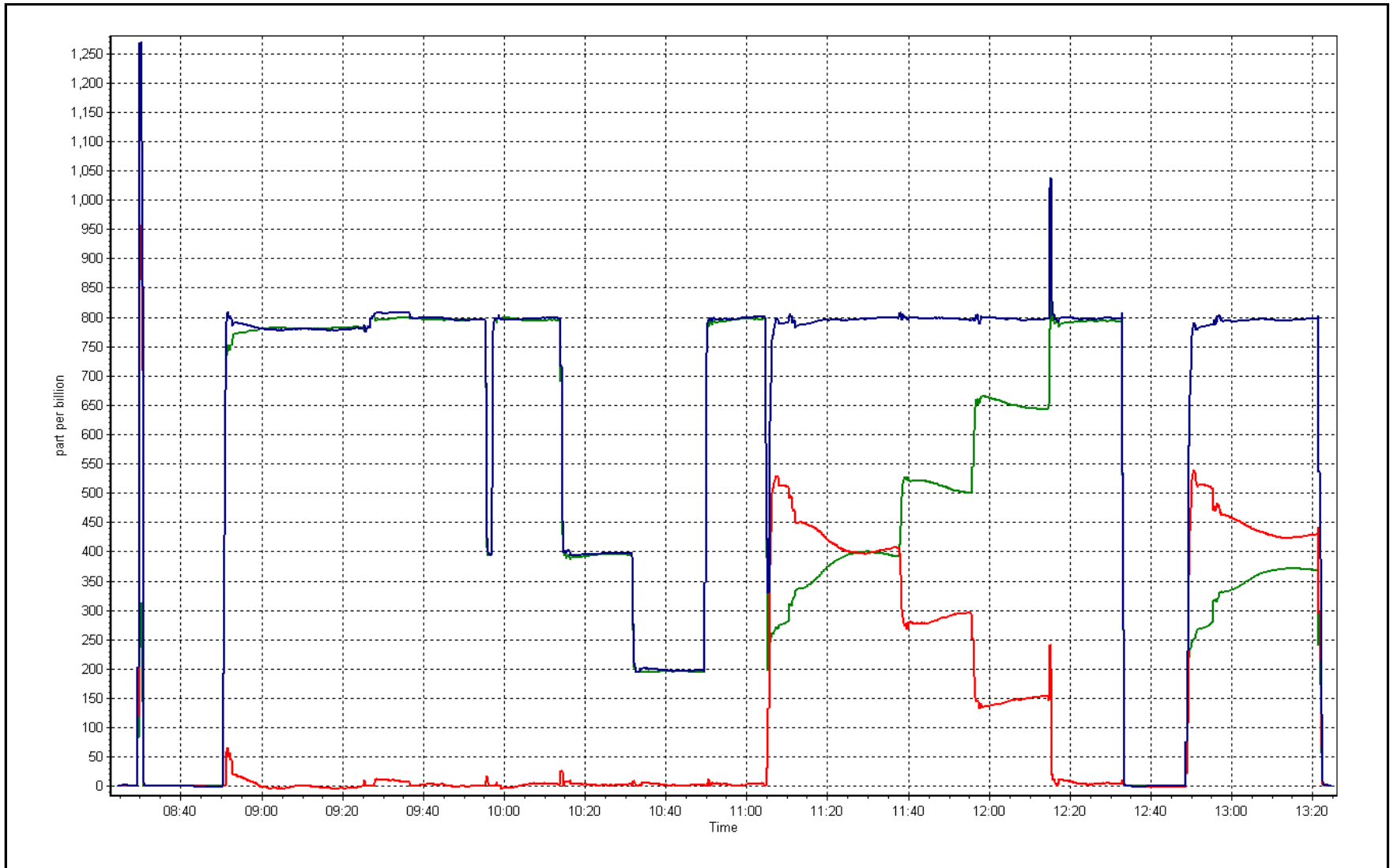
NO₂ Calibration Curve



NO_x Calibration Plot

Date: August 15, 2017

Location: Buffalo Viewpoint





Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-02-2017

Station Information

| | | | |
|------------------------|-------------------|-----------------|--------|
| Station Name: | Buffalo Viewpoint | Station number: | AMS 04 |
| Calibration Date: | August 4, 2017 | Last Cal Date: | |
| Start time (MST): | 6:01 | End time (MST): | 6:34 |
| Sharp Model: | Thermo 5030 | S/N: | 4173 |
| Particulate Fraction: | PM2.5 | C14 Source S/N: | E-803 |
| Flow Meter Make/Model: | Delta Cal | S/N: | 141227 |
| Temp/RH standard: | Delta Cal | S/N: | 141227 |

| <u>Parameter</u> | <u>As found</u> | <u>Measured</u> | <u>As left</u> | <u>Adjusted</u> | (Limits) |
|-----------------------------|-----------------|-------------------------------------|----------------|-------------------------------------|-----------------|
| T1 (°C) | 16 | 15 | 16 | <input type="checkbox"/> | +/- 2 °C |
| P3 (hPa) | 977 | 976 | 977 | <input type="checkbox"/> | +/- 13 hPa |
| flow (LPH) | 1000 | 1030 | 1000 | <input checked="" type="checkbox"/> | +/- 50 LPH |
| Nephelometer zero | 0.5 | ----- | 0.5 | <input type="checkbox"/> | +/- 0.5 ug/m3 |
| Instrument Clock: | Verified | <input checked="" type="checkbox"/> | | | |
| Cyclone cleaning : | PM10 Cyclone | <input checked="" type="checkbox"/> | PM2.5 Cyclone | <input checked="" type="checkbox"/> | |
| Date Filter Tape Installed: | | | | | |

Quarterly Calibration Test

Leak Test: Date of check: August 4, 2017 Last Cal Date: _____
 Flow w/o adaptor: 17.12 Flow w/ adaptor: 16.82

(Limit) 0.4 LPM

| <u>Adjusted</u> | <u>Current Test</u> | <u>Previous Test</u> | <u>% Change</u> |
|-----------------------------------|--------------------------------|--------------------------------|-----------------|
| <input type="checkbox"/> | Foil S/N: _____ | Foil S/N: _____ | |
| Foil Calibration | Foil Mass: _____ | Foil Mass: _____ | |
| | Calibration Date: _____ | Calibration Date: _____ | |
| (Limit) +/- 5% of previous | Correction Factor: <u>7120</u> | Correction Factor: <u>7000</u> | <u>1.71%</u> |

Annual Calibration Test

| <u>Parameter</u> | <u>As found</u> | <u>Measured</u> | <u>As left</u> | <u>Adjusted</u> | (Limits) |
|-----------------------------|-----------------|-----------------|----------------|--------------------------|-----------------|
| T2 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| T3 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| T4 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| RH (%) | | | | <input type="checkbox"/> | +/- 10% |
| Date Sample Tube Cleaned: | | | | | |
| Date Pump Rebuilt/Replaced: | | | | | |

Notes: Install Calibration, cyclone head cleaned; flow adjusted

Calibration by: Melissa



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 5
MANNIX
AUGUST 2017**

Operations, Data Collection,
QA/QC, Data Validation and Reporting by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

September 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)
AUGUST 2017

MONTHLY SUMMARY for
AMD SECTION III.B.1(c)

| Parameter | Hours of Data | Hours of Calibration | Hours without Data | Operational Time | Maximum 1-Hour Value | 1-Hour Exceedances | Maximum 24-Hour Value | 24-Hour Exceedances |
|---|---------------|----------------------|--------------------|------------------|----------------------|--------------------|-----------------------|---------------------|
| SO2 (ppb) Average | 709 | 35 | 35 | 100 | 44 | 0 | 14 | 0 |
| H2S (ppb) Average | 708 | 36 | 36 | 100 | 14 | 5 | 4 | 1 |
| THC (ppm) Average | 707 | 35 | 37 | 99.73 | 4.5 | - | 2.7 | - |
| Temperature 2 m (C) Average | 744 | 0 | 0 | 100 | 30.8 | - | 24.1 | - |
| Temperature 20 m (C) Average | 744 | 0 | 0 | 100 | 29.8 | - | 24.3 | - |
| Temperature 45 m (C) Average | 744 | 0 | 0 | 100 | 29.4 | - | 24.2 | - |
| Temperature 75 m (C) Average | 744 | 0 | 0 | 100 | 29.1 | - | 24 | - |
| Temperature 90 m (C) Average | 744 | 0 | 0 | 100 | 29 | - | 24 | - |
| Relative Humidity 2 m (%) Average | 744 | 0 | 0 | 100 | 97 | - | 88 | - |
| Relative Humidity 20 m (%) Average | 744 | 0 | 0 | 100 | 95 | - | 85 | - |
| Relative Humidity 45 m (%) Average | 744 | 0 | 0 | 100 | 95 | - | 85 | - |
| Relative Humidity 75 m (%) Average | 744 | 0 | 0 | 100 | 94 | - | 84 | - |
| Relative Humidity 90 m (%) Average | 744 | 0 | 0 | 100 | 94 | - | 84 | - |
| Wind Speed 20 m (km/h) Average | 744 | 0 | 0 | 100 | 38 | - | 20 | - |
| Wind Speed 45 m (km/h) Average | 744 | 0 | 0 | 100 | 44 | - | 26 | - |
| Wind Speed 75 m (km/h) Average | 744 | 0 | 0 | 100 | 47 | - | 29 | - |
| Wind Speed 90 m (km/h) Average | 744 | 0 | 0 | 100 | 49 | - | 31 | - |
| Wind Direction 20 m (deg) Average | 744 | 0 | 0 | 100 | - | - | - | - |
| Wind Direction 45 m (deg) Average | 744 | 0 | 0 | 100 | - | - | - | - |
| Wind Direction 75 m (deg) Average | 744 | 0 | 0 | 100 | - | - | - | - |
| Wind Direction 90 m (deg) Average | 744 | 0 | 0 | 100 | - | - | - | - |
| Vertical Wind Speed 20 m (km/h) Average | 744 | 0 | 0 | 100 | 1.5 | - | 1 | - |
| Vertical Wind Speed 45 m (km/h) Average | 744 | 0 | 0 | 100 | 3 | - | 1.9 | - |
| Vertical Wind Speed 75 m (km/h) Average | 744 | 0 | 0 | 100 | 1.8 | - | 1 | - |
| Vertical Wind Speed 90 m (km/h) Average | 743 | 0 | 1 | 99.87 | 2.2 | - | 0.7 | - |

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)
AUGUST 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

| Parameter | Number | Mean | StnDev | Total | Percentile | | | | | | |
|---|--------|-------|--------|-------|------------|------|------|--------|------|------|------|
| | | | | | Min | P10 | Q1 | Median | Q3 | P90 | Max |
| SO2 (ppb) Average | 709 | 1.4 | 5 | - | 0 | 0 | 0 | 0 | 0 | 2 | 44 |
| H2S (ppb) Average | 708 | 0.6 | 2 | - | 0 | 0 | 0 | 0 | 0 | 1 | 14 |
| THC (ppm) Average | 707 | 2.26 | 0.3 | - | 2 | 2.1 | 2.1 | 2.2 | 2.3 | 2.5 | 4.5 |
| Temperature 2 m (C) Average | 744 | 17.77 | 5.1 | - | 6 | 11.5 | 13.8 | 17.2 | 21.8 | 24.8 | 30.8 |
| Temperature 20 m (C) Average | 744 | 18.27 | 4.6 | - | 8.6 | 12.5 | 14.6 | 18.1 | 21.7 | 24.4 | 29.8 |
| Temperature 45 m (C) Average | 744 | 18.24 | 4.4 | - | 8.9 | 12.5 | 14.6 | 18.2 | 21.5 | 24.2 | 29.4 |
| Temperature 75 m (C) Average | 744 | 18.21 | 4.3 | - | 9 | 12.6 | 14.9 | 18.1 | 21.3 | 24 | 29.1 |
| Temperature 90 m (C) Average | 744 | 18.19 | 4.2 | - | 9.1 | 12.6 | 15.1 | 18.1 | 21.2 | 23.8 | 29 |
| Relative Humidity 2 m (%) Average | 744 | 62.5 | 20 | - | 24 | 34 | 45 | 63 | 80 | 91 | 97 |
| Relative Humidity 20 m (%) Average | 744 | 57.9 | 19 | - | 23 | 32 | 41 | 59 | 73 | 86 | 95 |
| Relative Humidity 45 m (%) Average | 744 | 57.1 | 19 | - | 23 | 32 | 40 | 58 | 71 | 84 | 95 |
| Relative Humidity 75 m (%) Average | 744 | 56.2 | 18 | - | 23 | 31 | 40 | 57 | 70 | 83 | 94 |
| Relative Humidity 90 m (%) Average | 744 | 56 | 18 | - | 23 | 31 | 40 | 56 | 69 | 81 | 94 |
| Wind Speed 20 m (km/h) Average | 744 | 10.7 | 6 | - | 1 | 4 | 6 | 9 | 14 | 19 | 38 |
| Wind Speed 45 m (km/h) Average | 744 | 15.2 | 8 | - | 1 | 5 | 9 | 14 | 20 | 26 | 44 |
| Wind Speed 75 m (km/h) Average | 744 | 17.2 | 9 | - | 1 | 6 | 9 | 17 | 24 | 30 | 47 |
| Wind Speed 90 m (km/h) Average | 744 | 18.4 | 10 | - | 1 | 6 | 10 | 18 | 26 | 31 | 49 |
| Wind Direction 20 m (deg) Average | 744 | - | - | - | - | - | - | - | - | - | - |
| Wind Direction 45 m (deg) Average | 744 | - | - | - | - | - | - | - | - | - | - |
| Wind Direction 75 m (deg) Average | 744 | - | - | - | - | - | - | - | - | - | - |
| Wind Direction 90 m (deg) Average | 744 | - | - | - | - | - | - | - | - | - | - |
| Vertical Wind Speed 20 m (km/h) Average | 744 | 0.14 | 0.4 | - | -0.9 | -0.3 | -0.2 | 0.1 | 0.4 | 0.7 | 1.5 |
| Vertical Wind Speed 45 m (km/h) Average | 744 | 0.42 | 0.7 | - | -0.9 | -0.3 | -0.1 | 0.2 | 0.9 | 1.5 | 3 |
| Vertical Wind Speed 75 m (km/h) Average | 744 | 0.29 | 0.4 | - | -0.7 | -0.1 | 0 | 0.2 | 0.5 | 0.8 | 1.8 |
| Vertical Wind Speed 90 m (km/h) Average | 743 | 0.17 | 0.4 | - | -1 | -0.4 | -0.1 | 0.1 | 0.4 | 0.7 | 2.2 |

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)
AUGUST 2017

OPERATIONAL NOTES

| Parameter | Period Start | Period End | Duration (Hours) | Notes |
|--------------------------|-------------------|-------------------|------------------|--------------------|
| THC | 27 Aug 2017 07:00 | 27 Aug 2017 08:00 | 2 | Analyzer failure |
| Vertical Wind Speed 90 m | 15 Aug 2017 21:00 | 15 Aug 2017 21:00 | 1 | Unstable operation |



Wood Buffalo Environmental Association

Summary of Hour Averages

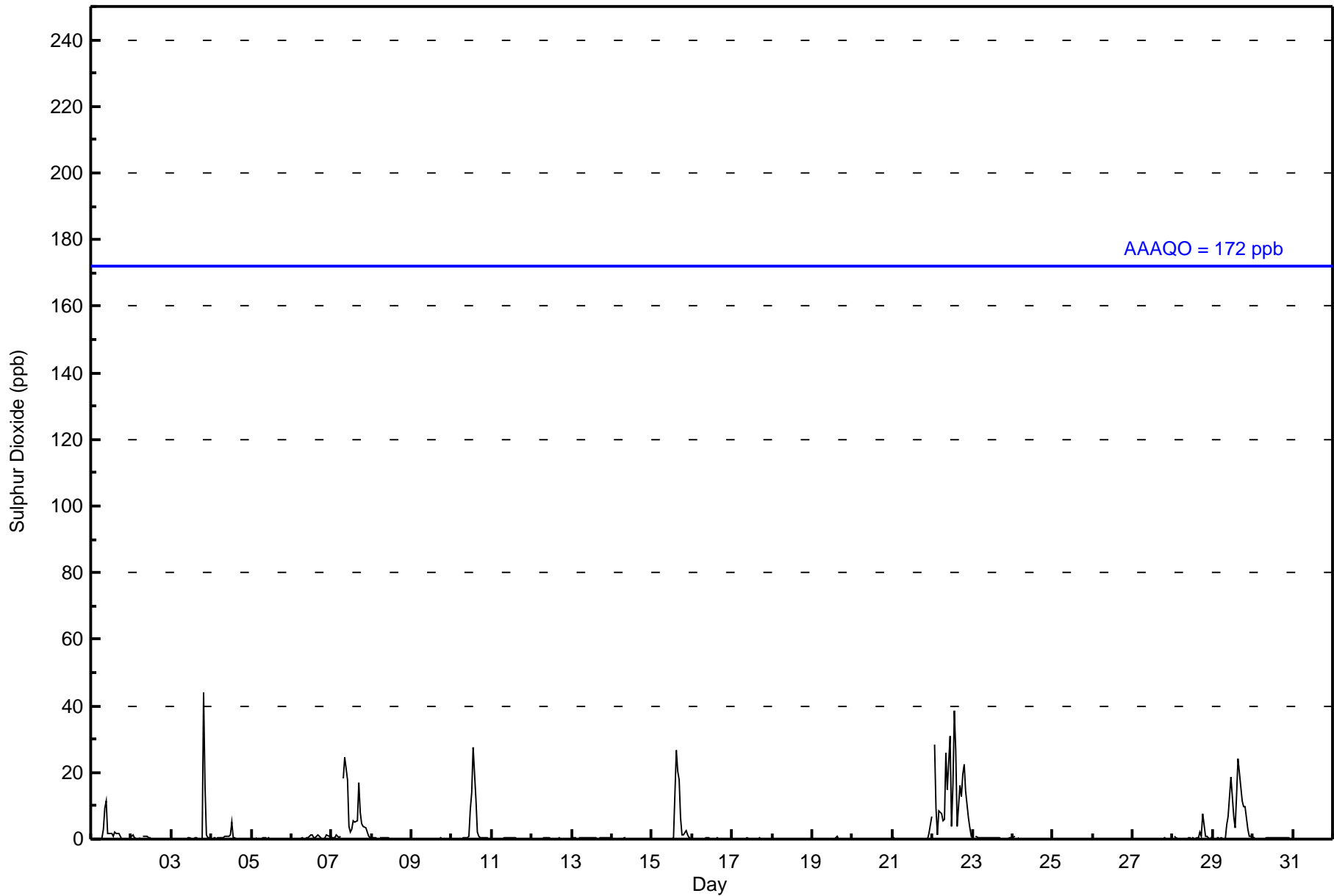
Sulphur Dioxide (SO₂) - ppb

Mannix - August 2017

| | | | | |
|---|---|----------|---------------------------|-------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 44 ppb on Aug 3 20:00 | Maximum Daily Average: 14.1 ppb on Aug 22 | | Hours of Data: | 709 |
| Minimum Value: 0 ppb on Aug 2 17:00 | Minimum Daily Average: 0.0 ppb on Aug 25 | | Hours of Missing Data: | 35 |
| Maximum Diurnal Average: 2.9 ppb at hour 15 | Minimum Diurnal Average: 0.2 ppb at hour 1 | | Hours of Calibration: | 35 |
| Monthly Average: 1.4 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 2 P ₉₉ = 26 | | Percent Operational Time: | 100.0 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | |
|--------|-------------------------------|----|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|---------------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|--|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 3 | 9 | 11 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1.6 | 11 | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 1 | 1 | 0 | 0 | 0 | 0 | Z | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 44 | 16 | 1 | 1 | 0 | 2.8 | 44 | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 5 | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0.5 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 0 | 0 | 1 | 1 | 0 | 1 | Z | 18 | 25 | 18 | 4 | 2 | 3 | 6 | 5 | 6 | 17 | 8 | 5 | 4 | 3 | 2 | 1 | 0 | 5.6 | 25 | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 9 | 14 | 27 | 12 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.0 | 27 | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 0 | 0 | 0 | Z | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | C | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 27 | 20 | 18 | 6 | 1 | 1 | 2 | 1 | 0 | 0 | 3.4 | 27 | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 1 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 7 | 0.5 | 7 | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | Z | 28 | 9 | 1 | 8 | 8 | 5 | 6 | 26 | 15 | 31 | 4 | 16 | 39 | 26 | 4 | 16 | 13 | 19 | 23 | 14 | 7 | 3 | 1 | 14.1 | 39 | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 1 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 0 | 1 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0.1 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 8 | 1 | 1 | 0 | 0 | 1 | 0.8 | 8 | | | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 7 | 13 | 19 | 7 | 4 | 13 | 24 | 20 | 11 | 10 | 10 | 6 | 3 | 1 | 1 | 6.7 | 24 | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.2 | 1.3 | 0.6 | 0.2 | 0.4 | 0.5 | 0.3 | 1.1 | 2.3 | 1.9 | 1.9 | 1.4 | 1.7 | 2.6 | 2.9 | 2.0 | 2.6 | 1.4 | 1.5 | 2.8 | 1.5 | 0.6 | 0.4 | 0.4 | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | | | | | | | 1 | 28 | 9 | 1 | 8 | 8 | 5 | 18 | 26 | 18 | 31 | 19 | 16 | 39 | 27 | 24 | 20 | 13 | 19 | 44 | 16 | 7 | 3 | 7 | Diurnal Maximum | |

Z - zerospan C - Calibration
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Mannix - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 10 | 678 | 95.63 | 95.63 |
| 11 - 20 | 20 | 2.82 | 98.45 |
| 21 - 60 | 11 | 1.55 | 100.00 |
| 61 - 110 | 0 | 0.00 | 100.00 |
| 111 - 172 | 0 | 0.00 | 100.00 |
| > 172 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 709

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Mannix - August 2017

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 10 | 20 | 12 | 3 | 9 | 6 | 14 | 110 | 113 | 53 | 56 | 63 | 119 | 65 | 19 | 6 | 10 | 678 |
| 11 - 20 | 4 | 0 | 4 | 2 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 3 | 1 | 1 | 1 | 20 |
| 21 - 60 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 2 | 2 | 11 |
| 61 - 110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 111 - 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 24 | 13 | 7 | 11 | 10 | 14 | 111 | 113 | 53 | 56 | 63 | 121 | 70 | 21 | 9 | 13 | 709 |

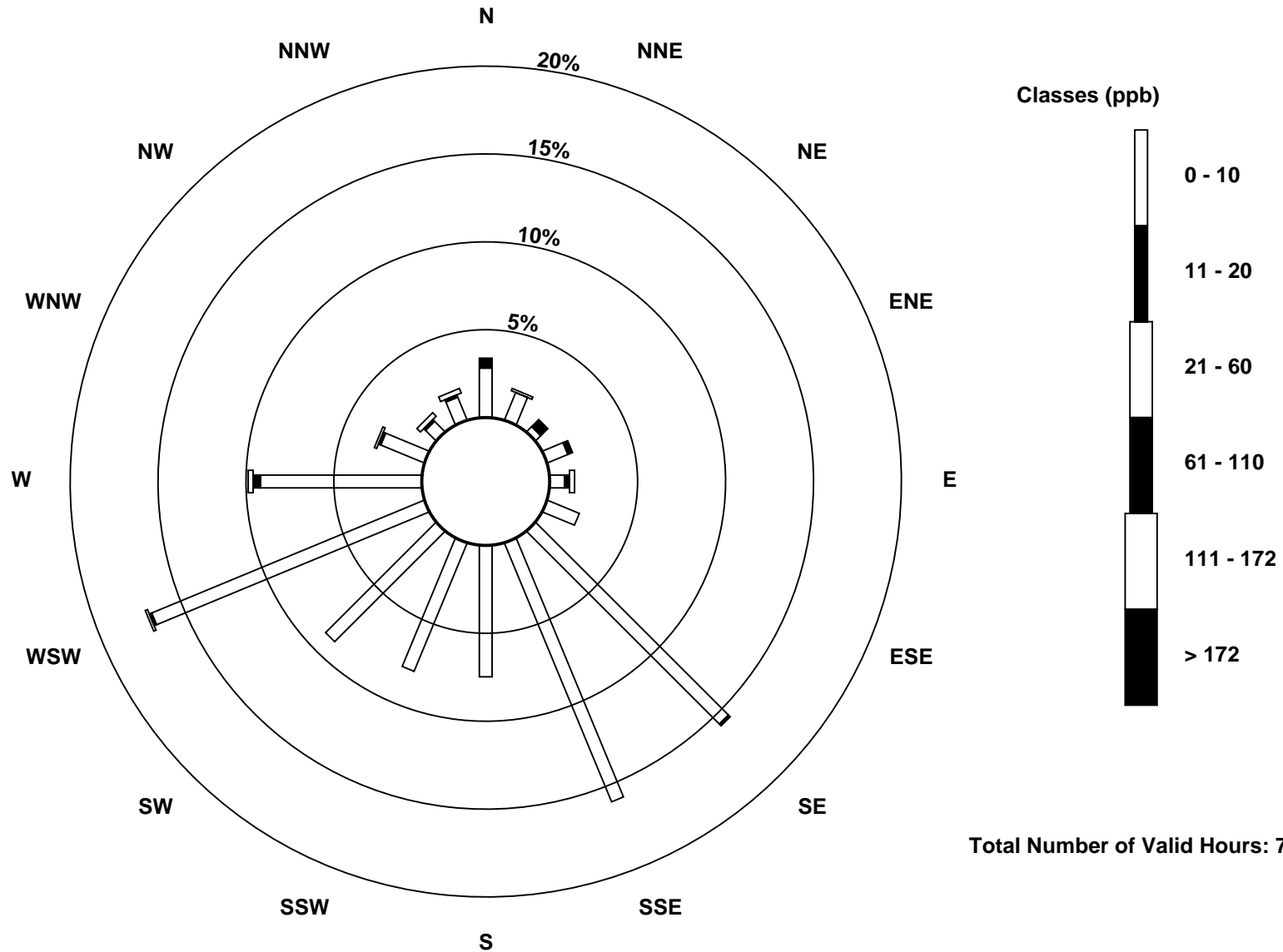
Total Number of Valid Hours: 709

Total Number of Hours: 744

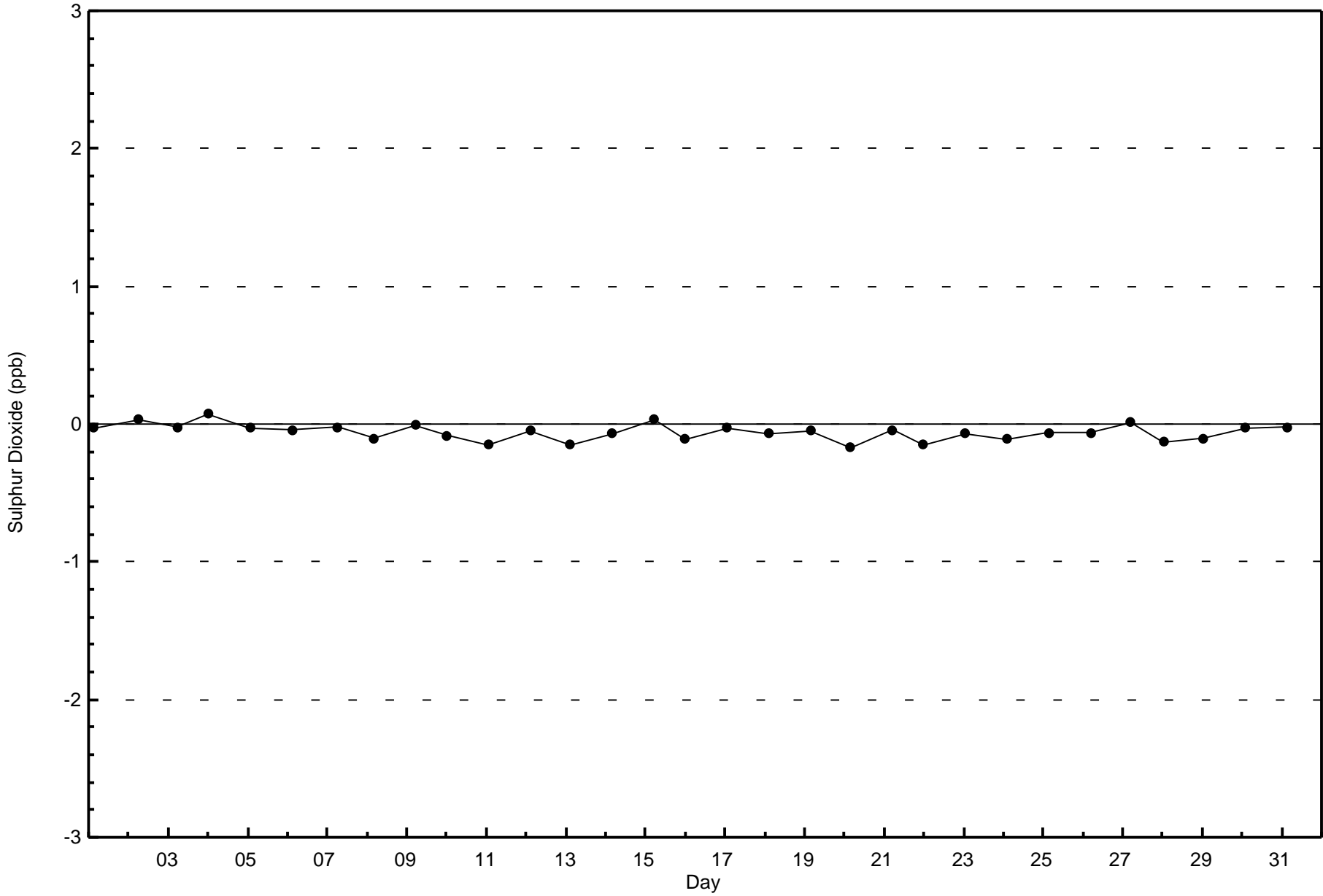


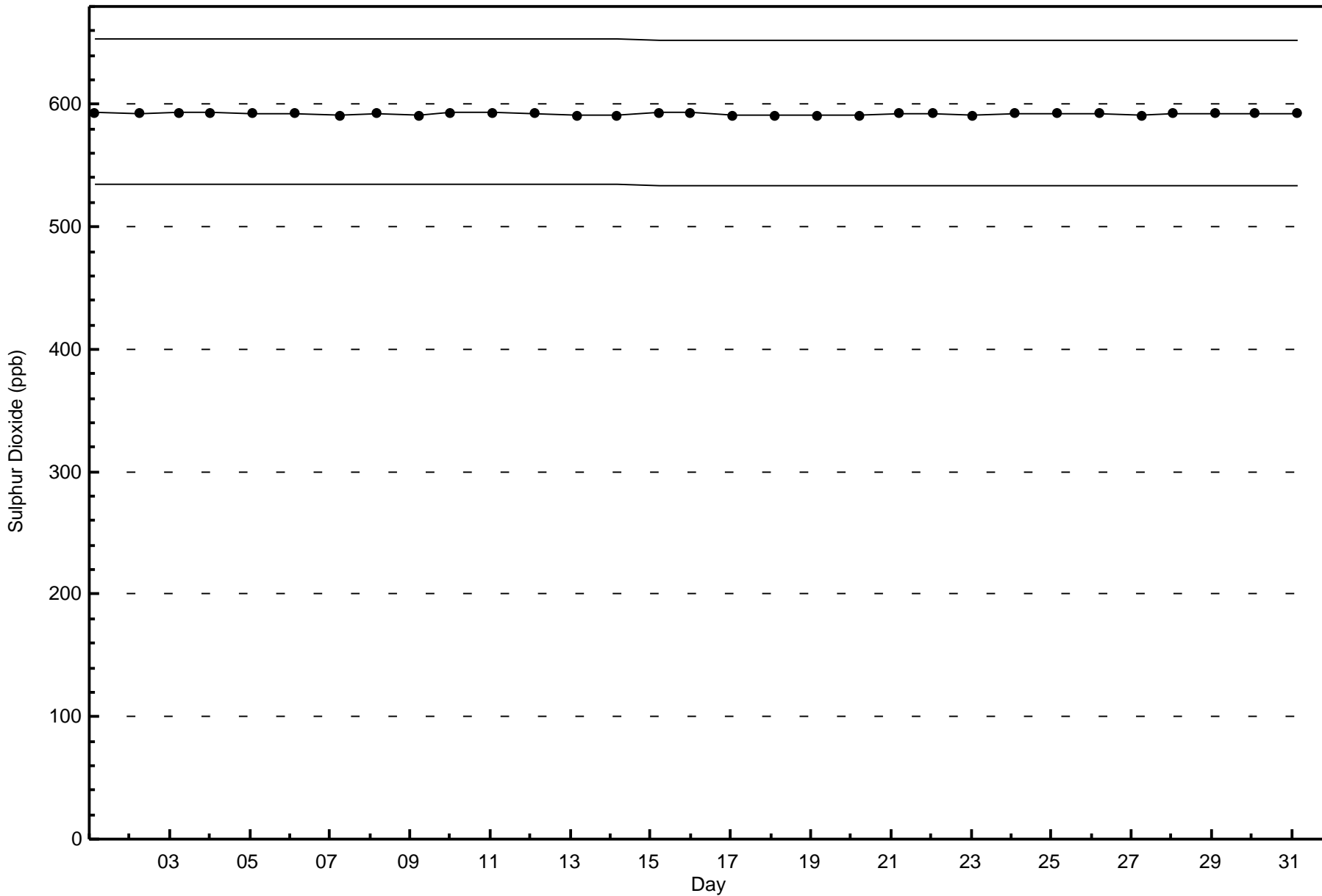
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Sulphur Dioxide (SO₂) - ppb
Mannix (AMS 5)



Total Number of Valid Hours: 709





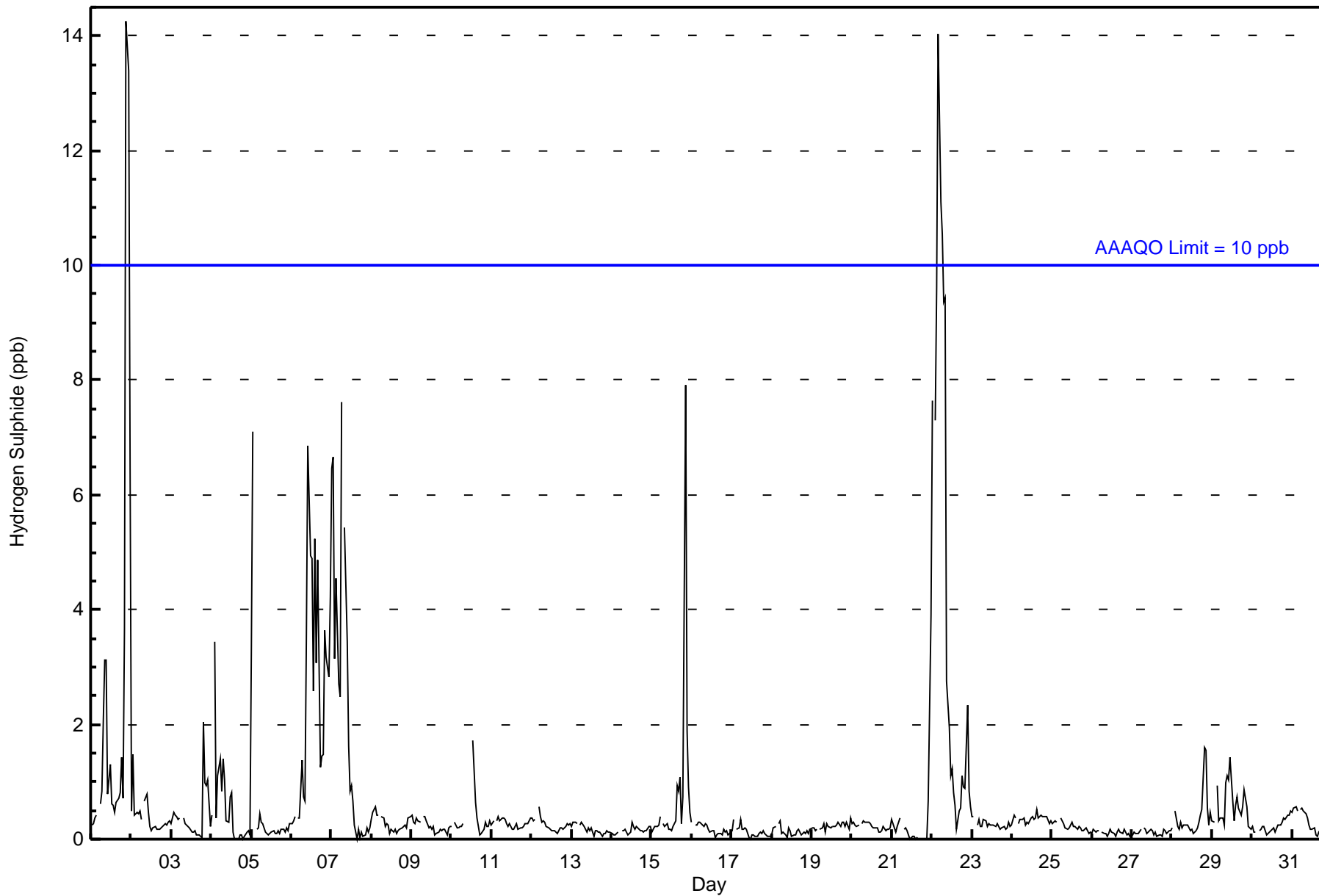


| | | | | |
|--|--|----------|---------------------------|-------|
| Number of Exceedences (AAAQO): | 1-hr: 5 | 24-hr: 1 | Hours in Service: | 744 |
| Maximum Value: 14 ppb on Aug 1 22:00 | Maximum Daily Average: 4.1 ppb on Aug 22 | | Hours of Data: | 708 |
| Minimum Value: 0 ppb on Aug 4 15:00 | Minimum Daily Average: 0.1 ppb on Aug 26 | | Hours of Missing Data: | 36 |
| Maximum Diurnal Average: 1.0 ppb at hour 7 | Minimum Diurnal Average: 0.3 ppb at hour 18 | | Hours of Calibration: | 36 |
| Monthly Average: 0.6 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 9 | | Percent Operational Time: | 100.0 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
|--------|-------------------------------|---|---|----|----|----|----|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|---------------|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 0 | 0 | 0 | 0 | Z | 1 | 1 | 2 | 3 | 3 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 4 | 14 | 13 | 6 | 2.5 | 14 | |
| 2-Aug | 0 | 1 | 0 | 0 | 0 | 0 | 0 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 1 | 0 | 0.4 | 2 | |
| 4-Aug | 0 | Z | 3 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 3 | |
| 5-Aug | 3 | 7 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 7 | |
| 6-Aug | 0 | 0 | 0 | Z | 0 | 0 | 1 | 1 | 1 | 3 | 7 | 5 | 5 | 3 | 5 | 3 | 5 | 1 | 1 | 1 | 4 | 3 | 3 | 4 | 2.5 | 7 | |
| 7-Aug | 6 | 7 | 3 | 5 | 3 | 2 | 8 | Z | 5 | 3 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.1 | 8 | |
| 8-Aug | 0 | 0 | 1 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | |
| 9-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | |
| 10-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | C | C | C | C | C | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 2 | |
| 11-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | |
| 12-Aug | 0 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | |
| 13-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | |
| 14-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | |
| 15-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 8 | 2 | 1 | 0 | 0.8 | 8 | |
| 16-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | |
| 17-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | |
| 18-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | |
| 19-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | |
| 20-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 0.3 | 4 |
| 22-Aug | 8 | Z | 7 | 10 | 14 | 11 | 11 | 9 | 9 | 3 | 2 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 4.1 | 14 | |
| 23-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | |
| 24-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | |
| 25-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | |
| 26-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | |
| 28-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 2 | 1 | 0 | 0 | 0.4 | 2 | |
| 29-Aug | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0.6 | 1 | |
| 30-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | |
| 31-Aug | 0 | 1 | 1 | 0 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | |

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|--|
| 0.8 | 0.8 | 0.8 | 0.8 | 0.9 | 0.9 | 1.0 | 0.7 | 0.9 | 0.7 | 0.6 | 0.5 | 0.4 | 0.3 | 0.4 | 0.3 | 0.4 | 0.3 | 0.3 | 0.4 | 0.8 | 0.9 | 0.8 | 0.7 | Diurnal Average | |
| 8 | 7 | 7 | 10 | 14 | 11 | 11 | 9 | 9 | 3 | 7 | 5 | 5 | 3 | 5 | 3 | 5 | 1 | 1 | 2 | 8 | 14 | 13 | 6 | Diurnal Maximum | |

Z - zerospan C - Calibration
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Mannix - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2 | 668 | 94.35 | 94.35 |
| 3 - 4 | 17 | 2.40 | 96.75 |
| 5 - 7 | 12 | 1.69 | 98.45 |
| 8 - 11 | 6 | 0.85 | 99.29 |
| > 11 | 5 | 0.71 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Mannix - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|---|-----|-----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2 | 8 | 8 | 7 | 9 | 8 | 14 | 110 | 121 | 53 | 53 | 62 | 120 | 70 | 17 | 4 | 4 | 668 |
| 3 - 4 | 4 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 2 | 5 | 17 |
| 5 - 7 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 1 | 12 |
| 8 - 11 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 6 |
| > 11 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| Totals | 25 | 14 | 7 | 9 | 8 | 14 | 110 | 121 | 53 | 53 | 62 | 120 | 73 | 19 | 8 | 12 | 708 |

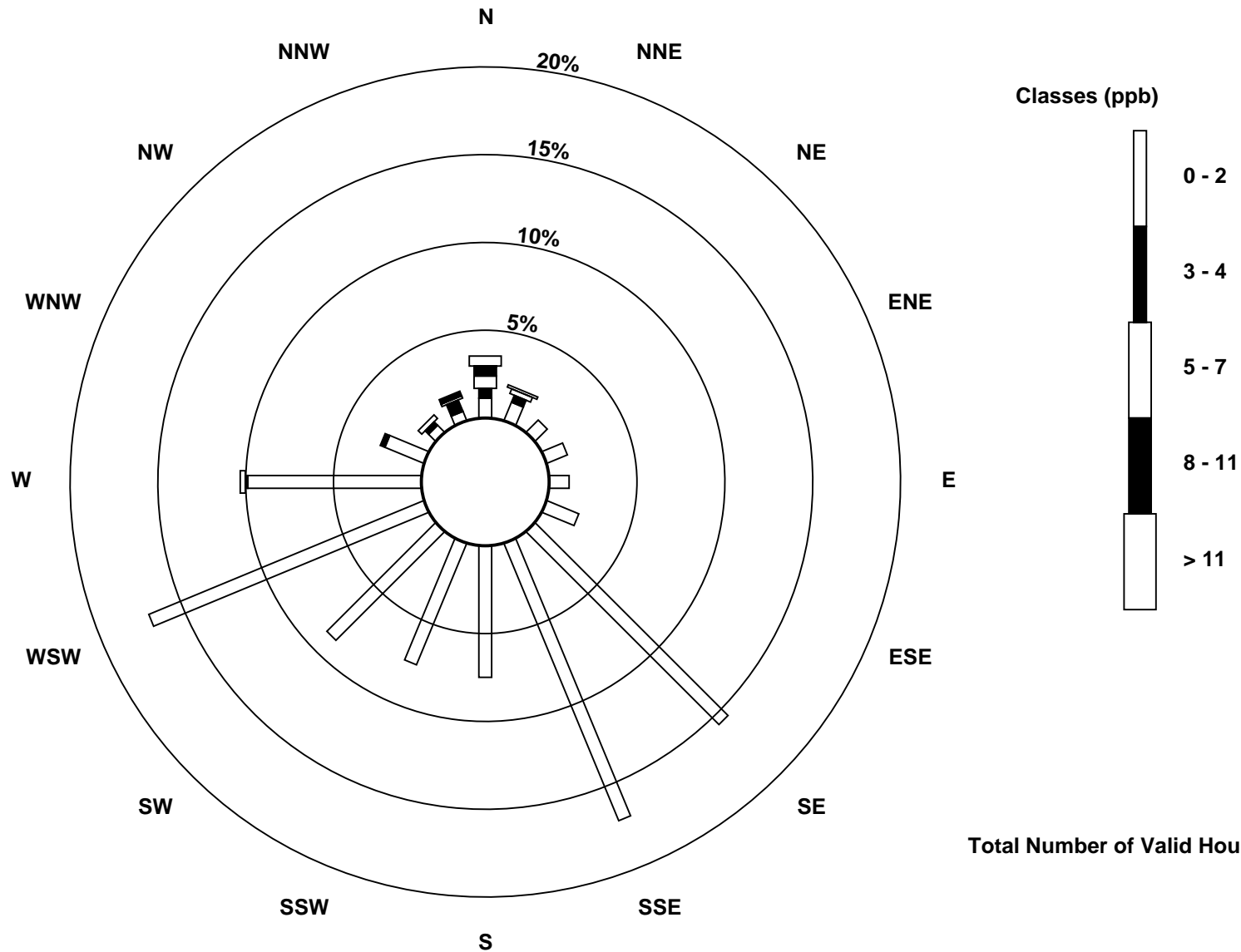
Total Number of Valid Hours: 708

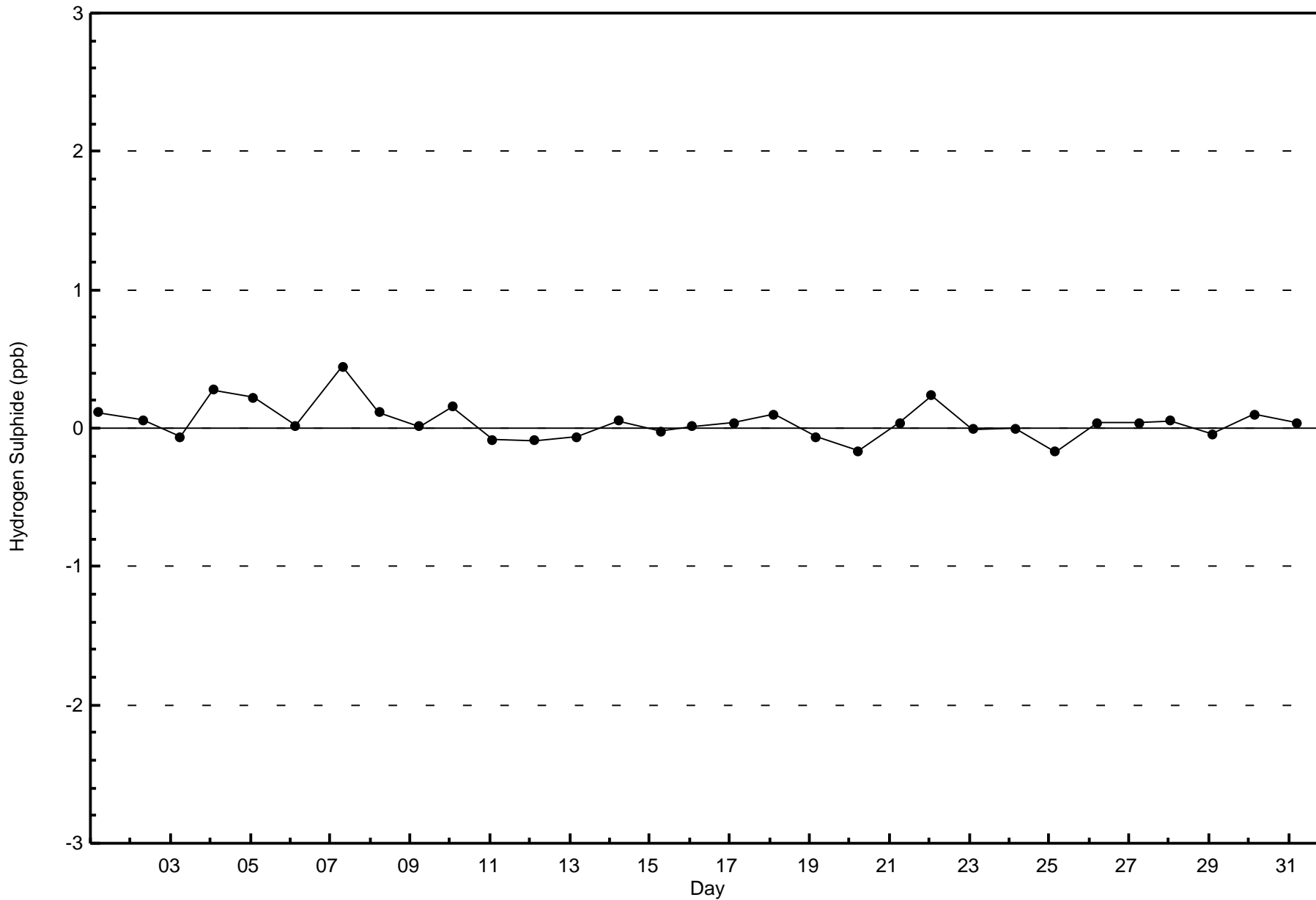
Total Number of Hours: 744

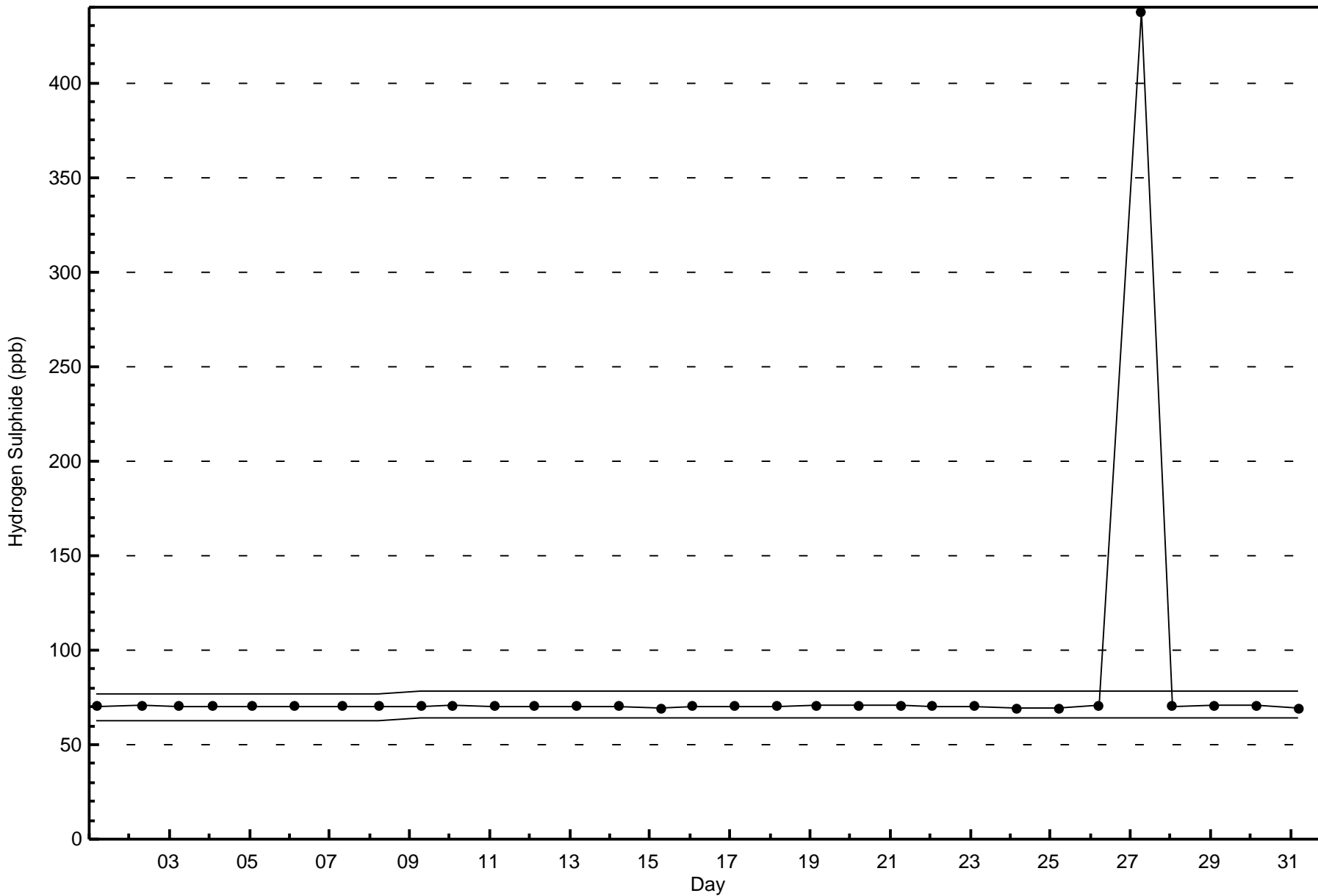


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Hydrogen Sulphide (H₂S) - ppb
Mannix (AMS 5)









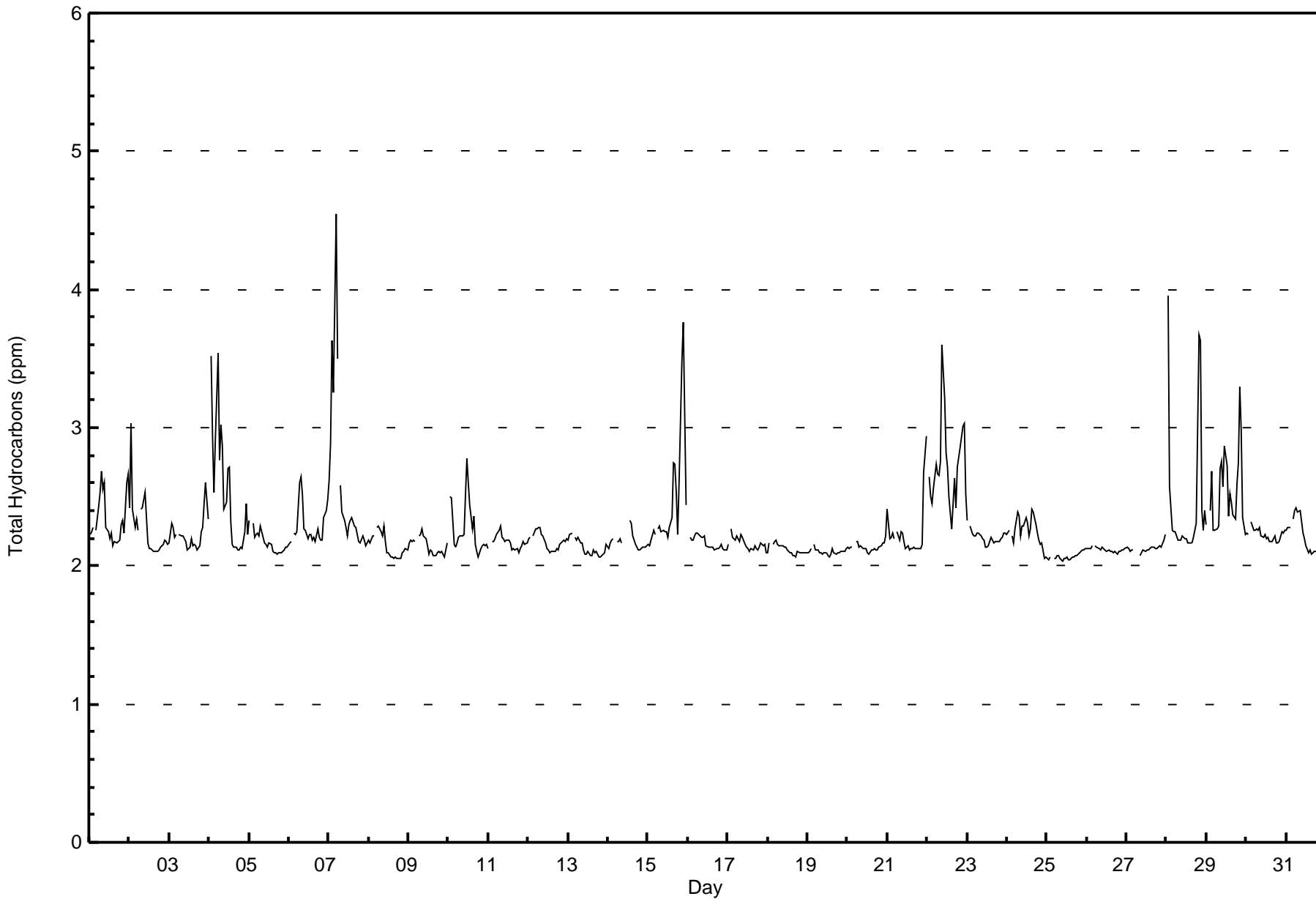
Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Mannix - August 2017

| Maximum Value: 4.5 ppm on Aug 7 05:00 | | Maximum Daily Average: 2.7 ppm on Aug 22 | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|--|-----|--------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|---------------|-----------------------|-----|
| Minimum Value: 2.0 ppm on Aug 25 10:00 | | Minimum Daily Average: 2.1 ppm on Aug 25 | | Hours of Data: 707 | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 2.4 ppm at hour 2 | | Minimum Diurnal Average: 2.2 ppm at hour 18 | | Hours of Missing Data: 37 | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 2.26 ppm | | Percentiles: P ₁ = 2.1 P ₁₀ = 2.1 Q ₁ = 2.1 Median = 2.2 Q ₃ = 2.3 P ₉₀ = 2.5 P ₉₉ = 3.6 | | Hours of Calibration: 35 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Percent Operational Time: 99.7 | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 2.2 | 2.2 | 2.3 | Z | 2.3 | 2.4 | 2.5 | 2.7 | 2.5 | 2.6 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.2 | 2.6 | 2.7 | 2.3 | 2.7 | |
| 2-Aug | 2.4 | 3.0 | 2.4 | 2.3 | 2.3 | 2.3 | Z | 2.4 | 2.4 | 2.5 | 2.3 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 3.0 | |
| 3-Aug | 2.2 | 2.3 | 2.3 | 2.2 | 2.2 | Z | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.2 | 2.1 | 2.2 | 2.1 | 2.1 | 2.1 | 2.2 | 2.3 | 2.4 | 2.6 | 2.3 | 2.2 | 2.6 | |
| 4-Aug | Z | 3.5 | 3.0 | 2.5 | 2.9 | 3.5 | 2.8 | 3.0 | 2.9 | 2.4 | 2.5 | 2.7 | 2.7 | 2.3 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.4 | 2.2 | 2.5 | 3.5 | |
| 5-Aug | 2.3 | Z | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.3 | |
| 6-Aug | 2.2 | 2.2 | Z | 2.2 | 2.2 | 2.3 | 2.6 | 2.6 | 2.5 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.2 | 2.2 | 2.2 | 2.3 | 2.4 | 2.5 | 2.3 | 2.6 | |
| 7-Aug | 2.6 | 2.9 | 3.6 | 3.3 | 4.5 | 3.5 | Z | 2.6 | 2.4 | 2.3 | 2.3 | 2.2 | 2.3 | 2.3 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.2 | 2.6 | 4.5 | | |
| 8-Aug | 2.2 | 2.2 | 2.2 | 2.2 | Z | 2.3 | 2.3 | 2.3 | 2.2 | 2.3 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.3 | | |
| 9-Aug | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | Z | 2.2 | 2.2 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.3 | | |
| 10-Aug | Z | 2.5 | 2.5 | 2.2 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.5 | 2.8 | 2.6 | 2.4 | 2.3 | 2.4 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.2 | 2.3 | 2.8 | |
| 11-Aug | 2.1 | Z | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | |
| 12-Aug | 2.2 | 2.2 | Z | 2.2 | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | |
| 13-Aug | 2.2 | 2.2 | 2.2 | Z | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.2 | | |
| 14-Aug | 2.1 | 2.2 | 2.2 | 2.2 | Z | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | C | C | C | C | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.3 | | |
| 15-Aug | 2.2 | 2.1 | 2.2 | 2.3 | 2.2 | Z | 2.3 | 2.3 | 2.2 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.8 | 2.7 | 2.5 | 2.2 | 2.6 | 3.5 | 3.8 | 3.1 | 2.4 | 2.5 | 3.8 |
| 16-Aug | Z | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | |
| 17-Aug | 2.2 | Z | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.2 | 2.1 | 2.2 | 2.3 | |
| 18-Aug | 2.1 | 2.2 | Z | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | |
| 19-Aug | 2.1 | 2.1 | 2.1 | Z | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | |
| 20-Aug | 2.1 | 2.1 | 2.1 | 2.1 | Z | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.2 | |
| 21-Aug | 2.4 | 2.2 | 2.2 | 2.2 | 2.2 | Z | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.7 | 2.9 | 2.2 | 2.9 | |
| 22-Aug | Z | 2.6 | 2.5 | 2.5 | 2.6 | 2.7 | 2.7 | 2.7 | 2.8 | 3.6 | 3.2 | 2.8 | 2.7 | 2.5 | 2.4 | 2.3 | 2.6 | 2.4 | 2.7 | 2.8 | 2.9 | 3.0 | 3.0 | 2.5 | 2.7 | 3.6 | |
| 23-Aug | 2.3 | Z | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | |
| 24-Aug | 2.2 | 2.3 | Z | 2.2 | 2.2 | 2.3 | 2.4 | 2.4 | 2.2 | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.3 | 2.4 | 2.4 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.3 | 2.4 | |
| 25-Aug | 2.1 | 2.0 | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | |
| 26-Aug | 2.1 | 2.1 | 2.1 | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | |
| 27-Aug | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | Z | AF | AF | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.1 | 2.2 | | |
| 28-Aug | Z | 4.0 | 2.6 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 3.7 | 3.6 | 2.4 | 2.3 | 2.4 | 2.4 | 4.0 |
| 29-Aug | 2.3 | Z | 2.4 | 2.7 | 2.3 | 2.3 | 2.3 | 2.3 | 2.7 | 2.8 | 2.6 | 2.9 | 2.7 | 2.4 | 2.5 | 2.5 | 2.4 | 2.3 | 2.6 | 2.7 | 3.3 | 3.0 | 2.3 | 2.2 | 2.5 | 3.3 | |
| 30-Aug | 2.2 | 2.2 | Z | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.2 | 2.3 | |
| 31-Aug | 2.3 | 2.3 | 2.3 | Z | 2.3 | 2.4 | 2.4 | 2.4 | 2.4 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.2 | 2.2 | 2.2 | 2.4 | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | |
| Z - zerospan | | | | | | | | | | | | | | | | | | | | | | | | C - Calibration | | AF - Analyzer Failure | |





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Mannix - August 2017

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2.0 | 4 | 0.57 | 0.57 |
| 2.1 - 3.0 | 688 | 97.31 | 97.88 |
| 3.1 - 10.0 | 15 | 2.12 | 100.00 |
| > 10.0 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Mannix - August 2017**

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 4 |
| 2.1 - 3.0 | 24 | 13 | 7 | 10 | 10 | 13 | 111 | 113 | 53 | 54 | 60 | 120 | 69 | 15 | 4 | 12 | 688 |
| 3.1 - 10.0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 5 | 1 | 15 |
| > 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 24 | 13 | 7 | 11 | 10 | 14 | 111 | 113 | 53 | 56 | 62 | 120 | 70 | 21 | 9 | 13 | 707 |

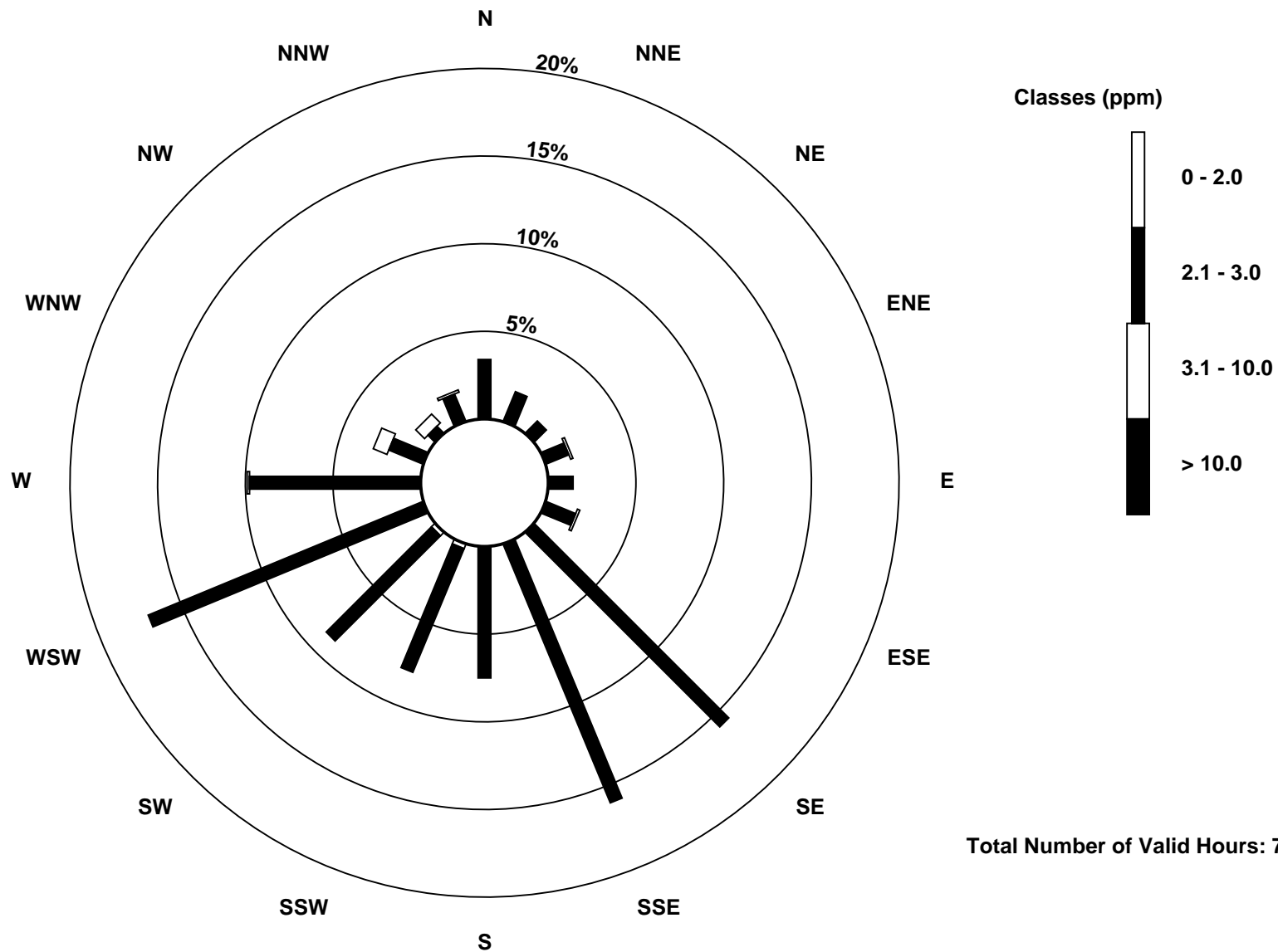
Total Number of Valid Hours: 707

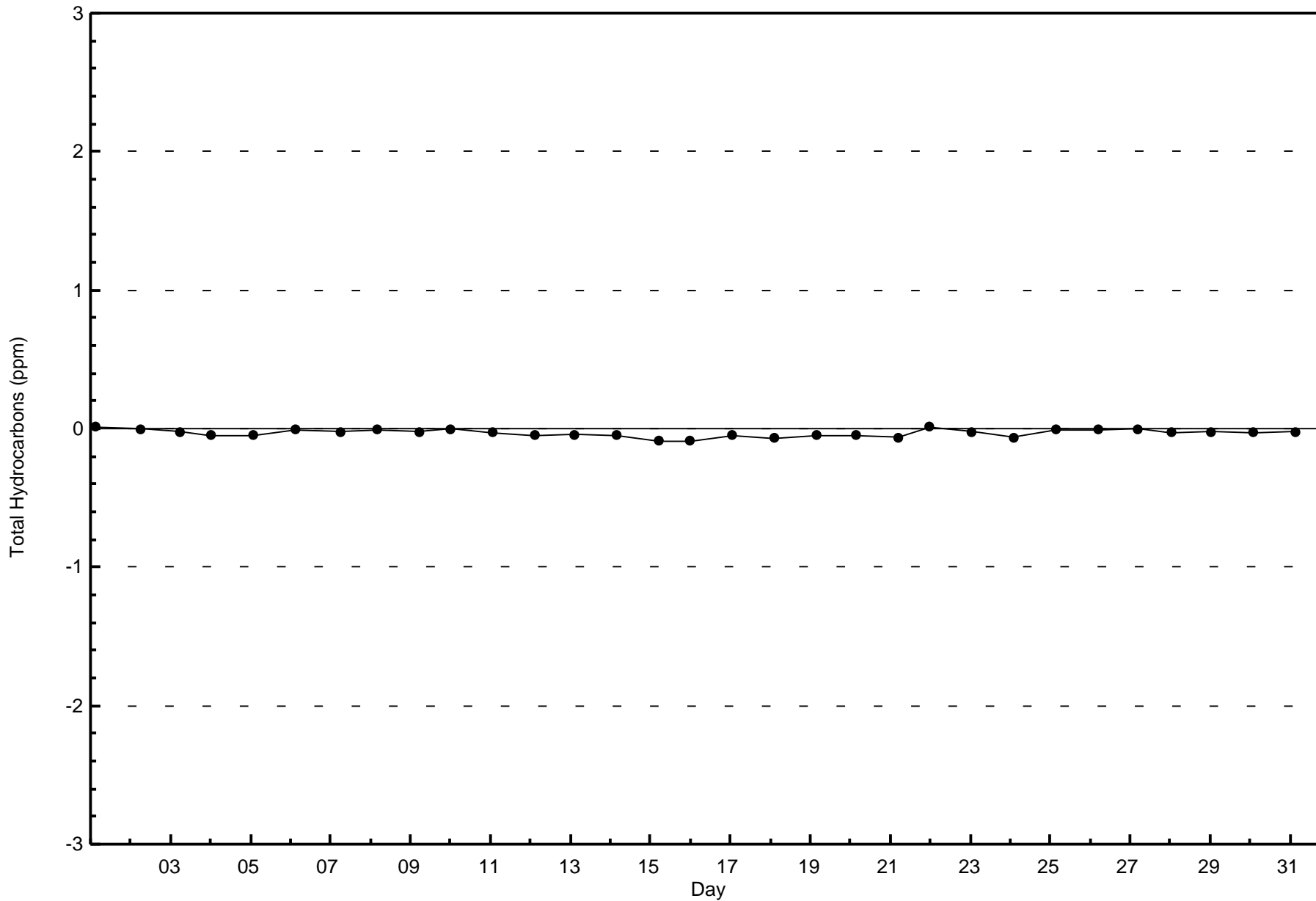
Total Number of Hours: 744

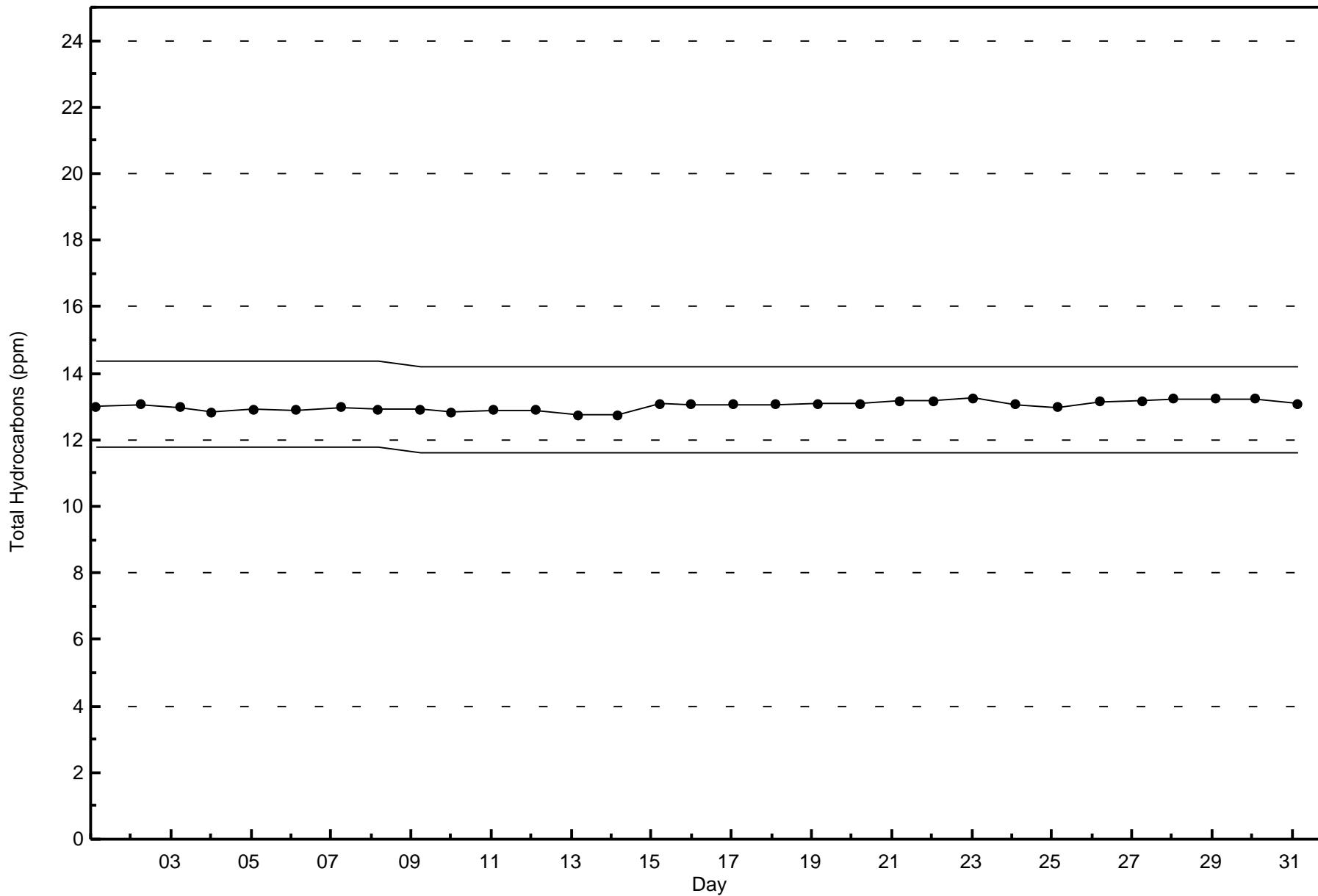


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Total Hydrocarbons (THC) - ppm
Mannix (AMS 5)

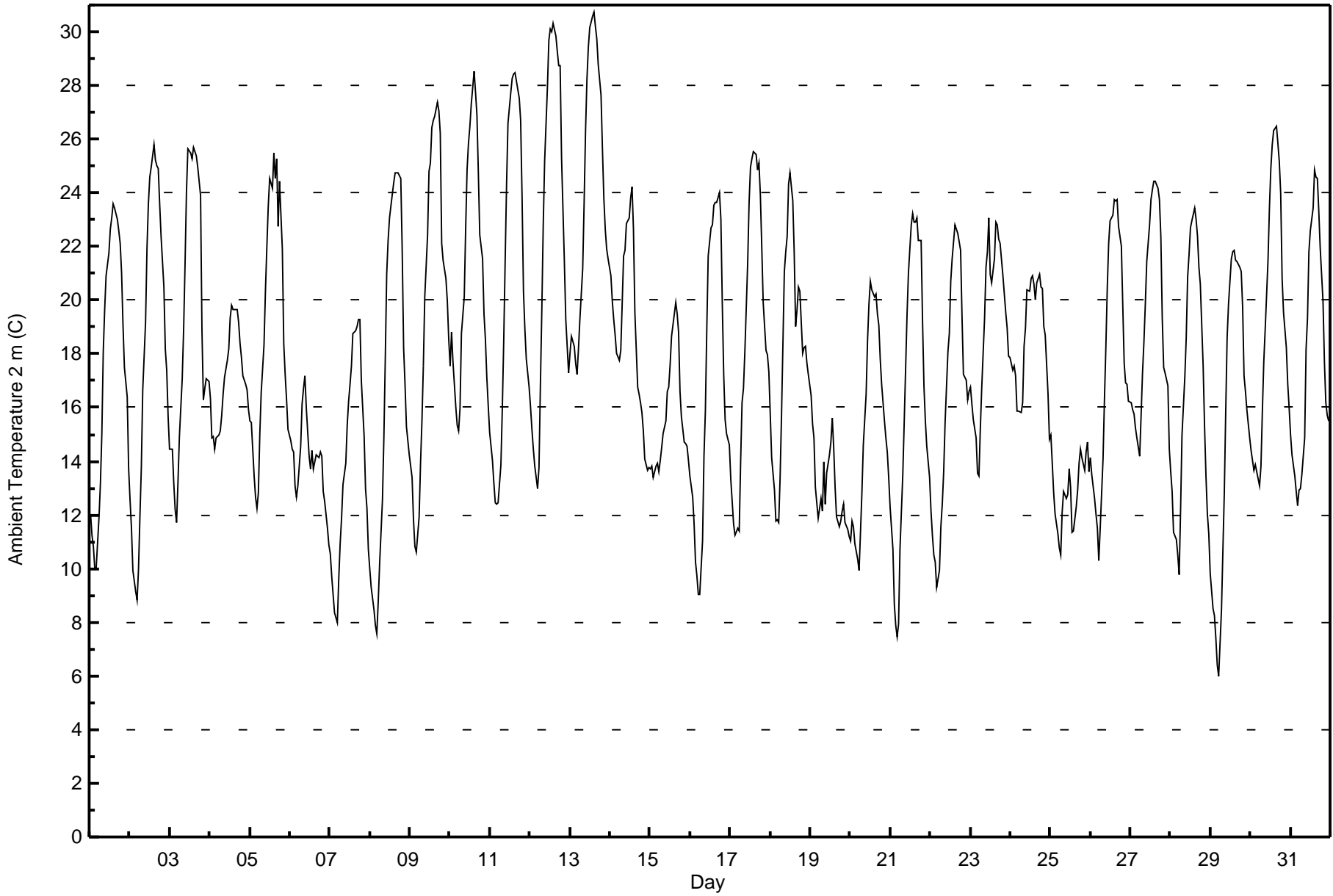








| Maximum Value: 30.8 C on Aug 13 15:00 | | Maximum Daily Average: 24.1 C on Aug 13 | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|--|------|---------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|
| Minimum Value: 6.0 C on Aug 29 06:00 | | Minimum Daily Average: 12.9 C on Aug 25 | | Hours of Data: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 23.0 C at hour 15 | | Minimum Diurnal Average: 11.9 C at hour 5 | | Hours of Missing Data: 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 17.77 C | | Percentiles: P ₁ = 7.9 P ₁₀ = 11.5 Q ₁ = 13.8 Median = 17.2 Q ₃ = 21.8 P ₉₀ = 24.8 P ₉₉ = 29.9 | | Hours of Calibration: 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 12.0 | 11.3 | 10.8 | 10.0 | 10.0 | 11.9 | 13.2 | 15.0 | 18.1 | 19.6 | 20.9 | 21.8 | 22.6 | 23.1 | 23.6 | 23.4 | 23.0 | 22.6 | 22.1 | 21.0 | 19.1 | 17.5 | 16.4 | 13.7 | 17.6 | 23.6 | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 12.6 | 11.5 | 9.9 | 9.2 | 8.8 | 10.0 | 11.9 | 13.7 | 16.6 | 19.2 | 21.9 | 23.6 | 24.6 | 24.9 | 25.8 | 25.2 | 25.0 | 24.9 | 23.6 | 22.4 | 20.5 | 18.2 | 17.4 | 15.6 | 18.2 | 25.8 | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 14.4 | 14.5 | 13.2 | 12.2 | 11.7 | 13.2 | 14.9 | 17.1 | 18.9 | 21.4 | 24.0 | 25.6 | 25.5 | 25.3 | 25.7 | 25.5 | 25.4 | 24.9 | 23.9 | 18.9 | 16.3 | 16.7 | 17.1 | 17.0 | 19.3 | 25.7 | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 16.3 | 14.9 | 14.9 | 14.4 | 14.9 | 15.0 | 15.1 | 15.7 | 16.5 | 17.1 | 17.8 | 18.2 | 19.3 | 19.8 | 19.7 | 19.7 | 19.7 | 19.2 | 18.4 | 17.9 | 17.2 | 16.8 | 16.6 | 15.9 | 17.1 | 19.8 | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 15.5 | 15.4 | 13.4 | 12.6 | 12.3 | 12.8 | 15.0 | 16.6 | 18.4 | 20.3 | 22.0 | 23.5 | 24.6 | 24.2 | 25.5 | 24.5 | 25.3 | 22.8 | 24.4 | 21.9 | 18.4 | 17.3 | 16.3 | 15.2 | 19.1 | 25.5 | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 14.7 | 14.4 | 14.3 | 13.1 | 12.7 | 13.1 | 14.5 | 16.1 | 16.7 | 17.2 | 16.0 | 14.2 | 13.7 | 14.4 | 13.7 | 14.0 | 14.2 | 14.1 | 14.4 | 14.2 | 12.9 | 12.5 | 11.5 | 10.9 | 14.1 | 17.2 | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 10.6 | 9.7 | 9.0 | 8.3 | 8.0 | 9.6 | 10.9 | 11.9 | 13.1 | 13.9 | 15.4 | 16.2 | 16.9 | 17.6 | 18.8 | 18.9 | 19.0 | 19.3 | 19.3 | 17.0 | 14.9 | 13.0 | 12.3 | 10.7 | 13.9 | 19.3 | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 10.0 | 9.3 | 8.5 | 7.9 | 7.6 | 8.8 | 10.2 | 12.5 | 14.9 | 17.8 | 21.0 | 22.2 | 23.1 | 24.0 | 24.4 | 24.7 | 24.7 | 24.8 | 24.6 | 21.9 | 18.2 | 16.9 | 15.3 | 14.2 | 17.0 | 24.8 | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 13.8 | 13.4 | 11.8 | 10.8 | 10.6 | 11.9 | 13.9 | 15.5 | 17.6 | 20.1 | 22.4 | 24.8 | 25.1 | 26.4 | 26.7 | 26.8 | 27.4 | 27.1 | 26.2 | 22.1 | 21.5 | 20.8 | 20.0 | 18.5 | 19.8 | 27.4 | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 17.5 | 18.8 | 17.7 | 16.0 | 15.3 | 15.1 | 16.0 | 18.8 | 20.1 | 22.7 | 24.9 | 25.8 | 26.5 | 27.3 | 28.5 | 27.7 | 26.9 | 24.8 | 22.4 | 21.6 | 19.5 | 18.5 | 17.1 | 16.1 | 21.1 | 28.5 | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 15.1 | 14.0 | 13.2 | 12.5 | 12.4 | 12.4 | 13.9 | 16.0 | 18.5 | 21.4 | 24.3 | 26.6 | 27.8 | 28.3 | 28.4 | 28.5 | 28.1 | 27.5 | 26.7 | 23.9 | 20.3 | 18.9 | 17.8 | 16.8 | 20.5 | 28.5 | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 16.0 | 15.2 | 14.5 | 13.8 | 13.0 | 13.8 | 16.8 | 19.6 | 22.7 | 25.2 | 27.9 | 29.7 | 30.1 | 30.0 | 30.3 | 29.8 | 29.3 | 28.8 | 28.7 | 25.3 | 21.5 | 19.3 | 18.3 | 17.3 | 22.4 | 30.3 | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 18.0 | 18.7 | 18.3 | 17.7 | 17.3 | 18.2 | 19.3 | 21.2 | 23.6 | 26.3 | 28.2 | 29.4 | 30.2 | 30.6 | 30.8 | 30.2 | 29.7 | 28.8 | 27.7 | 25.7 | 23.8 | 22.6 | 21.9 | 21.6 | 24.1 | 30.8 | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 20.9 | 20.0 | 19.3 | 18.7 | 18.0 | 17.8 | 18.1 | 19.8 | 21.7 | 21.9 | 22.9 | 23.0 | 23.8 | 24.2 | 22.6 | 19.5 | 16.8 | 16.5 | 16.2 | 15.8 | 15.1 | 14.1 | 13.7 | 13.8 | 18.9 | 24.2 | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 13.7 | 13.8 | 13.4 | 13.8 | 13.9 | 13.6 | 14.0 | 14.5 | 15.0 | 15.5 | 16.6 | 16.8 | 17.6 | 18.7 | 19.5 | 19.9 | 19.5 | 18.8 | 16.6 | 15.6 | 14.7 | 14.7 | 14.6 | 14.0 | 15.8 | 19.9 | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 13.5 | 12.6 | 11.7 | 10.2 | 9.7 | 9.1 | 9.0 | 11.0 | 14.2 | 15.9 | 18.9 | 21.6 | 22.7 | 22.8 | 23.5 | 23.6 | 23.7 | 24.0 | 23.0 | 19.9 | 17.2 | 15.6 | 15.0 | 14.6 | 16.8 | 24.0 | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 13.3 | 12.5 | 11.7 | 11.3 | 11.5 | 11.4 | 14.0 | 16.2 | 16.7 | 18.1 | 21.4 | 23.6 | 24.9 | 25.3 | 25.5 | 25.4 | 24.9 | 25.1 | 23.9 | 22.0 | 19.9 | 18.1 | 18.0 | 17.4 | 18.8 | 25.5 | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 15.7 | 14.1 | 12.9 | 11.8 | 11.8 | 11.7 | 13.4 | 15.7 | 21.0 | 21.8 | 22.4 | 24.3 | 24.8 | 23.7 | 21.8 | 19.0 | 19.7 | 20.5 | 20.4 | 18.0 | 18.2 | 18.3 | 17.7 | 17.2 | 18.2 | 24.8 | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 16.4 | 15.4 | 14.8 | 13.0 | 12.4 | 11.9 | 12.6 | 12.2 | 14.0 | 12.4 | 13.5 | 14.2 | 14.7 | 15.6 | 14.5 | 13.1 | 11.9 | 11.5 | 11.8 | 12.2 | 12.4 | 11.7 | 11.5 | 11.2 | 13.1 | 16.4 | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 11.0 | 11.8 | 11.6 | 10.9 | 10.3 | 10.0 | 11.4 | 12.8 | 14.6 | 16.5 | 18.5 | 19.8 | 20.7 | 20.4 | 20.1 | 20.2 | 19.5 | 19.1 | 17.8 | 16.9 | 15.5 | 14.9 | 14.3 | 13.4 | 15.5 | 20.7 | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 12.3 | 10.7 | 8.7 | 7.9 | 7.5 | 7.9 | 10.7 | 13.5 | 15.5 | 17.5 | 19.5 | 21.0 | 22.8 | 23.2 | 22.9 | 22.9 | 23.1 | 22.2 | 22.3 | 19.2 | 16.8 | 15.5 | 14.6 | 13.4 | 16.3 | 23.2 | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 12.1 | 11.3 | 10.5 | 10.2 | 9.3 | 9.9 | 11.6 | 12.4 | 13.6 | 15.4 | 18.1 | 18.8 | 20.7 | 21.6 | 22.2 | 22.8 | 22.5 | 22.1 | 21.9 | 19.4 | 17.2 | 17.0 | 16.3 | 16.6 | 16.4 | 22.8 | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 16.8 | 16.1 | 15.6 | 14.9 | 13.5 | 13.4 | 15.2 | 16.8 | 19.4 | 21.2 | 21.8 | 23.1 | 21.0 | 20.7 | 21.6 | 22.9 | 22.8 | 22.3 | 22.1 | 20.9 | 20.2 | 19.6 | 18.9 | 17.9 | 19.1 | 23.1 | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 17.8 | 17.4 | 17.6 | 17.2 | 15.9 | 15.8 | 15.8 | 16.2 | 18.3 | 19.0 | 20.4 | 20.3 | 20.8 | 20.9 | 20.6 | 20.0 | 20.7 | 21.0 | 20.5 | 20.4 | 19.0 | 18.7 | 16.5 | 14.8 | 18.6 | 21.0 | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 15.0 | 13.9 | 12.8 | 12.0 | 11.3 | 10.8 | 10.5 | 12.1 | 12.9 | 12.6 | 12.7 | 13.7 | 13.0 | 11.3 | 11.4 | 12.3 | 12.9 | 13.9 | 14.5 | 14.1 | 13.7 | 14.3 | 14.7 | 13.6 | 12.9 | 15.0 | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 14.1 | 13.5 | 12.6 | 12.0 | 11.5 | 10.3 | 11.5 | 14.1 | 16.3 | 18.2 | 20.4 | 22.1 | 23.0 | 23.2 | 23.7 | 23.7 | 23.7 | 22.8 | 22.0 | 19.8 | 17.6 | 16.9 | 16.9 | 16.2 | 17.8 | 23.7 | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 16.2 | 15.9 | 15.8 | 15.2 | 14.8 | 14.2 | 15.7 | 17.3 | 18.5 | 19.9 | 21.5 | 22.8 | 23.7 | 24.1 | 24.4 | 24.4 | 24.2 | 23.8 | 22.4 | 19.3 | 17.5 | 17.3 | 16.8 | 14.5 | 19.2 | 24.4 | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 13.6 | 12.9 | 11.3 | 11.1 | 10.5 | 9.8 | 12.2 | 15.0 | 17.1 | 18.6 | 20.8 | 21.7 | 22.7 | 23.0 | 23.5 | 23.0 | 22.4 | 21.2 | 20.6 | 17.5 | 15.3 | 13.5 | 12.1 | 11.3 | 16.7 | 23.5 | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 9.8 | 8.5 | 8.2 | 7.4 | 6.4 | 6.0 | 8.4 | 10.7 | 12.8 | 15.8 | 18.6 | 19.9 | 21.5 | 21.8 | 21.9 | 21.5 | 21.4 | 21.2 | 21.1 | 19.7 | 17.2 | 16.6 | 15.9 | 14.9 | 15.3 | 21.9 | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 14.4 | 14.0 | 13.7 | 13.9 | 13.3 | 13.1 | 13.8 | 15.8 | 17.7 | 18.9 | 21.5 | 23.4 | 24.9 | 25.8 | 26.3 | 26.5 | 25.8 | 25.2 | 23.9 | 20.8 | 19.6 | 18.2 | 16.9 | 16.0 | 19.3 | 26.5 | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 15.0 | 14.2 | 13.4 | 12.9 | 12.3 | 12.9 | 13.0 | 13.5 | 14.9 | 18.2 | 19.3 | 21.8 | 22.6 | 23.5 | 24.9 | 24.6 | 24.5 | 23.3 | 21.9 | 20.0 | 17.7 | 16.2 | 15.7 | 15.5 | 18.0 | 24.9 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 14.5 | 13.9 | 13.1 | 12.4 | 11.9 | 12.1 | 13.4 | 15.1 | 17.1 | 18.7 | 20.5 | 21.7 | 22.4 | 22.8 | 23.0 | 22.7 | 22.5 | 22.1 | 21.5 | 19.5 | 17.7 | 16.8 | 16.1 | 15.2 | Diurnal Average |
| | | | | | | | | | | | | | | | | | | | | | | | | 20.9 | 20.0 | 19.3 | 18.7 | 18.0 | 18.2 | 19.3 | 21.2 | 23.6 | 26.3 | 28.2 | 29.7 | 30.2 | 30.6 | 30.8 | 30.2 | 29.7 | 28.8 | 28.7 | 25.7 | 23.8 | 22.6 | 21.9 | 21.6 | Diurnal Maximum |





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 2 m (AT2m) - C
Mannix - August 2017**

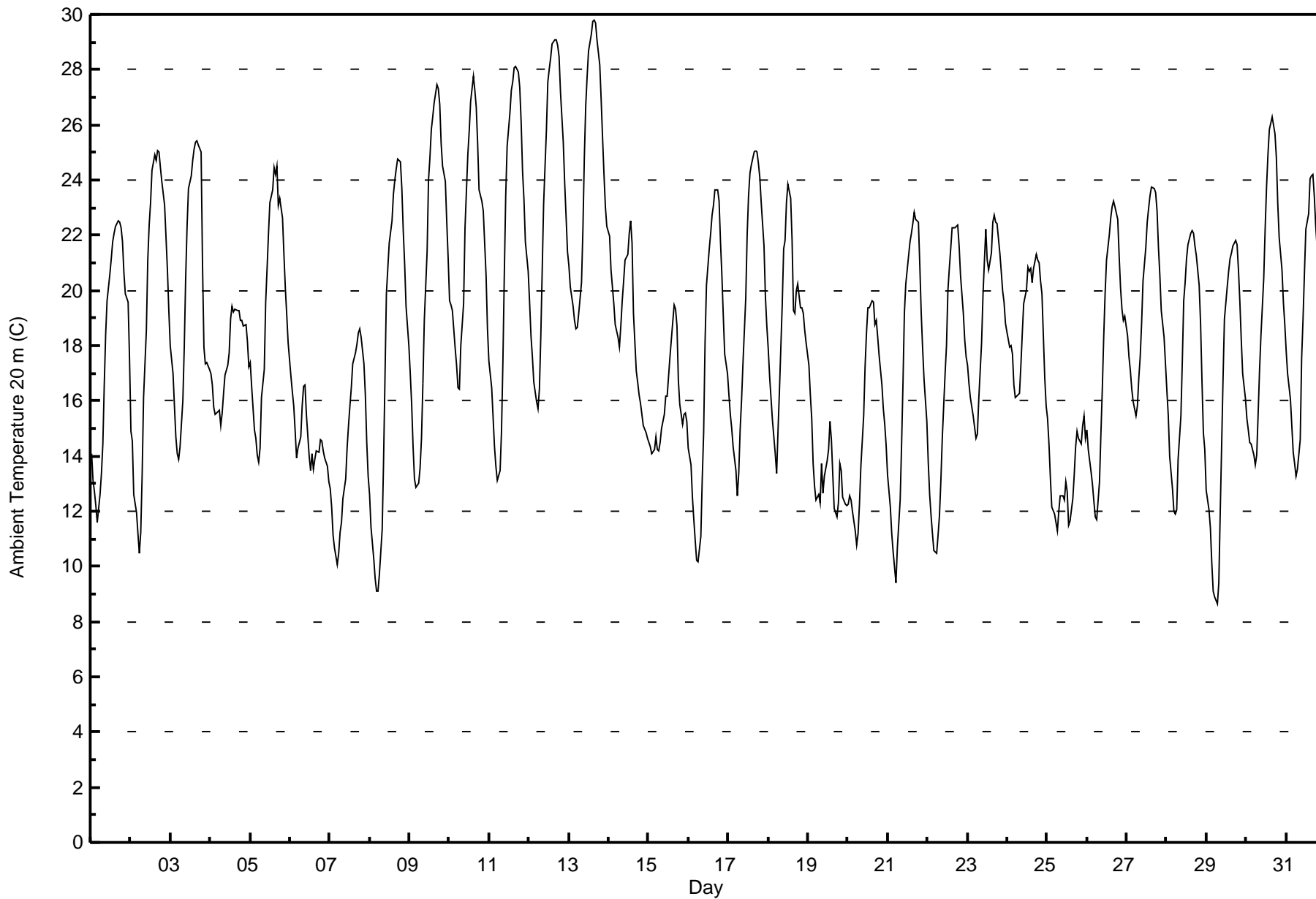
| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 34 | 4.57 | 4.57 |
| 10 - 20 | 463 | 62.23 | 66.80 |
| > 20 | 247 | 33.20 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



| Maximum Value: 29.8 C on Aug 13 16:00 Maximum Daily Average: 24.3 C on Aug 13 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: | 744 | | | |
|--|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------------------|-------|------|---------------|---------------|
| Minimum Value: 8.6 C on Aug 29 07:00 Minimum Daily Average: 13.2 C on Aug 25 | | | | | | | | | | | | | | | | | | | | | | Hours of Data: | 744 | | | |
| Maximum Diurnal Average: 22.3 C at hour 17 Minimum Diurnal Average: 13.1 C at hour 6 | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: | 0 | | | |
| Monthly Average: 18.27 C Percentiles: P ₁ = 9.6 P ₁₀ = 12.5 Q ₁ = 14.6 Median = 18.1 Q ₃ = 21.7 P ₉₀ = 24.4 P ₉₉ = 29.1 | | | | | | | | | | | | | | | | | | | | | | Hours of Calibration: | 0 | | | |
| | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: | 100.0 | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 14.1 | 13.1 | 12.7 | 12.2 | 11.6 | 12.6 | 13.4 | 14.5 | 16.6 | 18.4 | 19.6 | 20.6 | 21.1 | 21.8 | 22.1 | 22.3 | 22.5 | 22.5 | 22.3 | 21.8 | 20.6 | 19.9 | 19.6 | 17.6 | 18.1 | 22.5 |
| 2-Aug | 14.9 | 14.5 | 12.6 | 12.0 | 11.2 | 10.5 | 11.2 | 13.3 | 16.1 | 18.6 | 21.1 | 22.4 | 23.2 | 24.4 | 24.9 | 24.7 | 25.0 | 25.0 | 24.5 | 24.0 | 23.1 | 21.9 | 20.7 | 19.3 | 19.1 | 25.0 |
| 3-Aug | 18.0 | 17.0 | 15.8 | 14.7 | 14.1 | 13.9 | 14.3 | 16.0 | 18.0 | 20.4 | 22.3 | 23.7 | 24.2 | 24.7 | 25.1 | 25.4 | 25.4 | 25.3 | 25.0 | 21.0 | 18.0 | 17.3 | 17.4 | 17.1 | 19.8 | 25.4 |
| 4-Aug | 17.0 | 16.6 | 15.8 | 15.5 | 15.6 | 15.6 | 15.1 | 15.6 | 16.3 | 16.9 | 17.3 | 17.7 | 19.0 | 19.4 | 19.2 | 19.3 | 19.3 | 19.3 | 18.9 | 18.9 | 18.7 | 18.8 | 18.1 | 17.2 | 17.5 | 19.4 |
| 5-Aug | 17.4 | 16.5 | 14.9 | 14.6 | 14.0 | 13.8 | 14.3 | 16.1 | 17.1 | 19.6 | 20.8 | 22.0 | 23.2 | 23.7 | 24.4 | 24.2 | 24.5 | 23.1 | 23.4 | 22.6 | 21.3 | 20.1 | 19.1 | 18.1 | 19.5 | 24.5 |
| 6-Aug | 16.9 | 16.3 | 15.8 | 14.9 | 13.9 | 14.3 | 14.7 | 15.8 | 16.5 | 16.6 | 15.5 | 14.0 | 13.5 | 14.1 | 13.5 | 13.9 | 14.2 | 14.1 | 14.6 | 14.6 | 14.2 | 13.9 | 13.6 | 13.0 | 14.7 | 16.9 |
| 7-Aug | 12.8 | 12.2 | 11.2 | 10.7 | 10.1 | 10.5 | 11.2 | 11.6 | 12.5 | 13.2 | 14.3 | 15.1 | 15.8 | 16.5 | 17.3 | 17.7 | 18.0 | 18.5 | 18.6 | 18.3 | 17.4 | 16.2 | 14.5 | 13.3 | 14.5 | 18.6 |
| 8-Aug | 12.6 | 11.4 | 10.3 | 9.6 | 9.1 | 9.1 | 9.7 | 11.4 | 13.9 | 16.9 | 19.9 | 20.8 | 21.7 | 22.5 | 23.5 | 24.0 | 24.4 | 24.8 | 24.7 | 23.7 | 22.1 | 21.0 | 19.4 | 18.0 | 17.7 | 24.8 |
| 9-Aug | 17.0 | 15.9 | 14.3 | 13.2 | 12.9 | 13.0 | 13.6 | 14.6 | 16.6 | 18.9 | 21.4 | 24.0 | 24.8 | 25.8 | 26.3 | 26.8 | 27.5 | 27.3 | 26.8 | 25.3 | 24.5 | 23.9 | 22.5 | 21.2 | 20.8 | 27.5 |
| 10-Aug | 19.6 | 19.5 | 19.3 | 17.9 | 17.3 | 16.5 | 16.4 | 18.0 | 19.5 | 22.2 | 23.6 | 24.9 | 25.8 | 26.9 | 27.8 | 27.2 | 26.6 | 25.3 | 23.6 | 23.2 | 22.9 | 21.7 | 20.6 | 18.6 | 21.9 | 27.8 |
| 11-Aug | 17.5 | 16.5 | 15.4 | 14.3 | 13.6 | 13.1 | 13.5 | 14.9 | 17.4 | 20.6 | 23.4 | 25.2 | 26.5 | 27.2 | 27.6 | 28.0 | 28.1 | 27.9 | 27.4 | 26.1 | 24.3 | 23.3 | 21.8 | 20.7 | 21.4 | 28.1 |
| 12-Aug | 19.6 | 18.3 | 17.6 | 16.7 | 16.0 | 15.7 | 16.4 | 18.3 | 20.7 | 23.1 | 25.8 | 27.6 | 28.0 | 28.4 | 28.9 | 29.1 | 29.1 | 28.9 | 28.5 | 27.2 | 25.4 | 23.9 | 22.7 | 21.4 | 23.2 | 29.1 |
| 13-Aug | 20.9 | 20.1 | 19.4 | 18.9 | 18.6 | 18.7 | 19.2 | 20.3 | 22.2 | 24.8 | 26.7 | 27.7 | 28.7 | 29.3 | 29.7 | 29.8 | 29.7 | 29.1 | 28.2 | 26.9 | 25.5 | 24.2 | 23.1 | 22.3 | 24.3 | 29.8 |
| 14-Aug | 21.9 | 20.8 | 20.1 | 19.5 | 18.8 | 18.3 | 17.9 | 18.7 | 19.6 | 20.3 | 21.1 | 21.3 | 22.1 | 22.5 | 21.7 | 19.2 | 17.1 | 16.7 | 16.2 | 15.9 | 15.5 | 15.1 | 14.8 | 14.7 | 18.7 | 22.5 |
| 15-Aug | 14.5 | 14.3 | 14.1 | 14.3 | 14.7 | 14.2 | 14.2 | 14.5 | 15.0 | 15.5 | 16.2 | 16.2 | 16.9 | 17.6 | 18.9 | 19.5 | 19.3 | 18.7 | 16.7 | 15.9 | 15.2 | 15.5 | 15.5 | 15.2 | 15.9 | 19.5 |
| 16-Aug | 14.3 | 13.7 | 12.5 | 11.7 | 10.9 | 10.2 | 10.2 | 11.1 | 13.2 | 14.8 | 18.1 | 20.2 | 21.5 | 22.1 | 22.7 | 23.1 | 23.6 | 23.6 | 23.3 | 21.8 | 20.5 | 19.1 | 17.7 | 17.0 | 17.4 | 23.6 |
| 17-Aug | 16.2 | 15.5 | 15.0 | 14.4 | 13.5 | 12.6 | 13.4 | 14.9 | 16.0 | 17.4 | 19.7 | 22.0 | 23.4 | 24.3 | 24.6 | 25.0 | 25.0 | 25.0 | 24.6 | 24.1 | 23.2 | 21.6 | 19.8 | 18.7 | 19.6 | 25.0 |
| 18-Aug | 17.9 | 16.9 | 15.3 | 14.7 | 14.1 | 13.4 | 15.0 | 16.4 | 19.5 | 21.5 | 21.8 | 23.2 | 23.8 | 23.3 | 21.8 | 19.3 | 19.2 | 20.0 | 20.2 | 19.4 | 19.4 | 19.1 | 18.6 | 18.1 | 18.8 | 23.8 |
| 19-Aug | 17.3 | 16.2 | 15.3 | 13.7 | 12.9 | 12.4 | 12.6 | 12.3 | 13.7 | 12.7 | 13.3 | 13.8 | 14.3 | 15.3 | 14.6 | 13.3 | 12.1 | 11.8 | 12.3 | 13.7 | 13.5 | 12.5 | 12.2 | 12.2 | 13.5 | 17.3 |
| 20-Aug | 12.3 | 12.5 | 12.4 | 12.0 | 11.3 | 10.8 | 11.2 | 12.2 | 13.6 | 15.4 | 17.3 | 18.4 | 19.4 | 19.4 | 19.6 | 19.6 | 18.8 | 18.9 | 18.3 | 17.6 | 16.6 | 15.7 | 15.2 | 14.4 | 15.5 | 19.6 |
| 21-Aug | 13.3 | 12.2 | 11.2 | 10.5 | 10.0 | 9.4 | 10.7 | 12.4 | 14.4 | 16.6 | 19.1 | 20.3 | 21.3 | 21.8 | 22.1 | 22.4 | 22.8 | 22.6 | 22.5 | 20.9 | 19.2 | 17.9 | 16.8 | 15.3 | 16.9 | 22.8 |
| 22-Aug | 13.8 | 12.6 | 11.9 | 11.2 | 10.6 | 10.5 | 11.2 | 11.9 | 13.1 | 14.7 | 17.0 | 18.0 | 20.0 | 20.8 | 21.5 | 22.3 | 22.3 | 22.3 | 22.3 | 21.6 | 20.5 | 19.2 | 18.2 | 17.6 | 16.9 | 22.3 |
| 23-Aug | 17.3 | 16.6 | 16.1 | 15.5 | 15.0 | 14.6 | 14.8 | 16.1 | 18.1 | 19.8 | 21.1 | 22.2 | 21.1 | 20.8 | 21.4 | 22.5 | 22.7 | 22.5 | 22.4 | 21.3 | 20.7 | 20.0 | 19.6 | 18.8 | 19.2 | 22.7 |
| 24-Aug | 18.5 | 18.0 | 18.0 | 17.7 | 16.6 | 16.1 | 16.2 | 16.3 | 17.3 | 18.5 | 19.5 | 20.0 | 20.8 | 20.7 | 20.8 | 20.3 | 20.8 | 21.3 | 21.1 | 21.0 | 20.4 | 19.9 | 16.8 | 15.8 | 18.8 | 21.3 |
| 25-Aug | 15.4 | 14.4 | 13.2 | 12.1 | 11.9 | 11.6 | 11.3 | 12.0 | 12.6 | 12.6 | 12.4 | 13.1 | 12.7 | 11.5 | 11.7 | 12.5 | 13.3 | 14.3 | 14.9 | 14.7 | 14.5 | 15.1 | 15.4 | 14.7 | 13.2 | 15.4 |
| 26-Aug | 14.9 | 14.2 | 13.4 | 13.0 | 12.4 | 11.8 | 11.7 | 13.1 | 14.8 | 16.4 | 18.3 | 19.9 | 21.1 | 22.0 | 22.6 | 23.0 | 23.2 | 23.0 | 22.6 | 21.3 | 20.1 | 19.3 | 18.9 | 19.1 | 17.9 | 23.2 |
| 27-Aug | 18.4 | 17.6 | 17.1 | 16.4 | 16.0 | 15.5 | 15.8 | 16.9 | 17.6 | 18.8 | 20.3 | 21.5 | 22.5 | 23.0 | 23.4 | 23.7 | 23.7 | 23.6 | 22.9 | 21.6 | 20.5 | 19.3 | 18.3 | 17.3 | 19.6 | 23.7 |
| 28-Aug | 16.4 | 15.5 | 14.0 | 12.8 | 12.0 | 11.9 | 12.0 | 13.9 | 15.4 | 17.4 | 19.6 | 20.3 | 21.2 | 21.7 | 22.1 | 22.2 | 22.1 | 21.6 | 21.3 | 20.2 | 18.8 | 16.7 | 14.8 | 14.2 | 17.4 | 22.2 |
| 29-Aug | 12.7 | 12.1 | 11.4 | 10.1 | 9.1 | 8.9 | 8.6 | 9.4 | 11.9 | 14.3 | 16.8 | 19.0 | 20.2 | 20.7 | 21.2 | 21.4 | 21.6 | 21.8 | 21.6 | 20.7 | 19.6 | 18.2 | 17.0 | 16.1 | 16.0 | 21.8 |
| 30-Aug | 15.4 | 15.0 | 14.5 | 14.4 | 14.0 | 13.7 | 14.0 | 15.5 | 17.1 | 18.4 | 20.4 | 22.2 | 23.8 | 24.9 | 25.8 | 26.3 | 26.0 | 25.7 | 24.8 | 23.1 | 21.9 | 20.7 | 19.6 | 18.8 | 19.8 | 26.3 |
| 31-Aug | 17.8 | 17.0 | 16.1 | 15.1 | 14.2 | 13.7 | 13.3 | 13.5 | 14.6 | 17.6 | 19.0 | 20.6 | 22.2 | 22.8 | 24.0 | 24.1 | 24.2 | 23.4 | 22.4 | 20.7 | 19.0 | 17.7 | 16.9 | 16.6 | 18.6 | 24.2 |
| | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | |
| | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | |





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 20 m (AT20m) - C
Mannix - August 2017**

| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 10 | 1.34 | 1.34 |
| 10 - 20 | 466 | 62.63 | 63.98 |
| > 20 | 268 | 36.02 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Summary of Hour Averages

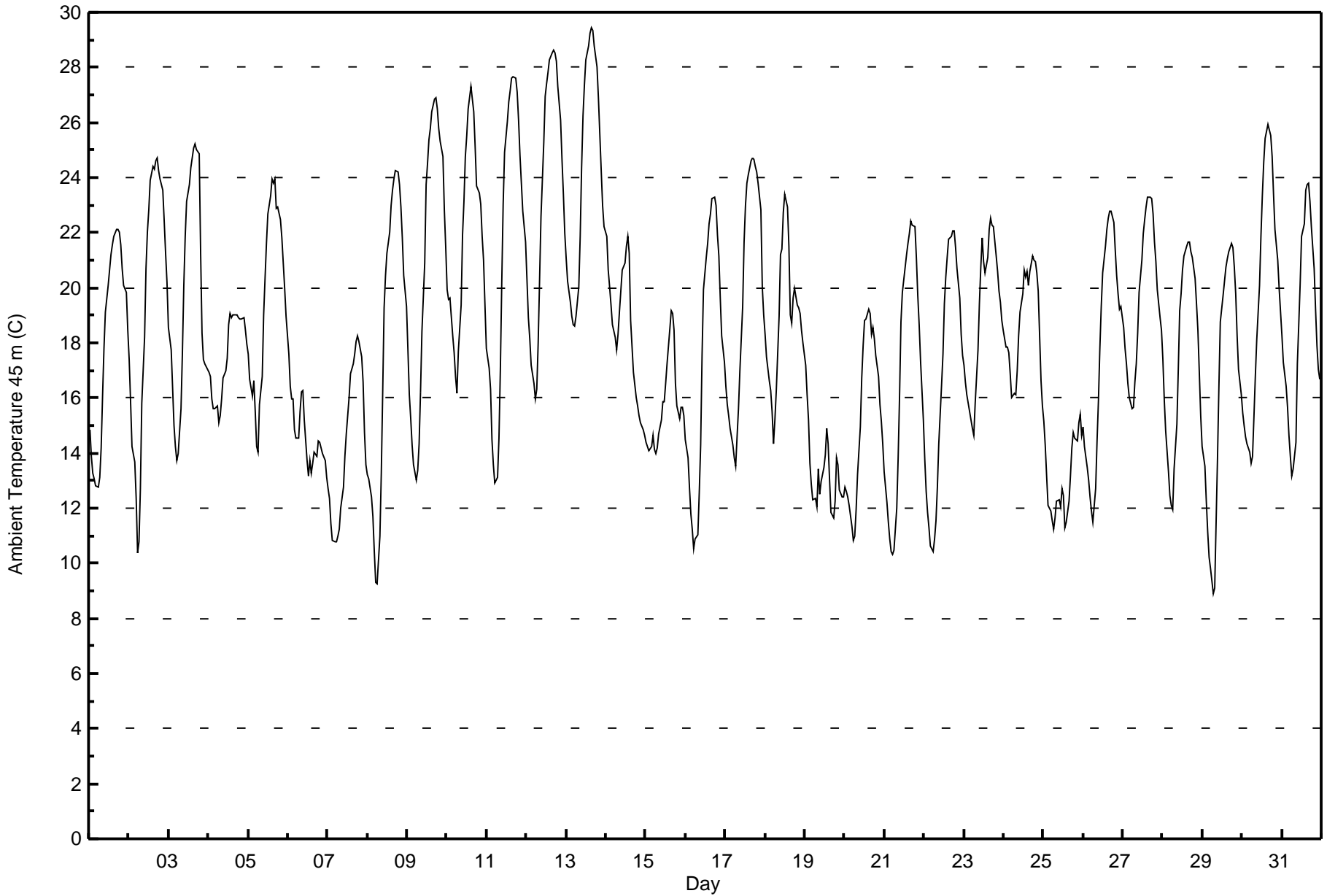
Mannix - August 2017

| Maximum Value: 29.4 C on Aug 13 16:00 Maximum Daily Average: 24.2 C on Aug 13 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 | | | | |
|---|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|------|------|---------------|---------------|
| Minimum Value: 8.9 C on Aug 29 07:00 Minimum Daily Average: 13.1 C on Aug 25 Maximum Diurnal Average: 22.0 C at hour 17 Minimum Diurnal Average: 13.3 C at hour 7 Monthly Average: 18.24 C Percentiles: P ₁ = 10.4 P ₁₀ = 12.5 Q ₁ = 14.6 Median = 18.2 Q ₃ = 21.5 P ₉₀ = 24.2 P ₉₉ = 28.4 | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 14.8 | 13.9 | 13.3 | 13.1 | 12.8 | 12.7 | 13.1 | 14.2 | 16.1 | 17.8 | 19.1 | 20.1 | 20.7 | 21.2 | 21.6 | 21.9 | 22.1 | 22.1 | 22.0 | 21.5 | 20.7 | 20.1 | 19.8 | 18.5 | 18.0 | 22.1 |
| 2-Aug | 17.4 | 15.9 | 14.3 | 13.7 | 12.4 | 10.4 | 10.8 | 12.7 | 15.8 | 18.2 | 20.7 | 22.0 | 22.8 | 23.9 | 24.4 | 24.3 | 24.6 | 24.7 | 24.2 | 23.9 | 23.5 | 22.4 | 21.3 | 20.2 | 19.4 | 24.7 |
| 3-Aug | 18.6 | 17.7 | 16.4 | 15.0 | 14.2 | 13.7 | 14.0 | 15.6 | 17.7 | 20.1 | 21.9 | 23.2 | 23.7 | 24.4 | 24.7 | 25.1 | 25.2 | 25.0 | 24.9 | 21.3 | 18.4 | 17.4 | 17.2 | 17.0 | 19.7 | 25.2 |
| 4-Aug | 17.0 | 16.8 | 16.0 | 15.6 | 15.6 | 15.7 | 15.1 | 15.3 | 15.9 | 16.7 | 17.0 | 17.4 | 18.7 | 19.1 | 18.9 | 19.0 | 19.0 | 19.0 | 18.9 | 18.9 | 18.9 | 18.9 | 18.5 | 17.9 | 17.5 | 19.1 |
| 5-Aug | 17.6 | 16.7 | 16.1 | 16.6 | 15.5 | 14.2 | 14.0 | 15.8 | 16.8 | 19.0 | 20.3 | 21.6 | 22.7 | 23.3 | 24.0 | 23.8 | 24.0 | 22.9 | 22.9 | 22.5 | 21.8 | 20.9 | 20.0 | 19.0 | 19.7 | 24.0 |
| 6-Aug | 17.6 | 16.4 | 16.0 | 15.9 | 14.9 | 14.5 | 14.5 | 15.5 | 16.2 | 16.3 | 15.2 | 13.7 | 13.2 | 13.7 | 13.3 | 13.6 | 14.0 | 13.9 | 14.4 | 14.4 | 14.2 | 14.0 | 13.8 | 13.1 | 14.7 | 17.6 |
| 7-Aug | 12.7 | 12.3 | 11.5 | 10.8 | 10.8 | 10.8 | 11.0 | 11.2 | 12.0 | 12.8 | 13.9 | 14.7 | 15.4 | 16.0 | 16.9 | 17.2 | 17.6 | 18.1 | 18.3 | 18.1 | 17.5 | 16.6 | 14.7 | 13.6 | 14.3 | 18.3 |
| 8-Aug | 13.2 | 13.1 | 12.4 | 11.7 | 10.4 | 9.3 | 9.3 | 11.0 | 13.3 | 16.2 | 19.3 | 20.4 | 21.2 | 22.0 | 23.0 | 23.5 | 24.0 | 24.2 | 24.2 | 23.7 | 22.9 | 21.8 | 20.4 | 19.3 | 17.9 | 24.2 |
| 9-Aug | 17.8 | 16.1 | 15.3 | 14.3 | 13.6 | 13.0 | 13.4 | 14.4 | 16.2 | 18.4 | 20.9 | 23.8 | 24.5 | 25.4 | 25.8 | 26.4 | 26.8 | 26.9 | 26.5 | 25.8 | 25.3 | 24.8 | 22.8 | 21.4 | 20.8 | 26.9 |
| 10-Aug | 20.0 | 19.6 | 19.6 | 18.3 | 17.7 | 16.8 | 16.2 | 17.7 | 19.4 | 21.9 | 23.1 | 24.7 | 25.6 | 26.5 | 27.3 | 26.9 | 26.4 | 25.1 | 23.7 | 23.4 | 23.0 | 21.8 | 21.0 | 19.4 | 21.9 | 27.3 |
| 11-Aug | 17.8 | 17.1 | 16.3 | 14.5 | 13.6 | 12.9 | 13.1 | 14.5 | 17.1 | 20.2 | 23.1 | 24.9 | 26.1 | 26.8 | 27.2 | 27.6 | 27.7 | 27.6 | 27.1 | 26.1 | 24.8 | 23.8 | 22.8 | 21.7 | 21.4 | 27.7 |
| 12-Aug | 20.3 | 18.9 | 18.1 | 17.2 | 16.5 | 16.0 | 16.3 | 18.0 | 20.3 | 22.6 | 25.3 | 27.0 | 27.4 | 27.8 | 28.3 | 28.5 | 28.7 | 28.5 | 28.2 | 27.3 | 26.1 | 24.7 | 23.4 | 22.0 | 23.2 | 28.7 |
| 13-Aug | 21.0 | 20.2 | 19.5 | 19.0 | 18.7 | 18.6 | 19.0 | 20.0 | 21.9 | 24.4 | 26.3 | 27.3 | 28.3 | 28.8 | 29.3 | 29.4 | 29.3 | 28.8 | 28.0 | 26.9 | 25.6 | 24.3 | 23.0 | 22.2 | 24.2 | 29.4 |
| 14-Aug | 21.9 | 20.7 | 20.0 | 19.4 | 18.7 | 18.2 | 17.7 | 18.3 | 19.1 | 19.9 | 20.6 | 20.9 | 21.5 | 21.9 | 21.2 | 18.8 | 16.9 | 16.5 | 16.0 | 15.7 | 15.4 | 15.1 | 14.8 | 14.7 | 18.5 | 21.9 |
| 15-Aug | 14.4 | 14.2 | 14.1 | 14.2 | 14.7 | 14.2 | 14.0 | 14.2 | 14.7 | 15.2 | 15.8 | 15.9 | 16.5 | 17.2 | 18.5 | 19.2 | 19.1 | 18.4 | 16.5 | 15.7 | 15.3 | 15.7 | 15.7 | 15.3 | 15.8 | 19.2 |
| 16-Aug | 14.5 | 13.8 | 12.8 | 11.8 | 11.2 | 10.5 | 10.9 | 11.1 | 12.6 | 14.3 | 17.5 | 19.9 | 21.1 | 21.6 | 22.3 | 22.7 | 23.2 | 23.3 | 23.0 | 21.9 | 21.2 | 19.6 | 18.2 | 17.3 | 17.3 | 23.3 |
| 17-Aug | 16.4 | 15.8 | 15.4 | 14.9 | 14.3 | 13.8 | 13.5 | 14.6 | 15.6 | 17.0 | 19.3 | 21.6 | 23.0 | 23.8 | 24.1 | 24.6 | 24.7 | 24.6 | 24.4 | 24.2 | 23.8 | 22.8 | 20.0 | 19.0 | 19.6 | 24.7 |
| 18-Aug | 18.3 | 17.5 | 16.6 | 16.3 | 15.5 | 14.3 | 15.2 | 16.3 | 19.0 | 21.2 | 21.4 | 22.8 | 23.4 | 22.9 | 21.5 | 19.0 | 18.7 | 19.6 | 20.0 | 19.4 | 19.3 | 19.1 | 18.5 | 18.0 | 18.9 | 23.4 |
| 19-Aug | 17.2 | 16.1 | 15.2 | 13.6 | 12.9 | 12.3 | 12.4 | 12.1 | 13.4 | 12.5 | 13.0 | 13.5 | 13.9 | 14.9 | 14.3 | 13.1 | 11.8 | 11.6 | 12.2 | 13.8 | 13.6 | 12.7 | 12.4 | 12.4 | 13.4 | 17.2 |
| 20-Aug | 12.8 | 12.6 | 12.4 | 12.1 | 11.3 | 10.8 | 11.0 | 11.9 | 13.2 | 15.0 | 16.7 | 17.9 | 18.8 | 18.9 | 19.2 | 19.1 | 18.3 | 18.6 | 18.1 | 17.6 | 16.8 | 15.8 | 15.2 | 14.4 | 15.4 | 19.2 |
| 21-Aug | 13.3 | 12.2 | 11.5 | 10.9 | 10.4 | 10.3 | 10.5 | 12.0 | 13.8 | 16.1 | 18.8 | 19.8 | 20.7 | 21.2 | 21.6 | 22.0 | 22.4 | 22.3 | 22.2 | 21.1 | 19.7 | 18.7 | 17.4 | 15.2 | 16.8 | 22.4 |
| 22-Aug | 13.8 | 12.6 | 11.9 | 11.3 | 10.6 | 10.4 | 10.9 | 11.5 | 12.8 | 14.3 | 16.5 | 17.6 | 19.4 | 20.4 | 21.1 | 21.7 | 21.9 | 22.1 | 22.1 | 21.5 | 20.7 | 19.6 | 18.3 | 17.5 | 16.7 | 22.1 |
| 23-Aug | 17.2 | 16.6 | 16.1 | 15.5 | 15.2 | 14.9 | 14.7 | 15.8 | 17.7 | 19.4 | 20.7 | 21.8 | 20.9 | 20.6 | 21.1 | 22.1 | 22.5 | 22.3 | 22.2 | 21.1 | 20.6 | 19.9 | 19.5 | 18.8 | 19.1 | 22.5 |
| 24-Aug | 18.5 | 17.9 | 17.9 | 17.7 | 16.9 | 16.0 | 16.2 | 16.1 | 17.0 | 18.3 | 19.1 | 19.8 | 20.7 | 20.4 | 20.6 | 20.1 | 20.6 | 21.2 | 21.0 | 20.9 | 20.6 | 19.9 | 16.6 | 15.7 | 18.7 | 21.2 |
| 25-Aug | 15.1 | 14.3 | 13.2 | 12.1 | 11.9 | 11.5 | 11.2 | 11.6 | 12.3 | 12.3 | 12.1 | 12.7 | 12.5 | 11.3 | 11.5 | 12.3 | 13.1 | 14.2 | 14.8 | 14.6 | 14.4 | 15.1 | 15.4 | 14.7 | 13.1 | 15.4 |
| 26-Aug | 14.9 | 14.2 | 13.5 | 13.0 | 12.4 | 11.9 | 11.5 | 12.7 | 14.4 | 15.9 | 17.8 | 19.3 | 20.5 | 21.5 | 22.1 | 22.5 | 22.8 | 22.8 | 22.4 | 21.4 | 20.4 | 19.8 | 19.2 | 19.3 | 17.8 | 22.8 |
| 27-Aug | 18.6 | 17.8 | 17.2 | 16.5 | 16.0 | 15.6 | 15.7 | 16.6 | 17.2 | 18.3 | 19.8 | 21.0 | 22.0 | 22.5 | 22.9 | 23.3 | 23.3 | 23.2 | 22.7 | 21.7 | 21.0 | 19.9 | 18.9 | 18.5 | 19.6 | 23.3 |
| 28-Aug | 17.4 | 15.9 | 14.8 | 13.3 | 12.5 | 12.1 | 12.0 | 13.4 | 15.0 | 17.1 | 19.2 | 19.8 | 20.6 | 21.2 | 21.5 | 21.7 | 21.7 | 21.3 | 21.1 | 20.3 | 19.4 | 18.5 | 16.9 | 15.4 | 17.6 | 21.7 |
| 29-Aug | 14.3 | 13.5 | 12.3 | 11.1 | 10.2 | 9.8 | 8.9 | 9.1 | 11.5 | 13.8 | 16.4 | 18.8 | 19.7 | 20.2 | 20.7 | 21.0 | 21.3 | 21.6 | 21.4 | 20.8 | 19.8 | 18.3 | 17.0 | 16.1 | 16.2 | 21.6 |
| 30-Aug | 15.5 | 15.0 | 14.6 | 14.3 | 14.0 | 13.6 | 13.9 | 15.3 | 16.8 | 18.1 | 20.1 | 21.9 | 23.3 | 24.5 | 25.4 | 25.9 | 25.7 | 25.5 | 24.8 | 23.4 | 22.1 | 21.0 | 20.0 | 19.1 | 19.7 | 25.9 |
| 31-Aug | 18.3 | 17.3 | 16.4 | 15.7 | 14.6 | 13.9 | 13.2 | 13.4 | 14.4 | 17.2 | 18.7 | 20.2 | 21.9 | 22.3 | 23.6 | 23.7 | 23.8 | 23.2 | 22.2 | 20.7 | 19.2 | 17.9 | 17.0 | 16.7 | 18.6 | 23.8 |
| Diurnal Average: 16.7 15.9 15.2 14.5 13.9 13.3 13.3 14.3 15.8 17.4 19.0 20.2 21.0 21.5 21.9 21.9 22.0 21.9 21.6 20.9 20.2 19.4 18.4 17.5 | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | |
| Diurnal Maximum: 21.9 20.7 20.0 19.4 18.7 18.6 19.0 20.0 21.9 24.4 26.3 27.3 28.3 28.8 29.3 29.4 29.3 28.8 28.2 27.3 26.1 24.8 23.4 22.2 | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 45 m (AT45m) - C
Mannix - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 45 m (AT45m) - C
Mannix - August 2017**

| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 5 | 0.67 | 0.67 |
| 10 - 20 | 472 | 63.44 | 64.11 |
| > 20 | 267 | 35.89 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744

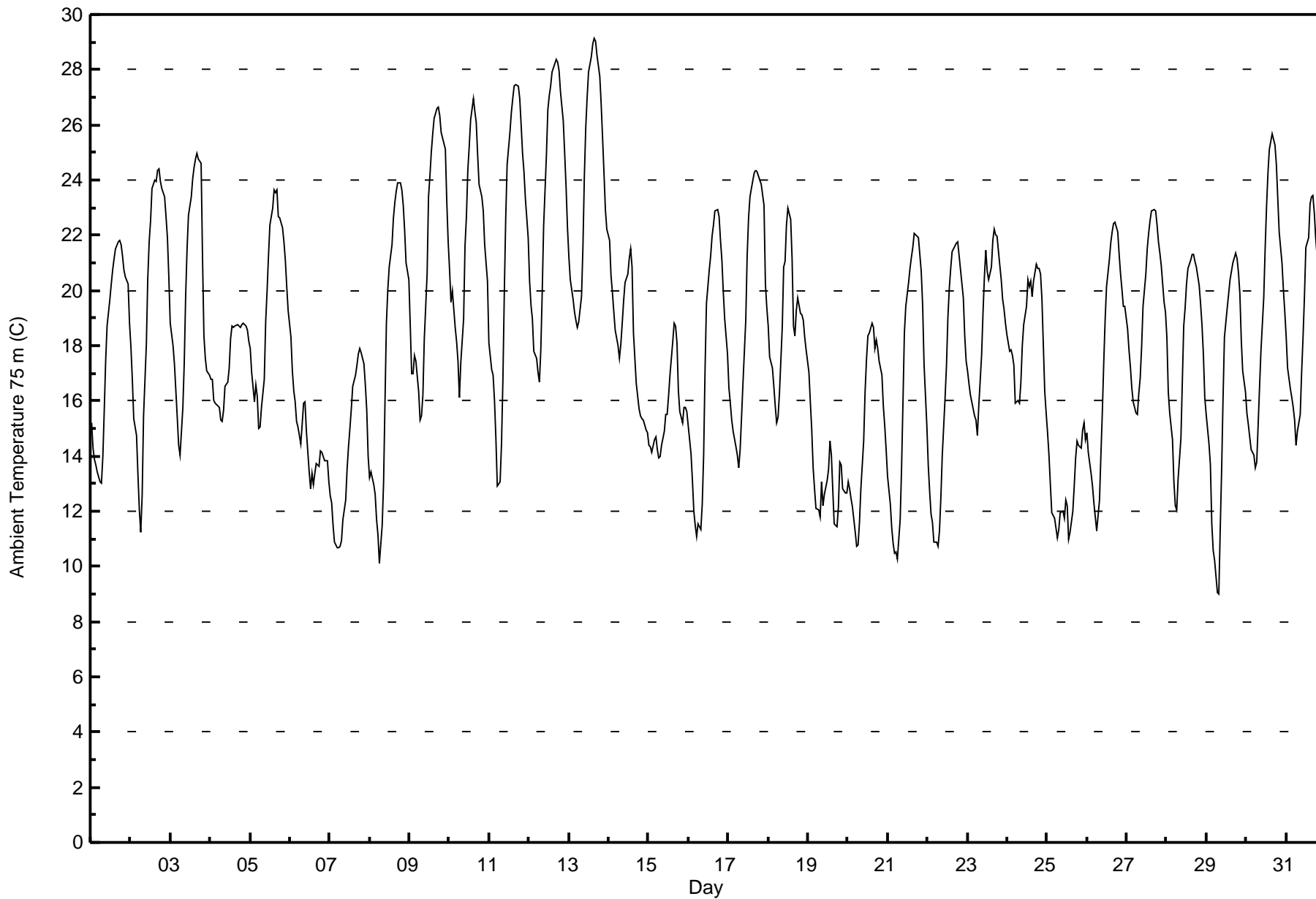


| Maximum Value: 29.1 C on Aug 13 16:00 Maximum Daily Average: 24.0 C on Aug 13 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 | | | | |
|---|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|------|------|---------------|---------------|
| Minimum Value: 9.0 C on Aug 29 08:00 Minimum Daily Average: 12.9 C on Aug 25 Maximum Diurnal Average: 21.7 C at hour 17 Minimum Diurnal Average: 13.5 C at hour 7 Monthly Average: 18.21 C Percentiles: P ₁ = 10.6 P ₁₀ = 12.6 Q ₁ = 14.9 Median = 18.1 Q ₃ = 21.3 P ₉₀ = 24.0 P ₉₉ = 28.2 | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 15.2 | 14.3 | 13.9 | 13.7 | 13.4 | 13.1 | 13.0 | 14.0 | 15.7 | 17.4 | 18.7 | 19.7 | 20.2 | 20.8 | 21.2 | 21.5 | 21.8 | 21.8 | 21.7 | 21.3 | 20.8 | 20.5 | 20.2 | 18.8 | 18.0 | 21.8 |
| 2-Aug | 18.0 | 16.8 | 15.3 | 14.8 | 13.3 | 12.0 | 11.2 | 12.6 | 15.5 | 18.0 | 20.4 | 21.7 | 22.5 | 23.7 | 24.0 | 24.0 | 24.3 | 24.4 | 23.9 | 23.7 | 23.4 | 22.7 | 21.9 | 20.5 | 19.5 | 24.4 |
| 3-Aug | 18.8 | 18.0 | 17.4 | 16.4 | 15.4 | 14.4 | 14.0 | 15.8 | 17.4 | 19.8 | 21.5 | 22.7 | 23.4 | 24.1 | 24.4 | 24.8 | 25.0 | 24.7 | 24.6 | 21.2 | 18.3 | 17.5 | 17.1 | 16.9 | 19.7 | 25.0 |
| 4-Aug | 16.8 | 16.8 | 16.0 | 15.9 | 15.9 | 15.8 | 15.3 | 15.3 | 15.7 | 16.5 | 16.7 | 17.2 | 18.3 | 18.7 | 18.6 | 18.7 | 18.7 | 18.7 | 18.7 | 18.8 | 18.8 | 18.7 | 18.5 | 18.1 | 17.4 | 18.8 |
| 5-Aug | 17.9 | 17.0 | 16.0 | 16.6 | 16.2 | 15.0 | 15.0 | 15.8 | 16.8 | 18.8 | 20.0 | 21.2 | 22.4 | 23.0 | 23.6 | 23.5 | 23.7 | 22.7 | 22.6 | 22.3 | 21.8 | 21.1 | 20.1 | 19.3 | 19.7 | 23.7 |
| 6-Aug | 18.3 | 17.1 | 16.4 | 16.0 | 15.3 | 15.0 | 14.4 | 15.2 | 15.9 | 16.0 | 14.9 | 13.4 | 12.8 | 13.4 | 13.0 | 13.4 | 13.7 | 13.6 | 14.2 | 14.1 | 14.0 | 13.8 | 13.8 | 13.1 | 14.6 | 18.3 |
| 7-Aug | 12.6 | 12.3 | 11.5 | 10.9 | 10.7 | 10.7 | 10.7 | 10.9 | 11.7 | 12.4 | 13.5 | 14.4 | 15.0 | 15.7 | 16.5 | 16.9 | 17.3 | 17.7 | 17.9 | 17.7 | 17.3 | 16.6 | 15.6 | 14.0 | 14.2 | 17.9 |
| 8-Aug | 13.2 | 13.4 | 13.0 | 12.6 | 11.7 | 11.1 | 10.1 | 11.5 | 13.0 | 16.0 | 18.8 | 20.0 | 20.8 | 21.7 | 22.6 | 23.2 | 23.6 | 23.9 | 23.9 | 23.6 | 23.1 | 22.2 | 21.0 | 20.4 | 18.1 | 23.9 |
| 9-Aug | 18.7 | 17.0 | 17.0 | 17.7 | 17.5 | 16.3 | 15.3 | 15.5 | 16.2 | 18.3 | 20.6 | 23.4 | 24.2 | 25.0 | 25.7 | 26.2 | 26.6 | 26.6 | 26.4 | 25.7 | 25.5 | 25.1 | 23.2 | 21.8 | 21.5 | 26.6 |
| 10-Aug | 20.7 | 19.6 | 20.0 | 18.7 | 18.1 | 17.5 | 16.1 | 17.4 | 19.0 | 21.6 | 22.7 | 24.4 | 25.2 | 26.2 | 27.0 | 26.5 | 26.1 | 24.9 | 23.9 | 23.4 | 22.9 | 21.6 | 21.0 | 20.3 | 21.9 | 27.0 |
| 11-Aug | 18.1 | 17.1 | 16.9 | 16.0 | 14.7 | 12.9 | 13.1 | 14.4 | 16.8 | 20.0 | 22.6 | 24.6 | 25.7 | 26.5 | 26.9 | 27.4 | 27.5 | 27.4 | 27.0 | 26.0 | 25.0 | 24.3 | 23.3 | 21.9 | 21.5 | 27.5 |
| 12-Aug | 20.3 | 19.5 | 19.0 | 17.8 | 17.5 | 17.0 | 16.7 | 17.8 | 20.0 | 22.3 | 24.9 | 26.5 | 27.0 | 27.4 | 27.9 | 28.2 | 28.4 | 28.3 | 28.0 | 27.2 | 26.1 | 24.9 | 23.7 | 22.3 | 23.3 | 28.4 |
| 13-Aug | 21.2 | 20.4 | 19.7 | 19.2 | 18.9 | 18.6 | 18.8 | 19.8 | 21.6 | 24.1 | 25.9 | 27.0 | 27.9 | 28.5 | 29.0 | 29.1 | 29.1 | 28.5 | 27.8 | 26.7 | 25.5 | 24.3 | 22.9 | 22.2 | 24.0 | 29.1 |
| 14-Aug | 21.8 | 20.5 | 19.9 | 19.2 | 18.5 | 18.0 | 17.6 | 18.0 | 18.8 | 19.6 | 20.3 | 20.6 | 21.1 | 21.5 | 20.8 | 18.5 | 16.6 | 16.2 | 15.7 | 15.5 | 15.3 | 15.3 | 15.0 | 14.9 | 18.3 | 21.8 |
| 15-Aug | 14.4 | 14.3 | 14.1 | 14.6 | 14.7 | 14.2 | 13.9 | 14.0 | 14.4 | 14.9 | 15.5 | 15.5 | 16.2 | 16.9 | 18.1 | 18.8 | 18.7 | 18.1 | 16.4 | 15.6 | 15.2 | 15.8 | 15.8 | 15.6 | 15.7 | 18.8 |
| 16-Aug | 15.1 | 14.1 | 13.1 | 12.0 | 11.5 | 11.1 | 11.5 | 11.3 | 12.2 | 14.0 | 17.1 | 19.5 | 20.8 | 21.3 | 21.9 | 22.4 | 22.9 | 22.9 | 22.7 | 21.8 | 21.1 | 19.9 | 19.0 | 17.7 | 17.4 | 22.9 |
| 17-Aug | 16.5 | 15.9 | 15.3 | 14.9 | 14.4 | 14.0 | 13.6 | 14.2 | 15.4 | 16.7 | 18.9 | 21.2 | 22.6 | 23.4 | 23.7 | 24.3 | 24.3 | 24.3 | 24.2 | 24.0 | 23.8 | 23.1 | 20.2 | 19.4 | 19.5 | 24.3 |
| 18-Aug | 18.7 | 17.6 | 17.2 | 16.5 | 15.8 | 15.2 | 15.4 | 16.3 | 18.7 | 20.8 | 21.0 | 22.4 | 23.0 | 22.6 | 21.2 | 18.7 | 18.4 | 19.3 | 19.7 | 19.2 | 19.1 | 18.9 | 18.3 | 17.8 | 18.8 | 23.0 |
| 19-Aug | 17.0 | 15.9 | 15.0 | 13.6 | 12.8 | 12.1 | 12.1 | 11.8 | 13.1 | 12.2 | 12.6 | 13.1 | 13.5 | 14.6 | 14.0 | 12.8 | 11.6 | 11.4 | 12.2 | 13.8 | 13.7 | 12.8 | 12.7 | 12.6 | 13.2 | 17.0 |
| 20-Aug | 13.1 | 12.8 | 12.4 | 12.1 | 11.2 | 10.7 | 10.8 | 11.6 | 12.8 | 14.6 | 16.3 | 17.5 | 18.4 | 18.4 | 18.8 | 18.7 | 17.9 | 18.2 | 17.9 | 17.4 | 16.9 | 15.8 | 15.1 | 14.2 | 15.2 | 18.8 |
| 21-Aug | 13.2 | 12.2 | 11.4 | 10.8 | 10.5 | 10.5 | 10.3 | 11.7 | 13.6 | 15.9 | 18.4 | 19.4 | 20.3 | 20.8 | 21.2 | 21.6 | 22.0 | 22.0 | 21.9 | 21.3 | 20.7 | 19.5 | 17.3 | 15.1 | 16.7 | 22.0 |
| 22-Aug | 13.7 | 12.7 | 11.9 | 11.6 | 10.9 | 10.9 | 10.8 | 11.3 | 12.5 | 14.0 | 16.1 | 17.3 | 19.0 | 20.1 | 20.8 | 21.4 | 21.6 | 21.7 | 21.7 | 21.2 | 20.8 | 19.7 | 18.3 | 17.5 | 16.6 | 21.7 |
| 23-Aug | 17.1 | 16.6 | 16.2 | 15.7 | 15.5 | 15.3 | 14.7 | 15.8 | 17.6 | 19.1 | 20.5 | 21.5 | 20.7 | 20.4 | 20.8 | 21.8 | 22.2 | 22.0 | 22.0 | 20.9 | 20.4 | 19.7 | 19.3 | 18.8 | 19.0 | 22.2 |
| 24-Aug | 18.4 | 17.8 | 17.8 | 17.6 | 17.3 | 15.9 | 16.0 | 15.9 | 16.7 | 18.0 | 18.8 | 19.4 | 20.4 | 20.1 | 20.3 | 19.8 | 20.3 | 21.0 | 20.8 | 20.8 | 20.6 | 19.7 | 16.3 | 15.5 | 18.6 | 21.0 |
| 25-Aug | 14.9 | 14.0 | 13.0 | 11.9 | 11.8 | 11.4 | 11.0 | 11.4 | 12.0 | 12.0 | 11.7 | 12.4 | 12.2 | 11.0 | 11.2 | 12.0 | 12.9 | 13.9 | 14.6 | 14.4 | 14.3 | 14.9 | 15.2 | 14.6 | 12.9 | 15.2 |
| 26-Aug | 14.8 | 14.2 | 13.4 | 12.9 | 12.3 | 11.8 | 11.3 | 12.4 | 14.1 | 15.5 | 17.3 | 18.9 | 20.1 | 21.1 | 21.7 | 22.1 | 22.4 | 22.5 | 22.1 | 21.3 | 20.6 | 20.0 | 19.4 | 19.4 | 17.6 | 22.5 |
| 27-Aug | 18.6 | 17.8 | 17.2 | 16.5 | 16.0 | 15.6 | 15.5 | 16.3 | 16.8 | 17.9 | 19.4 | 20.6 | 21.5 | 22.1 | 22.5 | 22.9 | 22.9 | 22.9 | 22.3 | 21.7 | 21.4 | 20.9 | 19.6 | 19.2 | 19.5 | 22.9 |
| 28-Aug | 18.3 | 16.3 | 15.6 | 14.6 | 13.1 | 12.2 | 12.1 | 13.2 | 14.7 | 16.7 | 18.7 | 19.4 | 20.2 | 20.8 | 21.1 | 21.3 | 21.3 | 21.0 | 20.8 | 20.2 | 19.5 | 18.7 | 17.7 | 16.1 | 17.7 | 21.3 |
| 29-Aug | 15.5 | 14.4 | 13.7 | 11.6 | 10.6 | 10.2 | 9.0 | 9.0 | 11.3 | 13.5 | 16.1 | 18.3 | 19.4 | 19.9 | 20.4 | 20.7 | 21.0 | 21.4 | 21.2 | 20.6 | 19.9 | 18.2 | 17.1 | 16.3 | 16.2 | 21.4 |
| 30-Aug | 15.6 | 15.1 | 14.7 | 14.2 | 14.0 | 13.6 | 13.8 | 15.1 | 16.5 | 17.8 | 19.7 | 21.5 | 23.0 | 24.2 | 25.1 | 25.7 | 25.5 | 25.3 | 24.6 | 23.4 | 22.1 | 21.0 | 20.0 | 19.2 | 19.6 | 25.7 |
| 31-Aug | 18.3 | 17.2 | 16.4 | 16.1 | 15.8 | 15.3 | 14.4 | 14.9 | 15.5 | 17.0 | 18.3 | 19.8 | 21.5 | 21.9 | 23.2 | 23.4 | 23.4 | 22.8 | 21.9 | 20.6 | 19.5 | 18.2 | 17.3 | 16.6 | 18.7 | 23.4 |
| 16.9 16.1 15.5 14.9 14.4 13.8 13.5 14.2 15.5 17.2 18.7 19.8 20.6 21.1 21.5 21.6 21.7 21.6 21.4 20.8 20.2 19.5 18.6 17.8 | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | |
| 21.8 20.5 20.0 19.2 18.9 18.6 18.8 19.8 21.6 24.1 25.9 27.0 27.9 28.5 29.0 29.1 29.1 28.5 28.0 27.2 26.1 25.1 23.7 22.3 | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 75 m (AT75m) - C
Mannix - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 75 m (AT75m) - C
Mannix - August 2017**

| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 2 | 0.27 | 0.27 |
| 10 - 20 | 479 | 64.38 | 64.65 |
| > 20 | 263 | 35.35 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Summary of Hour Averages

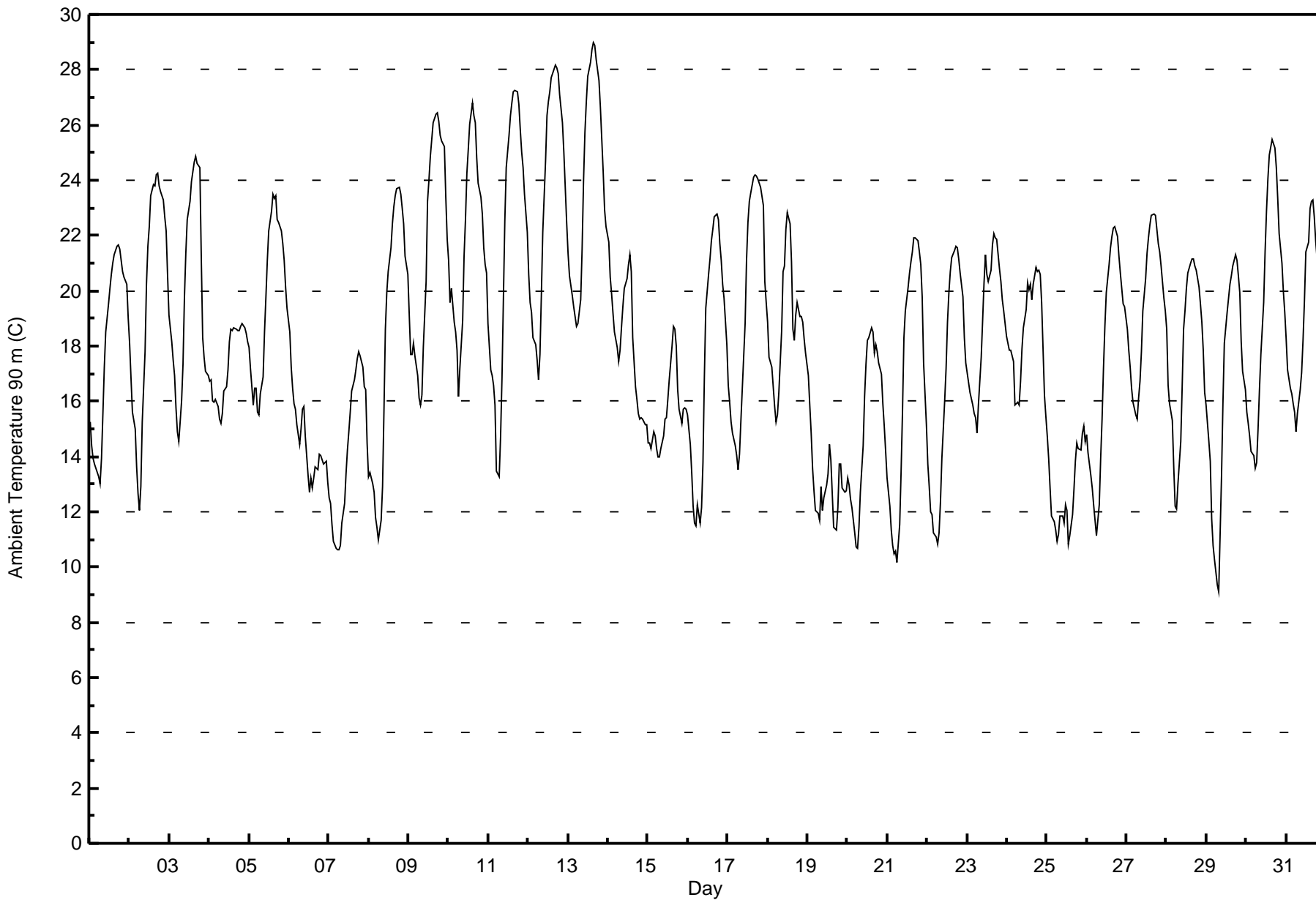
Mannix - August 2017

| Maximum Value: 29.0 C on Aug 13 16:00 Maximum Daily Average: 24.0 C on Aug 13 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 | | | | |
|---|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|------|------|---------------|---------------|
| Minimum Value: 9.1 C on Aug 29 08:00 Minimum Daily Average: 12.8 C on Aug 25 Maximum Diurnal Average: 21.5 C at hour 17 Minimum Diurnal Average: 13.6 C at hour 7 Monthly Average: 18.19 C Percentiles: P ₁ = 10.6 P ₁₀ = 12.6 Q ₁ = 15.1 Median = 18.1 Q ₃ = 21.2 P ₉₀ = 23.8 P ₉₉ = 28.0 | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 15.3 | 14.4 | 13.9 | 13.7 | 13.6 | 13.2 | 13.0 | 14.0 | 15.6 | 17.3 | 18.5 | 19.5 | 20.1 | 20.6 | 21.0 | 21.3 | 21.6 | 21.6 | 21.5 | 21.1 | 20.7 | 20.5 | 20.2 | 19.0 | 18.0 | 21.6 |
| 2-Aug | 18.1 | 16.8 | 15.6 | 15.0 | 13.6 | 12.6 | 12.1 | 12.9 | 15.2 | 17.8 | 20.2 | 21.6 | 22.3 | 23.5 | 23.8 | 23.8 | 24.2 | 24.3 | 23.8 | 23.6 | 23.3 | 22.7 | 22.2 | 20.6 | 19.6 | 24.3 |
| 3-Aug | 19.1 | 18.1 | 17.5 | 16.9 | 15.8 | 14.9 | 14.5 | 16.0 | 17.3 | 19.7 | 21.4 | 22.6 | 23.2 | 24.0 | 24.3 | 24.7 | 24.9 | 24.6 | 24.5 | 21.2 | 18.3 | 17.6 | 17.1 | 16.9 | 19.8 | 24.9 |
| 4-Aug | 16.7 | 16.8 | 16.0 | 16.0 | 16.1 | 15.8 | 15.3 | 15.2 | 15.6 | 16.4 | 16.5 | 17.1 | 18.2 | 18.6 | 18.5 | 18.7 | 18.6 | 18.6 | 18.5 | 18.7 | 18.8 | 18.6 | 18.5 | 18.1 | 17.3 | 18.8 |
| 5-Aug | 18.0 | 17.2 | 15.9 | 16.5 | 16.5 | 15.6 | 15.5 | 16.2 | 16.9 | 18.5 | 19.8 | 21.1 | 22.2 | 22.9 | 23.5 | 23.3 | 23.5 | 22.6 | 22.5 | 22.2 | 21.7 | 21.1 | 20.2 | 19.4 | 19.7 | 23.5 |
| 6-Aug | 18.5 | 17.2 | 16.5 | 15.9 | 15.7 | 15.2 | 14.5 | 15.0 | 15.7 | 15.8 | 14.8 | 13.3 | 12.7 | 13.2 | 12.8 | 13.2 | 13.6 | 13.5 | 14.1 | 14.0 | 13.9 | 13.7 | 13.8 | 13.1 | 14.6 | 18.5 |
| 7-Aug | 12.5 | 12.3 | 11.6 | 11.0 | 10.7 | 10.6 | 10.6 | 10.8 | 11.6 | 12.3 | 13.4 | 14.2 | 14.9 | 15.6 | 16.4 | 16.8 | 17.1 | 17.6 | 17.8 | 17.6 | 17.3 | 16.5 | 16.4 | 14.5 | 14.2 | 17.8 |
| 8-Aug | 13.3 | 13.4 | 13.0 | 12.7 | 11.8 | 11.4 | 11.0 | 11.7 | 12.9 | 15.7 | 18.6 | 19.9 | 20.7 | 21.6 | 22.4 | 23.0 | 23.5 | 23.7 | 23.7 | 23.5 | 23.0 | 22.4 | 21.3 | 20.6 | 18.1 | 23.7 |
| 9-Aug | 19.1 | 17.7 | 17.7 | 18.1 | 17.6 | 16.9 | 16.1 | 15.9 | 16.2 | 18.0 | 20.3 | 23.2 | 24.0 | 24.9 | 25.5 | 26.1 | 26.4 | 26.4 | 26.1 | 25.6 | 25.4 | 25.2 | 23.4 | 21.8 | 21.6 | 26.4 |
| 10-Aug | 21.1 | 19.6 | 20.1 | 18.9 | 18.5 | 17.8 | 16.2 | 17.2 | 18.9 | 21.3 | 22.6 | 24.2 | 25.1 | 26.0 | 26.8 | 26.3 | 26.1 | 24.8 | 23.9 | 23.4 | 22.8 | 21.6 | 21.0 | 20.6 | 21.9 | 26.8 |
| 11-Aug | 18.8 | 17.2 | 16.9 | 16.6 | 15.9 | 13.5 | 13.3 | 14.8 | 16.9 | 19.7 | 22.5 | 24.5 | 25.6 | 26.3 | 26.8 | 27.2 | 27.2 | 27.2 | 26.7 | 25.8 | 25.0 | 24.5 | 23.5 | 22.1 | 21.6 | 27.2 |
| 12-Aug | 20.6 | 19.6 | 19.2 | 18.3 | 18.0 | 17.5 | 16.8 | 17.7 | 19.8 | 22.1 | 24.7 | 26.4 | 26.8 | 27.2 | 27.7 | 28.0 | 28.2 | 28.1 | 27.8 | 27.1 | 26.1 | 25.0 | 23.8 | 22.5 | 23.3 | 28.2 |
| 13-Aug | 21.3 | 20.5 | 19.8 | 19.4 | 19.0 | 18.7 | 18.8 | 19.7 | 21.5 | 23.9 | 25.7 | 26.8 | 27.8 | 28.3 | 28.7 | 29.0 | 28.9 | 28.4 | 27.6 | 26.6 | 25.5 | 24.3 | 22.9 | 22.3 | 24.0 | 29.0 |
| 14-Aug | 21.8 | 20.5 | 19.9 | 19.2 | 18.5 | 17.9 | 17.5 | 17.8 | 18.6 | 19.4 | 20.1 | 20.4 | 21.0 | 21.3 | 20.7 | 18.3 | 16.5 | 16.1 | 15.6 | 15.4 | 15.4 | 15.3 | 15.1 | 15.2 | 18.2 | 21.8 |
| 15-Aug | 14.5 | 14.5 | 14.3 | 14.9 | 14.7 | 14.3 | 14.0 | 14.0 | 14.3 | 14.8 | 15.3 | 15.4 | 16.1 | 16.8 | 18.0 | 18.7 | 18.6 | 18.0 | 16.4 | 15.7 | 15.2 | 15.7 | 15.8 | 15.7 | 15.6 | 18.7 |
| 16-Aug | 15.5 | 14.4 | 13.4 | 12.2 | 11.6 | 11.5 | 12.2 | 11.6 | 12.2 | 13.8 | 16.9 | 19.4 | 20.6 | 21.1 | 21.8 | 22.2 | 22.7 | 22.8 | 22.6 | 21.7 | 21.1 | 20.2 | 19.7 | 18.0 | 17.5 | 22.8 |
| 17-Aug | 16.6 | 16.0 | 15.3 | 14.8 | 14.4 | 14.1 | 13.5 | 14.1 | 15.3 | 16.5 | 18.8 | 21.1 | 22.5 | 23.2 | 23.6 | 24.1 | 24.2 | 24.2 | 24.1 | 23.9 | 23.8 | 23.1 | 20.3 | 19.6 | 19.5 | 24.2 |
| 18-Aug | 18.8 | 17.6 | 17.2 | 16.5 | 15.8 | 15.3 | 15.5 | 16.3 | 18.6 | 20.7 | 20.9 | 22.2 | 22.8 | 22.4 | 21.0 | 18.6 | 18.2 | 19.1 | 19.6 | 19.1 | 19.0 | 18.9 | 18.2 | 17.8 | 18.8 | 22.8 |
| 19-Aug | 16.9 | 15.9 | 14.9 | 13.6 | 12.8 | 12.0 | 12.0 | 11.7 | 12.9 | 12.1 | 12.5 | 13.0 | 13.4 | 14.4 | 13.9 | 12.6 | 11.4 | 11.3 | 12.1 | 13.7 | 13.7 | 12.8 | 12.7 | 12.7 | 13.1 | 16.9 |
| 20-Aug | 13.2 | 12.9 | 12.5 | 12.1 | 11.2 | 10.7 | 10.7 | 11.4 | 12.7 | 14.4 | 16.2 | 17.3 | 18.2 | 18.3 | 18.7 | 18.5 | 17.8 | 18.1 | 17.8 | 17.4 | 17.0 | 15.9 | 15.1 | 14.2 | 15.1 | 18.7 |
| 21-Aug | 13.2 | 12.2 | 11.4 | 10.8 | 10.5 | 10.6 | 10.2 | 11.5 | 13.5 | 15.6 | 18.3 | 19.3 | 20.1 | 20.7 | 21.1 | 21.4 | 21.9 | 21.9 | 21.8 | 21.4 | 20.9 | 19.8 | 17.4 | 15.1 | 16.7 | 21.9 |
| 22-Aug | 13.7 | 12.9 | 12.0 | 11.9 | 11.3 | 11.1 | 10.8 | 11.2 | 12.4 | 13.9 | 16.0 | 17.2 | 18.9 | 19.9 | 20.7 | 21.2 | 21.5 | 21.6 | 21.6 | 21.2 | 20.7 | 19.8 | 18.3 | 17.4 | 16.5 | 21.6 |
| 23-Aug | 17.0 | 16.7 | 16.3 | 15.9 | 15.5 | 15.4 | 14.8 | 15.9 | 17.6 | 18.9 | 20.3 | 21.3 | 20.6 | 20.3 | 20.7 | 21.6 | 22.1 | 21.9 | 21.9 | 20.8 | 20.3 | 19.7 | 19.3 | 18.8 | 18.9 | 22.1 |
| 24-Aug | 18.4 | 17.8 | 17.8 | 17.6 | 17.5 | 15.9 | 16.0 | 15.8 | 16.7 | 17.9 | 18.6 | 19.3 | 20.3 | 20.0 | 20.2 | 19.7 | 20.2 | 20.9 | 20.7 | 20.7 | 20.6 | 19.6 | 16.2 | 15.4 | 18.5 | 20.9 |
| 25-Aug | 14.7 | 13.9 | 12.9 | 11.9 | 11.7 | 11.3 | 11.0 | 11.2 | 11.8 | 11.8 | 11.6 | 12.2 | 12.1 | 10.8 | 11.1 | 11.9 | 12.8 | 13.8 | 14.5 | 14.3 | 14.3 | 14.9 | 15.1 | 14.6 | 12.8 | 15.1 |
| 26-Aug | 14.8 | 14.1 | 13.3 | 12.9 | 12.3 | 11.7 | 11.1 | 12.2 | 13.9 | 15.4 | 17.2 | 18.7 | 20.0 | 21.0 | 21.6 | 22.0 | 22.3 | 22.3 | 22.0 | 21.2 | 20.7 | 20.1 | 19.5 | 19.4 | 17.5 | 22.3 |
| 27-Aug | 18.6 | 17.9 | 17.2 | 16.4 | 15.9 | 15.5 | 15.4 | 16.1 | 16.7 | 17.8 | 19.3 | 20.4 | 21.4 | 21.9 | 22.4 | 22.7 | 22.8 | 22.7 | 22.2 | 21.7 | 21.4 | 20.9 | 19.7 | 19.3 | 19.4 | 22.8 |
| 28-Aug | 18.6 | 16.6 | 15.9 | 15.3 | 13.6 | 12.2 | 12.1 | 13.0 | 14.6 | 16.5 | 18.6 | 19.3 | 20.1 | 20.6 | 21.0 | 21.2 | 21.1 | 20.9 | 20.7 | 20.1 | 19.5 | 18.8 | 17.9 | 16.3 | 17.7 | 21.2 |
| 29-Aug | 15.9 | 14.5 | 13.9 | 11.7 | 10.8 | 10.3 | 9.4 | 9.1 | 11.2 | 13.3 | 15.9 | 18.1 | 19.2 | 19.7 | 20.2 | 20.6 | 20.9 | 21.3 | 21.1 | 20.6 | 19.9 | 18.1 | 17.1 | 16.4 | 16.2 | 21.3 |
| 30-Aug | 15.6 | 15.2 | 14.7 | 14.2 | 14.0 | 13.6 | 13.8 | 15.0 | 16.4 | 17.7 | 19.6 | 21.4 | 22.9 | 24.1 | 24.9 | 25.5 | 25.3 | 25.2 | 24.5 | 23.3 | 22.1 | 21.0 | 20.0 | 19.2 | 19.5 | 25.5 |
| 31-Aug | 18.3 | 17.1 | 16.5 | 16.3 | 15.9 | 15.6 | 14.9 | 15.5 | 16.4 | 17.0 | 18.2 | 19.6 | 21.4 | 21.8 | 23.0 | 23.2 | 23.3 | 22.7 | 21.8 | 20.5 | 19.6 | 18.3 | 17.4 | 16.7 | 18.8 | 23.3 |
| 17.0 16.2 15.6 15.1 14.5 14.0 13.6 14.2 15.5 17.0 18.5 19.7 20.5 21.0 21.4 21.5 21.5 21.5 21.3 20.8 20.2 19.6 18.7 17.9 | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | |
| 21.8 20.5 20.1 19.4 19.0 18.7 18.8 19.7 21.5 23.9 25.7 26.8 27.8 28.3 28.7 29.0 28.9 28.4 27.8 27.1 26.1 25.2 23.8 22.5 | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 90 m (AT90m) - C
Mannix - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 90 m (AT90m) - C
Mannix - August 2017**

| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 2 | 0.27 | 0.27 |
| 10 - 20 | 481 | 64.65 | 64.92 |
| > 20 | 261 | 35.08 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



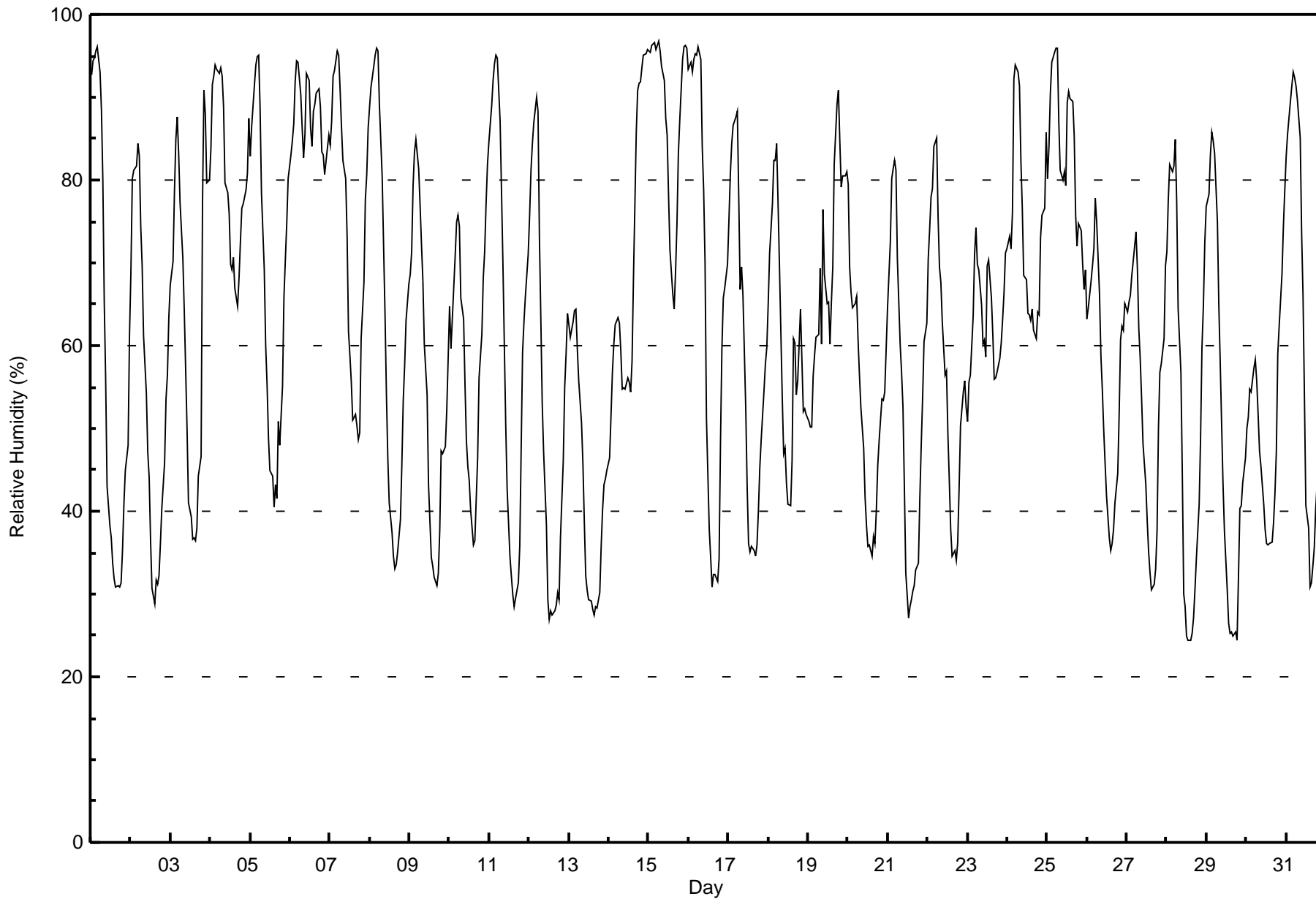
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Mannix - August 2017

| Maximum Value: 97 % on Aug 15 07:00 | | | | | | | | | | | | | | | | | | | Maximum Daily Average: 87.7 % on Aug 15 | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|------|------|------|------|------|---------------------------------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|-----------------|--|
| Minimum Value: 24 % on Aug 28 14:00 | | | | | | | | | | | | | | | | | | | Minimum Daily Average: 43.2 % on Aug 13 | | | | | | Hours of Data: 744 | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 83.5 % at hour 6 | | | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 43.4 % at hour 15 | | | | | | Hours of Missing Data: 0 | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 62.5 % | | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 25 P ₁₀ = 34 Q ₁ = 45 Median = 63 O ₃ = 80 P ₉₀ = 91 P ₉₉ = 96 | | | | | | Hours of Calibration: 0 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 93 | 94 | 95 | 96 | 96 | 93 | 88 | 80 | 65 | 56 | 43 | 38 | 37 | 34 | 32 | 31 | 31 | 31 | 31 | 35 | 41 | 45 | 48 | 61 | 58.1 | 96 | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 69 | 80 | 81 | 82 | 84 | 83 | 74 | 70 | 61 | 54 | 47 | 44 | 36 | 31 | 29 | 32 | 31 | 32 | 36 | 40 | 46 | 54 | 56 | 63 | 54.9 | 84 | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 67 | 70 | 79 | 85 | 88 | 83 | 77 | 70 | 64 | 57 | 50 | 41 | 39 | 37 | 37 | 36 | 38 | 44 | 47 | 77 | 91 | 88 | 80 | 80 | 63.6 | 91 | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 84 | 92 | 92 | 94 | 93 | 93 | 93 | 93 | 89 | 80 | 78 | 76 | 70 | 69 | 71 | 67 | 65 | 68 | 73 | 77 | 77 | 79 | 81 | 88 | 80.8 | 94 | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 83 | 86 | 91 | 94 | 95 | 95 | 89 | 79 | 69 | 60 | 55 | 49 | 45 | 44 | 40 | 43 | 41 | 51 | 48 | 55 | 66 | 70 | 75 | 80 | 66.8 | 95 | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 83 | 85 | 87 | 92 | 94 | 94 | 90 | 86 | 83 | 86 | 93 | 92 | 86 | 84 | 88 | 89 | 91 | 91 | 89 | 83 | 83 | 81 | 84 | 85 | 87.5 | 94 | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 84 | 87 | 92 | 93 | 96 | 95 | 91 | 87 | 82 | 80 | 73 | 62 | 59 | 56 | 51 | 52 | 50 | 49 | 50 | 61 | 68 | 78 | 81 | 86 | 73.4 | 96 | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 89 | 91 | 94 | 95 | 96 | 96 | 89 | 80 | 72 | 64 | 54 | 46 | 41 | 38 | 35 | 33 | 34 | 35 | 39 | 46 | 53 | 58 | 63 | 67 | 62.8 | 96 | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 69 | 71 | 79 | 83 | 85 | 81 | 77 | 72 | 68 | 60 | 54 | 43 | 39 | 34 | 33 | 32 | 31 | 33 | 38 | 47 | 47 | 48 | 52 | 58 | 55.7 | 85 | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 65 | 60 | 63 | 71 | 75 | 76 | 74 | 66 | 63 | 55 | 49 | 45 | 44 | 40 | 36 | 37 | 42 | 46 | 56 | 61 | 68 | 71 | 77 | 82 | 59.3 | 82 | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 85 | 89 | 92 | 94 | 95 | 95 | 87 | 79 | 70 | 60 | 51 | 43 | 35 | 32 | 30 | 28 | 29 | 31 | 36 | 47 | 59 | 63 | 66 | 71 | 61.1 | 95 | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 76 | 81 | 84 | 87 | 90 | 88 | 73 | 63 | 53 | 47 | 38 | 29 | 27 | 28 | 27 | 28 | 29 | 30 | 29 | 37 | 46 | 55 | 59 | 64 | 52.9 | 90 | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 62 | 61 | 63 | 64 | 64 | 60 | 56 | 51 | 46 | 39 | 32 | 30 | 29 | 29 | 28 | 27 | 28 | 28 | 30 | 36 | 40 | 43 | 44 | 45 | 43.2 | 64 | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 46 | 52 | 57 | 60 | 63 | 63 | 63 | 59 | 55 | 55 | 55 | 56 | 56 | 54 | 58 | 68 | 86 | 91 | 92 | 92 | 94 | 95 | 95 | 96 | 69.1 | 96 | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 96 | 95 | 96 | 97 | 96 | 96 | 97 | 96 | 94 | 92 | 88 | 85 | 78 | 71 | 66 | 64 | 69 | 75 | 83 | 87 | 95 | 96 | 96 | 96 | 87.7 | 97 | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 93 | 94 | 93 | 95 | 95 | 95 | 96 | 95 | 84 | 79 | 70 | 51 | 38 | 34 | 31 | 32 | 32 | 32 | 34 | 48 | 60 | 66 | 67 | 70 | 66.0 | 96 | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 75 | 81 | 84 | 87 | 88 | 88 | 78 | 67 | 69 | 66 | 52 | 43 | 36 | 35 | 36 | 35 | 35 | 36 | 40 | 45 | 49 | 55 | 58 | 60 | 58.2 | 88 | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 65 | 71 | 77 | 82 | 82 | 84 | 77 | 70 | 54 | 47 | 48 | 43 | 41 | 41 | 46 | 61 | 60 | 54 | 56 | 64 | 58 | 52 | 52 | 52 | 59.9 | 84 | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 51 | 50 | 50 | 56 | 59 | 61 | 61 | 69 | 60 | 76 | 69 | 65 | 65 | 60 | 65 | 69 | 82 | 89 | 91 | 85 | 79 | 81 | 80 | 81 | 69.0 | 91 | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 80 | 69 | 66 | 65 | 65 | 66 | 61 | 56 | 53 | 48 | 42 | 38 | 36 | 36 | 35 | 37 | 36 | 40 | 45 | 49 | 54 | 53 | 54 | 59 | 51.8 | 80 | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 65 | 72 | 80 | 81 | 82 | 81 | 71 | 60 | 57 | 53 | 43 | 33 | 27 | 28 | 29 | 30 | 31 | 33 | 34 | 41 | 48 | 54 | 61 | 63 | 52.4 | 82 | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 70 | 74 | 78 | 79 | 84 | 85 | 76 | 69 | 68 | 63 | 56 | 57 | 49 | 44 | 38 | 35 | 35 | 34 | 36 | 43 | 50 | 54 | 56 | 52 | 57.8 | 85 | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 51 | 56 | 56 | 64 | 71 | 74 | 70 | 69 | 65 | 60 | 61 | 59 | 70 | 70 | 66 | 61 | 56 | 56 | 57 | 58 | 60 | 63 | 67 | 71 | 62.9 | 74 | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 72 | 73 | 72 | 76 | 92 | 94 | 93 | 91 | 82 | 77 | 68 | 68 | 64 | 64 | 63 | 64 | 62 | 61 | 64 | 64 | 73 | 76 | 77 | 86 | 74.0 | 94 | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 80 | 84 | 91 | 94 | 95 | 96 | 96 | 87 | 81 | 80 | 81 | 79 | 89 | 91 | 90 | 89 | 85 | 76 | 72 | 75 | 74 | 70 | 67 | 69 | 83.0 | 96 | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 63 | 65 | 68 | 70 | 72 | 78 | 75 | 66 | 59 | 55 | 50 | 46 | 42 | 37 | 35 | 36 | 38 | 41 | 45 | 52 | 61 | 62 | 62 | 65 | 55.8 | 78 | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 64 | 65 | 66 | 69 | 70 | 74 | 69 | 62 | 58 | 54 | 48 | 43 | 39 | 35 | 32 | 30 | 31 | 33 | 38 | 50 | 57 | 58 | 61 | 70 | 53.2 | 74 | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 71 | 78 | 82 | 81 | 82 | 85 | 77 | 65 | 57 | 44 | 30 | 29 | 25 | 24 | 24 | 25 | 27 | 31 | 34 | 41 | 49 | 60 | 65 | 72 | 52.4 | 85 | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 77 | 78 | 83 | 86 | 85 | 83 | 75 | 65 | 58 | 51 | 43 | 38 | 30 | 26 | 25 | 25 | 25 | 25 | 24 | 32 | 40 | 41 | 43 | 46 | 50.3 | 86 | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 50 | 51 | 55 | 54 | 57 | 58 | 56 | 52 | 47 | 45 | 41 | 38 | 36 | 36 | 36 | 36 | 39 | 42 | 47 | 59 | 62 | 69 | 74 | 79 | 50.9 | 79 | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 83 | 86 | 89 | 91 | 93 | 92 | 91 | 90 | 85 | 73 | 66 | 54 | 41 | 38 | 31 | 31 | 33 | 36 | 40 | 46 | 53 | 57 | 56 | 54 | 62.9 | 93 | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | 72.9 | 75.6 | 78.6 | 81.2 | 83.3 | 83.5 | 78.8 | 73.0 | 66.8 | 61.8 | 55.7 | 50.4 | 46.7 | 44.5 | 43.4 | 44.1 | 45.2 | 46.9 | 49.4 | 56.0 | 61.3 | 64.3 | 66.3 | 70.1 | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | 96 | 95 | 96 | 97 | 96 | 96 | 97 | 96 | 94 | 92 | 93 | 92 | 89 | 91 | 90 | 89 | 91 | 91 | 92 | 92 | 95 | 96 | 96 | 96 | 96 | Diurnal Maximum | |





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity (RH) - %
Mannix - August 2017**

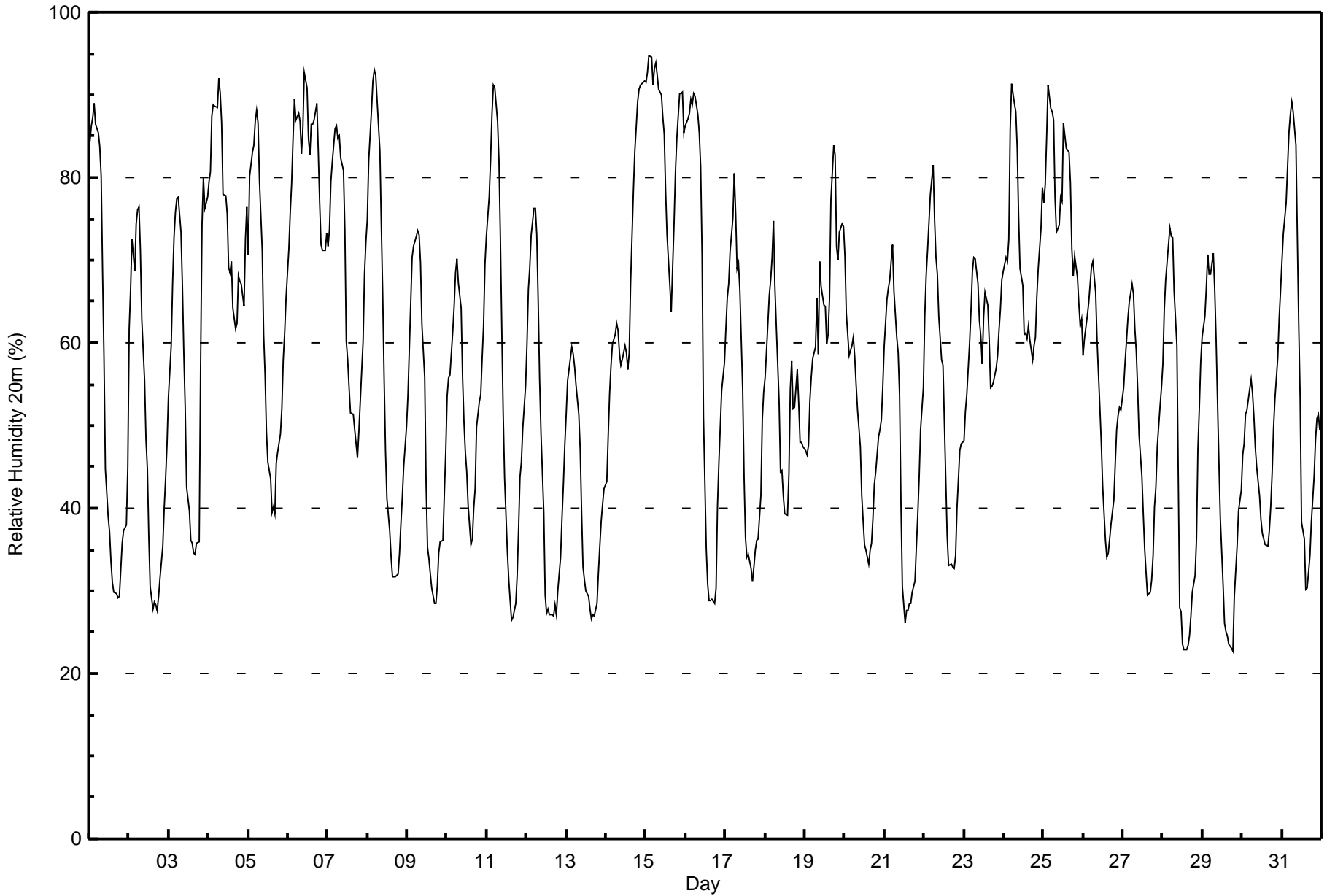
| Concentration Ranges (%) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 0 | 0.00 | 0.00 |
| 20 - 40 | 137 | 18.41 | 18.41 |
| 40 - 60 | 195 | 26.21 | 44.62 |
| 60 - 80 | 221 | 29.70 | 74.33 |
| 80 - 100 | 191 | 25.67 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



| Maximum Value: 95 % on Aug 15 03:00 | | | | | | | | | | | | | | | | | | Maximum Daily Average: 85.2 % on Aug 15 | | | | | | | | | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|------|---------------|---------------|------|------|------|------|------|------|------|------|------|---------------------------------|------|------|------|------|------|------|------|------|------|------|------|-----------------|--|
| Minimum Value: 23 % on Aug 29 19:00 | | | | | | | | | | | | | | | | | | Minimum Daily Average: 40.9 % on Aug 13 | | | | | | | | | | | | | | | | | | Hours of Data: 744 | | | | | | | | | | | | | |
| Maximum Diurnal Average: 77.0 % at hour 6 | | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 42.1 % at hour 16 | | | | | | | | | | | | | | | | | | Hours of Missing Data: 0 | | | | | | | | | | | | | |
| Monthly Average: 57.9 % | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 25 P ₁₀ = 32 Q ₁ = 41 Median = 59 O ₃ = 73 P ₉₀ = 86 P ₉₉ = 93 | | | | | | | | | | | | | | | | | | Hours of Calibration: 0 | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 84 | 86 | 87 | 89 | 86 | 85 | 84 | 80 | 69 | 58 | 45 | 39 | 37 | 34 | 31 | 30 | 30 | 29 | 29 | 33 | 36 | 37 | 38 | 45 | 54.2 | 89 | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 62 | 67 | 73 | 69 | 74 | 76 | 76 | 71 | 63 | 55 | 48 | 45 | 37 | 30 | 28 | 29 | 28 | 28 | 29 | 32 | 35 | 40 | 44 | 48 | 49.4 | 76 | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 53 | 60 | 67 | 73 | 76 | 77 | 78 | 73 | 67 | 59 | 52 | 42 | 40 | 36 | 36 | 35 | 34 | 36 | 36 | 57 | 74 | 80 | 76 | 78 | 58.1 | 80 | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 80 | 81 | 88 | 89 | 89 | 88 | 92 | 90 | 87 | 78 | 78 | 76 | 69 | 68 | 70 | 64 | 62 | 62 | 68 | 67 | 67 | 64 | 73 | 76 | 76.1 | 92 | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 71 | 80 | 83 | 84 | 87 | 88 | 87 | 80 | 71 | 61 | 56 | 49 | 46 | 44 | 39 | 40 | 39 | 45 | 47 | 49 | 52 | 58 | 61 | 65 | 61.8 | 88 | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 71 | 76 | 79 | 85 | 90 | 87 | 88 | 87 | 83 | 86 | 93 | 91 | 85 | 83 | 86 | 86 | 87 | 89 | 83 | 77 | 72 | 71 | 71 | 73 | 82.4 | 93 | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 72 | 74 | 79 | 82 | 86 | 86 | 85 | 85 | 82 | 81 | 74 | 60 | 58 | 55 | 51 | 51 | 49 | 48 | 46 | 49 | 57 | 60 | 68 | 72 | 67.1 | 86 | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 75 | 82 | 88 | 92 | 93 | 92 | 89 | 83 | 74 | 66 | 56 | 47 | 41 | 37 | 34 | 32 | 32 | 32 | 32 | 35 | 38 | 41 | 45 | 50 | 57.8 | 93 | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 54 | 59 | 65 | 70 | 72 | 73 | 74 | 73 | 70 | 62 | 56 | 43 | 35 | 34 | 32 | 30 | 29 | 29 | 31 | 35 | 36 | 36 | 42 | 47 | 49.3 | 74 | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 54 | 56 | 56 | 61 | 64 | 68 | 70 | 67 | 64 | 56 | 51 | 47 | 44 | 40 | 36 | 36 | 40 | 42 | 50 | 53 | 54 | 58 | 62 | 70 | 54.2 | 70 | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 73 | 78 | 82 | 88 | 91 | 91 | 87 | 82 | 73 | 62 | 52 | 44 | 35 | 31 | 29 | 26 | 27 | 28 | 32 | 37 | 44 | 46 | 50 | 55 | 55.9 | 91 | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 60 | 66 | 69 | 73 | 76 | 76 | 73 | 65 | 56 | 49 | 40 | 30 | 27 | 28 | 27 | 27 | 27 | 28 | 27 | 30 | 34 | 39 | 43 | 48 | 46.6 | 76 | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 51 | 55 | 58 | 59 | 59 | 57 | 55 | 51 | 47 | 39 | 33 | 31 | 30 | 29 | 28 | 27 | 27 | 28 | 32 | 35 | 38 | 40 | 42 | 42 | 40.9 | 59 | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 43 | 49 | 54 | 57 | 60 | 61 | 62 | 62 | 59 | 57 | 58 | 60 | 59 | 57 | 59 | 67 | 79 | 83 | 86 | 89 | 91 | 91 | 92 | 92 | 67.7 | 92 | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 91 | 93 | 95 | 95 | 91 | 93 | 94 | 92 | 91 | 90 | 87 | 85 | 78 | 73 | 67 | 64 | 69 | 74 | 81 | 85 | 90 | 90 | 90 | 85 | 85.2 | 95 | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 86 | 87 | 88 | 89 | 89 | 90 | 90 | 88 | 86 | 81 | 71 | 51 | 35 | 31 | 29 | 29 | 29 | 28 | 30 | 40 | 45 | 50 | 54 | 58 | 60.6 | 90 | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 62 | 65 | 67 | 71 | 75 | 81 | 76 | 69 | 70 | 66 | 54 | 44 | 36 | 34 | 34 | 33 | 31 | 33 | 35 | 36 | 36 | 42 | 51 | 54 | 52.3 | 81 | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 56 | 59 | 66 | 68 | 70 | 75 | 67 | 62 | 53 | 44 | 45 | 41 | 39 | 39 | 44 | 54 | 58 | 52 | 52 | 57 | 53 | 48 | 48 | 48 | 54.1 | 75 | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 47 | 46 | 48 | 53 | 56 | 58 | 60 | 65 | 59 | 70 | 67 | 65 | 64 | 60 | 61 | 65 | 77 | 84 | 83 | 72 | 70 | 73 | 74 | 74 | 64.6 | 84 | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 71 | 64 | 61 | 59 | 60 | 61 | 58 | 55 | 52 | 47 | 42 | 39 | 36 | 35 | 33 | 35 | 36 | 39 | 43 | 44 | 49 | 49 | 51 | 55 | 48.8 | 71 | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 59 | 65 | 67 | 68 | 70 | 72 | 66 | 61 | 59 | 54 | 41 | 31 | 26 | 28 | 28 | 28 | 28 | 30 | 31 | 35 | 39 | 44 | 50 | 55 | 47.2 | 72 | | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 63 | 68 | 71 | 75 | 78 | 82 | 75 | 70 | 68 | 63 | 58 | 57 | 50 | 43 | 37 | 33 | 33 | 33 | 33 | 34 | 40 | 47 | 48 | 48 | 54.5 | 82 | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 48 | 52 | 54 | 60 | 64 | 69 | 70 | 70 | 67 | 63 | 61 | 58 | 63 | 66 | 65 | 60 | 55 | 55 | 55 | 57 | 59 | 62 | 64 | 68 | 60.9 | 70 | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 69 | 70 | 70 | 73 | 86 | 91 | 89 | 88 | 84 | 75 | 69 | 67 | 61 | 61 | 61 | 62 | 60 | 58 | 60 | 61 | 66 | 69 | 74 | 79 | 70.9 | 91 | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 77 | 79 | 85 | 91 | 88 | 88 | 87 | 78 | 73 | 74 | 78 | 77 | 87 | 85 | 84 | 83 | 79 | 71 | 68 | 71 | 68 | 65 | 62 | 63 | 77.5 | 91 | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 58 | 60 | 63 | 65 | 67 | 69 | 70 | 66 | 60 | 56 | 52 | 48 | 43 | 36 | 34 | 35 | 36 | 38 | 41 | 45 | 49 | 51 | 52 | 52 | 52.0 | 70 | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 55 | 58 | 60 | 63 | 65 | 67 | 66 | 62 | 59 | 54 | 49 | 44 | 39 | 35 | 32 | 29 | 30 | 31 | 34 | 40 | 43 | 47 | 52 | 55 | 48.7 | 67 | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 58 | 64 | 68 | 72 | 74 | 73 | 73 | 66 | 60 | 44 | 28 | 27 | 24 | 23 | 23 | 23 | 25 | 27 | 30 | 32 | 36 | 47 | 52 | 58 | 46.0 | 74 | | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 61 | 63 | 67 | 71 | 68 | 68 | 71 | 66 | 60 | 53 | 46 | 39 | 31 | 26 | 25 | 25 | 24 | 23 | 23 | 29 | 32 | 35 | 40 | 42 | 45.3 | 71 | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 46 | 48 | 51 | 52 | 54 | 56 | 54 | 51 | 47 | 45 | 41 | 39 | 37 | 36 | 36 | 35 | 37 | 40 | 44 | 50 | 53 | 58 | 63 | 66 | 47.5 | 66 | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 70 | 73 | 77 | 81 | 85 | 88 | 89 | 88 | 84 | 73 | 62 | 53 | 38 | 36 | 30 | 30 | 32 | 34 | 38 | 44 | 48 | 51 | 51 | 50 | 58.6 | 89 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 63.8 | 67.2 | 70.5 | 73.4 | 75.6 | 77.0 | 75.9 | 72.5 | 67.6 | 62.1 | 56.1 | 50.6 | 46.1 | 43.7 | 42.2 | 42.1 | 42.9 | 43.8 | 45.4 | 48.6 | 51.7 | 54.5 | 57.4 | 60.2 | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | | | | | | | 91 | 93 | 95 | 95 | 93 | 93 | 94 | 92 | 91 | 90 | 93 | 91 | 87 | 85 | 86 | 86 | 87 | 89 | 86 | 89 | 91 | 91 | 92 | 92 | Diurnal Maximum | |





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity 20m (RH20m) - %
Mannix - August 2017

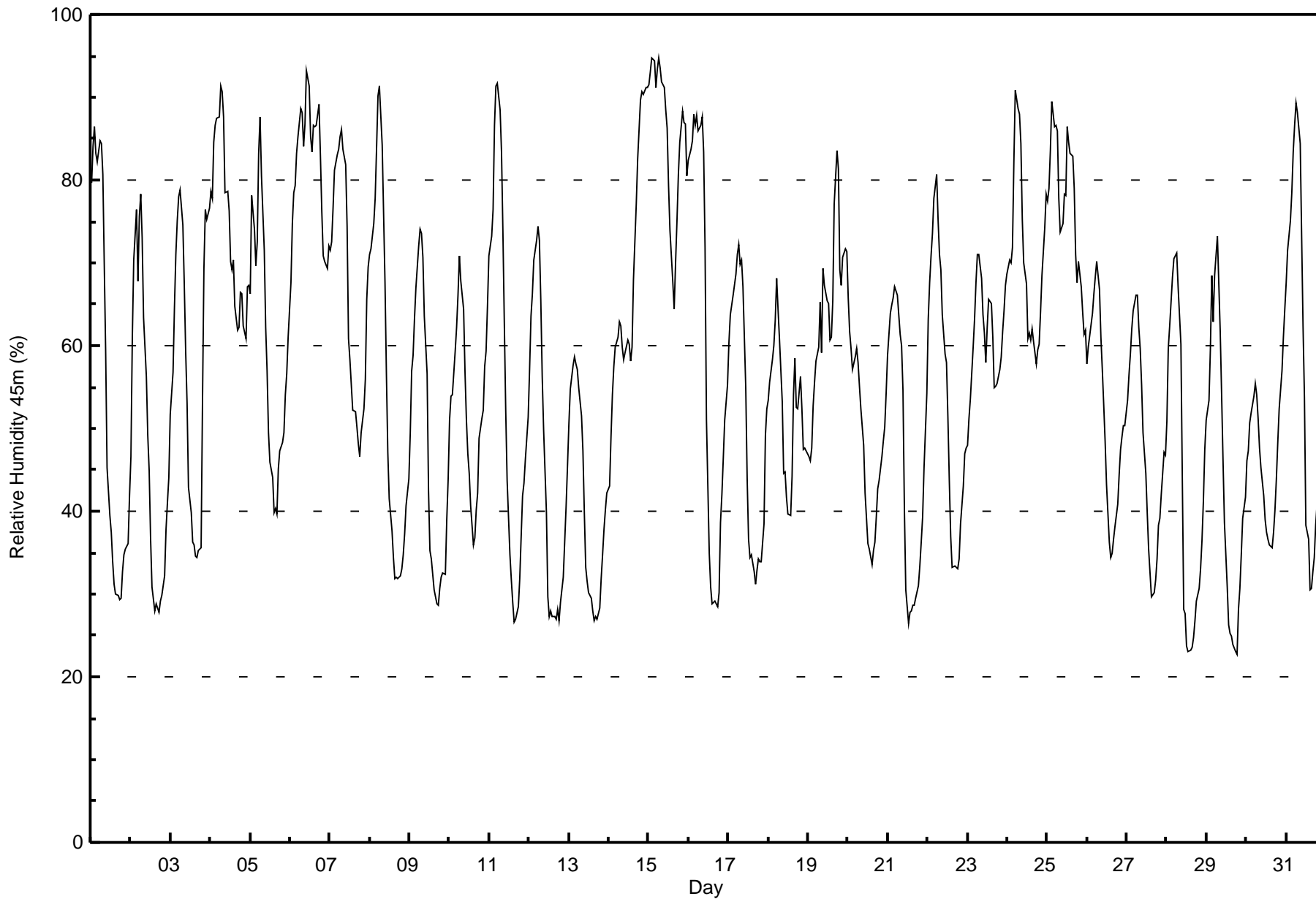
| Concentration Ranges (%) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 0 | 0.00 | 0.00 |
| 20 - 40 | 173 | 23.25 | 23.25 |
| 40 - 60 | 221 | 29.70 | 52.96 |
| 60 - 80 | 232 | 31.18 | 84.14 |
| 80 - 100 | 118 | 15.86 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



| Maximum Value: 95 % on Aug 15 07:00 | | | | | | | | | | | | | | | | | | | Maximum Daily Average: 85.1 % on Aug 15 | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|------|---------------------------------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|-----------------|--|
| Minimum Value: 23 % on Aug 29 19:00 | | | | | | | | | | | | | | | | | | | Minimum Daily Average: 40.8 % on Aug 13 | | | | | | Hours of Data: 744 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 76.0 % at hour 7 | | | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 42.3 % at hour 16 | | | | | | Hours of Missing Data: 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 57.1 % | | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 25 P ₁₀ = 32 Q ₁ = 40 Median = 58 O ₃ = 71 P ₉₀ = 84 P ₉₉ = 93 | | | | | | Hours of Calibration: 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 80 | 84 | 86 | 83 | 82 | 85 | 84 | 81 | 70 | 59 | 45 | 39 | 37 | 34 | 31 | 30 | 30 | 29 | 29 | 33 | 35 | 35 | 36 | 42 | 53.4 | 86 | | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 47 | 61 | 70 | 76 | 68 | 76 | 78 | 73 | 63 | 56 | 49 | 45 | 37 | 31 | 28 | 29 | 28 | 28 | 29 | 30 | 32 | 38 | 41 | 44 | 48.2 | 78 | | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 52 | 57 | 65 | 71 | 75 | 78 | 79 | 75 | 67 | 59 | 53 | 43 | 40 | 36 | 36 | 35 | 34 | 35 | 36 | 53 | 69 | 77 | 75 | 77 | 57.3 | 79 | | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 79 | 78 | 85 | 87 | 88 | 88 | 91 | 91 | 88 | 79 | 79 | 76 | 70 | 69 | 70 | 65 | 62 | 62 | 66 | 66 | 62 | 61 | 67 | 67 | 74.8 | 91 | | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 66 | 78 | 74 | 70 | 73 | 83 | 88 | 81 | 72 | 62 | 57 | 50 | 46 | 44 | 40 | 40 | 40 | 45 | 47 | 48 | 49 | 54 | 57 | 61 | 59.3 | 88 | | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 68 | 75 | 79 | 79 | 83 | 85 | 89 | 88 | 84 | 87 | 93 | 91 | 85 | 83 | 87 | 86 | 87 | 89 | 83 | 76 | 71 | 70 | 69 | 72 | 81.7 | 93 | | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 71 | 73 | 77 | 81 | 83 | 84 | 85 | 86 | 84 | 82 | 74 | 61 | 58 | 55 | 52 | 52 | 50 | 48 | 47 | 50 | 52 | 56 | 66 | 70 | 66.5 | 86 | | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 71 | 72 | 75 | 78 | 84 | 90 | 91 | 84 | 76 | 68 | 57 | 47 | 41 | 38 | 34 | 32 | 32 | 32 | 32 | 33 | 35 | 37 | 41 | 44 | 55.1 | 91 | | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 49 | 57 | 59 | 63 | 67 | 72 | 74 | 73 | 71 | 64 | 57 | 43 | 35 | 34 | 32 | 31 | 29 | 29 | 31 | 32 | 33 | 32 | 39 | 44 | 47.9 | 74 | | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 51 | 54 | 54 | 59 | 62 | 66 | 71 | 68 | 64 | 57 | 51 | 47 | 45 | 41 | 36 | 37 | 40 | 42 | 49 | 51 | 52 | 57 | 59 | 65 | 53.3 | 71 | | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 71 | 73 | 77 | 87 | 91 | 92 | 88 | 83 | 74 | 63 | 52 | 44 | 35 | 32 | 29 | 27 | 27 | 28 | 32 | 37 | 42 | 43 | 46 | 51 | 55.1 | 92 | | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 57 | 64 | 66 | 70 | 73 | 74 | 73 | 65 | 56 | 50 | 40 | 30 | 27 | 28 | 27 | 27 | 27 | 28 | 27 | 29 | 32 | 36 | 41 | 45 | 45.5 | 74 | | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 51 | 55 | 58 | 59 | 58 | 57 | 55 | 51 | 47 | 40 | 33 | 32 | 30 | 30 | 28 | 27 | 27 | 27 | 28 | 32 | 35 | 38 | 40 | 42 | 40.8 | 59 | | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 43 | 49 | 54 | 58 | 60 | 61 | 63 | 62 | 60 | 58 | 59 | 61 | 60 | 58 | 60 | 68 | 77 | 82 | 86 | 90 | 91 | 90 | 91 | 91 | 68.0 | 91 | | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 92 | 93 | 95 | 94 | 91 | 93 | 95 | 94 | 92 | 91 | 89 | 86 | 79 | 74 | 68 | 64 | 70 | 75 | 81 | 85 | 88 | 87 | 87 | 80 | 85.1 | 95 | | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 82 | 84 | 85 | 88 | 87 | 88 | 86 | 87 | 88 | 83 | 72 | 51 | 35 | 31 | 29 | 29 | 29 | 28 | 30 | 39 | 42 | 46 | 51 | 55 | 59.3 | 88 | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 60 | 64 | 65 | 66 | 69 | 71 | 72 | 70 | 70 | 67 | 55 | 44 | 37 | 34 | 35 | 33 | 31 | 33 | 34 | 34 | 34 | 38 | 49 | 52 | 50.7 | 72 | | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 53 | 56 | 58 | 60 | 63 | 68 | 64 | 61 | 53 | 45 | 45 | 42 | 40 | 39 | 44 | 54 | 59 | 53 | 52 | 56 | 52 | 47 | 48 | 47 | 52.5 | 68 | | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 47 | 46 | 48 | 53 | 56 | 58 | 60 | 65 | 59 | 69 | 67 | 65 | 65 | 61 | 61 | 65 | 77 | 83 | 81 | 69 | 67 | 71 | 72 | 71 | 64.1 | 83 | | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 66 | 62 | 60 | 57 | 59 | 60 | 58 | 55 | 52 | 48 | 42 | 39 | 36 | 35 | 34 | 35 | 36 | 39 | 43 | 44 | 47 | 48 | 50 | 54 | 48.3 | 66 | | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 59 | 64 | 65 | 66 | 67 | 67 | 66 | 61 | 60 | 55 | 40 | 30 | 26 | 28 | 28 | 29 | 29 | 30 | 31 | 33 | 36 | 39 | 45 | 54 | 46.2 | 67 | | | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 63 | 68 | 71 | 74 | 78 | 81 | 75 | 71 | 69 | 64 | 59 | 58 | 51 | 44 | 37 | 33 | 33 | 33 | 33 | 34 | 38 | 43 | 47 | 48 | 54.4 | 81 | | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 48 | 51 | 53 | 60 | 63 | 68 | 71 | 71 | 68 | 64 | 61 | 58 | 62 | 66 | 65 | 61 | 55 | 55 | 55 | 57 | 59 | 62 | 64 | 67 | 61.0 | 71 | | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 69 | 70 | 70 | 72 | 82 | 91 | 89 | 88 | 84 | 75 | 70 | 67 | 61 | 61 | 61 | 62 | 61 | 58 | 59 | 60 | 64 | 68 | 74 | 78 | 70.7 | 91 | | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 78 | 79 | 84 | 89 | 86 | 87 | 86 | 78 | 74 | 75 | 78 | 78 | 86 | 85 | 83 | 83 | 79 | 71 | 68 | 70 | 67 | 64 | 61 | 62 | 77.1 | 89 | | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 58 | 60 | 63 | 64 | 66 | 68 | 70 | 67 | 61 | 57 | 53 | 48 | 43 | 36 | 34 | 35 | 37 | 38 | 41 | 44 | 47 | 49 | 50 | 50 | 51.7 | 70 | | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 53 | 57 | 59 | 62 | 64 | 66 | 66 | 62 | 60 | 55 | 49 | 45 | 40 | 35 | 33 | 30 | 30 | 32 | 34 | 38 | 39 | 42 | 47 | 47 | 47.7 | 66 | | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 51 | 60 | 62 | 68 | 70 | 71 | 71 | 67 | 60 | 44 | 28 | 28 | 24 | 23 | 23 | 24 | 25 | 27 | 29 | 31 | 33 | 36 | 41 | 47 | 43.5 | 71 | | | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 51 | 53 | 60 | 68 | 63 | 69 | 73 | 67 | 62 | 54 | 46 | 39 | 31 | 26 | 25 | 25 | 24 | 23 | 23 | 28 | 31 | 35 | 39 | 42 | 44.0 | 73 | | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 46 | 47 | 51 | 52 | 54 | 56 | 54 | 51 | 48 | 45 | 42 | 39 | 37 | 37 | 36 | 36 | 37 | 40 | 44 | 48 | 52 | 57 | 61 | 64 | 47.3 | 64 | | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 68 | 72 | 75 | 78 | 83 | 87 | 89 | 88 | 84 | 73 | 62 | 54 | 38 | 37 | 30 | 31 | 33 | 34 | 38 | 44 | 47 | 50 | 50 | 49 | 58.1 | 89 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 61.2 | 64.9 | 67.7 | 70.7 | 72.5 | 75.4 | 76.0 | 73.1 | 68.4 | 62.8 | 56.7 | 50.9 | 46.4 | 44.0 | 42.5 | 42.3 | 43.0 | 43.8 | 45.1 | 47.6 | 49.5 | 51.9 | 55.1 | 57.6 | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 92 | 93 | 95 | 94 | 91 | 93 | 95 | 94 | 92 | 91 | 93 | 91 | 86 | 85 | 87 | 86 | 87 | 89 | 86 | 90 | 91 | 90 | 91 | 91 | 91 | Diurnal Maximum | |





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity 45m (RH45m) - %
Mannix - August 2017

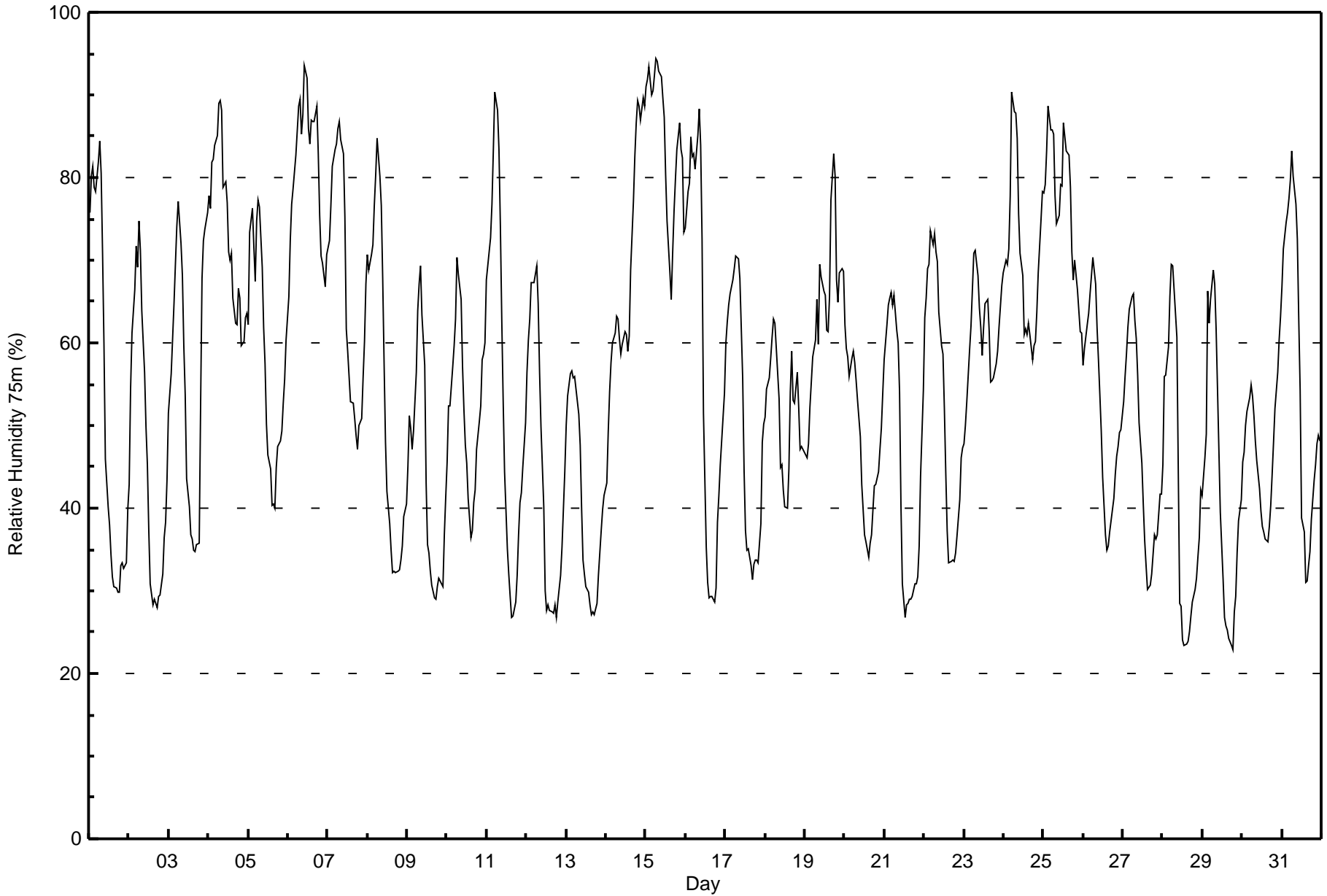
| Concentration Ranges (%) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 0 | 0.00 | 0.00 |
| 20 - 40 | 182 | 24.46 | 24.46 |
| 40 - 60 | 224 | 30.11 | 54.57 |
| 60 - 80 | 233 | 31.32 | 85.89 |
| 80 - 100 | 105 | 14.11 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



| Maximum Value: 94 % on Aug 15 07:00 | | | | | | | | | | | | | | | | | | | Maximum Daily Average: 84.3 % on Aug 15 | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|------|---------------------------------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|-----------------|--|
| Minimum Value: 23 % on Aug 29 19:00 | | | | | | | | | | | | | | | | | | | Minimum Daily Average: 40.5 % on Aug 13 | | | | | | Hours of Data: 744 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 73.9 % at hour 7 | | | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 42.7 % at hour 16 | | | | | | Hours of Missing Data: 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 56.2 % | | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 25 P ₁₀ = 31 Q ₁ = 40 Median = 57 O ₃ = 70 P ₉₀ = 83 P ₉₉ = 92 | | | | | | Hours of Calibration: 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 76 | 80 | 81 | 79 | 78 | 82 | 84 | 81 | 71 | 60 | 46 | 40 | 38 | 34 | 32 | 31 | 30 | 30 | 30 | 33 | 33 | 33 | 33 | 40 | 52.3 | 84 | | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 43 | 54 | 61 | 66 | 72 | 69 | 75 | 71 | 64 | 56 | 50 | 45 | 37 | 31 | 28 | 29 | 28 | 28 | 29 | 30 | 32 | 36 | 38 | 43 | 46.6 | 75 | | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 51 | 56 | 61 | 65 | 70 | 74 | 77 | 72 | 68 | 60 | 54 | 44 | 40 | 37 | 36 | 35 | 35 | 36 | 36 | 53 | 68 | 72 | 74 | 76 | 56.1 | 77 | | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 78 | 76 | 82 | 82 | 84 | 85 | 89 | 89 | 88 | 79 | 79 | 77 | 71 | 70 | 71 | 65 | 62 | 62 | 67 | 65 | 60 | 60 | 63 | 64 | 73.7 | 89 | | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 62 | 73 | 76 | 72 | 68 | 75 | 77 | 76 | 69 | 62 | 58 | 50 | 46 | 45 | 40 | 41 | 40 | 45 | 47 | 48 | 49 | 53 | 56 | 60 | 57.9 | 77 | | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 66 | 72 | 77 | 79 | 81 | 83 | 89 | 90 | 85 | 88 | 94 | 92 | 86 | 84 | 87 | 87 | 87 | 89 | 83 | 75 | 70 | 70 | 67 | 71 | 81.2 | 94 | | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 72 | 72 | 77 | 81 | 83 | 84 | 86 | 87 | 85 | 83 | 75 | 62 | 59 | 56 | 53 | 53 | 51 | 49 | 47 | 50 | 51 | 56 | 60 | 67 | 66.6 | 87 | | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 71 | 69 | 71 | 72 | 77 | 80 | 85 | 80 | 77 | 68 | 57 | 48 | 42 | 38 | 35 | 32 | 32 | 32 | 32 | 33 | 34 | 35 | 39 | 40 | 53.3 | 85 | | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 45 | 51 | 50 | 47 | 49 | 56 | 64 | 67 | 69 | 63 | 57 | 43 | 36 | 35 | 32 | 31 | 29 | 29 | 30 | 32 | 31 | 31 | 37 | 41 | 44.0 | 69 | | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 46 | 52 | 52 | 57 | 60 | 63 | 70 | 68 | 65 | 57 | 52 | 48 | 45 | 41 | 36 | 37 | 41 | 42 | 47 | 50 | 52 | 58 | 59 | 60 | 52.5 | 70 | | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 68 | 71 | 73 | 77 | 83 | 90 | 88 | 83 | 74 | 63 | 53 | 44 | 35 | 32 | 29 | 27 | 27 | 29 | 32 | 37 | 41 | 42 | 45 | 50 | 53.9 | 90 | | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 56 | 60 | 63 | 67 | 67 | 68 | 69 | 65 | 56 | 50 | 40 | 30 | 28 | 28 | 28 | 27 | 27 | 28 | 27 | 29 | 32 | 35 | 40 | 44 | 44.4 | 69 | | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 50 | 54 | 56 | 57 | 56 | 56 | 54 | 51 | 48 | 40 | 34 | 32 | 31 | 30 | 28 | 27 | 28 | 27 | 28 | 32 | 35 | 37 | 40 | 42 | 40.5 | 57 | | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 43 | 49 | 54 | 58 | 60 | 61 | 63 | 63 | 61 | 59 | 60 | 61 | 61 | 59 | 61 | 69 | 77 | 83 | 87 | 89 | 89 | 87 | 90 | 89 | 67.9 | 90 | | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 91 | 92 | 93 | 90 | 90 | 92 | 94 | 94 | 93 | 92 | 90 | 87 | 80 | 75 | 69 | 65 | 71 | 76 | 80 | 83 | 87 | 83 | 82 | 73 | 84.3 | 94 | | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 74 | 78 | 79 | 85 | 83 | 83 | 81 | 85 | 88 | 84 | 72 | 51 | 35 | 31 | 29 | 29 | 29 | 29 | 30 | 38 | 42 | 45 | 48 | 54 | 57.7 | 88 | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 60 | 63 | 65 | 66 | 68 | 69 | 71 | 70 | 70 | 68 | 56 | 45 | 37 | 35 | 35 | 33 | 31 | 33 | 34 | 34 | 33 | 38 | 48 | 50 | 50.4 | 71 | | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 51 | 54 | 56 | 58 | 61 | 63 | 62 | 59 | 53 | 45 | 45 | 42 | 40 | 40 | 45 | 54 | 59 | 53 | 53 | 56 | 52 | 47 | 47 | 47 | 51.8 | 63 | | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 47 | 46 | 48 | 52 | 55 | 58 | 60 | 65 | 60 | 70 | 68 | 66 | 66 | 61 | 61 | 66 | 77 | 83 | 80 | 68 | 65 | 68 | 69 | 69 | 63.7 | 83 | | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 62 | 59 | 58 | 56 | 58 | 59 | 58 | 55 | 53 | 49 | 43 | 40 | 37 | 36 | 34 | 36 | 37 | 40 | 43 | 43 | 44 | 47 | 50 | 54 | 47.9 | 62 | | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 58 | 62 | 65 | 65 | 66 | 64 | 66 | 61 | 60 | 54 | 40 | 31 | 27 | 28 | 28 | 29 | 29 | 29 | 31 | 31 | 32 | 35 | 44 | 54 | 45.5 | 66 | | | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 63 | 65 | 69 | 70 | 74 | 72 | 73 | 71 | 70 | 64 | 60 | 59 | 52 | 44 | 37 | 33 | 34 | 34 | 34 | 35 | 37 | 41 | 46 | 47 | 53.4 | 74 | | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 48 | 50 | 53 | 59 | 62 | 66 | 71 | 71 | 68 | 64 | 62 | 59 | 62 | 65 | 65 | 61 | 55 | 55 | 56 | 57 | 59 | 62 | 64 | 67 | 61.0 | 71 | | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 68 | 70 | 70 | 71 | 78 | 90 | 88 | 88 | 85 | 76 | 71 | 68 | 61 | 62 | 61 | 62 | 61 | 58 | 60 | 60 | 64 | 68 | 75 | 78 | 70.6 | 90 | | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 78 | 79 | 83 | 89 | 86 | 86 | 85 | 78 | 74 | 75 | 79 | 79 | 87 | 85 | 83 | 83 | 79 | 71 | 68 | 70 | 66 | 64 | 61 | 61 | 77.1 | 89 | | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 57 | 59 | 62 | 64 | 66 | 68 | 70 | 67 | 62 | 58 | 54 | 49 | 44 | 37 | 35 | 35 | 37 | 39 | 41 | 44 | 46 | 47 | 49 | 49 | 51.7 | 70 | | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 53 | 56 | 59 | 62 | 64 | 66 | 66 | 63 | 61 | 56 | 50 | 45 | 41 | 36 | 33 | 30 | 31 | 32 | 34 | 37 | 36 | 37 | 42 | 42 | 47.1 | 66 | | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 45 | 56 | 56 | 59 | 66 | 70 | 69 | 67 | 61 | 44 | 29 | 28 | 24 | 23 | 24 | 24 | 25 | 27 | 29 | 30 | 32 | 34 | 36 | 42 | 41.7 | 70 | | | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 42 | 46 | 49 | 66 | 62 | 65 | 69 | 67 | 62 | 54 | 47 | 39 | 31 | 27 | 26 | 25 | 24 | 23 | 23 | 27 | 29 | 35 | 39 | 41 | 42.5 | 69 | | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 46 | 47 | 50 | 52 | 53 | 55 | 54 | 51 | 48 | 46 | 42 | 40 | 38 | 37 | 36 | 36 | 38 | 40 | 44 | 48 | 52 | 56 | 60 | 63 | 47.2 | 63 | | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 67 | 71 | 75 | 76 | 77 | 80 | 83 | 80 | 77 | 73 | 63 | 54 | 39 | 37 | 31 | 31 | 33 | 35 | 39 | 43 | 45 | 48 | 49 | 48 | 56.4 | 83 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 59.2 | 62.8 | 65.2 | 67.7 | 69.5 | 72.1 | 73.9 | 72.2 | 68.5 | 63.2 | 57.4 | 51.6 | 47.0 | 44.5 | 42.9 | 42.7 | 43.4 | 44.0 | 45.2 | 47.1 | 48.3 | 50.4 | 53.2 | 55.7 | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 91 | 92 | 93 | 90 | 90 | 92 | 94 | 94 | 93 | 92 | 94 | 92 | 87 | 85 | 87 | 87 | 87 | 87 | 89 | 87 | 89 | 89 | 87 | 90 | 89 | Diurnal Maximum | |





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity 75m (RH75m) - %
Mannix - August 2017

| Concentration Ranges (%) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 0 | 0.00 | 0.00 |
| 20 - 40 | 180 | 24.19 | 24.19 |
| 40 - 60 | 235 | 31.59 | 55.78 |
| 60 - 80 | 240 | 32.26 | 88.04 |
| 80 - 100 | 89 | 11.96 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744

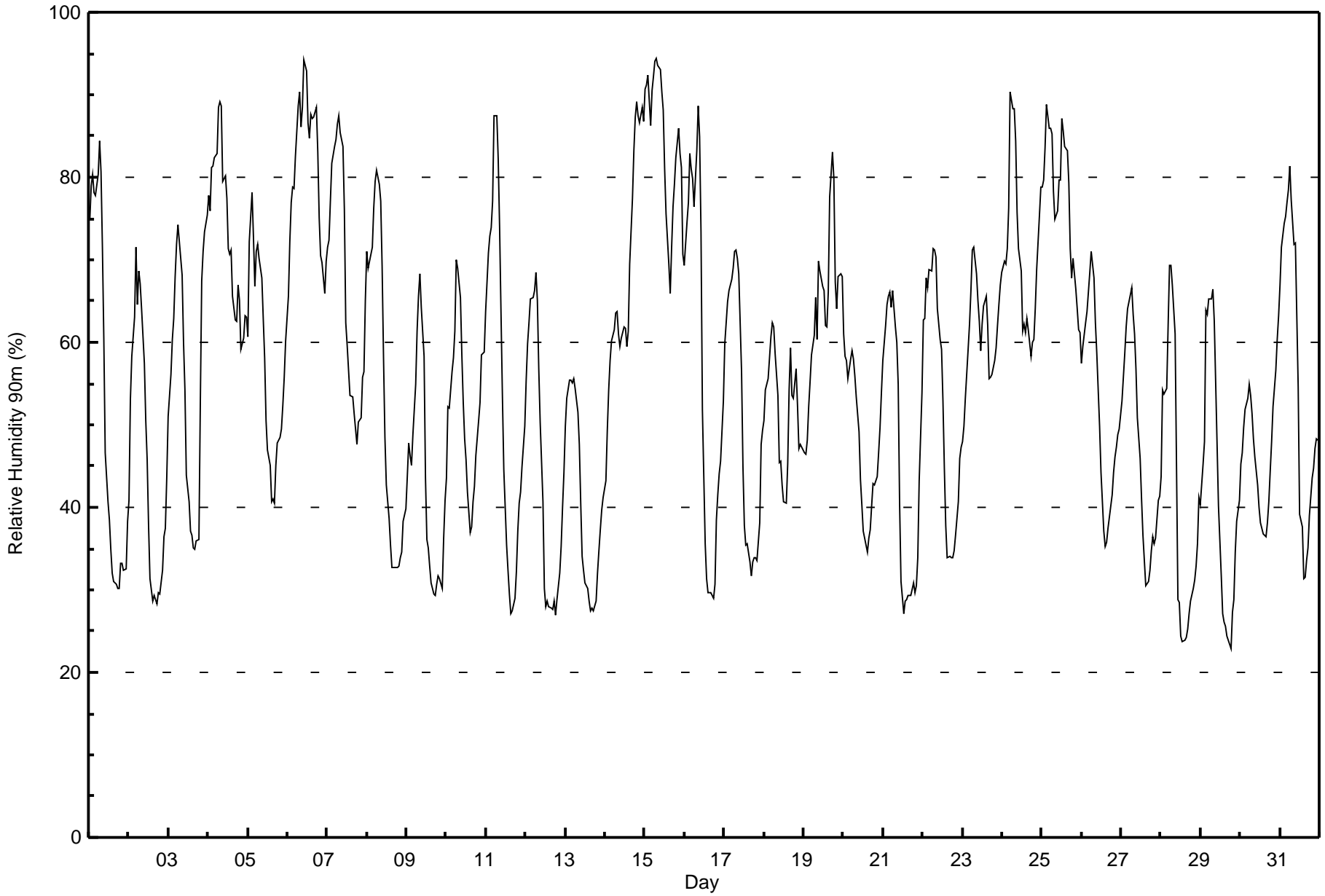


| Maximum Value: 94 % on Aug 15 08:00 | | | | | | | | | | | | | | | | | | | Maximum Daily Average: 84.1 % on Aug 15 | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|------|------|------|------|------|---------------------------------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|--|
| Minimum Value: 23 % on Aug 29 19:00 | | | | | | | | | | | | | | | | | | | Minimum Daily Average: 40.5 % on Aug 13 | | | | | | Hours of Data: 744 | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 72.9 % at hour 7 | | | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 43.1 % at hour 16 | | | | | | Hours of Missing Data: 0 | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 56.0 % | | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 25 P ₁₀ = 31 Q ₁ = 40 Median = 56 O ₃ = 69 P ₉₀ = 81 P ₉₉ = 92 | | | | | | Hours of Calibration: 0 | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 75 | 79 | 80 | 78 | 78 | 80 | 84 | 81 | 72 | 61 | 47 | 41 | 38 | 35 | 32 | 31 | 31 | 30 | 30 | 33 | 33 | 32 | 32 | 38 | 52.2 | 84 | | | | | | | | | | | | | | | | | | |
| 2-Aug | 41 | 53 | 58 | 63 | 72 | 65 | 69 | 67 | 64 | 57 | 50 | 46 | 38 | 31 | 29 | 29 | 29 | 28 | 30 | 30 | 32 | 36 | 37 | 44 | 45.8 | 72 | | | | | | | | | | | | | | | | | | |
| 3-Aug | 51 | 56 | 60 | 63 | 68 | 72 | 74 | 70 | 68 | 60 | 54 | 44 | 41 | 37 | 37 | 35 | 35 | 36 | 36 | 52 | 68 | 71 | 73 | 75 | 55.7 | 75 | | | | | | | | | | | | | | | | | | |
| 4-Aug | 78 | 76 | 81 | 81 | 82 | 83 | 88 | 89 | 89 | 80 | 80 | 77 | 71 | 71 | 71 | 66 | 63 | 63 | 67 | 65 | 59 | 61 | 63 | 63 | 73.6 | 89 | | | | | | | | | | | | | | | | | | |
| 5-Aug | 61 | 72 | 78 | 73 | 67 | 71 | 72 | 70 | 68 | 63 | 58 | 51 | 47 | 45 | 41 | 41 | 40 | 45 | 48 | 48 | 50 | 52 | 56 | 60 | 57.3 | 78 | | | | | | | | | | | | | | | | | | |
| 6-Aug | 66 | 72 | 77 | 79 | 79 | 83 | 89 | 90 | 86 | 88 | 94 | 93 | 87 | 85 | 88 | 87 | 87 | 89 | 83 | 75 | 71 | 70 | 66 | 70 | 81.3 | 94 | | | | | | | | | | | | | | | | | | |
| 7-Aug | 72 | 72 | 77 | 82 | 84 | 85 | 86 | 88 | 85 | 84 | 76 | 62 | 60 | 57 | 53 | 53 | 51 | 49 | 48 | 50 | 51 | 56 | 57 | 65 | 66.8 | 88 | | | | | | | | | | | | | | | | | | |
| 8-Aug | 71 | 69 | 71 | 72 | 76 | 79 | 81 | 79 | 77 | 69 | 58 | 48 | 43 | 39 | 35 | 33 | 33 | 33 | 33 | 33 | 34 | 35 | 38 | 40 | 53.2 | 81 | | | | | | | | | | | | | | | | | | |
| 9-Aug | 44 | 48 | 46 | 45 | 49 | 55 | 61 | 66 | 68 | 64 | 58 | 44 | 36 | 35 | 33 | 31 | 29 | 29 | 31 | 32 | 31 | 30 | 36 | 41 | 43.4 | 68 | | | | | | | | | | | | | | | | | | |
| 10-Aug | 43 | 52 | 52 | 56 | 58 | 61 | 70 | 69 | 65 | 58 | 53 | 48 | 46 | 42 | 37 | 38 | 41 | 42 | 46 | 51 | 53 | 58 | 59 | 59 | 52.4 | 70 | | | | | | | | | | | | | | | | | | |
| 11-Aug | 64 | 71 | 73 | 74 | 77 | 87 | 88 | 82 | 74 | 64 | 54 | 45 | 35 | 32 | 30 | 27 | 27 | 29 | 32 | 37 | 40 | 42 | 45 | 50 | 53.3 | 88 | | | | | | | | | | | | | | | | | | |
| 12-Aug | 55 | 60 | 62 | 65 | 65 | 66 | 68 | 65 | 57 | 50 | 41 | 30 | 28 | 29 | 28 | 28 | 28 | 29 | 27 | 29 | 32 | 35 | 40 | 44 | 44.3 | 68 | | | | | | | | | | | | | | | | | | |
| 13-Aug | 50 | 53 | 56 | 55 | 55 | 56 | 54 | 51 | 48 | 40 | 34 | 32 | 31 | 30 | 29 | 27 | 28 | 27 | 29 | 32 | 35 | 37 | 40 | 41 | 40.5 | 56 | | | | | | | | | | | | | | | | | | |
| 14-Aug | 43 | 49 | 54 | 58 | 60 | 62 | 64 | 64 | 61 | 59 | 61 | 62 | 62 | 60 | 61 | 69 | 77 | 83 | 87 | 89 | 88 | 87 | 88 | 87 | 68.1 | 89 | | | | | | | | | | | | | | | | | | |
| 15-Aug | 91 | 91 | 92 | 86 | 90 | 92 | 94 | 94 | 94 | 93 | 90 | 88 | 81 | 76 | 69 | 66 | 71 | 76 | 79 | 82 | 86 | 83 | 81 | 71 | 84.1 | 94 | | | | | | | | | | | | | | | | | | |
| 16-Aug | 69 | 75 | 77 | 83 | 81 | 80 | 76 | 83 | 89 | 85 | 73 | 52 | 36 | 31 | 30 | 30 | 30 | 29 | 31 | 38 | 41 | 44 | 46 | 53 | 56.7 | 89 | | | | | | | | | | | | | | | | | | |
| 17-Aug | 60 | 62 | 65 | 66 | 68 | 69 | 71 | 71 | 70 | 68 | 56 | 45 | 38 | 35 | 36 | 33 | 32 | 33 | 34 | 34 | 34 | 38 | 48 | 49 | 50.7 | 71 | | | | | | | | | | | | | | | | | | |
| 18-Aug | 50 | 54 | 56 | 58 | 61 | 62 | 62 | 59 | 54 | 45 | 46 | 43 | 41 | 40 | 45 | 54 | 59 | 54 | 53 | 57 | 52 | 47 | 48 | 47 | 51.9 | 62 | | | | | | | | | | | | | | | | | | |
| 19-Aug | 47 | 46 | 48 | 52 | 55 | 59 | 61 | 65 | 60 | 70 | 69 | 67 | 66 | 62 | 62 | 66 | 78 | 83 | 80 | 67 | 64 | 68 | 68 | 68 | 63.8 | 83 | | | | | | | | | | | | | | | | | | |
| 20-Aug | 61 | 58 | 58 | 56 | 58 | 59 | 58 | 56 | 53 | 49 | 43 | 40 | 37 | 36 | 35 | 36 | 37 | 40 | 43 | 43 | 44 | 47 | 50 | 54 | 47.9 | 61 | | | | | | | | | | | | | | | | | | |
| 21-Aug | 58 | 62 | 65 | 66 | 66 | 64 | 66 | 62 | 60 | 55 | 40 | 31 | 27 | 29 | 29 | 29 | 29 | 29 | 31 | 30 | 30 | 34 | 43 | 54 | 45.4 | 66 | | | | | | | | | | | | | | | | | | |
| 22-Aug | 63 | 63 | 68 | 67 | 69 | 69 | 71 | 71 | 70 | 64 | 60 | 59 | 53 | 45 | 38 | 34 | 34 | 34 | 34 | 35 | 37 | 41 | 46 | 47 | 52.9 | 71 | | | | | | | | | | | | | | | | | | |
| 23-Aug | 48 | 50 | 53 | 59 | 62 | 66 | 71 | 72 | 68 | 65 | 63 | 59 | 62 | 64 | 66 | 62 | 56 | 56 | 56 | 58 | 59 | 62 | 65 | 67 | 61.2 | 72 | | | | | | | | | | | | | | | | | | |
| 24-Aug | 68 | 70 | 69 | 71 | 76 | 90 | 88 | 88 | 84 | 76 | 71 | 69 | 61 | 62 | 61 | 63 | 62 | 58 | 60 | 60 | 64 | 69 | 75 | 79 | 70.7 | 90 | | | | | | | | | | | | | | | | | | |
| 25-Aug | 79 | 80 | 84 | 89 | 86 | 86 | 85 | 78 | 75 | 76 | 80 | 80 | 87 | 86 | 84 | 83 | 79 | 71 | 68 | 70 | 66 | 64 | 62 | 61 | 77.4 | 89 | | | | | | | | | | | | | | | | | | |
| 26-Aug | 57 | 59 | 62 | 64 | 66 | 69 | 71 | 68 | 62 | 59 | 54 | 50 | 44 | 37 | 35 | 36 | 37 | 39 | 41 | 44 | 46 | 47 | 49 | 49 | 52.0 | 71 | | | | | | | | | | | | | | | | | | |
| 27-Aug | 53 | 56 | 59 | 62 | 64 | 66 | 67 | 63 | 61 | 57 | 51 | 46 | 41 | 37 | 33 | 31 | 31 | 32 | 35 | 36 | 36 | 36 | 41 | 41 | 47.3 | 67 | | | | | | | | | | | | | | | | | | |
| 28-Aug | 44 | 54 | 54 | 54 | 62 | 69 | 69 | 67 | 61 | 45 | 29 | 29 | 24 | 24 | 24 | 24 | 25 | 27 | 29 | 30 | 31 | 33 | 36 | 41 | 41.0 | 69 | | | | | | | | | | | | | | | | | | |
| 29-Aug | 40 | 45 | 48 | 64 | 63 | 65 | 65 | 66 | 63 | 55 | 48 | 40 | 32 | 27 | 26 | 26 | 24 | 23 | 23 | 27 | 29 | 35 | 38 | 41 | 42.3 | 66 | | | | | | | | | | | | | | | | | | |
| 30-Aug | 45 | 47 | 50 | 52 | 53 | 55 | 54 | 51 | 48 | 46 | 43 | 40 | 38 | 37 | 37 | 36 | 38 | 41 | 44 | 48 | 52 | 57 | 60 | 63 | 47.3 | 63 | | | | | | | | | | | | | | | | | | |
| 31-Aug | 67 | 72 | 74 | 75 | 77 | 79 | 81 | 77 | 72 | 72 | 63 | 55 | 39 | 38 | 31 | 32 | 34 | 35 | 39 | 44 | 45 | 47 | 48 | 48 | 56.0 | 81 | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | 58.5 | 62.2 | 64.8 | 66.7 | 68.6 | 71.1 | 72.9 | 71.8 | 68.6 | 63.8 | 58.0 | 52.1 | 47.4 | 44.9 | 43.3 | 43.1 | 43.7 | 44.3 | 45.4 | 47.1 | 48.1 | 50.1 | 52.7 | 55.2 | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | | 91 | 91 | 92 | 89 | 90 | 92 | 94 | 94 | 94 | 93 | 94 | 93 | 87 | 86 | 88 | 87 | 87 | 89 | 87 | 89 | 88 | 87 | 88 | 87 | Diurnal Maximum | |



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity 90m (RH90m) - %
Mannix - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity 90m (RH90m) - %
Mannix - August 2017

| Concentration Ranges (%) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 0 | 0.00 | 0.00 |
| 20 - 40 | 178 | 23.92 | 23.92 |
| 40 - 60 | 234 | 31.45 | 55.38 |
| 60 - 80 | 251 | 33.74 | 89.11 |
| 80 - 100 | 81 | 10.89 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



| | | |
|--|---|---------------------------------|
| Maximum Speed: 38 km/h on Aug 19 15:00 | Maximum Daily Speed Average: 19.9 km/h on Aug 20 | Hours in Service: 744 |
| Minimum Speed Value: 1 km/h on Aug 6 09:00 | Minimum Daily Speed Average: 1.8 km/h on Aug 22 | Hours of Data: 744 |
| Maximum Diurnal Speed Average: 8.2 km/h at hour 15 | Minimum Diurnal Speed Average: 4.7 km/h at hour 2 | Hours of Missing Data: 0 |
| Monthly Average Velocity: 5.6 km/h 205.2 deg | Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 6 Median = 9 Q ₃ = 14 P ₉₀ = 19 P ₉₉ = 29 | Percent Operational Time: 100.0 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | W4 | WSW5 | W4 | W3 | WSW5 | W4 | W4 | WNW3 | NNW5 | NNW5 | NNE8 | NNE11 | N10 | N10 | NNW10 | N12 | N10 | N11 | N10 | NNE8 | NNE6 | N6 | NNE5 | W1 | NNW5.1 | N12 |
| 2-Aug | W7 | NE1 | WSW6 | SW3 | S5 | S4 | SSE4 | SE3 | SE3 | ESE4 | ESE4 | SSE4 | WNW5 | ESE2 | WSW6 | W7 | S2 | WSW8 | SW9 | SSW5 | SSW8 | WSW7 | SSW6 | S7 | SSW3.3 | SW9 |
| 3-Aug | SSW6 | SSE5 | SSE8 | SSE8 | SSE9 | SSE10 | SSE7 | SE7 | SE5 | SE7 | SE10 | S7 | S7 | ESE8 | SE6 | SE7 | SE6 | S5 | SSE5 | WNW6 | WSW4 | ENE10 | NE10 | E11 | SE5.5 | E11 |
| 4-Aug | NNE4 | NW4 | W7 | W2 | ESE4 | ENE3 | WSW5 | SW4 | SSW2 | S1 | W5 | WNW4 | E5 | E11 | SE9 | SE10 | SSE8 | SSW4 | SSW6 | SSE7 | SSE3 | SE4 | SW3 | SSE5 | SSE2.3 | E11 |
| 5-Aug | NNW4 | W2 | WSW7 | WSW5 | SSW4 | S3 | SSE4 | SE4 | SSE6 | SE5 | SE6 | SSE7 | SE8 | ESE8 | SSE12 | SSE12 | S12 | SSE12 | S10 | S9 | S8 | SSW8 | SSW8 | S7 | S5.8 | SSE12 |
| 6-Aug | SSE8 | SSE5 | SE3 | SSW6 | SSW5 | SW2 | NE4 | ENE6 | ENE1 | NNW8 | N14 | N19 | NNE18 | NNE18 | N15 | NNE11 | N7 | NNE8 | NNE7 | NNE7 | N8 | N8 | NNW8 | N6 | NNE5.9 | N19 |
| 7-Aug | N7 | NNW6 | NW4 | NW4 | WNW4 | NW4 | N6 | N5 | NW4 | N7 | NNW6 | NNW7 | WNW6 | NW6 | WSW9 | W9 | W8 | W8 | WSW6 | WSW5 | WSW4 | WSW8 | WSW8 | SW4 | WNW4.3 | WSW9 |
| 8-Aug | SSE7 | SSE7 | SSE9 | SSE8 | SSE7 | SE7 | SE5 | SSE7 | SE6 | SE5 | SSE3 | WNW6 | WSW6 | W6 | W3 | WSW6 | WSW6 | SW5 | SSW6 | S8 | S9 | S8 | SSE9 | SSE9 | S4.9 | SSE9 |
| 9-Aug | SSE8 | SSE7 | SSE11 | SSE10 | SSE9 | SSE6 | SSE5 | SSE5 | SE5 | SE7 | SE6 | S2 | W4 | SE5 | SSE5 | SSE4 | SSW3 | S5 | SSE8 | S8 | SSW9 | SSW8 | WSW6 | SSW3 | SSE5.4 | SSE11 |
| 10-Aug | SSE8 | E7 | SSE9 | SSW7 | S9 | S7 | SSE4 | SE6 | SE5 | E3 | W3 | ENE3 | ENE5 | NNE4 | N4 | E11 | SE12 | SE14 | S8 | S6 | WSW6 | SW6 | S4 | SSE7 | SSE4.3 | SE14 |
| 11-Aug | SSE6 | SSE8 | SSE8 | SSE9 | SSE8 | SSE8 | SE8 | SE8 | SE7 | SE6 | ESE7 | SE10 | SE11 | SE13 | SE15 | SE13 | SSE12 | SE13 | SSE13 | SSE12 | SSE11 | SSE11 | SSE10 | SSE10 | SSE9.6 | SE15 |
| 12-Aug | SSE12 | SSE10 | SSE11 | SSE9 | SSE9 | SSE10 | SE10 | SSE12 | SSE14 | SSE13 | SSE14 | S17 | SSE22 | SSE21 | S18 | SSE19 | SSE20 | SSE19 | S14 | S10 | S10 | SSE13 | SSE14 | SSE12 | SSE13.7 | SSE22 |
| 13-Aug | SE13 | SE14 | SE13 | SE12 | SE13 | SE15 | SE14 | SE14 | SE15 | SE18 | SE23 | SE24 | SE24 | SSE22 | SSE23 | SE23 | SE22 | SE24 | SSE24 | SSE19 | SSE16 | SE14 | SE13 | SE13 | SE17.6 | SE24 |
| 14-Aug | SE13 | SE15 | SE13 | SE13 | SE15 | SE12 | SE10 | SSE12 | SSE11 | SSE12 | SSE12 | S10 | SSW10 | SW15 | SW18 | SW13 | SW6 | SSW5 | SE8 | SSE9 | SSE9 | SSE9 | SSE9 | SSE11 | SSE9.4 | SW18 |
| 15-Aug | SSE11 | SSE10 | SSE6 | SE8 | SSE8 | S6 | SSW5 | SW4 | SW5 | S1 | WSW5 | W8 | WSW8 | W7 | W5 | N3 | NE8 | NE6 | WSW13 | W14 | NNW6 | WNW5 | W6 | W10 | SW3.1 | W14 |
| 16-Aug | W14 | W11 | WSW11 | W5 | W9 | WSW6 | WSW8 | SW4 | SSE4 | SE5 | SSE4 | WSW7 | WSW10 | W14 | W9 | WNW8 | WSW8 | W13 | WSW11 | WSW10 | SW9 | SW8 | SW9 | SW8 | WSW7.5 | W14 |
| 17-Aug | SW5 | S4 | S4 | S6 | S6 | S7 | S5 | SW6 | S4 | SSW3 | WSW7 | W6 | WSW7 | W11 | WSW14 | WSW12 | W15 | WSW13 | WSW10 | SW5 | SSW8 | SSW11 | SW15 | WSW13 | SW7.3 | SW15 |
| 18-Aug | SW8 | SSE6 | SSE7 | S7 | SSE7 | SSE7 | SSW10 | SSW12 | SSW11 | SW20 | SW15 | SSW18 | SW23 | WSW28 | WSW23 | SSW21 | S14 | SSW16 | SSW14 | SSW14 | SW18 | SW21 | SW17 | SW18 | SW13.6 | WSW28 |
| 19-Aug | SW19 | WSW19 | W20 | WSW15 | WSW16 | WSW16 | WSW16 | SW16 | WSW24 | WSW25 | WSW28 | WSW27 | WSW27 | W32 | W38 | W30 | W24 | WSW14 | SW5 | W10 | W10 | WSW11 | WSW11 | WSW9 | WSW18.7 | W38 |
| 20-Aug | WSW11 | WSW13 | WSW16 | WSW16 | WSW17 | WSW14 | WSW10 | WSW14 | WSW18 | WSW24 | WSW27 | W29 | W26 | W22 | W28 | W33 | WSW33 | WSW25 | WSW21 | W17 | WSW14 | WSW17 | W21 | W15 | WSW19.9 | WSW33 |
| 21-Aug | W14 | WSW8 | SW8 | SSW5 | S5 | SSE2 | SW6 | SW5 | SE5 | SE5 | WSW8 | WSW19 | WSW19 | WSW17 | W21 | WSW19 | WSW15 | WSW15 | WSW15 | WSW11 | WSW10 | W8 | WNW7 | NW6 | WSW9.2 | W21 |
| 22-Aug | N7 | NNW6 | N7 | N7 | N6 | N5 | N4 | N3 | NNW2 | WNW4 | NW4 | W5 | W2 | W4 | WSW3 | SSW4 | NW3 | ENE4 | NE3 | E2 | E3 | ENE8 | SE8 | SE10 | N1.8 | SE10 |
| 23-Aug | SE11 | SE10 | SE11 | SSE12 | SE11 | SSE12 | SE11 | SE10 | SSE11 | SSE16 | SSE12 | S12 | S9 | SSE10 | SE13 | SSE13 | SE18 | SE16 | SE18 | SE18 | SE18 | SE16 | SE13 | SE12 | SE12.8 | SE18 |
| 24-Aug | SE13 | SE12 | SE15 | SSE17 | S8 | ESE8 | SE10 | SE7 | SE10 | SE11 | ESE10 | ESE7 | SE13 | SSE10 | SE15 | ESE16 | ESE10 | SE13 | SE12 | SE12 | S7 | SSW13 | WSW17 | SW12 | SE9.6 | WSW17 |
| 25-Aug | SW13 | SSW12 | SSW10 | SSW10 | SSW11 | S9 | S10 | SSW12 | SSW14 | SSW16 | SSW14 | SSW15 | SW20 | SW31 | SW29 | SW32 | WSW29 | WSW27 | WSW23 | SW15 | SW13 | SW19 | SW21 | SW15 | SW16.6 | SW32 |
| 26-Aug | WSW23 | WSW21 | WSW19 | WSW17 | WSW14 | SSW6 | SSW9 | SSW9 | SW10 | SW10 | SSW9 | SSW9 | SW14 | WSW23 | WSW20 | WSW19 | SW19 | WSW18 | SW17 | SW11 | SW10 | SSW11 | SW12 | SW10 | SW13.7 | WSW23 |
| 27-Aug | SW12 | SW14 | SW16 | SW15 | WSW14 | SW11 | SW9 | WSW16 | WSW17 | W22 | WSW24 | WSW27 | WSW28 | WSW28 | W29 | W27 | W25 | W22 | W14 | W7 | WSW6 | W7 | WSW6 | WSW7 | WSW16.2 | W29 |
| 28-Aug | W8 | WNW6 | SW9 | WSW12 | WSW8 | SW5 | S5 | S3 | SW6 | W11 | W17 | W18 | W18 | W18 | W20 | WNW19 | WNW17 | WNW14 | WNW11 | WNW8 | WNW7 | W8 | W10 | W5 | W10.2 | W20 |
| 29-Aug | WSW7 | W6 | WNW3 | SSW4 | SW5 | WSW3 | SW4 | SSW2 | SE2 | SSW3 | W2 | NE2 | WNW4 | NNW6 | NE5 | E9 | E6 | SE6 | ENE8 | ENE9 | ESE7 | ESE9 | SE13 | SE14 | SE2.1 | SE14 |
| 30-Aug | SE12 | SE13 | SE12 | SE16 | SE16 | SE17 | SE19 | SE17 | SE21 | SE19 | SE18 | SE24 | SE24 | SE25 | SSE24 | SE23 | SE18 | SE17 | SSE17 | SSE15 | S12 | S14 | SSE13 | SSE13 | SE17.1 | SE25 |
| 31-Aug | SSE10 | SSE9 | SSE8 | SSE8 | S7 | SSE8 | SSE9 | SSE8 | S6 | S7 | SSW11 | SSW9 | WSW18 | WSW19 | WSW24 | W27 | WSW24 | WSW23 | W23 | WSW18 | WSW12 | WSW12 | WSW14 | WSW16 | SW11.0 | W27 |

| | |
|--|-----------------|
| SSW5.1SSW4.7SSW5.6 S5.6 S5.8 S4.9 S5.0 S5.0 S5.2SSW4.9SSW5.1 SW5.8 SW6.9 SW7.0 SW8.2 SW7.2 SW6.8 SW6.5SSW6.5SSW5.2SSW5.4SSW5.8SSW6.1SSW5.7 | Diurnal Average |
| WSW23WSW21WSW20 SSE17WSW17 SE17 SE19 SE17WSW24WSW25WSW28 W29WSW28 W32 W38 W33WSW33WSW27 SSE24 SSE19 SE18 SW21 SW21 SW18 | Diurnal Maximum |

All monthly, daily, and diurnal averages have been calculated using vector methods

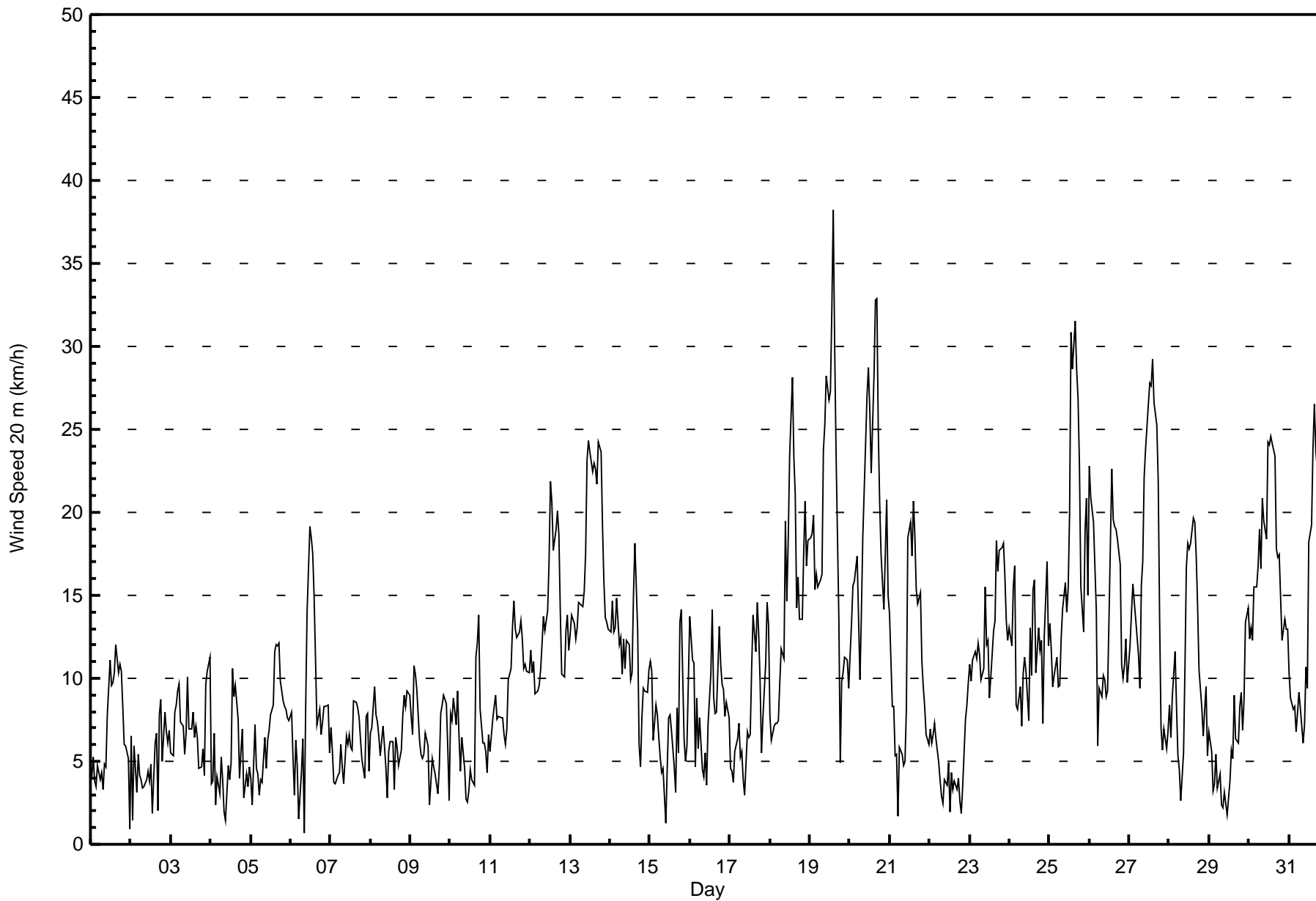


Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed 20 m (WS20m) - km/h

Mannix - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Aug 19 16:00 Minimum Value: 1 km/h on Aug 7 21:00 Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 6 P ₉₉ = 8 | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | |
|---|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 | 6 | 6 | 5 | 5 | 4 | 2 | 2 | 1 | 1 | 2 | 6 |
| 2-Aug | 1 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 5 | 4 | 2 | 4 | 2 | 1 | 2 | 1 | 1 | 2 | 5 |
| 3-Aug | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 2 | 1 | 5 | 3 | 4 | 3 | 3 | 5 |
| 4-Aug | 2 | 2 | 4 | 3 | 1 | 2 | 3 | 2 | 2 | 1 | 3 | 3 | 3 | 5 | 4 | 3 | 3 | 2 | 2 | 2 | 3 | 1 | 2 | 2 | 5 |
| 5-Aug | 4 | 3 | 2 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 3 | 5 | 5 | 5 | 5 | 4 | 4 | 3 | 2 | 2 | 2 | 5 |
| 6-Aug | 3 | 2 | 2 | 2 | 2 | 1 | 3 | 2 | 2 | 3 | 6 | 7 | 6 | 5 | 4 | 4 | 3 | 3 | 4 | 2 | 3 | 2 | 3 | 2 | 7 |
| 7-Aug | 2 | 2 | 1 | 1 | 1 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 3 | 3 | 2 | 1 | 1 | 2 | 1 | 1 | 4 |
| 8-Aug | 1 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 4 | 3 | 4 | 4 | 4 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 4 |
| 9-Aug | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 3 | 4 | 3 | 3 | 3 | 4 | 3 | 2 | 2 | 2 | 3 | 1 | 4 |
| 10-Aug | 3 | 3 | 3 | 3 | 3 | 4 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 4 | 4 | 2 | 2 | 1 | 2 | 1 | 5 |
| 11-Aug | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 4 | 5 | 5 | 4 | 4 | 4 | 4 | 3 | 2 | 2 | 2 | 2 | 5 |
| 12-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 5 | 5 | 5 | 7 | 8 | 9 | 8 | 8 | 7 | 7 | 6 | 4 | 2 | 2 | 2 | 2 | 9 |
| 13-Aug | 3 | 4 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 6 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 7 | 7 | 5 | 5 | 4 | 4 | 4 | 8 |
| 14-Aug | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 4 | 5 | 5 | 5 | 5 | 6 | 5 | 4 | 3 | 2 | 3 | 3 | 3 | 2 | 3 | 6 |
| 15-Aug | 3 | 4 | 2 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 3 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 2 | 2 | 2 | 4 |
| 16-Aug | 2 | 3 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 5 | 4 | 4 | 4 | 4 | 3 | 2 | 1 | 1 | 1 | 1 | 5 |
| 17-Aug | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 4 | 3 | 4 | 3 | 3 | 1 | 2 | 2 | 3 | 2 | 4 |
| 18-Aug | 3 | 1 | 2 | 2 | 2 | 2 | 3 | 4 | 6 | 6 | 5 | 7 | 7 | 7 | 8 | 9 | 6 | 6 | 5 | 5 | 6 | 6 | 5 | 5 | 9 |
| 19-Aug | 5 | 5 | 4 | 3 | 3 | 3 | 4 | 4 | 7 | 7 | 7 | 7 | 7 | 7 | 9 | 10 | 5 | 5 | 2 | 2 | 2 | 2 | 2 | 2 | 10 |
| 20-Aug | 2 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 5 | 5 | 6 | 7 | 7 | 7 | 7 | 8 | 7 | 5 | 5 | 3 | 2 | 5 | 3 | 5 | 8 |
| 21-Aug | 4 | 3 | 2 | 2 | 1 | 2 | 2 | 3 | 2 | 2 | 6 | 5 | 6 | 5 | 5 | 5 | 4 | 4 | 3 | 2 | 1 | 2 | 2 | 2 | 6 |
| 22-Aug | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 2 | 1 | 2 | 2 | 3 | 4 | 4 |
| 23-Aug | 4 | 4 | 3 | 3 | 3 | 2 | 3 | 3 | 4 | 5 | 4 | 5 | 4 | 3 | 4 | 5 | 6 | 5 | 5 | 5 | 5 | 5 | 4 | 3 | 6 |
| 24-Aug | 4 | 3 | 5 | 5 | 5 | 3 | 4 | 3 | 4 | 4 | 4 | 3 | 5 | 3 | 8 | 5 | 4 | 5 | 4 | 4 | 2 | 7 | 7 | 4 | 8 |
| 25-Aug | 5 | 4 | 4 | 3 | 4 | 4 | 4 | 5 | 6 | 6 | 6 | 6 | 8 | 7 | 8 | 8 | 8 | 7 | 7 | 6 | 4 | 5 | 5 | 4 | 8 |
| 26-Aug | 6 | 5 | 4 | 4 | 5 | 2 | 3 | 4 | 4 | 4 | 4 | 4 | 7 | 5 | 6 | 6 | 5 | 5 | 5 | 2 | 3 | 3 | 3 | 3 | 7 |
| 27-Aug | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 5 | 4 | 5 | 7 | 6 | 6 | 6 | 6 | 6 | 5 | 5 | 4 | 2 | 1 | 1 | 3 | 2 | 7 |
| 28-Aug | 3 | 3 | 3 | 2 | 4 | 2 | 2 | 2 | 2 | 4 | 5 | 5 | 6 | 6 | 7 | 6 | 5 | 5 | 3 | 3 | 2 | 2 | 1 | 2 | 7 |
| 29-Aug | 1 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 4 | 4 | 4 |
| 30-Aug | 4 | 4 | 4 | 5 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 7 | 7 | 8 | 7 | 8 | 6 | 5 | 5 | 4 | 4 | 4 | 3 | 3 | 8 |
| 31-Aug | 3 | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 3 | 4 | 4 | 4 | 5 | 6 | 8 | 6 | 5 | 6 | 5 | 5 | 2 | 2 | 3 | 3 | 8 |
| | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | | | |





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed 20 m (WS20m) - km/h
Mannix - August 2017**

| Wind Speed Ranges (km/h) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 5 | 156 | 20.97 | 20.97 |
| 6 - 11 | 316 | 42.47 | 63.44 |
| 12 - 19 | 199 | 26.75 | 90.19 |
| 20 - 28 | 62 | 8.33 | 98.52 |
| 29 - 38 | 11 | 1.48 | 100.00 |
| > 38 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Wind Speed 20 m (WS20m) - km/h
Mannix - August 2017

| Wind Speed Ranges (km/h) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-----------------------------|----------------|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 5 | 6 | 3 | 4 | 6 | 4 | 4 | 16 | 17 | 17 | 16 | 15 | 11 | 17 | 9 | 7 | 4 | 156 |
| 6 - 11 | 17 | 8 | 3 | 5 | 6 | 9 | 36 | 68 | 31 | 27 | 20 | 40 | 26 | 9 | 2 | 9 | 316 |
| 12 - 19 | 3 | 3 | 0 | 0 | 0 | 1 | 56 | 32 | 8 | 13 | 22 | 45 | 13 | 3 | 0 | 0 | 199 |
| 20 - 28 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 9 | 0 | 1 | 4 | 26 | 13 | 0 | 0 | 0 | 62 |
| 29 - 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 6 | 0 | 0 | 0 | 11 |
| > 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 26 | 14 | 7 | 11 | 10 | 14 | 117 | 126 | 56 | 57 | 64 | 124 | 75 | 21 | 9 | 13 | 744 |

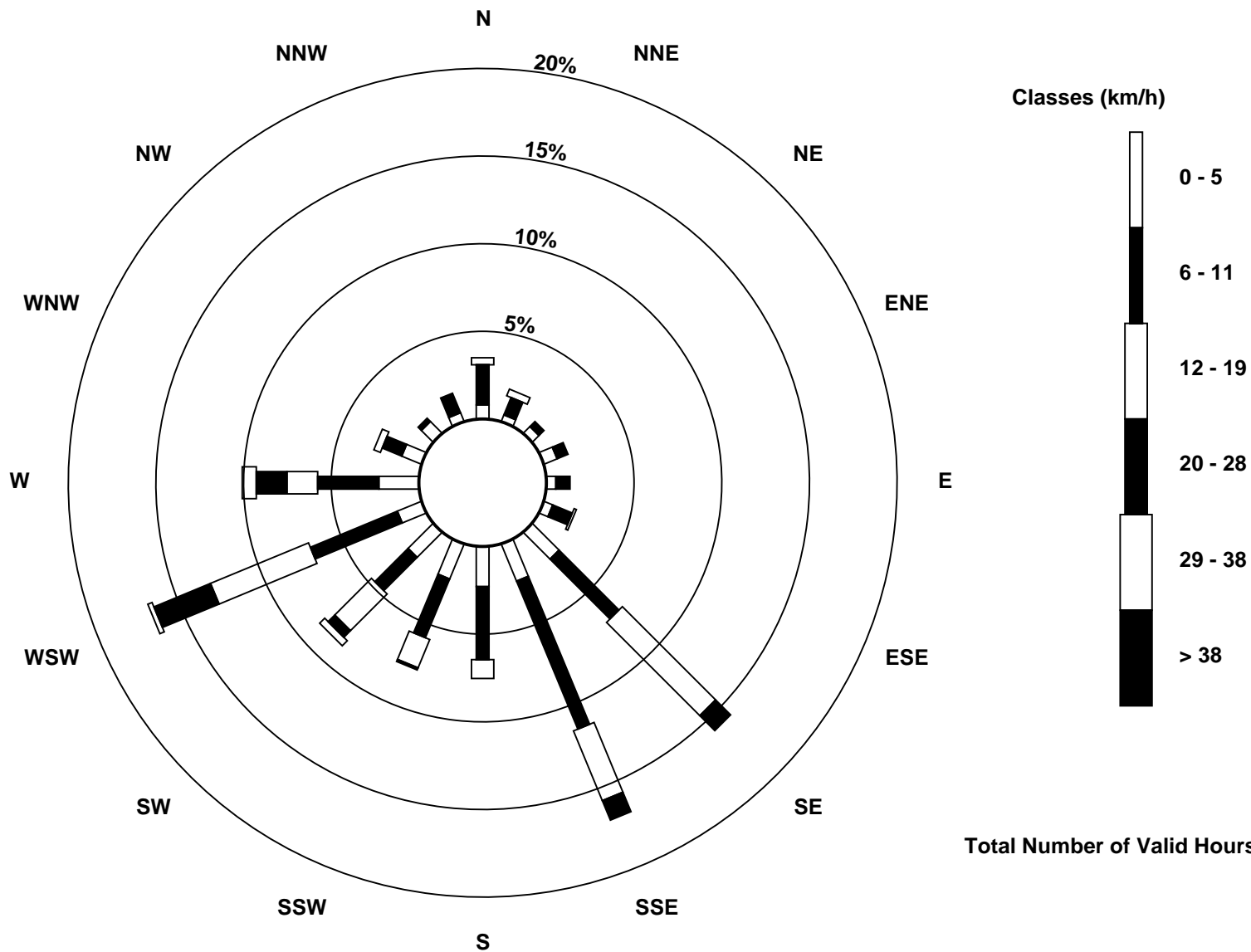
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Wind Speed 20 m (WS20m) - km/h
Mannix (AMS 5)





| Maximum Speed: 44 km/h on Aug 19 15:00 Maximum Daily Speed Average: 25.0 km/h on Aug 20 | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----------------|---------------|---------------|
| Minimum Speed Value: 1 km/h on Aug 6 09:00 Minimum Daily Speed Average: 1.5 km/h on Aug 29 Maximum Diurnal Speed Average: 10.1 km/h at hour 15 Minimum Diurnal Speed Average: 6.3 km/h at hour 10 Monthly Average Velocity: 8.0 km/h 199.3 deg Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 9 Median = 14 Q ₃ = 20 P ₉₀ = 26 P ₉₉ = 38 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | WNW7 | WNW5 | NW4 | NW6 | W9 | WNW7 | W5 | WNW5 | NW7 | NNW7 | N10 | N14 | NNW13 | N14 | NNW15 | N17 | N14 | N15 | N14 | NNE11 | NNE11 | NNE10 | NNE7 | NE3 | NNW8.2 | N17 |
| 2-Aug | W5 | NNE5 | WSW2 | SW2 | SSE8 | S9 | SSE5 | SSE4 | SE3 | ESE4 | ESE5 | SSE4 | W6 | SSE2 | SW8 | WSW8 | SSW3 | WSW10 | SW11 | SSW8 | SSW14 | SW13 | SSW12 | S13 | SSW4.9 | SSW14 |
| 3-Aug | SSW13 | S9 | SSE14 | SE15 | SE15 | SE14 | SE10 | SE9 | SE6 | ESE7 | SE12 | S10 | S10 | ESE9 | SE8 | SE9 | SE8 | SSE7 | SSE6 | WNW8 | SW3 | ENE13 | NE14 | E15 | SE7.5 | SSE15 |
| 4-Aug | NE5 | NW9 | W8 | W5 | E5 | ENE5 | W6 | SW5 | SSW3 | S1 | W6 | WNW5 | ENE6 | E13 | SE11 | SE12 | SSE10 | S6 | S11 | SE12 | SSE6 | SE6 | S4 | SE9 | SSE2.9 | E13 |
| 5-Aug | NNW5 | WNW4 | SW11 | SW6 | S6 | SSE5 | SSE6 | SE4 | SE8 | SE6 | SE8 | SSE9 | SE10 | ESE10 | SSE15 | SE4 | S18 | SSE19 | S17 | SSE16 | S17 | SSW17 | SSW17 | S16 | S9.3 | SSE19 |
| 6-Aug | S16 | SSE10 | SE3 | SSW6 | SW8 | W3 | NE7 | NE7 | N1 | NNW14 | N20 | N27 | N25 | N24 | N20 | N15 | N11 | NNE11 | NNE10 | N11 | NNW13 | N13 | NNW17 | NNW11 | N8.7 | N27 |
| 7-Aug | NNW9 | NNW11 | NNW9 | NW7 | NW7 | NNW9 | N11 | N7 | NW6 | N9 | NNW9 | NNW10 | WNW8 | WNW8 | WSW10 | W10 | W10 | WSW9 | WSW8 | WSW6 | SW6 | SW12 | SW13 | SW9 | WNW6.1 | SW13 |
| 8-Aug | S9 | SSE12 | SSE13 | SSE12 | SSE14 | SSE11 | SE7 | SSE8 | SE8 | SE6 | SSE3 | W7 | SW8 | W8 | W5 | WSW8 | WSW7 | SW7 | SSW9 | S13 | S19 | S19 | SSE17 | SSE17 | S8.4 | S19 |
| 9-Aug | SSE15 | SSE13 | SSE19 | SSE20 | SSE18 | SSE12 | SSE8 | SSE7 | SE6 | SE9 | SE7 | S3 | W5 | SE6 | SE6 | SSE5 | SSW5 | S6 | SSE10 | S15 | SSW19 | SSW18 | SW10 | SSW5 | S9.0 | SSE20 |
| 10-Aug | SSE15 | E10 | SE15 | S15 | S19 | S15 | SSE7 | SE8 | ESE5 | E2 | W3 | ENE3 | ENE5 | N5 | N5 | E13 | SE15 | SE19 | S16 | S12 | WSW10 | SW8 | S6 | SSE14 | SSE7.2 | SE19 |
| 11-Aug | S9 | SSE11 | SSE13 | SSE16 | SE13 | SSE12 | SE10 | SE10 | SE8 | ESE7 | ESE8 | SE12 | SE13 | SE17 | SE19 | SE17 | SE17 | SE17 | SE18 | SSE18 | SSE18 | SSE19 | SSE19 | SSE21 | SE13.9 | SSE21 |
| 12-Aug | SSE20 | SSE18 | SSE19 | SE15 | SE17 | SE16 | SE16 | SSE17 | SSE19 | SSE18 | SSE20 | SSE28 | SSE32 | SSE31 | S28 | SSE28 | SSE27 | SSE27 | S24 | S20 | SSE20 | SSE22 | SSE23 | SSE20 | SSE21.6 | SSE32 |
| 13-Aug | SE20 | SE22 | SE21 | SE20 | SE21 | SE21 | SE21 | SE19 | SE20 | SE22 | SE30 | SE32 | SE30 | SE30 | SE30 | SE29 | SE28 | SE32 | SSE31 | SSE27 | SE23 | SE21 | SE20 | SE19 | SE24.4 | SE32 |
| 14-Aug | SE18 | ESE20 | ESE17 | ESE16 | SE20 | SE16 | SE16 | SE15 | SSE17 | SE14 | SSE17 | SE15 | S14 | S16 | SW20 | SW24 | SW18 | SSW9 | S7 | SE10 | SSE14 | SE15 | SSE15 | SE17 | SSE13.1 | SW24 |
| 15-Aug | SE17 | SE16 | SSE12 | SE12 | SE12 | SSE11 | S8 | SW5 | SW6 | S2 | SW5 | WSW8 | WSW9 | W8 | W6 | NNW5 | NE9 | NNE7 | WSW16 | W19 | NW11 | WNW10 | W10 | W14 | SW3.9 | W19 |
| 16-Aug | W19 | W16 | W16 | W7 | W13 | W11 | WSW12 | SW8 | SSE5 | SSE7 | SSE4 | SW8 | WSW12 | W17 | W11 | WNW11 | WSW9 | WSW15 | WSW13 | WSW15 | SW17 | SW15 | SW15 | SW14 | WSW10.8 | W19 |
| 17-Aug | SW10 | SW7 | SSW5 | SSW8 | SSW10 | SSW11 | SSW10 | SW7 | S6 | SSW4 | SW8 | WSW8 | WSW8 | WSW12 | SW17 | SW14 | W17 | WSW15 | WSW12 | SW8 | SW13 | SW21 | SW23 | WSW22 | SW11.0 | SW23 |
| 18-Aug | SW15 | S11 | S12 | SSW15 | S13 | S13 | SSW20 | SSW22 | SSW18 | SW25 | SSW21 | SSW27 | SW31 | WSW35 | SW30 | SSW33 | S26 | SSW25 | SSW22 | SSW24 | SSW27 | SW29 | SW26 | SW26 | SSW21.6 | WSW35 |
| 19-Aug | SW26 | SW26 | WSW24 | WSW21 | WSW22 | WSW20 | WSW20 | SW22 | WSW29 | SW32 | WSW35 | WSW31 | WSW32 | WSW37 | W44 | W38 | W27 | WSW17 | SW8 | W14 | W15 | WSW16 | WSW17 | WSW15 | WSW23.9 | W44 |
| 20-Aug | SW19 | WSW21 | WSW23 | WSW22 | WSW23 | WSW20 | WSW15 | WSW17 | WSW21 | WSW28 | WSW31 | WSW33 | WSW31 | W26 | W33 | W39 | WSW38 | WSW29 | WSW25 | W21 | WSW20 | WSW24 | WSW25 | W20 | WSW25.0 | W39 |
| 21-Aug | W20 | W13 | SW14 | SW10 | SW9 | WSW6 | SW9 | SSW7 | SE6 | SE6 | WSW11 | WSW22 | WSW23 | WSW21 | W23 | WSW22 | WSW18 | WSW18 | WSW18 | WSW17 | WSW16 | W13 | NW12 | NNW11 | WSW12.7 | WSW23 |
| 22-Aug | N11 | N11 | N12 | N13 | N10 | N8 | N5 | NNW4 | NNW3 | WNW5 | NW5 | WNW6 | WNW3 | W5 | SW4 | SSW5 | NW5 | ENE3 | NE3 | ENE3 | ENE6 | ENE11 | ESE10 | ESE13 | N3.2 | N13 |
| 23-Aug | ESE13 | SE14 | SE16 | SE18 | SE17 | SE18 | SE17 | SE14 | SE15 | ESE20 | SE16 | S22 | S16 | SSE15 | SE17 | SE18 | SE24 | SE22 | SE24 | SE24 | SE25 | SE23 | SE20 | SE19 | SE18.0 | SE25 |
| 24-Aug | SE20 | SE17 | SE22 | SSE26 | S17 | ESE12 | ESE13 | ESE9 | SE13 | ESE13 | ESE12 | E9 | ESE17 | SE13 | ESE20 | ESE20 | E13 | SE17 | SE16 | SE18 | S16 | SSW21 | WSW21 | SSW20 | SE13.4 | SSE26 |
| 25-Aug | SSW20 | SSW18 | SSW16 | S18 | SSW20 | S17 | S19 | S21 | S24 | SSW25 | S23 | SSW25 | SW29 | SW39 | SW39 | SW41 | SW37 | WSW35 | WSW29 | SW22 | SW20 | SW27 | SW29 | SW23 | SW24.3 | SW41 |
| 26-Aug | WSW30 | WSW28 | WSW27 | WSW23 | WSW20 | SSW9 | SSW15 | SSW13 | SW13 | SSW13 | SSW13 | SSW14 | SSW19 | WSW26 | SW25 | SW24 | SW24 | SW24 | SW23 | SW17 | SSW19 | SSW21 | SW21 | SW18 | SW19.4 | WSW30 |
| 27-Aug | SW20 | SW22 | SW23 | SW22 | WSW20 | SW18 | SW15 | WSW19 | WSW19 | WSW25 | WSW28 | WSW31 | WSW32 | WSW32 | WSW33 | W31 | W29 | W25 | W16 | W11 | WSW11 | WSW11 | W10 | WSW12 | WSW21.0 | WSW33 |
| 28-Aug | W14 | WNW12 | SW13 | WSW16 | WSW13 | WSW9 | SSW8 | S4 | SW6 | W12 | W20 | W21 | W22 | W22 | W24 | W25 | WNW23 | WNW21 | WNW15 | WNW15 | NW13 | WNW13 | W15 | WNW12 | W14.2 | W25 |
| 29-Aug | W13 | WNW12 | WNW10 | WSW3 | SW9 | WNW7 | WSW6 | SW3 | SE2 | SSW3 | WSW3 | NE2 | WNW5 | NNW8 | NNE6 | E10 | E7 | ESE7 | ENE10 | ENE12 | E10 | ESE11 | SE19 | SE22 | ESE1.5 | SE22 |
| 30-Aug | ESE19 | SE21 | ESE18 | ESE20 | ESE21 | ESE24 | ESE26 | SE22 | SE27 | SE25 | SE24 | SE31 | SE32 | SE32 | SE32 | SE30 | SE24 | SE23 | SSE25 | SSE24 | S23 | SSE24 | SSE22 | SSE23 | SE23.9 | SE32 |
| 31-Aug | SSE19 | SSE17 | SSE15 | SSE15 | SSE14 | SSE13 | SSE14 | SSE14 | S11 | S12 | SSW16 | SSW14 | SW23 | SW23 | WSW29 | WSW30 | WSW27 | WSW27 | WSW27 | WSW25 | WSW20 | WSW20 | WSW22 | WSW22 | SW15.4 | WSW30 |
| SSW8.0SSW6.8 S8.0 S8.3 S8.9 S7.2 S7.0 S7.0 S7.1 S6.3SSW6.8SSW7.8 SW8.9 SW8.6SW10.1 SW9.2SSW8.6SSW8.6SSW9.2SSW8.1SSW9.1SSW9.7SSW9.4SSW9.3 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| WSW30WSW28WSW27 SSE26WSW23 ESE24 ESE26 SE22WSW29 SW32WSW35WSW33 SSE32 SW39 W44 SW41WSW38WSW35 SSE31 SSE27 SSW27 SW29 SW29 SW26 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| All monthly, daily, and diurnal averages have been calculated using vector methods | | | | | | | | | | | | | | | | | | | | | | | | | | |

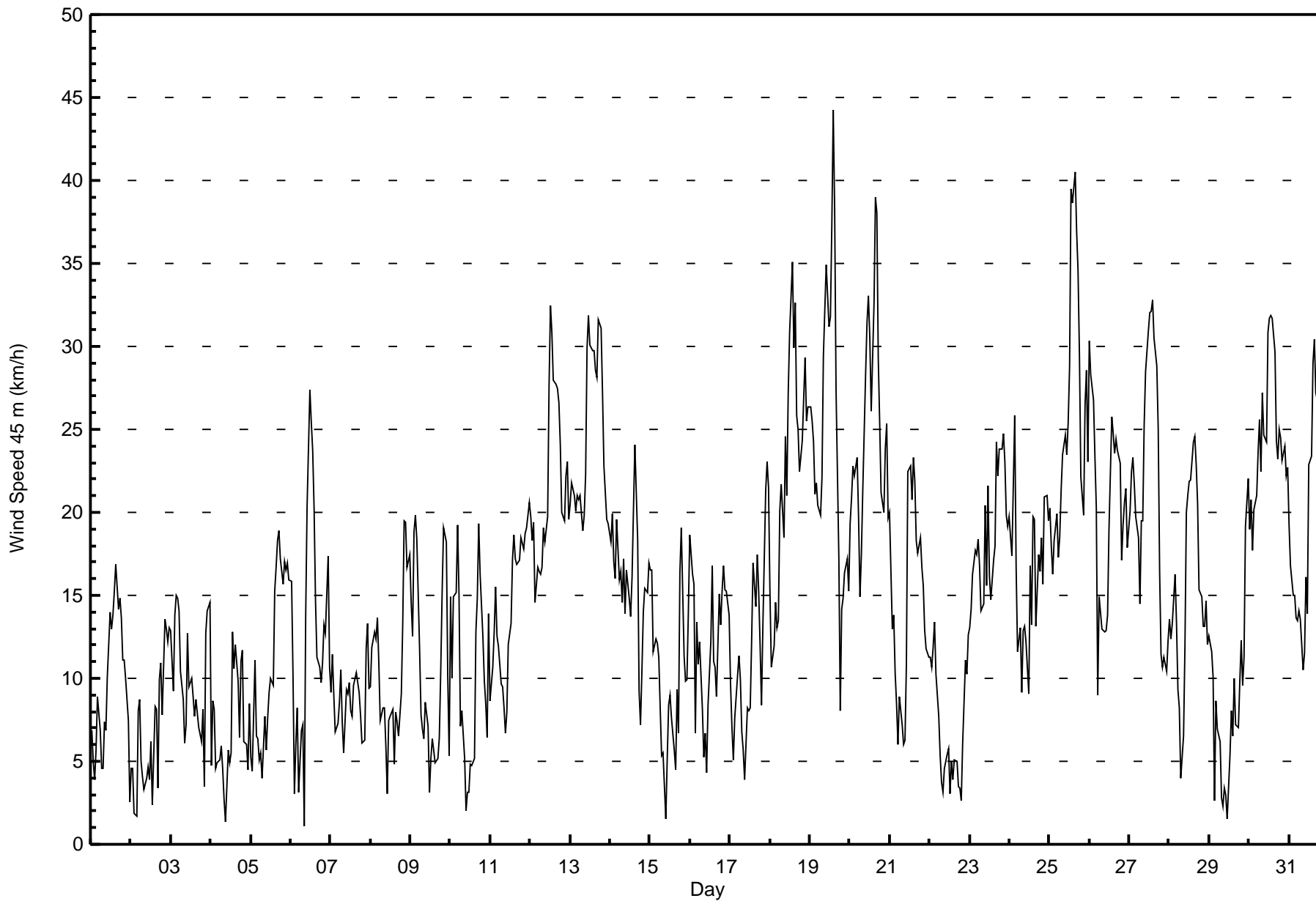


Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed 45 m (WS45m) - km/h

Mannix - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Aug 24 15:00 Minimum Value: 1 km/h on Aug 17 20:00 Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 6 P ₉₉ = 7 | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | |
|--|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 3 | 1 | 1 | 1 | 1 | 4 | 1 | 2 | 3 | 3 | 4 | 4 | 4 | 6 | 6 | 5 | 5 | 4 | 3 | 2 | 3 | 1 | 1 | 2 | 6 |
| 2-Aug | 3 | 2 | 1 | 1 | 4 | 4 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 6 | 4 | 3 | 4 | 2 | 1 | 2 | 1 | 1 | 1 | 6 |
| 3-Aug | 2 | 2 | 2 | 2 | 1 | 2 | 3 | 2 | 2 | 3 | 3 | 5 | 4 | 3 | 3 | 3 | 3 | 2 | 1 | 5 | 4 | 5 | 3 | 3 | 5 |
| 4-Aug | 2 | 3 | 5 | 3 | 1 | 2 | 3 | 1 | 2 | 1 | 2 | 4 | 3 | 6 | 3 | 3 | 2 | 1 | 2 | 2 | 4 | 2 | 2 | 4 | 6 |
| 5-Aug | 6 | 4 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 3 | 6 | 5 | 5 | 2 | 3 | 2 | 1 | 1 | 1 | 1 | 6 |
| 6-Aug | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 5 | 7 | 6 | 4 | 4 | 4 | 3 | 3 | 5 | 2 | 3 | 3 | 3 | 4 | 7 |
| 7-Aug | 2 | 2 | 1 | 1 | 1 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 3 | 2 | 2 | 3 |
| 8-Aug | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 3 | 5 | 4 | 4 | 5 | 4 | 4 | 3 | 2 | 3 | 1 | 2 | 1 | 1 | 5 |
| 9-Aug | 2 | 3 | 3 | 2 | 2 | 3 | 2 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 3 | 3 | 3 | 4 | 2 | 2 | 1 | 2 | 4 | 2 | 4 |
| 10-Aug | 3 | 3 | 4 | 4 | 5 | 6 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 5 | 5 | 5 | 4 | 6 | 3 | 2 | 1 | 2 | 2 | 6 |
| 11-Aug | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 5 | 4 | 4 | 4 | 3 | 3 | 2 | 1 | 2 | 2 | 1 | 5 |
| 12-Aug | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 5 | 5 | 6 | 6 | 6 | 6 | 7 | 5 | 5 | 6 | 3 | 2 | 2 | 2 | 2 | 7 |
| 13-Aug | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 6 | 8 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 6 | 4 | 4 | 3 | 3 | 3 | 8 |
| 14-Aug | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 4 | 3 | 4 | 4 | 5 | 4 | 5 | 3 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 5 |
| 15-Aug | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 3 | 5 | 3 | 2 | 3 | 3 | 5 |
| 16-Aug | 2 | 3 | 2 | 2 | 2 | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 4 | 4 | 4 | 5 | 4 | 4 | 2 | 2 | 1 | 2 | 1 | 1 | 5 |
| 17-Aug | 2 | 1 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 4 | 3 | 4 | 3 | 3 | 1 | 3 | 2 | 2 | 2 | 4 |
| 18-Aug | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 5 | 6 | 5 | 6 | 7 | 6 | 8 | 7 | 5 | 5 | 4 | 4 | 5 | 5 | 4 | 4 | 8 |
| 19-Aug | 4 | 4 | 3 | 3 | 3 | 3 | 4 | 4 | 8 | 6 | 7 | 7 | 7 | 6 | 9 | 9 | 5 | 6 | 2 | 2 | 2 | 2 | 2 | 2 | 9 |
| 20-Aug | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 5 | 5 | 6 | 6 | 7 | 7 | 8 | 7 | 5 | 5 | 3 | 2 | 4 | 3 | 4 | 8 |
| 21-Aug | 3 | 3 | 2 | 2 | 1 | 3 | 3 | 3 | 2 | 2 | 7 | 4 | 5 | 5 | 5 | 5 | 4 | 4 | 3 | 2 | 1 | 1 | 3 | 2 | 7 |
| 22-Aug | 3 | 2 | 4 | 4 | 2 | 2 | 2 | 1 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 2 | 2 | 3 | 2 | 1 | 2 | 3 | 3 | 5 | 5 |
| 23-Aug | 4 | 5 | 3 | 3 | 3 | 2 | 3 | 3 | 4 | 3 | 3 | 4 | 3 | 2 | 3 | 5 | 6 | 4 | 5 | 5 | 5 | 5 | 4 | 3 | 6 |
| 24-Aug | 4 | 3 | 4 | 6 | 7 | 5 | 5 | 3 | 3 | 4 | 3 | 4 | 5 | 3 | 10 | 5 | 5 | 5 | 4 | 3 | 2 | 6 | 7 | 4 | 10 |
| 25-Aug | 6 | 4 | 3 | 3 | 3 | 4 | 3 | 4 | 5 | 5 | 5 | 4 | 7 | 7 | 7 | 7 | 7 | 7 | 5 | 4 | 5 | 5 | 3 | 7 | 7 |
| 26-Aug | 6 | 5 | 4 | 4 | 5 | 3 | 2 | 3 | 3 | 3 | 4 | 4 | 6 | 5 | 5 | 6 | 5 | 5 | 5 | 2 | 3 | 2 | 3 | 2 | 6 |
| 27-Aug | 2 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 5 | 7 | 6 | 6 | 6 | 6 | 5 | 4 | 4 | 3 | 1 | 1 | 2 | 2 | 2 | 7 |
| 28-Aug | 3 | 3 | 3 | 1 | 4 | 2 | 2 | 2 | 2 | 4 | 5 | 4 | 6 | 5 | 6 | 5 | 5 | 4 | 2 | 2 | 3 | 2 | 2 | 2 | 6 |
| 29-Aug | 1 | 3 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 1 | 2 | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 5 | 3 | 5 |
| 30-Aug | 4 | 3 | 4 | 5 | 5 | 5 | 6 | 5 | 6 | 6 | 5 | 6 | 6 | 7 | 7 | 7 | 6 | 5 | 4 | 3 | 3 | 3 | 2 | 3 | 7 |
| 31-Aug | 2 | 2 | 2 | 1 | 2 | 4 | 5 | 4 | 3 | 5 | 3 | 4 | 5 | 6 | 7 | 5 | 5 | 5 | 4 | 4 | 2 | 2 | 3 | 3 | 7 |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed 45 m (WS45m) - km/h
Mannix - August 2017**

| Wind Speed Ranges (km/h) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 5 | 77 | 10.35 | 10.35 |
| 6 - 11 | 200 | 26.88 | 37.23 |
| 12 - 19 | 249 | 33.47 | 70.70 |
| 20 - 28 | 166 | 22.31 | 93.01 |
| 29 - 38 | 47 | 6.32 | 99.33 |
| > 38 | 5 | 0.67 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed 45 m (WS45m) - km/h
Mannix - August 2017**

| Wind Speed Ranges (km/h) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-----------------------------|----------------|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 5 | 4 | 1 | 4 | 5 | 2 | 3 | 4 | 9 | 5 | 8 | 7 | 3 | 7 | 8 | 3 | 4 | 77 |
| 6 - 11 | 9 | 9 | 3 | 4 | 5 | 9 | 28 | 17 | 16 | 11 | 25 | 20 | 17 | 10 | 7 | 10 | 200 |
| 12 - 19 | 9 | 0 | 1 | 2 | 4 | 11 | 53 | 46 | 27 | 20 | 20 | 26 | 16 | 6 | 2 | 6 | 249 |
| 20 - 28 | 5 | 0 | 0 | 0 | 0 | 7 | 32 | 19 | 9 | 16 | 25 | 39 | 12 | 2 | 0 | 0 | 166 |
| 29 - 38 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 3 | 0 | 1 | 7 | 20 | 4 | 0 | 0 | 0 | 47 |
| > 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 2 | 0 | 0 | 0 | 5 |
| Totals | 27 | 10 | 8 | 11 | 11 | 30 | 129 | 94 | 57 | 56 | 87 | 108 | 58 | 26 | 12 | 20 | 744 |

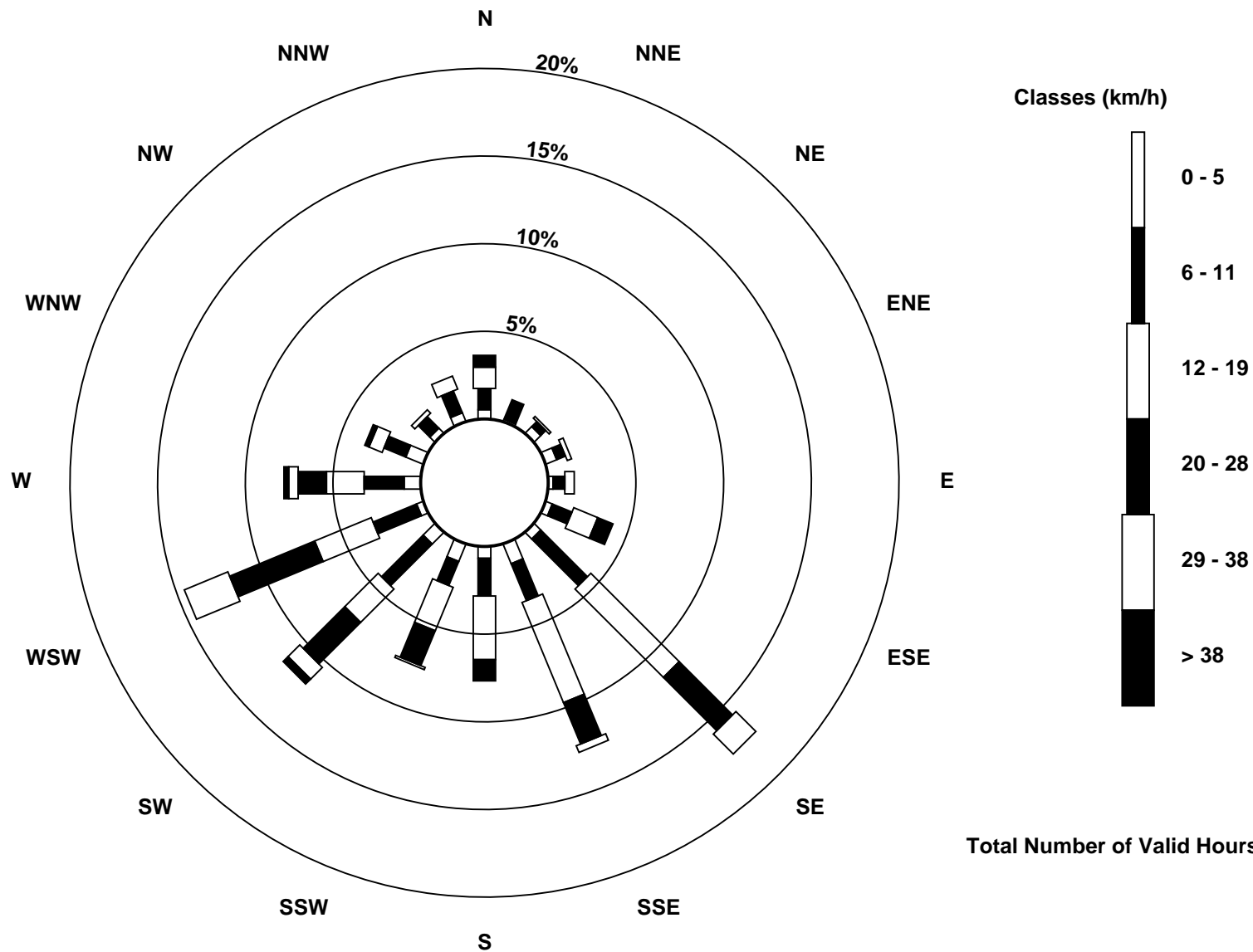
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Wind Speed 45 m (WS45m) - km/h
Mannix (AMS 5)



Total Number of Valid Hours: 744



| Maximum Speed: 47 km/h on Aug 19 15:00 Minimum Speed Value: 1 km/h on Aug 4 10:00 Maximum Diurnal Speed Average: 11.7 km/h at hour 22 Monthly Average Velocity: 8.9 km/h 203.6 deg | | Maximum Daily Speed Average: 28.5 km/h on Aug 20 Minimum Daily Speed Average: 1.3 km/h on Aug 29 Minimum Diurnal Speed Average: 6.7 km/h at hour 10 Percentiles: P ₁ = 2 P ₁₀ = 6 Q ₁ = 9 Median = 17 Q ₃ = 24 P ₉₀ = 30 P ₉₉ = 41 | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|---|-------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----------|-------|-------|-------|-------|-------|-------|-----------------|---------------|---------------|-------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | NNW8 | NNW5 | NNW6 | NW7WNW11 | NW9 | NW4 | NW5 | NNW8 | NNW8 | N11 | NNE15 | N14 | N15 | NNW16 | N18 | N15 | N16 | N15 | NNE13 | NNE17 | NNE15 | NNE10 | ENE6 | N9.9 | N18 | | |
| 2-Aug | NNE1 | NNW6 | WNW3 | WNW5 | SSE4 | SSE11 | S7 | S4 | SE3 | ESE4 | ESE4 | SSE3 | W6 | SSE3 | SW8 | WSW8 | SSW3WSW10 | SW11 | SSW8 | SSW15 | SW17 | SSW18 | SSW17 | SSW5.5 | SSW18 | | |
| 3-Aug | SW18 | SSW12 | SSE14 | SSE15 | SSE15 | SSE17 | SSE13 | SE8 | SE6 | ESE6 | SE12 | S10 | S10 | ESE8 | SE7 | SE8 | SE7 | SSE7 | SSE6 | NW8 | SW2 | E12 | NE17 | E16 | SE7.5 | SW18 | |
| 4-Aug | NE6 | NW9 | W8 | NW6 | ENE5 | ENE7 | WNW4 | SW3 | SSW2 | SSE1 | W6 | WNW4 | ENE6 | E10 | SE9 | SE11 | SE10 | S7 | S12 | SE15 | SSE8 | SE5 | SSE4 | SE11 | SE2.8 | SE15 | |
| 5-Aug | NNE5 | NW5 | SW10 | SW6 | SSW8 | S6 | SSE8 | SSE4 | SE7 | SE6 | SE8 | SSE9 | SE10 | ESE8 | SSE16 | SSE18 | S19 | SSE22 | S20 | SSE18 | S20 | SSW20 | SSW21 | SSW20 | S10.2 | SSE22 | |
| 6-Aug | S19 | SSW10 | SW1 | WSW6 | WSW8 | NW6 | NE11 | NE8 | NNE2 | NNW15 | N24 | N30 | N29 | NNE26 | N22 | N17 | N13 | NNE14 | NNE12 | NNE14 | N16 | N16 | NNW24 | NNW15 | N11.1 | N30 | |
| 7-Aug | NNW11 | NNW14 | N12 | NNW9 | NNW9 | NNW11 | N14 | N9 | NNW6 | N10 | NNW9 | NNW10 | NW8 | NW8 | WSW9 | W10 | W10 | WSW9 | WSW8 | WSW6 | SW8 | SW15 | SW22 | SW16 | WNW6.7 | SW22 | |
| 8-Aug | SSW10 | S10 | S10 | SSW10 | S11 | S11 | SSE10 | SSE7 | SSE8 | SSE6 | S3 | W7 | WSW8 | W8 | W5 | WSW8 | WSW7 | SW7 | SSW9 | S15 | S23 | S26 | S20 | S20 | SSW9.4 | S26 | |
| 9-Aug | S17 | SSE17 | S16 | S16 | S15 | SSW17 | SSW14 | SSW9 | SE6 | SE9 | SE7 | SSW3 | W5 | SE6 | SE5 | SSE4 | SSW5 | S7 | SSE11 | S17 | SSW23 | SSW23 | SW14 | SSW6 | S10.2 | SSW23 | |
| 10-Aug | SSE19 | E10 | SE16 | S20 | S26 | S22 | S10 | SE8 | SE6 | E2 | W3 | ENE3 | ENE5 | N5 | N6 | ENE11 | SE14 | SE21 | S21 | S16 | WSW12 | WSW10 | S7 | SSE16 | SSE8.6 | S26 | |
| 11-Aug | SSW8 | S8 | SSE8 | SSE15 | SSE17 | SSE16 | SSE11 | SSE10 | SE9 | SE7 | SE8 | SE11 | SE13 | SE17 | SE19 | SE18 | SE18 | SE19 | SE21 | SSE22 | SSE23 | SSE26 | SSE25 | SSE26 | SSE15.2 | SSE26 | |
| 12-Aug | SSE21 | SSE21 | SSE27 | SSE23 | SSE25 | SE25 | SE23 | SSE20 | SSE21 | SSE20 | SSE21 | SSE30 | SSE35 | SSE34 | S30 | SSE30 | SSE30 | SSE29 | S28 | S24 | SSE24 | SSE29 | SSE29 | SSE27 | SSE25.8 | SSE35 | |
| 13-Aug | SE28 | SE29 | SE29 | SE28 | SE28 | SE25 | SE24 | SE22 | SE22 | SE22 | SE31 | SE33 | SE31 | SE32 | SE31 | SE29 | SE30 | SE34 | SE35 | SSE32 | SE29 | SE28 | SE25 | SE25 | SE28.4 | SE35 | |
| 14-Aug | SE20 | SE18 | ESE14 | ESE14 | SE18 | SE14 | SE17 | SE16 | SSE18 | SE15 | SSE17 | SE15 | S14 | S17 | SW21 | SW25 | SW20 | SW10 | S8 | SE12 | SSE17 | SE21 | SSE21 | SE23 | SSE14.1 | SW25 | |
| 15-Aug | SE22 | SE21 | SSE16 | SE12 | SE15 | SSE15 | SSE11 | SSW6 | SW5 | S2 | SW5 | WSW8 | WSW9 | W7 | W6 | NNW5 | NE10 | NE8 | WSW19 | W22 | NW15 | NW13 | WNW13 | WNW18 | SW3.7 | W22 | |
| 16-Aug | W24 | W21 | W20 | WNW10 | W17 | W17 | W17 | WSW10 | SSE5 | SSE7 | S5 | SW9 | WSW13 | W17 | W11 | WNW11 | WSW9 | WSW15 | WSW14 | WSW18 | SW20 | SW21 | SW23 | SW21 | WSW13.4 | W24 | |
| 17-Aug | WSW15 | WSW9 | WSW5 | SW7 | SW10 | SW12 | SW10 | SW7 | S6 | SSW5 | SW8 | WSW8 | WSW8 | W13 | SW18 | WSW15 | W19 | WSW16 | WSW13 | SW9 | SW14 | SW24 | SW30 | WSW29 | WSW12.5 | SW30 | |
| 18-Aug | SW22 | SSW13 | SSW16 | SW19 | SSW17 | SSW18 | SSW27 | SSW28 | SSW21 | SW26 | SSW23 | SSW29 | SW34 | WSW38 | SW33 | SSW37 | S29 | SSW27 | SSW25 | SSW28 | SSW33 | SW34 | SW31 | SW31 | SSW25.7 | WSW38 | |
| 19-Aug | SW31 | SW30 | WSW28 | WSW27 | WSW27 | WSW25 | WSW23 | SW26 | WSW33 | SW36 | WSW38 | WSW34 | WSW34 | WSW40 | W47 | W41 | W29 | W20 | WSW11 | W18 | W19 | WSW20 | WSW21 | WSW21 | WSW27.4 | W47 | |
| 20-Aug | WSW25 | WSW27 | WSW29 | WSW28 | WSW28 | WSW25 | WSW19 | WSW20 | WSW24 | WSW31 | WSW33 | W34 | WSW32 | W28 | W34 | W41 | WSW41 | WSW31 | WSW29 | W24 | W24 | WSW30 | W30 | W23 | WSW28.5 | W41 | |
| 21-Aug | WNW24 | W16 | WSW15 | WSW14 | SW12 | WSW12 | WSW12 | SW8 | SSE6 | SSE7 | WSW13 | WSW25 | WSW24 | WSW22 | W24 | WSW24 | WSW19 | WSW20 | WSW21 | WSW22 | W21 | WNW17 | NW13 | NNW15 | WSW14.9 | WSW25 | |
| 22-Aug | N15 | N15 | N15 | N18 | N11 | N8 | N5 | NNW4 | NNW3 | NW4 | NW5 | WNW6 | WNW3 | W5 | SW4 | SSW5 | NW5 | ENE4 | NE4 | ENE3 | ENE8 | ENE12 | ESE8 | ESE10 | NNE4.4 | NNE18 | |
| 23-Aug | ESE10 | SE15 | SE16 | SE22 | SE19 | SE22 | SE21 | SE19 | SE17 | SSE21 | SSE17 | S24 | S19 | SSE18 | SE20 | SE20 | SE27 | SE26 | SE26 | SE26 | SE28 | SE28 | SE25 | SE25 | SE20.6 | SE28 | |
| 24-Aug | SE25 | SE22 | SE27 | SSE32 | S23 | ESE11 | ESE11 | ESE8 | SE12 | ESE10 | ESE10 | E8 | ESE15 | SE14 | SE19 | ESE15 | E11 | ESE16 | SE18 | SE23 | S21 | SSW25 | WSW23 | SSW23 | SE14.2 | SSE32 | |
| 25-Aug | SSW22 | SSW21 | SSW19 | SSW22 | SSW24 | SSW21 | S23 | SSW24 | S26 | SSW27 | S26 | SSW28 | SW32 | SW43 | SW43 | SW45 | SW42 | WSW40 | WSW34 | SW26 | SW24 | SW31 | SW33 | SW28 | SW27.8 | SW45 | |
| 26-Aug | WSW37 | WSW34 | WSW32 | WSW29 | WSW26 | SW12 | SSW17 | SSW15 | SW14 | SSW13 | SSW14 | SSW15 | SSW20 | WSW27 | SW26 | SW26 | SW26 | SW26 | SW26 | SW21 | SW26 | SW28 | SW28 | SW24 | SW22.8 | WSW37 | |
| 27-Aug | SW25 | SW28 | SW29 | SW26 | WSW25 | SW23 | SW18 | WSW22 | WSW21 | WSW27 | WSW31 | WSW33 | WSW34 | WSW34 | WSW35 | W32 | W30 | W26 | W18 | W15 | W15 | W15 | W12 | W12 | WSW23.6 | WSW35 | |
| 28-Aug | W16 | WNW15 | WSW12 | W20 | WSW16 | WSW14 | SW8 | SSW4 | SW7 | W12 | W20 | W22 | W23 | W23 | W25 | W25 | WNW24 | WNW22 | WNW17 | NW17 | NW17 | NW17 | WNW17 | NW14 | W15.8 | W25 | |
| 29-Aug | WNW14 | WNW13 | NW11 | NW3 | WSW9 | WNW9 | W8 | WSW3 | SE2 | SSW3 | WSW3 | NE2 | NW5 | NNW8 | NNE7 | E10 | E8 | ESE6 | ENE10 | ENE14 | E8 | ESE9 | SE22 | SE29 | E1.3 | SE29 | |
| 30-Aug | SE22 | SE25 | SE19 | ESE18 | ESE18 | SE21 | SE24 | SE23 | SE27 | SE23 | SE25 | SE32 | SE34 | SE34 | SE34 | SE32 | SE26 | SE26 | SSE29 | SSE30 | S29 | SSE30 | SSE27 | SSE28 | SE25.7 | SE34 | |
| 31-Aug | SSE24 | S20 | SSE17 | SSE14 | S10 | SE11 | SSE17 | S17 | S16 | S13 | SSW18 | SSW15 | SW24 | SW25 | WSW31 | WSW32 | WSW30 | WSW30 | WSW30 | WSW30 | WSW30 | WSW27 | WSW28 | WSW30 | WSW27 | SW18.1 | WSW32 |
| SSW9.6SSW7.7SSW8.4SSW8.8SSW9.5 S8.1 S8.1 S7.8 S7.7 S6.7SSW7.1SSW8.1 SW9.3 SW9.2SW10.5 SW9.7 SW8.9SSW9.5SW10.1SSW9.5SW10.5SW11.5SW11.5SW11.4 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | |
| WSW37WSW34WSW32 SSE32WSW28 SE25 SSW27 SSW28WSW33 SW36WSW38 W34 SSE35 SW43 W47 SW45 SW42WSW40 SE35 SSE32 SSW33 SW34 SW33 SW31 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | |
| All monthly, daily, and diurnal averages have been calculated using vector methods | | | | | | | | | | | | | | | | | | | | | | | | | | | |

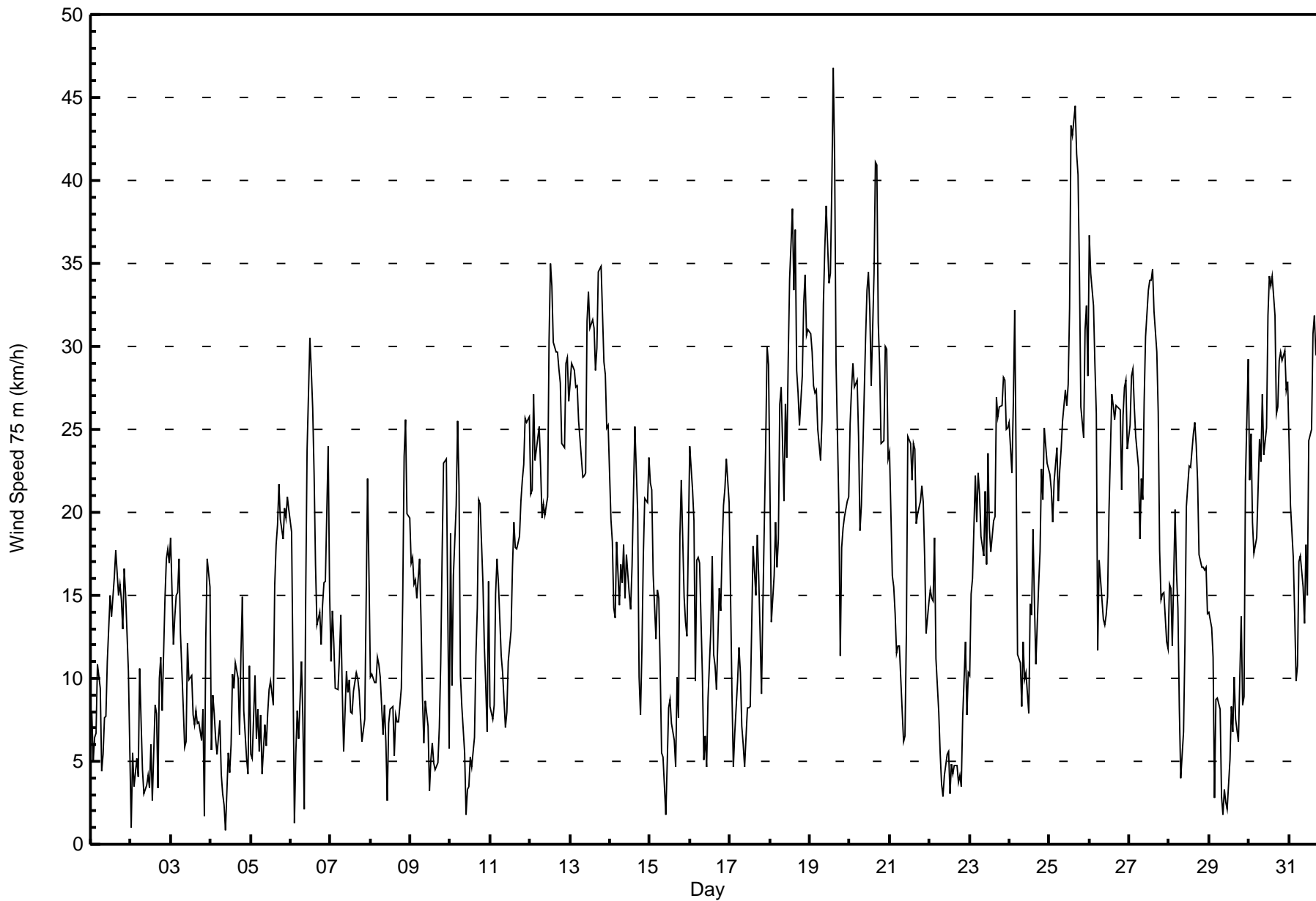


Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed 75 m (WS75m) - km/h

Mannix - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 12 km/h on Aug 24 15:00 Minimum Value: 1 km/h on Aug 9 21:00 Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 3 Q ₃ = 5 P ₉₀ = 6 P ₉₉ = 8 | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | |
|---|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 3 | 2 | 1 | 2 | 1 | 4 | 1 | 2 | 2 | 3 | 4 | 4 | 4 | 6 | 5 | 5 | 5 | 4 | 3 | 2 | 2 | 1 | 1 | 2 | 6 |
| 2-Aug | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 5 | 5 | 3 | 4 | 2 | 1 | 3 | 1 | 2 | 2 | 5 |
| 3-Aug | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 5 | 4 | 3 | 4 | 3 | 3 | 2 | 2 | 5 | 4 | 5 | 3 | 5 | 5 |
| 4-Aug | 2 | 2 | 4 | 4 | 2 | 2 | 3 | 1 | 2 | 1 | 2 | 4 | 3 | 4 | 3 | 3 | 2 | 1 | 2 | 2 | 5 | 2 | 2 | 5 | 5 |
| 5-Aug | 5 | 5 | 1 | 1 | 2 | 2 | 2 | 1 | 2 | 3 | 3 | 4 | 4 | 3 | 6 | 4 | 5 | 2 | 3 | 2 | 1 | 1 | 1 | 1 | 6 |
| 6-Aug | 3 | 1 | 3 | 3 | 1 | 2 | 3 | 3 | 3 | 3 | 5 | 7 | 6 | 4 | 4 | 5 | 3 | 3 | 5 | 3 | 3 | 4 | 3 | 4 | 7 |
| 7-Aug | 3 | 2 | 1 | 2 | 2 | 2 | 3 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 3 | 2 | 1 | 1 | 4 | 2 | 3 | 4 |
| 8-Aug | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 3 | 4 | 4 | 3 | 5 | 4 | 4 | 3 | 2 | 4 | 2 | 2 | 1 | 1 | 5 |
| 9-Aug | 1 | 1 | 2 | 2 | 1 | 1 | 3 | 3 | 1 | 2 | 3 | 3 | 3 | 4 | 3 | 2 | 3 | 4 | 2 | 3 | 1 | 2 | 7 | 2 | 7 |
| 10-Aug | 5 | 4 | 6 | 5 | 4 | 7 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 5 | 5 | 5 | 5 | 6 | 3 | 2 | 2 | 2 | 4 | 7 |
| 11-Aug | 3 | 2 | 2 | 2 | 1 | 2 | 2 | 1 | 2 | 2 | 3 | 4 | 5 | 5 | 4 | 4 | 4 | 4 | 3 | 3 | 2 | 1 | 1 | 2 | 5 |
| 12-Aug | 1 | 1 | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 5 | 4 | 6 | 6 | 6 | 6 | 7 | 5 | 6 | 6 | 3 | 1 | 2 | 2 | 2 | 7 |
| 13-Aug | 2 | 2 | 2 | 2 | 3 | 4 | 5 | 4 | 4 | 7 | 8 | 8 | 8 | 7 | 7 | 9 | 8 | 7 | 6 | 4 | 4 | 3 | 3 | 4 | 9 |
| 14-Aug | 6 | 6 | 6 | 5 | 7 | 6 | 5 | 4 | 4 | 3 | 4 | 4 | 5 | 3 | 5 | 3 | 3 | 3 | 2 | 3 | 2 | 1 | 2 | 2 | 7 |
| 15-Aug | 3 | 3 | 2 | 5 | 3 | 2 | 2 | 1 | 1 | 1 | 3 | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 3 | 5 | 4 | 3 | 2 | 4 | 5 |
| 16-Aug | 2 | 2 | 3 | 2 | 3 | 2 | 2 | 4 | 2 | 2 | 2 | 3 | 4 | 4 | 4 | 5 | 4 | 4 | 3 | 2 | 2 | 1 | 1 | 1 | 5 |
| 17-Aug | 2 | 2 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 4 | 3 | 3 | 2 | 2 | 1 | 3 | 4 | 2 | 1 | 4 |
| 18-Aug | 4 | 3 | 2 | 3 | 3 | 3 | 2 | 3 | 6 | 6 | 5 | 6 | 6 | 6 | 8 | 7 | 5 | 4 | 5 | 4 | 4 | 5 | 4 | 4 | 8 |
| 19-Aug | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 4 | 7 | 6 | 6 | 6 | 7 | 6 | 9 | 9 | 4 | 6 | 3 | 2 | 2 | 2 | 3 | 2 | 9 |
| 20-Aug | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 4 | 3 | 5 | 5 | 6 | 6 | 6 | 7 | 8 | 7 | 5 | 5 | 3 | 2 | 3 | 3 | 4 | 8 |
| 21-Aug | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 4 | 2 | 2 | 8 | 4 | 5 | 6 | 5 | 5 | 4 | 3 | 3 | 1 | 1 | 2 | 2 | 2 | 8 |
| 22-Aug | 3 | 2 | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 3 | 2 | 1 | 2 | 4 | 3 | 5 | 5 |
| 23-Aug | 4 | 7 | 5 | 4 | 5 | 4 | 4 | 3 | 4 | 3 | 3 | 4 | 3 | 2 | 4 | 5 | 6 | 4 | 6 | 6 | 5 | 5 | 3 | 2 | 7 |
| 24-Aug | 4 | 3 | 4 | 7 | 9 | 6 | 6 | 4 | 4 | 4 | 4 | 4 | 6 | 4 | 12 | 5 | 5 | 7 | 6 | 3 | 3 | 6 | 7 | 4 | 12 |
| 25-Aug | 6 | 4 | 3 | 2 | 3 | 4 | 3 | 4 | 5 | 5 | 5 | 4 | 7 | 7 | 7 | 6 | 6 | 7 | 6 | 5 | 4 | 5 | 4 | 4 | 7 |
| 26-Aug | 6 | 4 | 4 | 4 | 6 | 4 | 2 | 4 | 3 | 3 | 4 | 4 | 5 | 5 | 5 | 6 | 5 | 5 | 5 | 2 | 3 | 2 | 3 | 2 | 6 |
| 27-Aug | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 5 | 6 | 5 | 6 | 5 | 5 | 5 | 4 | 4 | 3 | 1 | 1 | 1 | 2 | 2 | 6 |
| 28-Aug | 3 | 3 | 5 | 2 | 5 | 2 | 2 | 2 | 2 | 4 | 5 | 4 | 6 | 5 | 5 | 5 | 5 | 4 | 3 | 2 | 2 | 3 | 3 | 2 | 6 |
| 29-Aug | 1 | 2 | 1 | 3 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 8 | 2 | 8 |
| 30-Aug | 6 | 4 | 7 | 7 | 7 | 7 | 8 | 7 | 7 | 7 | 7 | 7 | 7 | 8 | 7 | 8 | 7 | 6 | 4 | 3 | 3 | 3 | 2 | 3 | 8 |
| 31-Aug | 2 | 2 | 2 | 2 | 2 | 4 | 6 | 4 | 4 | 6 | 3 | 4 | 5 | 7 | 7 | 5 | 5 | 5 | 5 | 3 | 2 | 2 | 3 | 3 | 7 |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed 75 m (WS75m) - km/h
Mannix - August 2017**

| Wind Speed Ranges (km/h) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 5 | 69 | 9.27 | 9.27 |
| 6 - 11 | 183 | 24.60 | 33.87 |
| 12 - 19 | 193 | 25.94 | 59.81 |
| 20 - 28 | 201 | 27.02 | 86.83 |
| 29 - 38 | 88 | 11.83 | 98.66 |
| > 38 | 10 | 1.34 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Wind Speed 75 m (WS75m) - km/h
Mannix - August 2017

| Wind Speed Ranges (km/h) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-----------------------------|----------------|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 5 | 2 | 3 | 2 | 5 | 1 | 2 | 4 | 8 | 4 | 8 | 6 | 3 | 4 | 5 | 8 | 4 | 69 |
| 6 - 11 | 5 | 3 | 5 | 6 | 7 | 13 | 23 | 19 | 16 | 10 | 17 | 21 | 11 | 5 | 9 | 13 | 183 |
| 12 - 19 | 14 | 8 | 1 | 2 | 2 | 8 | 29 | 24 | 16 | 18 | 13 | 22 | 15 | 8 | 7 | 6 | 193 |
| 20 - 28 | 2 | 1 | 0 | 0 | 0 | 0 | 48 | 22 | 19 | 24 | 30 | 32 | 19 | 3 | 0 | 1 | 201 |
| 29 - 38 | 2 | 0 | 0 | 0 | 0 | 0 | 18 | 13 | 3 | 3 | 13 | 30 | 6 | 0 | 0 | 0 | 88 |
| > 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 3 | 3 | 0 | 0 | 0 | 10 |
| Totals | 25 | 15 | 8 | 13 | 10 | 23 | 122 | 86 | 58 | 63 | 83 | 111 | 58 | 21 | 24 | 24 | 744 |

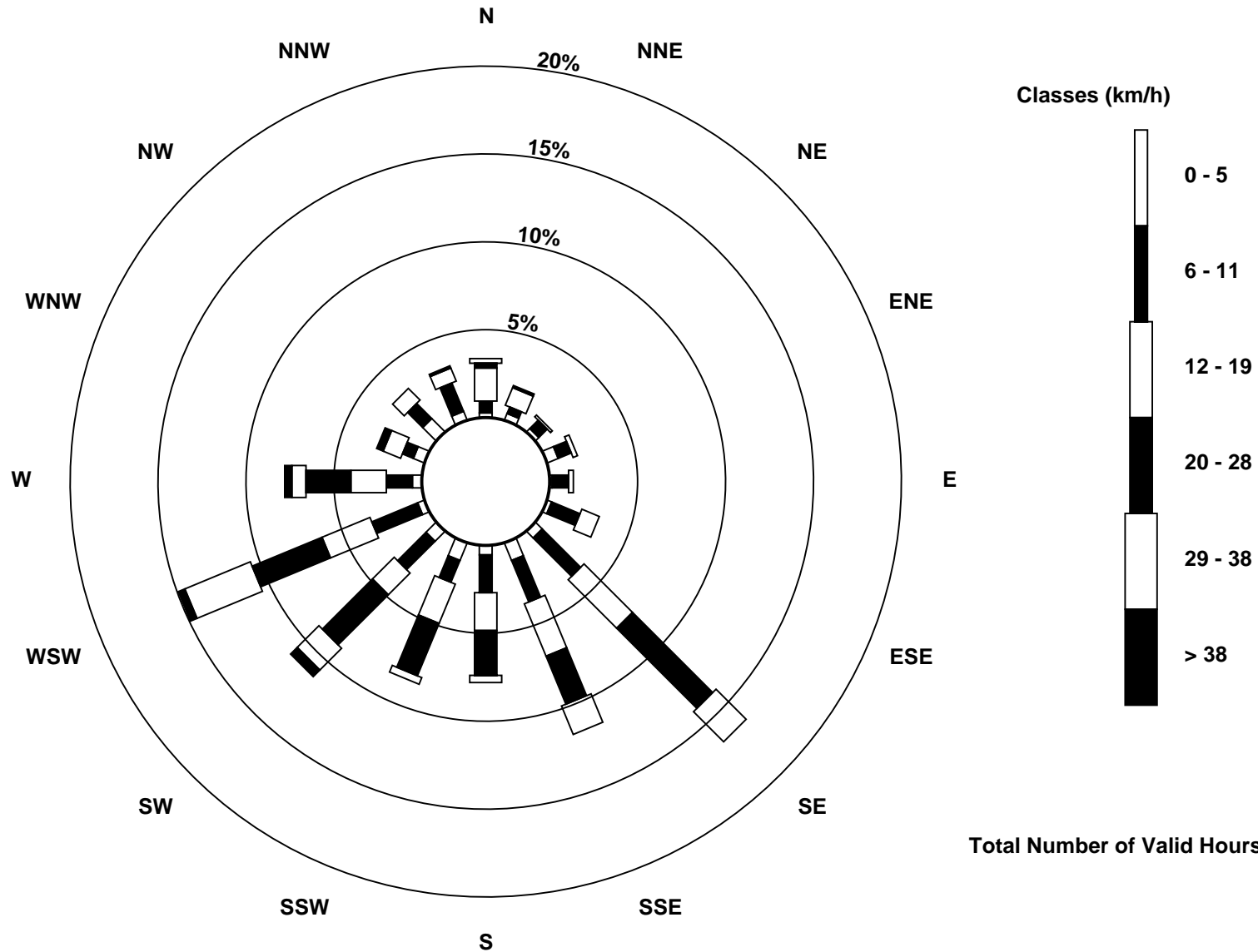
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Wind Speed 75 m (WS75m) - km/h
Mannix (AMS 5)



Total Number of Valid Hours: 744



| | | |
|---|---|---------------------------------|
| Maximum Speed: 49 km/h on Aug 19 15:00 | Maximum Daily Speed Average: 30.4 km/h on Aug 20 | Hours in Service: 744 |
| Minimum Speed Value: 1 km/h on Aug 4 10:00 | Minimum Daily Speed Average: 2.1 km/h on Aug 29 | Hours of Data: 744 |
| Maximum Diurnal Speed Average: 12.5 km/h at hour 23 | Minimum Diurnal Speed Average: 7.1 km/h at hour 10 | Hours of Missing Data: 0 |
| Monthly Average Velocity: 9.5 km/h 208.2 deg | Percentiles: P ₁ = 2 P ₁₀ = 6 Q ₁ = 10 Median = 18 Q ₃ = 26 P ₉₀ = 31 P ₉₉ = 42 | Percent Operational Time: 100.0 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | NNW9 | NNW6 | NW7 | NW8 | NW10 | NW10 | NNW5 | NNW6 | NNW8 | N8 | N11 | NNE15 | N14 | N15 | NNW17 | N18 | N15 | N16 | N15 | NNE14 | NNE17 | NNE16 | NE10 | ENE7 | N10.4 | N18 |
| 2-Aug | E3 | NNW5 | WNW4 | WNW5 | SSW2 | SSE8 | S8 | SSW6 | SSE3 | SE4 | SE4 | SSE4 | W6 | SSE3 | SW9 | WSW8 | SSW4 | WSW11 | WSW12 | SSW8 | SW15 | WSW19 | SW19 | SW20 | SW6.0 | SSW20 |
| 3-Aug | SW21 | SSW14 | S12 | S12 | S12 | SSE15 | SSE12 | SSE7 | SE7 | SE8 | SE13 | S10 | S11 | ESE9 | SE8 | SE9 | SE8 | S7 | SSE6 | NNW9 | SW2 | E15 | ENE18 | E18 | SSE7.3 | SW21 |
| 4-Aug | ENE6 | NW8 | WNW8 | NW7 | ENE6 | ENE9 | NW4 | SW3 | S2 | SSE1 | W6 | WNW4 | ENE6 | E14 | SE11 | SE12 | SE10 | S7 | S12 | SSE16 | SSE8 | SE5 | SSE4 | SE12 | SE3.2 | SSE16 |
| 5-Aug | NNE5 | NNW6 | SW9 | SW6 | SSW9 | S5 | S7 | S5 | SE7 | SSE6 | SE9 | SSE10 | SE10 | ESE10 | SSE16 | SSE18 | S19 | SSE22 | S20 | S19 | S21 | SSW21 | SSW23 | SSW22 | S10.5 | SSW23 |
| 6-Aug | SSW20 | SSW11 | W3 | WSW6 | W8 | NW8 | NNE13 | NE8 | NNE2 | NNW15 | N24 | N31 | N29 | NNE27 | N23 | N17 | N14 | NNE15 | NNE13 | NNE15 | N17 | N17 | NNW27 | NNW18 | N12.0 | N31 |
| 7-Aug | NNW13 | NNW16 | N13 | N11 | N11 | NNW12 | N15 | N10 | NNW5 | N10 | NNW9 | NNW10 | NW8 | NW8 | WSW9 | W11 | W10 | WSW9 | WSW8 | WSW6 | SW8 | WSW16 | WSW25 | SW21 | WNW7.2 | WSW25 |
| 8-Aug | SSW12 | SSW11 | SSW10 | SSW10 | SSW12 | SSW10 | S10 | S6 | SSE8 | SSE6 | S3 | W7 | WSW9 | W8 | W6 | WSW8 | WSW8 | SW8 | SSW10 | S15 | S23 | S28 | SSW22 | SSW21 | SSW10.1 | S28 |
| 9-Aug | S16 | S15 | S12 | SSW15 | SSW15 | SSW17 | SSW15 | SSW10 | SSE6 | SSE9 | SE8 | SSW4 | W5 | SE7 | SE5 | SSE5 | SSW5 | S7 | SSE11 | S18 | SSW23 | SSW24 | SW16 | S6 | SSW10.3 | SSW24 |
| 10-Aug | SSE17 | E12 | SE18 | S22 | S28 | S24 | S12 | SSE9 | SE7 | E2 | W4 | E4 | ENE5 | NNE4 | N7 | E14 | SE15 | SE22 | S21 | SSW17 | WSW13 | WSW10 | S7 | SSE14 | SSE9.1 | S28 |
| 11-Aug | SW9 | SSW7 | S7 | SSE12 | SSE14 | SSE17 | SSE13 | SSE11 | SSE10 | SE8 | SE10 | SE12 | SE14 | SE18 | SE20 | SE18 | SE18 | SE19 | SSE21 | SSE23 | SSE25 | SSE28 | SSE28 | S27 | SSE15.7 | SSE28 |
| 12-Aug | S21 | S21 | SSE26 | SSE27 | SSE27 | SSE28 | SSE26 | SSE21 | SSE21 | SSE20 | SSE21 | S31 | SSE35 | SSE34 | S30 | SSE30 | SSE30 | SSE29 | S28 | S25 | SSE25 | SSE31 | SSE31 | SSE29 | SSE26.7 | SSE35 |
| 13-Aug | SE30 | SE32 | SE31 | SE31 | SE30 | SE29 | SE28 | SE24 | SE23 | SE24 | SE33 | SE34 | SE33 | SSE33 | SSE32 | SE31 | SE31 | SE36 | SSE36 | SSE34 | SSE31 | SSE31 | SE27 | SE28 | SE30.3 | SSE36 |
| 14-Aug | SE22 | SE21 | ESE18 | ESE18 | SE21 | ESE18 | SE19 | SSE17 | SSE18 | SSE15 | SSE18 | SE15 | S14 | SSW17 | SW21 | SW25 | SW21 | SW11 | SSW8 | SE12 | SSE17 | SSE21 | SSE23 | SSE26 | SSE15.0 | SSE26 |
| 15-Aug | SSE24 | SE23 | SSE18 | SE15 | SE17 | SSE16 | SSE11 | SSW6 | SW6 | S2 | SW5 | WSW8 | WSW9 | W7 | WNW6 | NNW5 | NE10 | NE8 | WSW20 | W24 | NW17 | NW16 | NNW14 | NNW21 | SW3.9 | W24 |
| 16-Aug | WNW27 | WNW25 | W21 | WNW12 | W20 | W21 | W19 | W11 | S5 | S7 | S5 | WSW9 | WSW13 | W18 | W12 | WNW11 | WSW10 | WSW16 | WSW15 | WSW19 | SW22 | WSW25 | WSW28 | WSW25 | WSW15.1 | WSW28 |
| 17-Aug | WSW18 | WSW11 | WSW6 | WSW8 | WSW10 | WSW13 | WSW11 | SW8 | SSW6 | SSW5 | WSW8 | WSW9 | WSW9 | W14 | SW18 | WSW16 | W20 | WSW17 | WSW13 | SW10 | SW15 | SW25 | WSW34 | WSW32 | WSW13.6 | WSW34 |
| 18-Aug | WSW24 | SSW15 | SSW19 | SW22 | SW18 | SSW21 | SSW29 | SSW30 | SSW21 | SW27 | SW24 | SSW30 | SW35 | WSW39 | SW35 | SSW38 | S29 | SSW28 | SSW26 | SSW30 | SW35 | SW36 | SW33 | SW33 | SW27.4 | WSW39 |
| 19-Aug | SW33 | WSW32 | WSW30 | WSW30 | WSW30 | WSW27 | WSW25 | SW28 | WSW34 | WSW37 | WSW40 | WSW35 | WSW36 | W41 | W49 | W44 | W31 | W22 | WSW13 | W20 | W22 | W21 | WSW22 | WSW24 | WSW29.4 | W49 |
| 20-Aug | WSW28 | WSW31 | WSW32 | WSW30 | WSW30 | WSW27 | WSW21 | WSW21 | WSW25 | WSW31 | WSW34 | W35 | WSW33 | W29 | W36 | W43 | WSW42 | WSW32 | WSW30 | W26 | W27 | W33 | W33 | W26 | WSW30.4 | W43 |
| 21-Aug | WNW26 | W18 | WSW16 | WSW16 | WSW14 | WSW15 | WSW14 | SW9 | S7 | SSE7 | WSW14 | WSW25 | WSW25 | WSW23 | W25 | WSW25 | WSW20 | W21 | WSW22 | W24 | W22 | WNW19 | NNW13 | NNW16 | W16.1 | WNW26 |
| 22-Aug | N18 | N17 | N15 | NNE19 | N10 | NNE7 | NNE5 | NNW3 | NNW3 | NW4 | NW5 | WNW6 | WNW3 | WSW5 | SW5 | SSW5 | WNW5 | ENE3 | NE4 | E4 | ENE8 | E14 | ESE13 | ESE15 | NNE4.4 | NNE19 |
| 23-Aug | ESE15 | SE18 | SE17 | SE25 | SE22 | SE25 | SE25 | SE21 | SSE19 | SSE21 | SSE17 | S24 | SSW20 | SSE19 | SE21 | SE21 | SE28 | SE28 | SE29 | SE29 | SE30 | SE30 | SE27 | SE28 | SE22.3 | SE30 |
| 24-Aug | SE28 | SE24 | SE29 | SSE35 | S26 | ESE14 | ESE13 | ESE10 | SE14 | ESE13 | ESE13 | ESE10 | ESE17 | SE15 | SE23 | ESE23 | ESE16 | ESE19 | SE19 | SE25 | S23 | SSW26 | WSW24 | SW24 | SE16.3 | SSE35 |
| 25-Aug | SW23 | SW23 | SSW21 | SSW23 | SSW25 | SSW21 | S24 | SSW24 | SSW26 | SSW28 | SSW27 | SSW28 | SW34 | SW45 | SW44 | SW46 | WSW44 | WSW42 | WSW36 | SW28 | SW27 | SW33 | SW35 | SW30 | SW29.3 | SW46 |
| 26-Aug | WSW39 | WSW37 | WSW35 | WSW32 | WSW29 | SW13 | SW18 | SW16 | SW14 | SSW13 | SSW14 | SSW15 | SW21 | WSW28 | SW27 | WSW26 | SW27 | SW27 | SW28 | SW24 | SW29 | SW30 | SW31 | SW26 | SW24.5 | WSW39 |
| 27-Aug | SW28 | SW31 | SW32 | WSW29 | WSW27 | WSW25 | SW20 | WSW23 | WSW22 | WSW27 | WSW31 | WSW34 | WSW35 | WSW35 | WSW36 | W33 | W31 | W27 | W19 | W17 | W17 | WNW17 | WNW12 | W10 | WSW25.0 | WSW36 |
| 28-Aug | W16 | NW17 | W10 | W21 | W18 | WSW17 | WSW10 | SSW5 | SW7 | W13 | W21 | W22 | W24 | W24 | WNW26 | W27 | WNW25 | WNW23 | WNW19 | NW18 | NW19 | NW19 | NW18 | NW15 | WNW16.9 | W27 |
| 29-Aug | WNW13 | WNW12 | NW11 | NW3 | W9 | NW9 | W9 | W4 | SE2 | SSW3 | WSW3 | NE2 | NW5 | NNW8 | NNE7 | E11 | E8 | ESE7 | ENE10 | E14 | ESE14 | ESE14 | SE25 | SE32 | E2.1 | SE32 |
| 30-Aug | SE27 | SE27 | SE25 | ESE22 | ESE23 | ESE24 | SE28 | SE27 | SE29 | SE26 | SE27 | SE33 | SE36 | SE35 | SE35 | SE33 | SE28 | SE28 | SSE31 | SSE31 | S31 | S31 | SSE29 | SSE29 | SE27.8 | SE36 |
| 31-Aug | S26 | S21 | S17 | S11 | SSW7 | SSE8 | SSE16 | S17 | S16 | SSW14 | SSW19 | SSW16 | SW25 | WSW26 | WSW32 | WSW33 | WSW31 | WSW31 | W32 | WSW33 | WSW31 | WSW31 | WSW33 | WSW30 | SW19.4 | WSW33 |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|---------|--------|--------|--------|--------|--------|-------|-------|-------|--------|--------|--------|-------|-------|--------|-------|-------|--------|---------|---------|---------|---------|--------|---------|-----------------|
| SSW10.3 | SSW8.3 | SSW8.7 | SSW9.1 | SSW9.9 | SSW8.4 | S8.4 | S8.3 | S8.2 | SSW7.1 | SSW7.5 | SSW8.5 | SW9.7 | SW9.6 | SW10.9 | SW9.9 | SW9.3 | SSW9.3 | SSW10.6 | SSW10.6 | SSW11.5 | SSW12.5 | SW12.5 | SSW12.3 | Diurnal Average |
| WSW39 | WSW37 | WSW35 | SSE35 | WSW30 | SE29 | SSW29 | SSW30 | WSW34 | WSW37 | WSW40 | W35 | WSW36 | SW45 | W49 | SW46 | WSW44 | WSW42 | WSW36 | SSE34 | SW35 | SW36 | SW35 | SW33 | Diurnal Maximum |

All monthly, daily, and diurnal averages have been calculated using vector methods



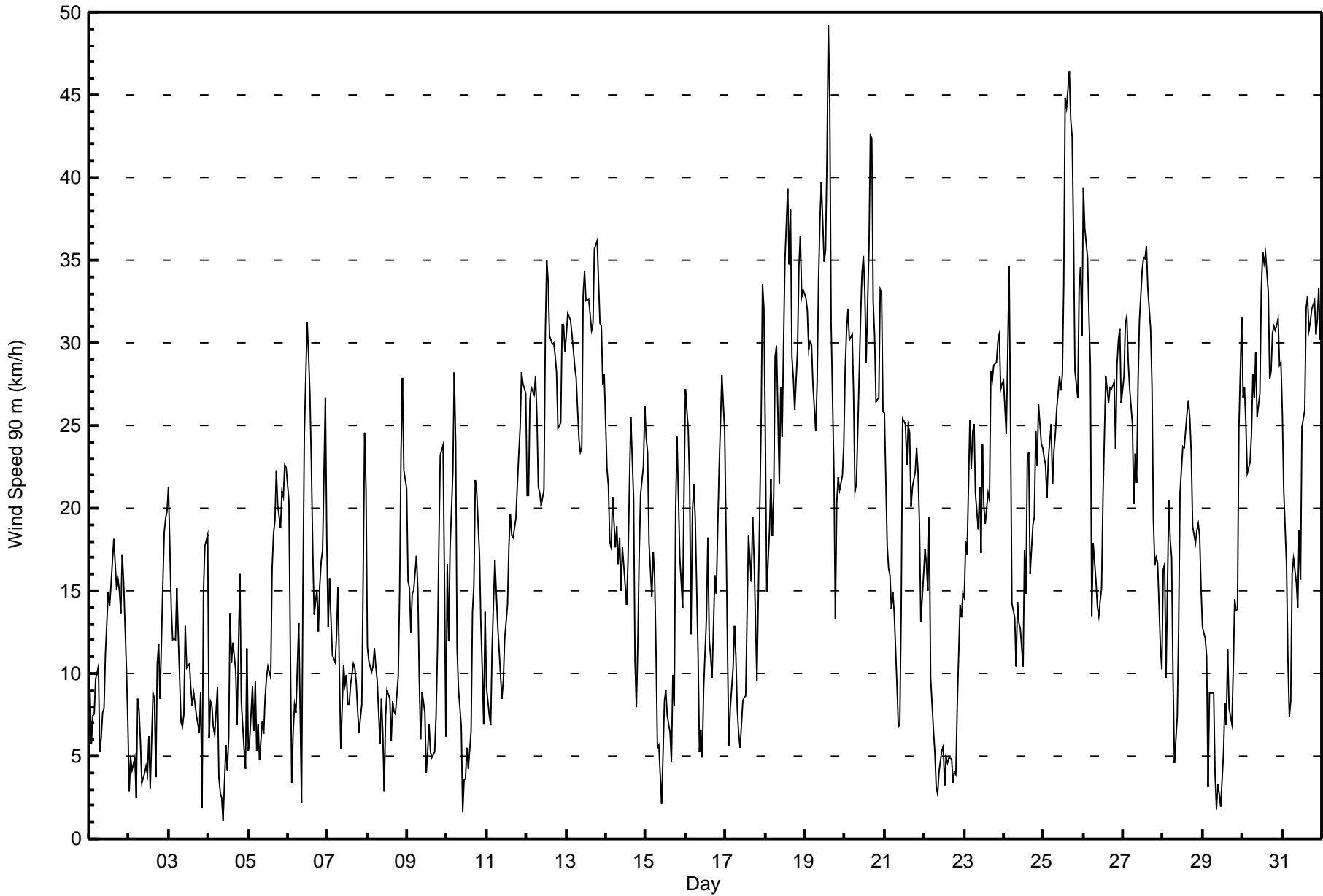
Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed 90 m (WS90m) - km/h

Mannix - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on Aug 24 15:00 Minimum Value: 1 km/h on Aug 29 01:00 Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 6 P ₉₉ = 7 | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | |
|--|-------------------------------|---|---|---|----|---|---|---|---|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 3 | 2 | 1 | 1 | 1 | 3 | 2 | 2 | 3 | 3 | 4 | 4 | 4 | 6 | 5 | 4 | 5 | 4 | 3 | 2 | 2 | 1 | 1 | 2 | 6 |
| 2-Aug | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 2 | 5 | 5 | 3 | 4 | 2 | 1 | 3 | 2 | 2 | 2 | 5 |
| 3-Aug | 2 | 3 | 2 | 1 | 2 | 2 | 3 | 2 | 2 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 3 | 2 | 2 | 6 | 4 | 6 | 3 | 4 | 6 |
| 4-Aug | 3 | 2 | 4 | 4 | 1 | 2 | 2 | 1 | 2 | 1 | 2 | 4 | 3 | 6 | 3 | 2 | 2 | 1 | 2 | 2 | 5 | 2 | 2 | 6 | 6 |
| 5-Aug | 5 | 6 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 3 | 3 | 4 | 4 | 3 | 6 | 4 | 4 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 6 |
| 6-Aug | 3 | 1 | 4 | 3 | 1 | 3 | 3 | 3 | 3 | 4 | 5 | 6 | 5 | 4 | 4 | 5 | 3 | 3 | 4 | 3 | 3 | 5 | 3 | 4 | 6 |
| 7-Aug | 3 | 2 | 1 | 2 | 2 | 2 | 3 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 3 | 2 | 1 | 1 | 5 | 1 | 3 | 5 |
| 8-Aug | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 5 | 4 | 4 | 5 | 4 | 4 | 3 | 2 | 4 | 2 | 2 | 1 | 1 | 5 |
| 9-Aug | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 3 | 1 | 2 | 2 | 3 | 3 | 4 | 3 | 2 | 3 | 4 | 2 | 3 | 1 | 2 | 8 | 1 | 8 |
| 10-Aug | 4 | 5 | 5 | 5 | 4 | 7 | 3 | 2 | 2 | 1 | 2 | 3 | 3 | 3 | 5 | 4 | 4 | 4 | 5 | 3 | 2 | 2 | 1 | 4 | 7 |
| 11-Aug | 3 | 1 | 1 | 2 | 2 | 2 | 3 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 2 | 1 | 1 | 3 | 4 |
| 12-Aug | 1 | 1 | 2 | 2 | 1 | 1 | 2 | 3 | 3 | 5 | 4 | 6 | 6 | 6 | 6 | 7 | 5 | 6 | 5 | 3 | 1 | 2 | 2 | 2 | 7 |
| 13-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 3 | 4 | 6 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 6 | 4 | 4 | 3 | 3 | 3 | 7 |
| 14-Aug | 5 | 5 | 4 | 4 | 6 | 4 | 5 | 4 | 4 | 3 | 4 | 4 | 4 | 3 | 5 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 6 |
| 15-Aug | 3 | 3 | 2 | 4 | 3 | 2 | 2 | 1 | 1 | 1 | 3 | 2 | 2 | 3 | 2 | 3 | 4 | 4 | 3 | 5 | 5 | 4 | 2 | 4 | 5 |
| 16-Aug | 2 | 2 | 3 | 2 | 3 | 2 | 2 | 4 | 2 | 2 | 2 | 3 | 4 | 4 | 5 | 5 | 4 | 5 | 3 | 2 | 2 | 1 | 1 | 2 | 5 |
| 17-Aug | 2 | 3 | 3 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 4 | 3 | 3 | 2 | 2 | 1 | 3 | 4 | 2 | 1 | 4 |
| 18-Aug | 4 | 3 | 2 | 3 | 3 | 3 | 2 | 3 | 6 | 6 | 5 | 6 | 6 | 6 | 7 | 7 | 4 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 7 |
| 19-Aug | 4 | 4 | 4 | 3 | 3 | 3 | 4 | 4 | 7 | 6 | 6 | 6 | 7 | 7 | 9 | 9 | 4 | 6 | 3 | 3 | 2 | 2 | 3 | 2 | 9 |
| 20-Aug | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 4 | 3 | 5 | 5 | 6 | 6 | 6 | 7 | 7 | 7 | 5 | 5 | 3 | 2 | 3 | 4 | 5 | 7 |
| 21-Aug | 2 | 4 | 3 | 2 | 2 | 3 | 3 | 4 | 2 | 2 | 9 | 4 | 5 | 6 | 5 | 5 | 4 | 2 | 3 | 2 | 1 | 2 | 2 | 2 | 9 |
| 22-Aug | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 2 | 1 | 2 | 4 | 3 | 4 | 4 |
| 23-Aug | 3 | 6 | 4 | 3 | 4 | 4 | 2 | 3 | 4 | 3 | 3 | 4 | 3 | 2 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 4 | 3 | 2 | 6 |
| 24-Aug | 4 | 3 | 3 | 6 | 10 | 5 | 5 | 4 | 4 | 4 | 3 | 4 | 5 | 4 | 11 | 5 | 6 | 6 | 5 | 3 | 3 | 6 | 7 | 4 | 11 |
| 25-Aug | 6 | 4 | 3 | 2 | 3 | 4 | 3 | 4 | 5 | 5 | 5 | 5 | 4 | 7 | 7 | 7 | 6 | 6 | 7 | 6 | 5 | 4 | 5 | 4 | 7 |
| 26-Aug | 6 | 4 | 4 | 5 | 6 | 4 | 3 | 4 | 3 | 3 | 3 | 4 | 5 | 4 | 5 | 6 | 5 | 5 | 5 | 5 | 2 | 3 | 2 | 3 | 6 |
| 27-Aug | 3 | 3 | 3 | 4 | 3 | 3 | 4 | 5 | 4 | 5 | 6 | 5 | 6 | 5 | 5 | 5 | 5 | 4 | 3 | 2 | 1 | 1 | 2 | 3 | 6 |
| 28-Aug | 4 | 4 | 6 | 3 | 4 | 2 | 2 | 2 | 2 | 4 | 5 | 4 | 6 | 5 | 5 | 5 | 5 | 4 | 3 | 2 | 2 | 3 | 3 | 2 | 6 |
| 29-Aug | 1 | 1 | 1 | 4 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 1 | 3 | 3 | 7 | 2 | 7 |
| 30-Aug | 4 | 3 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 7 | 7 | 6 | 8 | 6 | 5 | 4 | 3 | 3 | 2 | 2 | 3 | 8 |
| 31-Aug | 2 | 2 | 3 | 2 | 2 | 3 | 6 | 4 | 3 | 6 | 3 | 4 | 6 | 7 | 7 | 5 | 5 | 5 | 5 | 3 | 2 | 3 | 3 | 3 | 7 |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed 90 m (WS90m) - km/h
Mannix - August 2017

| Wind Speed Ranges (km/h) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 5 | 64 | 8.60 | 8.60 |
| 6 - 11 | 164 | 22.04 | 30.65 |
| 12 - 19 | 189 | 25.40 | 56.05 |
| 20 - 28 | 195 | 26.21 | 82.26 |
| 29 - 38 | 119 | 15.99 | 98.25 |
| > 38 | 13 | 1.75 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed 90 m (WS90m) - km/h
Mannix - August 2017**

| Wind Speed Ranges (km/h) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-----------------------------|----------------|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 5 | 0 | 4 | 2 | 2 | 4 | 0 | 5 | 6 | 7 | 9 | 3 | 2 | 4 | 5 | 6 | 5 | 64 |
| 6 - 11 | 8 | 2 | 4 | 7 | 2 | 5 | 14 | 18 | 15 | 15 | 12 | 24 | 14 | 4 | 12 | 8 | 164 |
| 12 - 19 | 15 | 9 | 0 | 1 | 7 | 16 | 19 | 23 | 16 | 18 | 9 | 21 | 11 | 8 | 8 | 8 | 189 |
| 20 - 28 | 2 | 1 | 0 | 0 | 0 | 5 | 36 | 21 | 19 | 24 | 25 | 31 | 23 | 7 | 0 | 1 | 195 |
| 29 - 38 | 2 | 0 | 0 | 0 | 0 | 0 | 24 | 19 | 5 | 5 | 16 | 39 | 9 | 0 | 0 | 0 | 119 |
| > 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 6 | 4 | 0 | 0 | 0 | 13 |
| Totals | 27 | 16 | 6 | 10 | 13 | 26 | 98 | 87 | 62 | 71 | 68 | 123 | 65 | 24 | 26 | 22 | 744 |

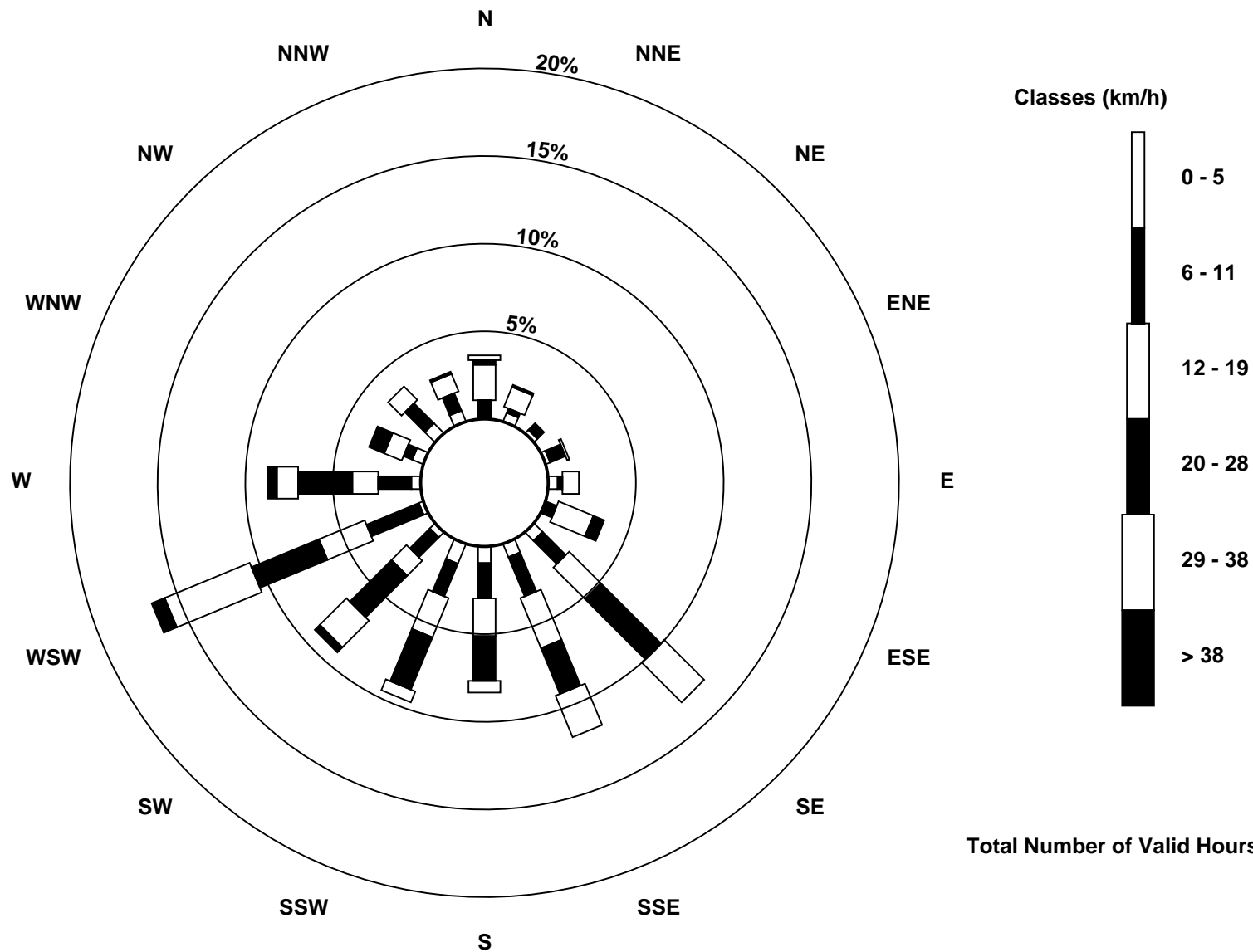
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Wind Speed 90 m (WS90m) - km/h
Mannix (AMS 5)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction 20 m (WD20m) - deg
Mannix - August 2017

| | | | |
|---|--|---------------------------|-------|
| Direction of Maximum Speed: 269 deg on Aug 19 15:00 | | Hours in Service: | 744 |
| Direction of Maximum Daily Speed Average: 257.6 deg on Aug 20 | | Hours of Data: | 744 |
| Direction of Minimum Speed: 70 deg on Aug 6 09:00 | | Hours of Missing Data: | 0 |
| Direction of Minimum Daily Speed Average: 1.8 deg on Aug 22 | | Percent Operational Time: | 100.0 |
| Monthly Average Direction: 221.9 deg | | | |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average |
|--------|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 266 | 254 | 266 | 261 | 253 | 272 | 269 | 283 | 328 | 348 | 17 | 22 | 355 | 360 | 332 | 357 | 4 | 2 | 7 | 20 | 17 | 2 | 22 | 265 | 347.0 |
| 2-Aug | 274 | 45 | 241 | 215 | 177 | 173 | 151 | 142 | 125 | 105 | 118 | 162 | 291 | 121 | 237 | 264 | 185 | 249 | 235 | 202 | 206 | 243 | 206 | 178 | 209.7 |
| 3-Aug | 195 | 147 | 150 | 149 | 151 | 150 | 149 | 145 | 127 | 125 | 138 | 185 | 176 | 119 | 132 | 134 | 139 | 169 | 158 | 293 | 237 | 77 | 55 | 92 | 138.7 |
| 4-Aug | 24 | 305 | 259 | 259 | 107 | 69 | 245 | 229 | 205 | 188 | 271 | 287 | 85 | 100 | 130 | 136 | 156 | 198 | 197 | 150 | 163 | 139 | 220 | 158 | 164.6 |
| 5-Aug | 337 | 259 | 239 | 252 | 211 | 178 | 161 | 134 | 149 | 136 | 146 | 150 | 138 | 109 | 153 | 158 | 184 | 166 | 180 | 172 | 174 | 193 | 196 | 176 | 170.0 |
| 6-Aug | 165 | 162 | 127 | 193 | 202 | 220 | 56 | 66 | 70 | 343 | 6 | 8 | 12 | 17 | 11 | 14 | 357 | 29 | 18 | 16 | 351 | 358 | 337 | 351 | 12.4 |
| 7-Aug | 357 | 330 | 323 | 315 | 290 | 315 | 354 | 352 | 324 | 354 | 336 | 334 | 298 | 306 | 241 | 265 | 269 | 259 | 245 | 246 | 240 | 252 | 249 | 221 | 291.3 |
| 8-Aug | 166 | 156 | 159 | 154 | 151 | 144 | 141 | 151 | 137 | 141 | 151 | 282 | 242 | 275 | 270 | 258 | 249 | 227 | 206 | 175 | 172 | 175 | 161 | 161 | 177.8 |
| 9-Aug | 152 | 150 | 157 | 157 | 165 | 164 | 160 | 152 | 139 | 141 | 134 | 173 | 270 | 130 | 149 | 152 | 204 | 183 | 151 | 177 | 208 | 212 | 247 | 203 | 167.4 |
| 10-Aug | 158 | 90 | 157 | 197 | 171 | 187 | 150 | 134 | 125 | 90 | 271 | 78 | 72 | 24 | 8 | 88 | 133 | 146 | 179 | 178 | 256 | 222 | 180 | 163 | 149.4 |
| 11-Aug | 166 | 167 | 157 | 154 | 147 | 159 | 145 | 139 | 135 | 125 | 121 | 136 | 138 | 138 | 144 | 146 | 147 | 144 | 151 | 153 | 155 | 154 | 160 | 164 | 147.9 |
| 12-Aug | 157 | 158 | 158 | 156 | 149 | 147 | 142 | 149 | 156 | 156 | 157 | 173 | 166 | 168 | 175 | 167 | 159 | 157 | 177 | 177 | 169 | 156 | 157 | 154 | 161.1 |
| 13-Aug | 144 | 142 | 141 | 141 | 140 | 136 | 133 | 139 | 143 | 141 | 142 | 145 | 144 | 150 | 140 | 146 | 146 | 152 | 154 | 148 | 144 | 137 | 138 | 138 | 143.9 |
| 14-Aug | 129 | 128 | 129 | 128 | 135 | 135 | 134 | 149 | 163 | 151 | 155 | 148 | 185 | 199 | 223 | 229 | 229 | 219 | 192 | 145 | 155 | 148 | 151 | 150 | 160.5 |
| 15-Aug | 150 | 152 | 164 | 142 | 152 | 170 | 203 | 231 | 232 | 184 | 245 | 263 | 256 | 267 | 278 | 355 | 52 | 36 | 252 | 273 | 327 | 287 | 272 | 273 | 233.3 |
| 16-Aug | 271 | 272 | 258 | 274 | 261 | 247 | 238 | 216 | 157 | 144 | 160 | 240 | 247 | 271 | 271 | 289 | 251 | 261 | 252 | 244 | 225 | 232 | 235 | 233 | 249.8 |
| 17-Aug | 219 | 190 | 175 | 191 | 187 | 181 | 190 | 226 | 179 | 209 | 238 | 264 | 256 | 263 | 238 | 241 | 263 | 249 | 258 | 230 | 209 | 213 | 235 | 245 | 231.6 |
| 18-Aug | 234 | 152 | 150 | 177 | 164 | 161 | 206 | 197 | 203 | 236 | 218 | 209 | 229 | 244 | 240 | 207 | 186 | 208 | 203 | 200 | 217 | 228 | 219 | 225 | 213.8 |
| 19-Aug | 231 | 238 | 259 | 253 | 256 | 253 | 251 | 235 | 243 | 238 | 242 | 254 | 257 | 261 | 269 | 281 | 271 | 257 | 225 | 266 | 261 | 243 | 244 | 249 | 253.7 |
| 20-Aug | 238 | 247 | 245 | 252 | 248 | 249 | 242 | 249 | 254 | 254 | 257 | 264 | 259 | 267 | 265 | 264 | 257 | 258 | 257 | 267 | 258 | 257 | 264 | 276 | 257.6 |
| 21-Aug | 281 | 258 | 230 | 203 | 182 | 151 | 228 | 214 | 137 | 131 | 247 | 249 | 257 | 250 | 264 | 251 | 254 | 258 | 258 | 254 | 251 | 260 | 290 | 326 | 251.4 |
| 22-Aug | 357 | 345 | 358 | 2 | 356 | 358 | 353 | 350 | 345 | 283 | 321 | 281 | 279 | 268 | 240 | 209 | 307 | 65 | 51 | 94 | 86 | 70 | 132 | 134 | 3.6 |
| 23-Aug | 130 | 141 | 138 | 147 | 140 | 150 | 140 | 143 | 151 | 150 | 147 | 188 | 190 | 158 | 144 | 149 | 146 | 138 | 136 | 136 | 138 | 140 | 142 | 145 | 145.6 |
| 24-Aug | 143 | 144 | 138 | 154 | 171 | 116 | 128 | 132 | 134 | 127 | 116 | 108 | 131 | 147 | 128 | 112 | 107 | 134 | 145 | 141 | 184 | 210 | 249 | 214 | 144.6 |
| 25-Aug | 216 | 213 | 202 | 195 | 199 | 189 | 182 | 198 | 196 | 205 | 195 | 198 | 221 | 236 | 229 | 235 | 239 | 245 | 247 | 236 | 229 | 233 | 234 | 225 | 222.7 |
| 26-Aug | 244 | 246 | 243 | 245 | 243 | 197 | 204 | 210 | 228 | 218 | 207 | 206 | 220 | 255 | 237 | 240 | 234 | 239 | 232 | 236 | 214 | 212 | 221 | 216 | 232.0 |
| 27-Aug | 228 | 228 | 234 | 236 | 243 | 228 | 228 | 252 | 258 | 259 | 248 | 251 | 255 | 257 | 259 | 265 | 271 | 269 | 270 | 273 | 252 | 269 | 253 | 239 | 253.3 |
| 28-Aug | 263 | 282 | 234 | 255 | 245 | 228 | 185 | 172 | 226 | 273 | 277 | 273 | 279 | 277 | 280 | 282 | 287 | 290 | 284 | 301 | 292 | 264 | 260 | 280 | 271.7 |
| 29-Aug | 249 | 281 | 299 | 206 | 225 | 242 | 231 | 212 | 145 | 213 | 265 | 51 | 299 | 348 | 35 | 97 | 94 | 127 | 77 | 72 | 102 | 120 | 132 | 140 | 128.0 |
| 30-Aug | 128 | 133 | 124 | 129 | 130 | 130 | 130 | 130 | 134 | 133 | 137 | 140 | 142 | 143 | 148 | 146 | 139 | 143 | 153 | 165 | 174 | 169 | 162 | 161 | 141.9 |
| 31-Aug | 161 | 165 | 160 | 163 | 172 | 151 | 154 | 167 | 171 | 181 | 212 | 210 | 237 | 239 | 253 | 259 | 256 | 256 | 262 | 254 | 246 | 243 | 248 | 255 | 231.1 |

201.2 193.1 193.0 188.9 187.5 174.6 174.3 178.9 181.7 191.7 202.5 217.1 224.7 231.8 230.0 224.6 221.5 215.7 213.3 206.1 204.8 206.4 211.9 198.0
 Diurnal Average

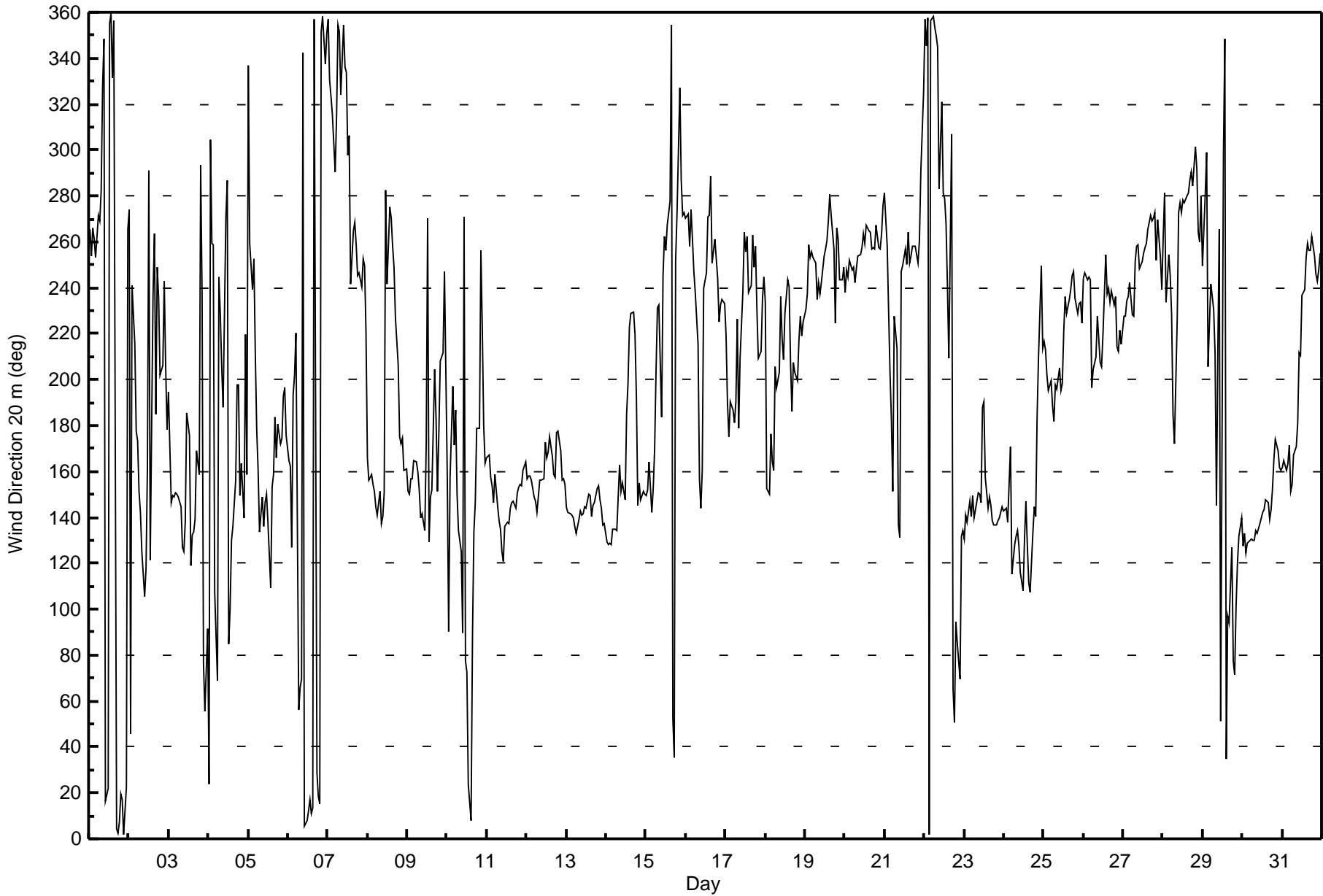
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction 20 m (WD20m) - deg
Mannix - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 92 deg on Aug 8 15:00 Minimum Value: 5 deg on Aug 16 23:00 Percentiles: P ₁ = 7 P ₁₀ = 10 Q ₁ = 12 Median = 16 Q ₃ = 24 P ₉₀ = 42 P ₉₉ = 81 | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 49 | 17 | 20 | 16 | 13 | 37 | 19 | 57 | 36 | 47 | 33 | 31 | 36 | 46 | 38 | 36 | 32 | 29 | 21 | 12 | 23 | 13 | 11 | 90 | |
| 2-Aug | 12 | 79 | 10 | 26 | 16 | 22 | 22 | 21 | 27 | 36 | 40 | 66 | 51 | 82 | 66 | 43 | 75 | 59 | 11 | 20 | 16 | 7 | 20 | 13 | 82 |
| 3-Aug | 23 | 12 | 11 | 10 | 9 | 10 | 15 | 15 | 20 | 18 | 17 | 47 | 43 | 26 | 37 | 31 | 18 | 31 | 12 | 71 | 70 | 31 | 19 | 11 | 71 |
| 4-Aug | 31 | 34 | 43 | 91 | 40 | 58 | 30 | 27 | 48 | 60 | 33 | 63 | 42 | 29 | 20 | 12 | 17 | 22 | 15 | 15 | 75 | 20 | 52 | 40 | 91 |
| 5-Aug | 58 | 70 | 18 | 45 | 19 | 19 | 16 | 23 | 14 | 30 | 30 | 36 | 37 | 28 | 27 | 18 | 25 | 13 | 17 | 15 | 13 | 12 | 12 | 14 | 70 |
| 6-Aug | 28 | 25 | 42 | 22 | 26 | 57 | 29 | 28 | 83 | 20 | 20 | 15 | 13 | 13 | 12 | 18 | 24 | 17 | 32 | 21 | 15 | 16 | 16 | 21 | 83 |
| 7-Aug | 14 | 15 | 25 | 35 | 16 | 32 | 26 | 44 | 42 | 27 | 34 | 38 | 41 | 43 | 33 | 33 | 28 | 25 | 24 | 14 | 13 | 7 | 6 | 23 | 44 |
| 8-Aug | 8 | 8 | 9 | 9 | 9 | 10 | 14 | 14 | 18 | 33 | 62 | 61 | 67 | 43 | 92 | 43 | 49 | 42 | 24 | 21 | 11 | 11 | 8 | 8 | 92 |
| 9-Aug | 11 | 12 | 9 | 10 | 11 | 13 | 14 | 17 | 17 | 18 | 23 | 73 | 71 | 80 | 56 | 48 | 71 | 58 | 16 | 25 | 10 | 17 | 29 | 55 | 80 |
| 10-Aug | 18 | 28 | 25 | 18 | 19 | 20 | 26 | 19 | 19 | 59 | 72 | 80 | 59 | 62 | 88 | 34 | 12 | 18 | 30 | 20 | 25 | 13 | 45 | 15 | 88 |
| 11-Aug | 12 | 10 | 8 | 10 | 13 | 14 | 13 | 11 | 14 | 16 | 18 | 17 | 21 | 14 | 17 | 15 | 15 | 14 | 12 | 10 | 7 | 8 | 7 | 10 | 21 |
| 12-Aug | 8 | 8 | 9 | 10 | 8 | 10 | 10 | 13 | 15 | 18 | 18 | 23 | 17 | 20 | 22 | 19 | 16 | 15 | 17 | 15 | 11 | 7 | 8 | 9 | 23 |
| 13-Aug | 10 | 9 | 10 | 10 | 11 | 10 | 11 | 11 | 12 | 13 | 13 | 13 | 15 | 15 | 14 | 14 | 12 | 11 | 10 | 10 | 10 | 11 | 10 | 10 | 15 |
| 14-Aug | 10 | 9 | 10 | 11 | 10 | 12 | 11 | 19 | 18 | 18 | 19 | 20 | 36 | 26 | 19 | 12 | 12 | 20 | 25 | 16 | 11 | 13 | 12 | 12 | 36 |
| 15-Aug | 11 | 17 | 22 | 22 | 21 | 17 | 24 | 23 | 19 | 61 | 35 | 17 | 19 | 25 | 34 | 57 | 20 | 55 | 16 | 21 | 34 | 16 | 11 | 7 | 61 |
| 16-Aug | 6 | 7 | 9 | 29 | 8 | 15 | 8 | 25 | 35 | 20 | 47 | 30 | 28 | 19 | 24 | 26 | 41 | 14 | 14 | 9 | 9 | 12 | 5 | 7 | 47 |
| 17-Aug | 19 | 17 | 35 | 16 | 21 | 17 | 20 | 20 | 38 | 61 | 31 | 37 | 54 | 24 | 19 | 17 | 15 | 14 | 9 | 12 | 8 | 10 | 9 | 9 | 61 |
| 18-Aug | 24 | 15 | 10 | 14 | 12 | 19 | 13 | 15 | 26 | 14 | 17 | 18 | 16 | 13 | 16 | 22 | 20 | 17 | 17 | 16 | 14 | 12 | 13 | 12 | 26 |
| 19-Aug | 12 | 13 | 10 | 10 | 9 | 10 | 11 | 11 | 12 | 13 | 11 | 13 | 14 | 11 | 13 | 11 | 9 | 13 | 20 | 11 | 10 | 11 | 9 | 12 | 20 |
| 20-Aug | 10 | 10 | 10 | 9 | 9 | 12 | 16 | 13 | 13 | 12 | 12 | 14 | 14 | 17 | 13 | 15 | 10 | 10 | 10 | 7 | 7 | 9 | 8 | 18 | 18 |
| 21-Aug | 15 | 17 | 11 | 19 | 20 | 81 | 19 | 30 | 22 | 18 | 59 | 13 | 20 | 21 | 17 | 13 | 17 | 10 | 10 | 8 | 6 | 10 | 27 | 16 | 81 |
| 22-Aug | 20 | 15 | 18 | 21 | 16 | 18 | 29 | 41 | 56 | 31 | 51 | 39 | 86 | 54 | 60 | 40 | 46 | 77 | 67 | 34 | 22 | 19 | 14 | 14 | 86 |
| 23-Aug | 12 | 16 | 11 | 13 | 12 | 9 | 12 | 12 | 14 | 14 | 14 | 22 | 18 | 12 | 12 | 13 | 11 | 10 | 11 | 10 | 10 | 11 | 10 | 10 | 22 |
| 24-Aug | 11 | 10 | 10 | 19 | 35 | 14 | 17 | 18 | 13 | 12 | 18 | 20 | 14 | 15 | 17 | 14 | 15 | 14 | 17 | 12 | 19 | 25 | 15 | 19 | 35 |
| 25-Aug | 16 | 14 | 16 | 15 | 15 | 21 | 16 | 19 | 18 | 16 | 18 | 17 | 20 | 11 | 12 | 11 | 11 | 11 | 12 | 14 | 13 | 11 | 11 | 13 | 21 |
| 26-Aug | 12 | 11 | 10 | 11 | 12 | 24 | 15 | 23 | 16 | 25 | 27 | 28 | 28 | 14 | 18 | 18 | 17 | 14 | 13 | 9 | 13 | 11 | 12 | 13 | 28 |
| 27-Aug | 11 | 11 | 9 | 10 | 10 | 13 | 21 | 16 | 13 | 11 | 13 | 14 | 14 | 15 | 11 | 13 | 10 | 11 | 9 | 13 | 8 | 6 | 38 | 11 | 38 |
| 28-Aug | 23 | 21 | 22 | 11 | 11 | 24 | 22 | 50 | 27 | 17 | 15 | 14 | 19 | 20 | 18 | 16 | 16 | 14 | 12 | 15 | 24 | 15 | 9 | 12 | 50 |
| 29-Aug | 17 | 41 | 38 | 80 | 14 | 20 | 20 | 62 | 48 | 48 | 71 | 86 | 72 | 59 | 56 | 21 | 33 | 23 | 13 | 10 | 17 | 13 | 13 | 10 | 86 |
| 30-Aug | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 13 | 11 | 13 | 12 | 13 | 13 | 12 | 12 | 12 | 11 | 14 | 13 | 10 | 11 | 14 |
| 31-Aug | 11 | 13 | 10 | 10 | 15 | 20 | 17 | 29 | 33 | 37 | 19 | 21 | 14 | 14 | 19 | 12 | 12 | 11 | 11 | 9 | 9 | 8 | 10 | 11 | 37 |
| 58 79 43 91 40 81 30 62 83 61 72 86 86 82 92 57 75 77 67 71 75 31 52 90 Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 45 m (WD45m) - deg

Mannix - August 2017

| | | | |
|---|--|---------------------------|-------|
| Direction of Maximum Speed: 266 deg on Aug 19 15:00 | | Hours in Service: | 744 |
| Direction of Maximum Daily Speed Average: 252.3 deg on Aug 20 | | Hours of Data: | 744 |
| Direction of Minimum Speed: 11 deg on Aug 6 09:00 | | Hours of Missing Data: | 0 |
| Direction of Minimum Daily Speed Average: 1.5 deg on Aug 29 | | Percent Operational Time: | 100.0 |
| Monthly Average Direction: 221.6 deg | | | |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average |
|--------|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 301 | 289 | 315 | 305 | 279 | 289 | 280 | 296 | 324 | 342 | 5 | 11 | 348 | 352 | 328 | 350 | 358 | 356 | 3 | 15 | 22 | 16 | 23 | 55 | 346.4 |
| 2-Aug | 271 | 13 | 247 | 227 | 163 | 171 | 151 | 148 | 132 | 105 | 120 | 158 | 273 | 159 | 228 | 253 | 193 | 239 | 231 | 200 | 206 | 232 | 206 | 188 | 205.0 |
| 3-Aug | 206 | 169 | 148 | 146 | 146 | 145 | 146 | 145 | 124 | 118 | 132 | 178 | 172 | 113 | 131 | 133 | 129 | 166 | 157 | 300 | 222 | 75 | 48 | 82 | 138.5 |
| 4-Aug | 36 | 310 | 270 | 281 | 86 | 67 | 261 | 226 | 203 | 175 | 271 | 283 | 75 | 92 | 126 | 129 | 151 | 189 | 190 | 144 | 153 | 131 | 184 | 145 | 154.8 |
| 5-Aug | 342 | 282 | 228 | 219 | 186 | 167 | 160 | 131 | 141 | 136 | 140 | 147 | 135 | 102 | 150 | 152 | 178 | 162 | 175 | 168 | 173 | 192 | 198 | 186 | 169.6 |
| 6-Aug | 169 | 166 | 127 | 209 | 217 | 280 | 38 | 55 | 11 | 340 | 1 | 1 | 6 | 10 | 5 | 5 | 354 | 20 | 13 | 11 | 345 | 349 | 335 | 333 | 0.6 |
| 7-Aug | 345 | 334 | 338 | 325 | 326 | 335 | 352 | 351 | 322 | 349 | 332 | 328 | 297 | 302 | 239 | 261 | 266 | 255 | 237 | 242 | 235 | 236 | 235 | 224 | 294.3 |
| 8-Aug | 178 | 162 | 164 | 162 | 157 | 148 | 143 | 147 | 142 | 142 | 161 | 275 | 236 | 265 | 272 | 250 | 247 | 222 | 197 | 171 | 170 | 177 | 166 | 166 | 177.8 |
| 9-Aug | 155 | 147 | 152 | 156 | 164 | 168 | 165 | 158 | 138 | 138 | 132 | 190 | 267 | 130 | 141 | 150 | 198 | 174 | 148 | 177 | 205 | 205 | 233 | 210 | 169.1 |
| 10-Aug | 152 | 83 | 145 | 182 | 169 | 180 | 157 | 134 | 122 | 87 | 260 | 71 | 64 | 2 | 3 | 81 | 127 | 142 | 175 | 181 | 243 | 234 | 182 | 162 | 154.4 |
| 11-Aug | 169 | 166 | 159 | 149 | 143 | 153 | 145 | 141 | 131 | 123 | 118 | 130 | 131 | 132 | 139 | 142 | 142 | 140 | 145 | 147 | 148 | 147 | 157 | 161 | 145.2 |
| 12-Aug | 156 | 151 | 149 | 146 | 146 | 143 | 141 | 147 | 152 | 153 | 153 | 168 | 161 | 163 | 170 | 162 | 154 | 153 | 172 | 173 | 164 | 153 | 153 | 148 | 156.7 |
| 13-Aug | 140 | 138 | 136 | 136 | 134 | 129 | 127 | 134 | 139 | 135 | 136 | 141 | 139 | 145 | 144 | 134 | 139 | 140 | 147 | 148 | 143 | 140 | 134 | 135 | 138.5 |
| 14-Aug | 125 | 123 | 121 | 121 | 127 | 126 | 129 | 146 | 156 | 146 | 152 | 144 | 181 | 189 | 216 | 224 | 223 | 213 | 187 | 142 | 151 | 144 | 147 | 145 | 155.4 |
| 15-Aug | 144 | 146 | 160 | 136 | 140 | 162 | 188 | 225 | 225 | 176 | 234 | 256 | 253 | 262 | 274 | 341 | 42 | 28 | 245 | 272 | 321 | 295 | 279 | 275 | 224.9 |
| 16-Aug | 273 | 273 | 261 | 280 | 265 | 262 | 253 | 229 | 159 | 149 | 163 | 233 | 238 | 265 | 269 | 285 | 241 | 254 | 245 | 240 | 226 | 227 | 228 | 230 | 247.6 |
| 17-Aug | 230 | 221 | 207 | 207 | 209 | 203 | 203 | 220 | 178 | 198 | 231 | 253 | 251 | 256 | 232 | 235 | 259 | 244 | 253 | 225 | 214 | 215 | 231 | 238 | 229.3 |
| 18-Aug | 230 | 175 | 172 | 202 | 188 | 177 | 202 | 192 | 197 | 230 | 213 | 204 | 222 | 238 | 234 | 199 | 179 | 199 | 195 | 193 | 212 | 222 | 214 | 219 | 207.9 |
| 19-Aug | 225 | 232 | 252 | 246 | 250 | 248 | 245 | 230 | 239 | 233 | 237 | 248 | 251 | 255 | 266 | 277 | 268 | 254 | 231 | 265 | 263 | 245 | 242 | 247 | 248.9 |
| 20-Aug | 236 | 242 | 240 | 247 | 246 | 246 | 240 | 243 | 248 | 250 | 252 | 258 | 254 | 262 | 260 | 259 | 251 | 251 | 251 | 264 | 256 | 251 | 258 | 272 | 252.3 |
| 21-Aug | 280 | 259 | 235 | 226 | 214 | 237 | 232 | 209 | 143 | 133 | 240 | 242 | 252 | 246 | 259 | 245 | 249 | 253 | 252 | 250 | 251 | 266 | 306 | 329 | 250.2 |
| 22-Aug | 354 | 351 | 355 | 2 | 352 | 355 | 351 | 339 | 328 | 294 | 315 | 282 | 284 | 263 | 233 | 204 | 304 | 57 | 40 | 78 | 74 | 72 | 118 | 121 | 2.7 |
| 23-Aug | 119 | 131 | 129 | 136 | 131 | 136 | 131 | 137 | 146 | 146 | 144 | 182 | 186 | 156 | 139 | 143 | 139 | 135 | 132 | 131 | 133 | 134 | 136 | 139 | 140.0 |
| 24-Aug | 138 | 138 | 131 | 151 | 171 | 113 | 121 | 123 | 128 | 120 | 110 | 101 | 123 | 140 | 122 | 105 | 100 | 125 | 136 | 136 | 180 | 202 | 243 | 209 | 141.3 |
| 25-Aug | 210 | 208 | 199 | 190 | 195 | 187 | 179 | 191 | 190 | 198 | 188 | 192 | 214 | 230 | 223 | 230 | 235 | 240 | 242 | 230 | 222 | 228 | 229 | 220 | 215.1 |
| 26-Aug | 239 | 242 | 237 | 240 | 239 | 209 | 205 | 206 | 223 | 210 | 200 | 195 | 212 | 248 | 231 | 234 | 230 | 233 | 227 | 230 | 212 | 210 | 218 | 215 | 226.0 |
| 27-Aug | 225 | 224 | 230 | 232 | 238 | 228 | 226 | 246 | 251 | 251 | 242 | 246 | 250 | 251 | 254 | 259 | 267 | 264 | 265 | 267 | 248 | 257 | 264 | 249 | 247.4 |
| 28-Aug | 265 | 291 | 235 | 254 | 246 | 247 | 195 | 175 | 221 | 268 | 273 | 270 | 275 | 273 | 277 | 277 | 283 | 287 | 284 | 302 | 305 | 299 | 275 | 285 | 272.7 |
| 29-Aug | 270 | 289 | 288 | 238 | 232 | 284 | 255 | 218 | 138 | 206 | 244 | 36 | 301 | 337 | 23 | 87 | 85 | 120 | 69 | 67 | 97 | 111 | 128 | 135 | 119.5 |
| 30-Aug | 123 | 129 | 119 | 121 | 122 | 123 | 123 | 124 | 127 | 127 | 133 | 134 | 137 | 138 | 142 | 141 | 134 | 138 | 147 | 161 | 170 | 165 | 158 | 157 | 137.5 |
| 31-Aug | 162 | 166 | 158 | 162 | 168 | 148 | 151 | 165 | 170 | 180 | 206 | 205 | 232 | 235 | 248 | 252 | 250 | 251 | 256 | 249 | 241 | 237 | 243 | 250 | 220.3 |

198.1 192.3 187.7 185.1 184.9 175.9 174.2 176.9 177.5 186.6 196.5 208.2 216.7 223.8 222.6 217.6 212.8 206.8 203.7 199.4 200.8 202.2 207.5 195.3
Diurnal Average

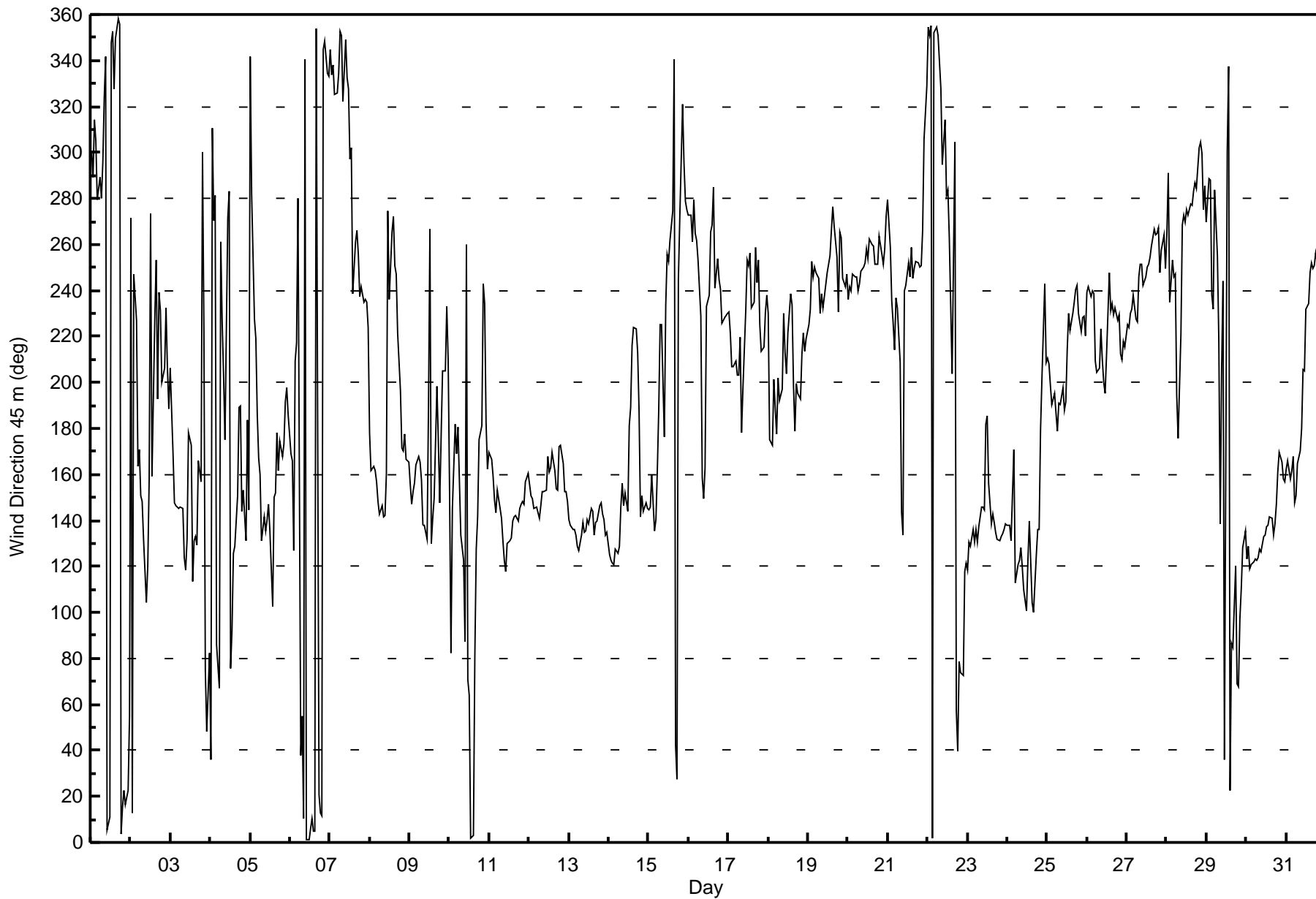
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction 45 m (WD45m) - deg
Mannix - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 99 deg on Aug 29 12:00 Minimum Value: 2 deg on Aug 9 00:00 Percentiles: P ₁ = 3 P ₁₀ = 6 Q ₁ = 8 Median = 11 Q ₃ = 18 P ₉₀ = 36 P ₉₉ = 76 | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 22 | 19 | 41 | 16 | 6 | 28 | 15 | 42 | 29 | 31 | 27 | 25 | 28 | 31 | 28 | 27 | 28 | 21 | 16 | 9 | 10 | 8 | 9 | 36 | 42 |
| 2-Aug | 36 | 27 | 59 | 45 | 15 | 12 | 15 | 19 | 29 | 34 | 38 | 67 | 37 | 77 | 46 | 42 | 74 | 55 | 9 | 17 | 16 | 4 | 15 | 15 | 77 |
| 3-Aug | 12 | 15 | 6 | 5 | 4 | 6 | 9 | 8 | 17 | 16 | 13 | 42 | 34 | 24 | 38 | 27 | 15 | 24 | 10 | 72 | 79 | 26 | 16 | 9 | 79 |
| 4-Aug | 27 | 21 | 38 | 68 | 36 | 36 | 29 | 26 | 43 | 58 | 20 | 60 | 41 | 27 | 17 | 8 | 14 | 15 | 8 | 13 | 27 | 19 | 46 | 24 | 68 |
| 5-Aug | 73 | 67 | 7 | 25 | 16 | 8 | 18 | 18 | 8 | 27 | 24 | 29 | 34 | 24 | 23 | 13 | 18 | 6 | 8 | 7 | 8 | 6 | 4 | 13 | 73 |
| 6-Aug | 8 | 12 | 48 | 28 | 17 | 70 | 17 | 26 | 81 | 11 | 13 | 10 | 8 | 8 | 7 | 13 | 15 | 11 | 21 | 15 | 10 | 11 | 8 | 15 | 81 |
| 7-Aug | 13 | 6 | 7 | 23 | 14 | 13 | 14 | 28 | 32 | 17 | 25 | 29 | 30 | 32 | 27 | 26 | 22 | 18 | 17 | 12 | 7 | 5 | 5 | 7 | 32 |
| 8-Aug | 13 | 5 | 4 | 9 | 6 | 7 | 8 | 8 | 11 | 24 | 63 | 58 | 62 | 33 | 85 | 33 | 40 | 27 | 18 | 18 | 5 | 3 | 4 | 2 | 85 |
| 9-Aug | 7 | 7 | 4 | 4 | 3 | 5 | 10 | 13 | 11 | 13 | 18 | 67 | 49 | 65 | 58 | 45 | 58 | 54 | 10 | 24 | 4 | 9 | 21 | 44 | 67 |
| 10-Aug | 6 | 25 | 19 | 10 | 11 | 7 | 19 | 15 | 19 | 65 | 59 | 77 | 51 | 55 | 87 | 34 | 8 | 16 | 22 | 14 | 18 | 9 | 28 | 8 | 87 |
| 11-Aug | 9 | 6 | 8 | 4 | 7 | 8 | 8 | 9 | 9 | 14 | 14 | 14 | 17 | 11 | 13 | 11 | 10 | 10 | 8 | 5 | 2 | 3 | 6 | 3 | 17 |
| 12-Aug | 4 | 3 | 4 | 5 | 5 | 5 | 6 | 8 | 8 | 12 | 12 | 16 | 11 | 14 | 14 | 13 | 12 | 11 | 8 | 7 | 6 | 3 | 3 | 5 | 16 |
| 13-Aug | 6 | 6 | 6 | 6 | 6 | 5 | 6 | 8 | 8 | 9 | 10 | 10 | 13 | 12 | 12 | 11 | 8 | 8 | 6 | 7 | 6 | 6 | 6 | 6 | 13 |
| 14-Aug | 7 | 6 | 8 | 9 | 6 | 9 | 7 | 14 | 10 | 13 | 15 | 18 | 31 | 17 | 15 | 8 | 7 | 16 | 20 | 12 | 5 | 8 | 7 | 7 | 31 |
| 15-Aug | 7 | 12 | 15 | 19 | 16 | 11 | 20 | 16 | 15 | 54 | 32 | 14 | 14 | 18 | 24 | 52 | 16 | 53 | 14 | 19 | 25 | 11 | 9 | 5 | 54 |
| 16-Aug | 5 | 6 | 4 | 20 | 4 | 5 | 5 | 19 | 24 | 19 | 42 | 28 | 26 | 15 | 22 | 22 | 39 | 14 | 10 | 6 | 5 | 5 | 3 | 4 | 42 |
| 17-Aug | 9 | 9 | 22 | 10 | 13 | 13 | 10 | 16 | 31 | 55 | 23 | 28 | 40 | 21 | 17 | 15 | 13 | 10 | 6 | 9 | 5 | 4 | 6 | 4 | 55 |
| 18-Aug | 12 | 12 | 7 | 10 | 10 | 15 | 7 | 6 | 20 | 11 | 12 | 12 | 13 | 11 | 13 | 18 | 10 | 12 | 11 | 9 | 8 | 9 | 8 | 7 | 20 |
| 19-Aug | 7 | 9 | 7 | 6 | 6 | 8 | 9 | 9 | 9 | 10 | 8 | 11 | 11 | 9 | 12 | 9 | 7 | 11 | 13 | 9 | 7 | 8 | 6 | 8 | 13 |
| 20-Aug | 5 | 5 | 6 | 6 | 6 | 8 | 11 | 9 | 10 | 9 | 10 | 11 | 12 | 15 | 13 | 14 | 8 | 8 | 7 | 6 | 5 | 7 | 7 | 14 | 15 |
| 21-Aug | 11 | 12 | 5 | 11 | 12 | 39 | 16 | 26 | 22 | 15 | 51 | 9 | 17 | 18 | 15 | 10 | 14 | 8 | 7 | 6 | 5 | 13 | 22 | 9 | 51 |
| 22-Aug | 14 | 8 | 13 | 11 | 9 | 11 | 20 | 29 | 49 | 24 | 36 | 33 | 73 | 43 | 52 | 34 | 34 | 93 | 57 | 23 | 12 | 15 | 10 | 12 | 93 |
| 23-Aug | 10 | 13 | 7 | 9 | 9 | 6 | 7 | 7 | 11 | 9 | 11 | 15 | 10 | 9 | 8 | 8 | 7 | 7 | 8 | 8 | 6 | 7 | 7 | 6 | 15 |
| 24-Aug | 7 | 6 | 7 | 16 | 29 | 13 | 14 | 15 | 9 | 10 | 17 | 19 | 10 | 12 | 17 | 12 | 13 | 10 | 13 | 8 | 14 | 21 | 13 | 14 | 29 |
| 25-Aug | 11 | 9 | 10 | 6 | 7 | 15 | 7 | 10 | 9 | 9 | 11 | 9 | 17 | 8 | 8 | 8 | 8 | 8 | 9 | 10 | 9 | 8 | 7 | 8 | 17 |
| 26-Aug | 9 | 8 | 7 | 8 | 9 | 18 | 9 | 16 | 13 | 18 | 18 | 18 | 22 | 11 | 16 | 15 | 15 | 12 | 10 | 6 | 8 | 4 | 7 | 8 | 22 |
| 27-Aug | 6 | 6 | 5 | 7 | 6 | 7 | 14 | 12 | 11 | 9 | 10 | 11 | 11 | 12 | 9 | 11 | 9 | 9 | 7 | 9 | 6 | 15 | 11 | 5 | 15 |
| 28-Aug | 19 | 16 | 10 | 9 | 5 | 16 | 15 | 41 | 24 | 15 | 12 | 12 | 17 | 16 | 15 | 13 | 15 | 11 | 9 | 9 | 9 | 8 | 4 | 6 | 41 |
| 29-Aug | 5 | 9 | 12 | 87 | 10 | 12 | 12 | 56 | 52 | 40 | 52 | 99 | 56 | 44 | 48 | 19 | 31 | 22 | 13 | 9 | 15 | 12 | 11 | 6 | 99 |
| 30-Aug | 6 | 5 | 7 | 7 | 7 | 5 | 6 | 7 | 6 | 7 | 10 | 8 | 9 | 9 | 9 | 10 | 10 | 10 | 7 | 5 | 6 | 5 | 4 | 5 | 10 |
| 31-Aug | 4 | 7 | 5 | 4 | 9 | 16 | 11 | 15 | 28 | 32 | 12 | 15 | 11 | 11 | 16 | 10 | 9 | 8 | 10 | 6 | 5 | 5 | 6 | 8 | 32 |
| 73 67 59 87 36 70 29 56 81 65 63 99 73 77 87 52 74 93 57 72 79 26 46 44 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 75 m (WD75m) - deg

Mannix - August 2017

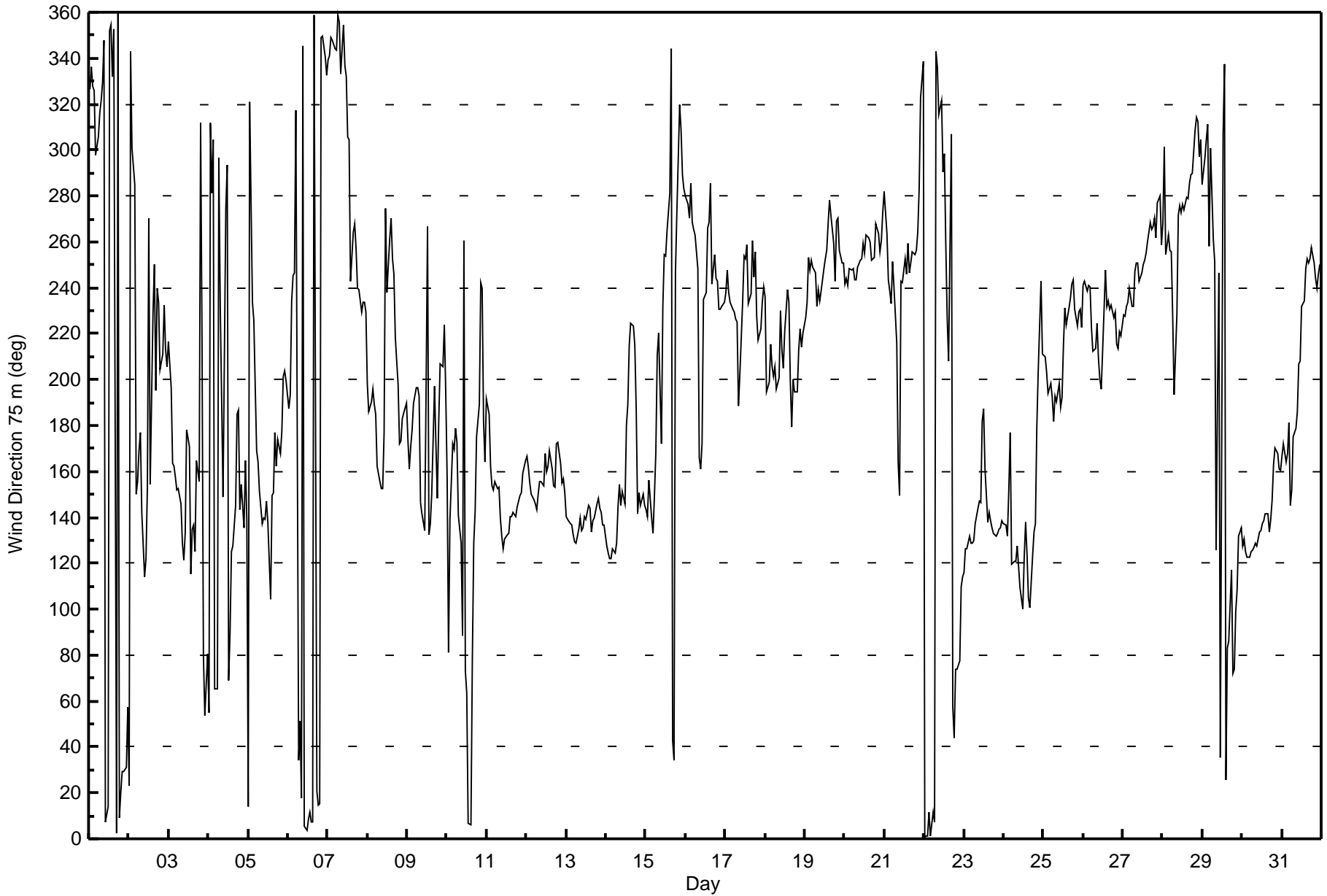
| Direction of Maximum Speed: 268 deg on Aug 19 15:00 | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 | | | | | | | |
|---|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|--------------------------|-----|-----|-----|---------------------------------|---------------|--|--|
| Direction of Maximum Daily Speed Average: 254.0 deg on Aug 20 | | | | | | | | | | | | | | | | | | | | Hours of Data: 744 | | | | | | | |
| Direction of Minimum Speed: 149 deg on Aug 4 10:00 | | | | | | | | | | Direction of Minimum Daily Speed Average: 1.3 deg on Aug 29 | | | | | | | | | | Hours of Missing Data: 0 | | | | | | | |
| Monthly Average Direction: 225.5 deg | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 327 | 336 | 328 | 326 | 298 | 306 | 316 | 321 | 329 | 348 | 8 | 14 | 352 | 354 | 332 | 353 | 2 | 360 | 9 | 20 | 29 | 29 | 31 | 57 | 355.7 | | |
| 2-Aug | 23 | 343 | 301 | 285 | 150 | 156 | 169 | 177 | 142 | 114 | 122 | 153 | 270 | 154 | 229 | 250 | 195 | 240 | 234 | 205 | 211 | 233 | 213 | 206 | 212.4 | | |
| 3-Aug | 217 | 197 | 164 | 162 | 157 | 152 | 153 | 146 | 129 | 121 | 133 | 178 | 171 | 115 | 135 | 136 | 125 | 165 | 155 | 312 | 217 | 80 | 53 | 80 | 145.6 | | |
| 4-Aug | 55 | 312 | 281 | 305 | 65 | 65 | 296 | 233 | 192 | 149 | 275 | 293 | 69 | 90 | 125 | 127 | 146 | 185 | 186 | 144 | 154 | 135 | 164 | 139 | 141.9 | | |
| 5-Aug | 14 | 321 | 234 | 226 | 196 | 169 | 164 | 151 | 138 | 140 | 139 | 147 | 138 | 104 | 150 | 151 | 177 | 162 | 174 | 168 | 178 | 201 | 204 | 200 | 172.8 | | |
| 6-Aug | 188 | 194 | 235 | 245 | 246 | 317 | 34 | 51 | 18 | 346 | 6 | 4 | 8 | 12 | 8 | 7 | 358 | 21 | 15 | 15 | 349 | 349 | 341 | 333 | 359.1 | | |
| 7-Aug | 340 | 341 | 349 | 348 | 344 | 343 | 359 | 356 | 333 | 354 | 337 | 332 | 306 | 305 | 243 | 264 | 268 | 257 | 240 | 239 | 230 | 234 | 233 | 229 | 298.7 | | |
| 8-Aug | 198 | 186 | 190 | 196 | 189 | 185 | 162 | 156 | 153 | 153 | 177 | 275 | 238 | 261 | 271 | 253 | 246 | 218 | 198 | 172 | 174 | 183 | 185 | 190 | 192.9 | | |
| 9-Aug | 174 | 161 | 171 | 178 | 190 | 196 | 196 | 193 | 146 | 142 | 134 | 197 | 267 | 132 | 137 | 150 | 197 | 172 | 148 | 182 | 207 | 205 | 224 | 195 | 182.8 | | |
| 10-Aug | 157 | 81 | 139 | 172 | 170 | 179 | 173 | 141 | 129 | 88 | 260 | 73 | 63 | 6 | 6 | 78 | 129 | 143 | 175 | 189 | 242 | 240 | 182 | 164 | 159.4 | | |
| 11-Aug | 192 | 185 | 162 | 154 | 152 | 156 | 153 | 153 | 140 | 132 | 126 | 131 | 133 | 133 | 140 | 140 | 142 | 140 | 145 | 147 | 149 | 151 | 159 | 165 | 148.8 | | |
| 12-Aug | 167 | 162 | 155 | 150 | 148 | 146 | 143 | 150 | 156 | 156 | 154 | 168 | 160 | 163 | 169 | 161 | 153 | 153 | 172 | 173 | 164 | 155 | 157 | 151 | 158.0 | | |
| 13-Aug | 141 | 139 | 137 | 137 | 132 | 130 | 129 | 135 | 140 | 134 | 135 | 140 | 139 | 145 | 144 | 134 | 139 | 139 | 146 | 148 | 144 | 142 | 137 | 137 | 138.9 | | |
| 14-Aug | 128 | 125 | 122 | 122 | 126 | 124 | 128 | 144 | 155 | 145 | 152 | 146 | 180 | 189 | 215 | 225 | 224 | 215 | 186 | 141 | 151 | 145 | 150 | 145 | 156.6 | | |
| 15-Aug | 143 | 141 | 156 | 140 | 133 | 149 | 168 | 211 | 220 | 172 | 232 | 254 | 254 | 265 | 281 | 344 | 42 | 34 | 247 | 273 | 320 | 309 | 289 | 283 | 219.0 | | |
| 16-Aug | 280 | 277 | 270 | 286 | 269 | 266 | 263 | 249 | 166 | 161 | 172 | 235 | 238 | 266 | 268 | 286 | 242 | 255 | 244 | 243 | 231 | 231 | 232 | 234 | 251.9 | | |
| 17-Aug | 238 | 248 | 238 | 234 | 231 | 229 | 226 | 225 | 188 | 202 | 234 | 254 | 253 | 259 | 233 | 237 | 260 | 244 | 256 | 227 | 217 | 222 | 234 | 240 | 236.5 | | |
| 18-Aug | 236 | 195 | 199 | 215 | 206 | 201 | 206 | 196 | 201 | 230 | 213 | 205 | 221 | 239 | 234 | 199 | 179 | 200 | 195 | 195 | 213 | 222 | 214 | 221 | 211.1 | | |
| 19-Aug | 227 | 234 | 253 | 248 | 252 | 249 | 247 | 232 | 239 | 234 | 239 | 248 | 253 | 256 | 268 | 278 | 271 | 259 | 243 | 269 | 270 | 256 | 251 | 251 | 251.3 | | |
| 20-Aug | 242 | 244 | 241 | 248 | 248 | 249 | 243 | 243 | 249 | 252 | 252 | 259 | 255 | 263 | 262 | 260 | 252 | 252 | 253 | 268 | 263 | 255 | 261 | 273 | 254.0 | | |
| 21-Aug | 282 | 264 | 243 | 239 | 233 | 251 | 240 | 216 | 164 | 150 | 243 | 242 | 252 | 246 | 259 | 246 | 251 | 256 | 255 | 256 | 264 | 283 | 323 | 338 | 255.5 | | |
| 22-Aug | 1 | 1 | 1 | 11 | 1 | 11 | 7 | 343 | 336 | 315 | 321 | 290 | 299 | 259 | 227 | 208 | 307 | 57 | 44 | 74 | 74 | 77 | 110 | 114 | 12.0 | | |
| 23-Aug | 116 | 126 | 126 | 132 | 129 | 129 | 130 | 137 | 144 | 147 | 147 | 182 | 187 | 161 | 138 | 142 | 139 | 135 | 133 | 132 | 133 | 135 | 136 | 139 | 139.6 | | |
| 24-Aug | 137 | 137 | 132 | 152 | 177 | 119 | 121 | 121 | 127 | 119 | 109 | 100 | 122 | 138 | 124 | 105 | 101 | 123 | 134 | 137 | 179 | 204 | 243 | 211 | 145.7 | | |
| 25-Aug | 211 | 210 | 203 | 194 | 198 | 192 | 182 | 193 | 190 | 198 | 188 | 192 | 215 | 231 | 224 | 232 | 236 | 242 | 243 | 230 | 223 | 229 | 231 | 223 | 216.6 | | |
| 26-Aug | 241 | 243 | 239 | 241 | 240 | 223 | 212 | 213 | 225 | 210 | 200 | 196 | 213 | 248 | 232 | 234 | 230 | 232 | 227 | 229 | 215 | 214 | 221 | 219 | 227.8 | | |
| 27-Aug | 228 | 227 | 232 | 233 | 240 | 232 | 232 | 247 | 251 | 251 | 243 | 247 | 250 | 252 | 255 | 260 | 269 | 265 | 267 | 270 | 262 | 277 | 280 | 259 | 249.4 | | |
| 28-Aug | 268 | 301 | 254 | 263 | 256 | 255 | 227 | 194 | 228 | 271 | 276 | 272 | 276 | 274 | 279 | 279 | 286 | 289 | 290 | 308 | 314 | 312 | 297 | 304 | 279.6 | | |
| 29-Aug | 285 | 296 | 305 | 311 | 258 | 301 | 261 | 251 | 125 | 194 | 247 | 35 | 307 | 337 | 26 | 83 | 86 | 117 | 72 | 74 | 99 | 108 | 132 | 135 | 94.0 | | |
| 30-Aug | 127 | 130 | 125 | 123 | 123 | 125 | 125 | 127 | 129 | 128 | 133 | 135 | 137 | 138 | 141 | 141 | 134 | 139 | 148 | 163 | 170 | 168 | 161 | 160 | 140.2 | | |
| 31-Aug | 167 | 172 | 164 | 168 | 181 | 145 | 152 | 175 | 179 | 186 | 207 | 208 | 232 | 235 | 249 | 253 | 250 | 252 | 257 | 251 | 244 | 240 | 246 | 250 | 223.4 | | |
| 204.7 202.4 197.4 195.7 195.4 186.8 181.5 183.6 180.8 190.9 198.7 209.2 217.5 225.2 223.8 220.3 214.0 207.8 204.2 200.8 204.5 206.8 211.2 200.4 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | |
| All monthly, daily, and diurnal averages have been calculated using vector methods | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction 75 m (WD75m) - deg
Mannix - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 101 deg on Aug 29 12:00 Minimum Value: 2 deg on Aug 16 23:00 Percentiles: P ₁ = 3 P ₁₀ = 5 Q ₁ = 7 Median = 11 Q ₃ = 17 P ₉₀ = 34 P ₉₉ = 76 | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|-----|----|----|----|----|----|----|---|----|----|----|----|----|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 22 | 20 | 17 | 12 | 7 | 13 | 11 | 32 | 26 | 30 | 20 | 21 | 27 | 27 | 25 | 24 | 26 | 20 | 14 | 9 | 4 | 4 | 5 | 20 | 32 |
| 2-Aug | 69 | 14 | 44 | 8 | 31 | 14 | 14 | 22 | 37 | 34 | 38 | 68 | 38 | 73 | 44 | 43 | 78 | 53 | 8 | 17 | 18 | 4 | 11 | 9 | 78 |
| 3-Aug | 6 | 15 | 11 | 6 | 5 | 5 | 7 | 10 | 16 | 16 | 11 | 40 | 32 | 23 | 39 | 28 | 17 | 22 | 11 | 74 | 91 | 23 | 13 | 10 | 91 |
| 4-Aug | 23 | 20 | 28 | 54 | 24 | 21 | 47 | 43 | 46 | 99 | 19 | 75 | 31 | 27 | 15 | 9 | 12 | 18 | 8 | 14 | 28 | 25 | 41 | 13 | 99 |
| 5-Aug | 69 | 70 | 7 | 29 | 9 | 12 | 13 | 24 | 12 | 24 | 22 | 27 | 31 | 22 | 22 | 12 | 17 | 5 | 6 | 5 | 10 | 6 | 3 | 8 | 70 |
| 6-Aug | 6 | 12 | 90 | 32 | 16 | 40 | 13 | 24 | 65 | 11 | 10 | 9 | 6 | 6 | 6 | 10 | 13 | 8 | 15 | 11 | 10 | 9 | 5 | 9 | 90 |
| 7-Aug | 11 | 7 | 6 | 16 | 13 | 11 | 10 | 21 | 32 | 14 | 24 | 27 | 29 | 26 | 29 | 23 | 19 | 17 | 16 | 10 | 5 | 5 | 2 | 3 | 32 |
| 8-Aug | 17 | 8 | 6 | 13 | 9 | 6 | 12 | 12 | 11 | 23 | 76 | 53 | 59 | 34 | 77 | 35 | 45 | 23 | 17 | 18 | 6 | 2 | 4 | 4 | 77 |
| 9-Aug | 11 | 5 | 7 | 9 | 5 | 5 | 11 | 22 | 13 | 13 | 19 | 63 | 46 | 64 | 64 | 46 | 61 | 51 | 10 | 24 | 4 | 7 | 20 | 46 | 64 |
| 10-Aug | 7 | 25 | 17 | 6 | 5 | 5 | 14 | 15 | 21 | 74 | 56 | 78 | 45 | 52 | 79 | 34 | 8 | 15 | 14 | 13 | 13 | 9 | 26 | 11 | 79 |
| 11-Aug | 15 | 17 | 14 | 2 | 4 | 7 | 8 | 9 | 13 | 17 | 17 | 16 | 16 | 11 | 12 | 10 | 9 | 9 | 7 | 4 | 2 | 3 | 4 | 5 | 17 |
| 12-Aug | 4 | 2 | 3 | 4 | 4 | 3 | 4 | 8 | 8 | 10 | 11 | 14 | 10 | 13 | 13 | 11 | 12 | 11 | 7 | 6 | 7 | 3 | 4 | 4 | 14 |
| 13-Aug | 4 | 3 | 3 | 4 | 4 | 5 | 6 | 7 | 8 | 9 | 9 | 9 | 11 | 11 | 11 | 11 | 10 | 7 | 7 | 5 | 5 | 5 | 5 | 5 | 11 |
| 14-Aug | 7 | 8 | 11 | 11 | 9 | 11 | 9 | 13 | 9 | 12 | 13 | 17 | 29 | 16 | 14 | 7 | 6 | 15 | 20 | 10 | 4 | 6 | 5 | 4 | 29 |
| 15-Aug | 6 | 9 | 10 | 22 | 11 | 9 | 14 | 24 | 15 | 47 | 37 | 13 | 14 | 16 | 20 | 52 | 13 | 51 | 14 | 19 | 19 | 9 | 8 | 5 | 52 |
| 16-Aug | 4 | 4 | 2 | 13 | 4 | 3 | 5 | 19 | 28 | 17 | 39 | 25 | 23 | 14 | 23 | 21 | 37 | 15 | 10 | 5 | 5 | 3 | 2 | 3 | 39 |
| 17-Aug | 6 | 8 | 26 | 13 | 9 | 7 | 7 | 15 | 24 | 46 | 20 | 25 | 36 | 19 | 16 | 14 | 13 | 9 | 6 | 8 | 6 | 4 | 4 | 3 | 46 |
| 18-Aug | 8 | 10 | 6 | 8 | 8 | 7 | 5 | 5 | 18 | 10 | 11 | 11 | 12 | 10 | 13 | 17 | 9 | 11 | 11 | 8 | 6 | 9 | 6 | 6 | 18 |
| 19-Aug | 7 | 9 | 6 | 5 | 5 | 6 | 8 | 8 | 7 | 9 | 7 | 10 | 11 | 9 | 11 | 8 | 7 | 11 | 11 | 10 | 7 | 8 | 9 | 6 | 11 |
| 20-Aug | 5 | 3 | 5 | 6 | 5 | 6 | 8 | 7 | 8 | 8 | 9 | 10 | 11 | 14 | 13 | 13 | 7 | 8 | 7 | 6 | 5 | 5 | 8 | 11 | 14 |
| 21-Aug | 9 | 8 | 5 | 8 | 9 | 15 | 12 | 22 | 25 | 20 | 39 | 8 | 16 | 17 | 15 | 10 | 13 | 7 | 6 | 6 | 5 | 15 | 19 | 8 | 39 |
| 22-Aug | 9 | 6 | 12 | 9 | 7 | 15 | 17 | 28 | 51 | 28 | 34 | 33 | 77 | 45 | 48 | 37 | 37 | 82 | 33 | 17 | 9 | 17 | 15 | 16 | 82 |
| 23-Aug | 14 | 12 | 9 | 6 | 8 | 5 | 6 | 7 | 10 | 8 | 10 | 14 | 9 | 10 | 8 | 7 | 6 | 6 | 7 | 7 | 5 | 6 | 5 | 4 | 14 |
| 24-Aug | 5 | 5 | 5 | 15 | 23 | 16 | 15 | 17 | 10 | 14 | 19 | 18 | 12 | 12 | 18 | 15 | 16 | 13 | 12 | 8 | 12 | 20 | 12 | 13 | 23 |
| 25-Aug | 9 | 7 | 9 | 6 | 6 | 12 | 6 | 9 | 9 | 8 | 10 | 9 | 16 | 7 | 7 | 8 | 7 | 7 | 8 | 10 | 8 | 7 | 7 | 7 | 16 |
| 26-Aug | 8 | 6 | 6 | 7 | 7 | 16 | 8 | 13 | 12 | 14 | 16 | 16 | 21 | 10 | 14 | 14 | 15 | 11 | 9 | 5 | 6 | 3 | 6 | 6 | 21 |
| 27-Aug | 5 | 5 | 5 | 6 | 5 | 6 | 11 | 11 | 10 | 8 | 9 | 9 | 11 | 11 | 9 | 11 | 9 | 8 | 7 | 6 | 3 | 14 | 15 | 10 | 15 |
| 28-Aug | 16 | 14 | 9 | 7 | 5 | 10 | 20 | 51 | 26 | 15 | 11 | 11 | 16 | 15 | 13 | 12 | 16 | 10 | 9 | 10 | 6 | 5 | 4 | 5 | 51 |
| 29-Aug | 10 | 6 | 9 | 86 | 13 | 7 | 13 | 68 | 59 | 39 | 55 | 101 | 56 | 35 | 45 | 17 | 26 | 21 | 12 | 9 | 16 | 16 | 10 | 5 | 101 |
| 30-Aug | 7 | 4 | 9 | 10 | 10 | 7 | 8 | 8 | 6 | 8 | 9 | 7 | 7 | 8 | 8 | 9 | 9 | 8 | 6 | 5 | 4 | 5 | 4 | 5 | 10 |
| 31-Aug | 4 | 6 | 5 | 5 | 20 | 16 | 9 | 17 | 22 | 24 | 11 | 14 | 9 | 10 | 14 | 9 | 9 | 8 | 10 | 4 | 4 | 3 | 4 | 6 | 24 |
| 69 70 90 86 31 40 47 68 65 99 76 101 77 73 79 52 78 82 33 74 91 25 41 46 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |

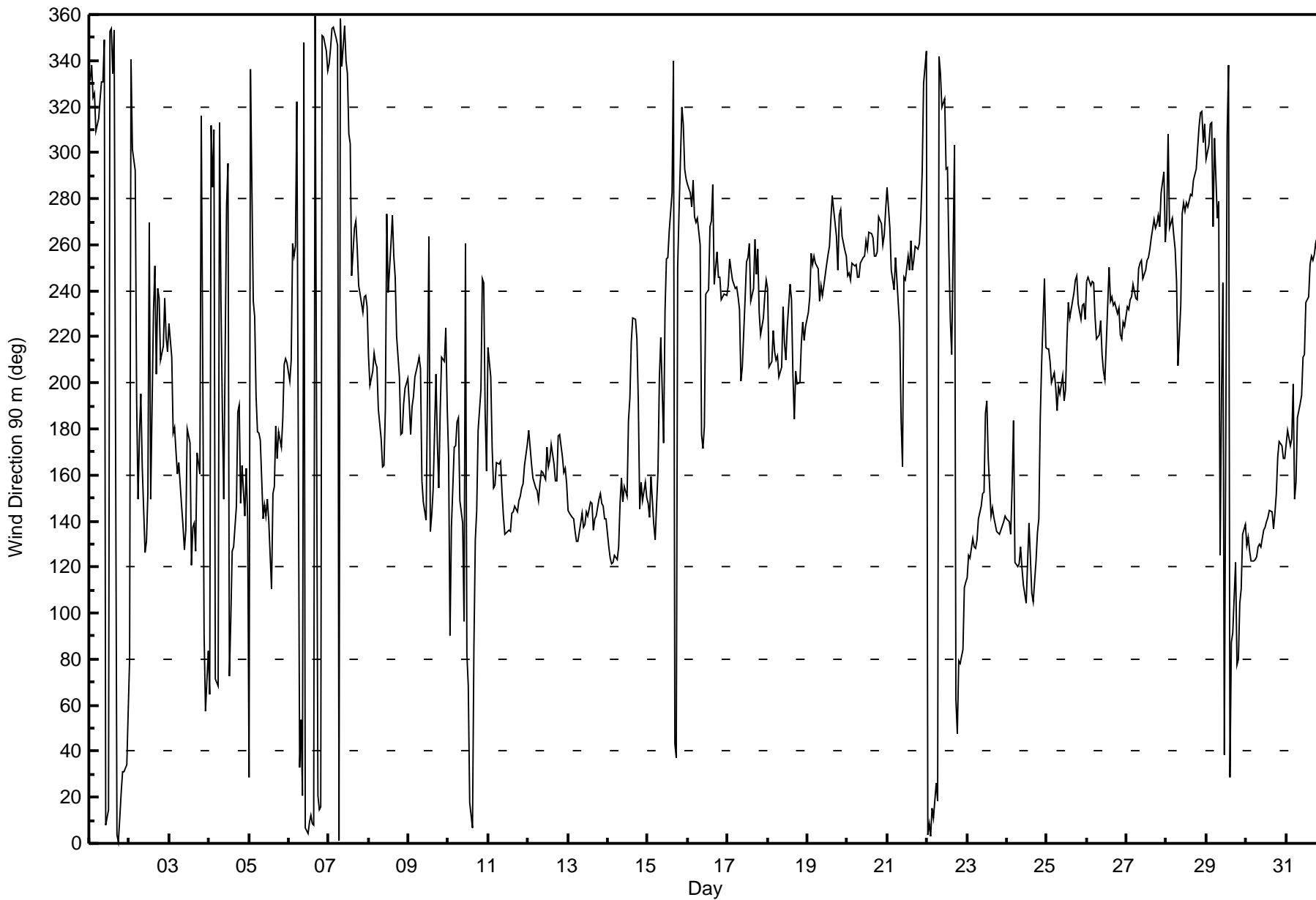




Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction 90 m (WD90m) - deg
Mannix - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 102 deg on Aug 29 12:00 Minimum Value: 2 deg on Aug 7 23:00 Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 6 Median = 10 Q ₃ = 17 P ₉₀ = 34 P ₉₉ = 78 | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | |
|--|-------------------------------|----|----|----|----|----|----|----|----|----|----|-----|----|----|----|----|---|----|----|----|----|----|----|----|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 16 | 14 | 13 | 8 | 8 | 12 | 10 | 25 | 26 | 30 | 21 | 21 | 27 | 29 | 25 | 24 | 25 | 19 | 15 | 8 | 3 | 4 | 4 | 16 | 30 |
| 2-Aug | 63 | 16 | 30 | 13 | 49 | 16 | 15 | 15 | 36 | 34 | 40 | 66 | 37 | 67 | 41 | 39 | 73 | 49 | 7 | 15 | 17 | 3 | 10 | 8 | 73 |
| 3-Aug | 5 | 14 | 14 | 8 | 9 | 4 | 9 | 11 | 14 | 13 | 12 | 39 | 29 | 19 | 38 | 26 | 17 | 22 | 10 | 72 | 80 | 21 | 13 | 8 | 80 |
| 4-Aug | 22 | 20 | 22 | 48 | 20 | 17 | 48 | 47 | 47 | 86 | 20 | 85 | 27 | 25 | 14 | 7 | 12 | 18 | 8 | 13 | 30 | 30 | 43 | 12 | 86 |
| 5-Aug | 60 | 82 | 9 | 28 | 6 | 19 | 13 | 30 | 12 | 23 | 20 | 25 | 29 | 20 | 22 | 11 | 17 | 5 | 5 | 5 | 11 | 5 | 3 | 7 | 82 |
| 6-Aug | 4 | 10 | 53 | 23 | 10 | 37 | 12 | 24 | 64 | 11 | 9 | 9 | 6 | 6 | 6 | 9 | 12 | 7 | 13 | 10 | 9 | 9 | 4 | 7 | 64 |
| 7-Aug | 10 | 7 | 6 | 13 | 12 | 10 | 8 | 20 | 41 | 14 | 23 | 25 | 27 | 25 | 27 | 22 | 18 | 17 | 15 | 9 | 5 | 5 | 2 | 2 | 41 |
| 8-Aug | 16 | 9 | 7 | 12 | 9 | 6 | 11 | 18 | 11 | 24 | 72 | 59 | 41 | 34 | 71 | 32 | 41 | 22 | 16 | 18 | 5 | 4 | 3 | 3 | 72 |
| 9-Aug | 10 | 7 | 9 | 8 | 4 | 3 | 4 | 18 | 17 | 13 | 18 | 57 | 43 | 61 | 61 | 43 | 53 | 49 | 11 | 24 | 4 | 6 | 18 | 42 | 61 |
| 10-Aug | 9 | 22 | 17 | 5 | 3 | 6 | 13 | 15 | 18 | 86 | 52 | 76 | 44 | 64 | 72 | 34 | 8 | 15 | 12 | 13 | 13 | 9 | 26 | 9 | 86 |
| 11-Aug | 17 | 19 | 17 | 4 | 3 | 5 | 6 | 8 | 14 | 16 | 14 | 14 | 15 | 10 | 12 | 10 | 9 | 9 | 7 | 4 | 2 | 2 | 3 | 5 | 19 |
| 12-Aug | 5 | 4 | 3 | 3 | 4 | 3 | 4 | 8 | 8 | 10 | 11 | 14 | 10 | 13 | 12 | 12 | 13 | 11 | 7 | 6 | 7 | 3 | 4 | 4 | 14 |
| 13-Aug | 3 | 2 | 2 | 2 | 3 | 2 | 4 | 6 | 8 | 9 | 8 | 9 | 12 | 12 | 11 | 11 | 10 | 8 | 7 | 5 | 5 | 4 | 4 | 4 | 12 |
| 14-Aug | 6 | 6 | 7 | 8 | 7 | 9 | 7 | 13 | 9 | 12 | 13 | 17 | 28 | 15 | 13 | 6 | 5 | 14 | 19 | 10 | 5 | 6 | 5 | 3 | 28 |
| 15-Aug | 5 | 8 | 11 | 23 | 9 | 8 | 11 | 30 | 11 | 45 | 33 | 13 | 13 | 17 | 20 | 53 | 13 | 52 | 14 | 19 | 17 | 10 | 8 | 4 | 53 |
| 16-Aug | 4 | 3 | 2 | 8 | 4 | 2 | 5 | 18 | 27 | 19 | 36 | 25 | 23 | 13 | 22 | 22 | 34 | 15 | 10 | 4 | 3 | 3 | 2 | 3 | 36 |
| 17-Aug | 6 | 7 | 23 | 11 | 9 | 6 | 6 | 15 | 21 | 39 | 19 | 24 | 33 | 18 | 14 | 13 | 13 | 9 | 7 | 6 | 6 | 5 | 4 | 3 | 39 |
| 18-Aug | 7 | 10 | 5 | 7 | 7 | 5 | 4 | 5 | 16 | 9 | 11 | 10 | 12 | 9 | 13 | 16 | 8 | 10 | 10 | 8 | 6 | 8 | 6 | 6 | 16 |
| 19-Aug | 6 | 8 | 6 | 4 | 4 | 5 | 7 | 7 | 7 | 8 | 7 | 10 | 10 | 9 | 11 | 7 | 7 | 10 | 11 | 10 | 6 | 9 | 9 | 5 | 11 |
| 20-Aug | 5 | 3 | 4 | 6 | 5 | 6 | 7 | 7 | 8 | 8 | 9 | 10 | 10 | 14 | 12 | 13 | 7 | 8 | 7 | 6 | 5 | 5 | 8 | 10 | 14 |
| 21-Aug | 8 | 8 | 6 | 7 | 7 | 11 | 10 | 16 | 25 | 20 | 35 | 7 | 14 | 17 | 14 | 9 | 12 | 7 | 6 | 6 | 6 | 13 | 18 | 8 | 35 |
| 22-Aug | 8 | 7 | 10 | 7 | 10 | 19 | 17 | 35 | 57 | 31 | 34 | 32 | 77 | 43 | 39 | 39 | 38 | 83 | 35 | 15 | 8 | 17 | 9 | 10 | 83 |
| 23-Aug | 9 | 9 | 6 | 4 | 7 | 4 | 4 | 6 | 10 | 8 | 10 | 14 | 9 | 10 | 8 | 7 | 6 | 6 | 7 | 6 | 5 | 5 | 4 | 3 | 14 |
| 24-Aug | 4 | 4 | 5 | 15 | 21 | 12 | 9 | 13 | 8 | 10 | 17 | 15 | 9 | 13 | 15 | 9 | 12 | 10 | 12 | 8 | 12 | 19 | 12 | 12 | 21 |
| 25-Aug | 9 | 7 | 9 | 5 | 5 | 12 | 6 | 9 | 8 | 8 | 10 | 9 | 15 | 6 | 7 | 7 | 7 | 6 | 7 | 10 | 7 | 6 | 6 | 7 | 15 |
| 26-Aug | 7 | 6 | 5 | 7 | 7 | 15 | 8 | 12 | 11 | 13 | 15 | 16 | 20 | 9 | 14 | 13 | 14 | 10 | 9 | 4 | 5 | 3 | 6 | 6 | 20 |
| 27-Aug | 4 | 4 | 4 | 5 | 5 | 6 | 10 | 10 | 9 | 7 | 9 | 9 | 10 | 11 | 8 | 11 | 9 | 8 | 6 | 6 | 2 | 13 | 15 | 12 | 15 |
| 28-Aug | 15 | 11 | 16 | 7 | 5 | 8 | 16 | 41 | 24 | 14 | 10 | 11 | 15 | 15 | 13 | 11 | 15 | 9 | 8 | 10 | 5 | 5 | 4 | 5 | 41 |
| 29-Aug | 10 | 7 | 8 | 78 | 12 | 6 | 16 | 56 | 60 | 33 | 53 | 102 | 55 | 35 | 46 | 15 | 26 | 19 | 12 | 9 | 9 | 10 | 10 | 4 | 102 |
| 30-Aug | 5 | 4 | 6 | 7 | 7 | 6 | 6 | 6 | 6 | 7 | 8 | 7 | 7 | 8 | 8 | 8 | 8 | 8 | 6 | 6 | 4 | 4 | 3 | 5 | 8 |
| 31-Aug | 5 | 7 | 6 | 8 | 26 | 25 | 11 | 18 | 17 | 26 | 11 | 13 | 8 | 9 | 13 | 9 | 8 | 8 | 10 | 4 | 3 | 3 | 4 | 6 | 26 |
| 63 82 53 78 49 37 48 56 64 86 72 102 77 67 72 53 73 83 35 72 80 30 43 42 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |





| Maximum Value: 1.5 km/h on Aug 30 14:00 Maximum Daily Average: 1.0 km/h on Aug 13 | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|---|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------|-----------------|
| Minimum Value: -0.9 km/h on Aug 25 16:00 Maximum Diurnal Average: 0.2 km/h at hour 9 Monthly Average: 0.14 km/h | | Minimum Daily Average: -0.4 km/h on Aug 25 Minimum Diurnal Average: 0.0 km/h at hour 21 Percentiles: $P_1 = -0.7$ $P_{10} = -0.3$ $Q_1 = -0.2$ Median = 0.1 $Q_3 = 0.4$ $P_{90} = 0.7$ $P_{99} = 1.3$ | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0.0 | -0.1 | -0.1 | 0.0 | -0.1 | 0.1 | 0.0 | 0.2 | 0.4 | 0.6 | 0.4 | 0.5 | 0.3 | 0.4 | 0.0 | 0.1 | 0.3 | 0.1 | -0.1 | 0.0 | 0.1 | -0.2 | 0.1 | 0.0 | 0.1 | 0.6 |
| 2-Aug | -0.3 | 0.0 | -0.3 | -0.1 | 0.0 | 0.3 | 0.1 | 0.3 | 0.2 | 0.3 | 0.2 | 0.2 | 0.0 | 0.3 | 0.0 | 0.0 | 0.1 | 0.1 | -0.1 | -0.1 | -0.2 | -0.1 | -0.1 | -0.1 | 0.0 | 0.3 |
| 3-Aug | -0.1 | 0.1 | 0.4 | 0.4 | 0.5 | 0.6 | 0.5 | 0.3 | 0.5 | 0.3 | 0.7 | 0.2 | 0.3 | 0.8 | 0.7 | 0.5 | 0.5 | 0.2 | 0.3 | -0.3 | -0.4 | 0.9 | 0.9 | 1.0 | 0.4 | 1.0 |
| 4-Aug | 0.1 | 0.0 | 0.0 | 0.1 | 0.4 | 0.3 | -0.2 | 0.0 | 0.2 | -0.1 | 0.1 | -0.1 | 0.4 | 1.1 | 0.5 | 0.5 | 0.2 | 0.0 | 0.4 | 0.2 | 0.3 | 0.0 | 0.2 | 0.2 | 0.2 | 1.1 |
| 5-Aug | -0.1 | -0.2 | -0.1 | 0.0 | -0.3 | 0.0 | 0.2 | 0.3 | 0.1 | 0.3 | 0.4 | 0.4 | 0.8 | 0.7 | 0.3 | 0.6 | 0.0 | 0.3 | 0.1 | 0.2 | 0.1 | -0.2 | -0.1 | 0.1 | 0.2 | 0.8 |
| 6-Aug | 0.2 | 0.1 | 0.2 | -0.2 | -0.2 | 0.1 | 0.5 | 0.6 | 0.4 | 0.1 | 0.1 | 0.0 | -0.1 | 0.0 | -0.2 | 0.0 | 0.0 | 0.2 | 0.2 | 0.3 | -0.2 | -0.1 | 0.1 | 0.1 | 0.1 | 0.6 |
| 7-Aug | -0.1 | -0.1 | -0.1 | -0.1 | -0.2 | -0.1 | 0.1 | 0.1 | 0.4 | 0.3 | 0.1 | 0.0 | 0.1 | -0.2 | -0.3 | -0.2 | -0.2 | 0.0 | -0.1 | 0.1 | 0.0 | 0.0 | 0.0 | -0.1 | 0.0 | 0.4 |
| 8-Aug | 0.0 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.5 | 0.3 | 0.6 | 0.6 | 0.6 | 0.0 | 0.1 | -0.1 | 0.0 | -0.1 | -0.1 | 0.3 | 0.1 | 0.1 | 0.1 | 0.0 | 0.4 | 0.4 | 0.2 | 0.6 |
| 9-Aug | 0.3 | 0.3 | 0.5 | 0.4 | 0.3 | 0.3 | 0.3 | 0.4 | 0.3 | 0.5 | 0.3 | 0.2 | 0.0 | 0.5 | 0.1 | 0.0 | 0.2 | 0.3 | 0.5 | 0.2 | -0.3 | -0.2 | 0.0 | 0.0 | 0.2 | 0.5 |
| 10-Aug | 0.4 | 0.7 | 0.2 | -0.2 | 0.3 | 0.0 | 0.3 | 0.5 | 0.3 | 0.4 | 0.0 | 0.4 | 0.3 | 0.4 | 0.5 | 1.1 | 0.7 | 0.8 | 0.1 | 0.1 | -0.1 | -0.2 | -0.1 | 0.2 | 0.3 | 1.1 |
| 11-Aug | 0.0 | 0.1 | 0.3 | 0.5 | 0.6 | 0.4 | 0.5 | 0.4 | 0.4 | 0.3 | 0.5 | 0.7 | 0.8 | 1.0 | 0.6 | 0.9 | 0.9 | 0.9 | 0.8 | 0.7 | 0.6 | 0.6 | 0.5 | 0.5 | 0.6 | 1.0 |
| 12-Aug | 0.6 | 0.5 | 0.5 | 0.4 | 0.6 | 0.6 | 0.5 | 0.8 | 0.8 | 0.6 | 0.7 | 0.4 | 0.7 | 0.7 | 0.2 | 0.4 | 0.8 | 1.0 | 0.1 | 0.1 | 0.2 | 0.7 | 0.7 | 0.7 | 0.6 | 1.0 |
| 13-Aug | 0.6 | 0.7 | 0.7 | 0.7 | 0.7 | 0.8 | 1.0 | 0.5 | 0.8 | 1.0 | 1.2 | 1.3 | 1.3 | 1.1 | 1.2 | 1.4 | 1.4 | 1.1 | 1.1 | 0.9 | 0.8 | 0.6 | 0.7 | 1.0 | 1.4 | |
| 14-Aug | 0.7 | 0.8 | 0.8 | 0.8 | 0.5 | 0.7 | 0.4 | 0.6 | 0.5 | 0.6 | 0.6 | 0.2 | 0.1 | -0.3 | -0.4 | -0.2 | 0.1 | 0.0 | 0.4 | 0.6 | 0.5 | 0.6 | 0.6 | 0.4 | 0.8 | |
| 15-Aug | 0.6 | 0.6 | 0.3 | 0.5 | 0.3 | 0.2 | -0.1 | 0.0 | -0.1 | 0.0 | 0.0 | -0.1 | 0.0 | -0.5 | -0.2 | 0.2 | 0.6 | 0.3 | -0.1 | 0.0 | -0.1 | 0.0 | 0.2 | 0.3 | 0.1 | 0.6 |
| 16-Aug | 0.2 | 0.1 | 0.0 | 0.1 | -0.1 | -0.2 | -0.3 | 0.0 | 0.4 | 0.3 | 0.4 | -0.3 | -0.1 | -0.2 | -0.1 | -0.2 | 0.0 | 0.0 | -0.1 | -0.3 | -0.4 | -0.2 | -0.3 | -0.2 | -0.1 | 0.4 |
| 17-Aug | -0.2 | -0.2 | -0.1 | -0.2 | -0.1 | -0.1 | 0.0 | -0.3 | 0.2 | 0.2 | -0.3 | -0.1 | -0.4 | -0.1 | -0.3 | -0.1 | 0.0 | -0.2 | 0.0 | -0.1 | -0.3 | -0.4 | -0.4 | -0.4 | -0.2 | 0.2 |
| 18-Aug | -0.2 | 0.2 | 0.2 | -0.1 | 0.0 | 0.2 | -0.2 | -0.1 | 0.0 | -0.5 | -0.4 | -0.4 | -0.6 | -0.6 | -0.5 | -0.5 | 0.2 | -0.3 | -0.2 | -0.1 | -0.5 | -0.5 | -0.5 | -0.5 | -0.2 | 0.2 |
| 19-Aug | -0.3 | -0.4 | -0.3 | -0.3 | -0.2 | -0.3 | -0.3 | -0.4 | -0.6 | -0.5 | -0.9 | -0.4 | -0.4 | -0.6 | -0.6 | -0.5 | -0.1 | -0.1 | -0.2 | 0.0 | 0.0 | -0.3 | -0.4 | -0.2 | -0.3 | 0.0 |
| 20-Aug | -0.4 | -0.3 | -0.4 | -0.4 | -0.5 | -0.3 | -0.1 | -0.1 | -0.1 | -0.4 | -0.5 | -0.4 | -0.2 | -0.3 | -0.3 | -0.3 | -0.7 | -0.3 | -0.1 | 0.1 | -0.2 | -0.2 | 0.0 | 0.1 | -0.3 | 0.1 |
| 21-Aug | -0.2 | 0.1 | -0.2 | -0.2 | -0.2 | 0.0 | -0.2 | -0.2 | 0.4 | 0.6 | 0.3 | -0.1 | -0.2 | -0.3 | -0.4 | -0.2 | 0.0 | -0.1 | -0.1 | -0.2 | -0.3 | 0.0 | -0.1 | -0.2 | -0.1 | 0.6 |
| 22-Aug | -0.1 | -0.2 | 0.0 | -0.1 | -0.1 | 0.0 | 0.1 | 0.1 | 0.1 | -0.1 | 0.3 | -0.2 | 0.5 | 0.1 | 0.0 | 0.2 | 0.0 | 0.3 | 0.6 | 0.1 | 0.3 | 0.7 | 0.4 | 0.4 | 0.1 | 0.7 |
| 23-Aug | 0.6 | 0.6 | 0.5 | 0.4 | 0.5 | 0.4 | 0.3 | 0.5 | 0.5 | 0.8 | 0.6 | 0.2 | 0.1 | 0.5 | 0.7 | 0.9 | 0.9 | 0.8 | 0.9 | 0.9 | 0.8 | 0.8 | 0.7 | 0.6 | 0.6 | 0.9 |
| 24-Aug | 0.7 | 0.5 | 0.6 | 0.6 | 0.2 | 0.8 | 0.4 | 0.6 | 0.5 | 0.6 | 1.0 | 1.0 | 0.8 | 0.5 | 1.0 | 1.2 | 1.0 | 0.7 | 0.5 | 0.7 | 0.1 | -0.1 | -0.3 | -0.3 | 0.6 | 1.2 |
| 25-Aug | -0.3 | -0.3 | -0.2 | -0.2 | -0.2 | 0.0 | 0.0 | -0.1 | -0.1 | -0.5 | -0.1 | -0.3 | -0.4 | -0.9 | -0.6 | -0.9 | -0.8 | -0.7 | -0.7 | -0.3 | -0.3 | -0.4 | -0.4 | -0.4 | -0.4 | 0.0 |
| 26-Aug | -0.5 | -0.6 | -0.4 | -0.4 | -0.4 | -0.3 | -0.2 | -0.2 | -0.4 | -0.4 | 0.0 | -0.1 | -0.1 | -0.2 | -0.4 | -0.3 | -0.5 | -0.5 | -0.2 | -0.3 | -0.3 | -0.3 | -0.5 | -0.3 | -0.3 | 0.0 |
| 27-Aug | -0.3 | -0.5 | -0.3 | -0.4 | -0.4 | -0.3 | -0.2 | -0.2 | 0.0 | -0.2 | -0.5 | -0.3 | -0.4 | -0.5 | -0.6 | -0.3 | -0.2 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | -0.2 | 0.2 |
| 28-Aug | -0.1 | 0.0 | -0.2 | -0.2 | -0.3 | -0.2 | 0.1 | 0.3 | -0.3 | -0.3 | -0.3 | -0.1 | -0.3 | -0.2 | -0.3 | -0.2 | -0.3 | -0.4 | -0.2 | -0.3 | -0.2 | -0.2 | -0.1 | -0.1 | -0.2 | 0.3 |
| 29-Aug | -0.2 | 0.1 | -0.1 | -0.2 | -0.2 | -0.1 | -0.2 | 0.1 | 0.1 | 0.0 | 0.2 | 0.5 | 0.2 | 0.0 | 0.4 | 0.9 | 0.5 | 0.5 | 0.7 | 0.8 | 0.7 | 0.7 | 0.8 | 0.7 | 0.3 | 0.9 |
| 30-Aug | 0.6 | 0.8 | 0.7 | 0.7 | 0.8 | 1.1 | 1.1 | 0.8 | 0.9 | 0.9 | 1.1 | 1.1 | 1.3 | 1.5 | 1.5 | 1.2 | 1.1 | 0.9 | 1.0 | 0.5 | 0.1 | 0.3 | 0.5 | 0.6 | 0.9 | 1.5 |
| 31-Aug | 0.5 | 0.3 | 0.4 | 0.3 | 0.1 | 0.4 | 0.4 | 0.2 | 0.1 | 0.1 | -0.3 | 0.0 | -0.5 | -0.3 | -0.5 | -0.5 | -0.2 | -0.3 | -0.3 | -0.4 | -0.3 | -0.4 | -0.3 | -0.2 | -0.1 | 0.5 |
| | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | Diurnal Average |
| | 0.7 | 0.8 | 0.8 | 0.8 | 0.8 | 1.1 | 1.1 | 0.8 | 0.9 | 1.0 | 1.2 | 1.3 | 1.3 | 1.5 | 1.5 | 1.2 | 1.4 | 1.4 | 1.1 | 1.1 | 0.9 | 0.9 | 0.9 | 1.0 | 1.0 | Diurnal Maximum |



| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3.8 km/h on Aug 20 16:00 Minimum Value: 0.2 km/h on Aug 1 04:00 Percentiles: P ₁ = 0.3 P ₁₀ = 0.6 Q ₁ = 1.0 Median = 1.5 Q ₃ = 2.1 P ₉₀ = 2.7 P ₉₉ = 3.6 | | | | | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | |
|--|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|---------------|-----|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0.4 | 0.3 | 0.3 | 0.2 | 0.4 | 0.8 | 0.8 | 1.2 | 1.7 | 1.6 | 2.0 | 2.4 | 2.4 | 2.6 | 2.5 | 2.5 | 2.5 | 2.1 | 1.7 | 1.2 | 1.0 | 0.6 | 0.4 | 0.3 | 2.6 | |
| 2-Aug | 0.3 | 0.4 | 0.3 | 0.3 | 0.5 | 0.8 | 0.9 | 1.1 | 1.2 | 1.4 | 1.7 | 1.7 | 1.8 | 1.9 | 2.0 | 1.7 | 1.3 | 1.5 | 1.0 | 0.6 | 0.9 | 0.4 | 0.5 | 0.8 | 2.0 | |
| 3-Aug | 0.7 | 0.5 | 0.8 | 1.0 | 1.1 | 1.3 | 1.2 | 1.2 | 1.3 | 1.5 | 1.9 | 2.1 | 1.8 | 1.8 | 1.7 | 1.6 | 1.2 | 0.9 | 0.7 | 1.9 | 0.9 | 1.4 | 1.5 | 1.3 | 2.1 | |
| 4-Aug | 0.6 | 0.7 | 0.6 | 0.4 | 0.6 | 0.6 | 0.7 | 0.6 | 0.7 | 0.7 | 1.0 | 1.2 | 1.5 | 2.0 | 1.6 | 1.4 | 1.2 | 0.7 | 0.9 | 1.0 | 0.7 | 0.5 | 0.4 | 0.7 | 2.0 | |
| 5-Aug | 0.7 | 0.9 | 0.4 | 0.2 | 0.3 | 0.3 | 0.7 | 0.9 | 1.2 | 1.3 | 1.7 | 1.9 | 2.1 | 1.9 | 2.3 | 2.0 | 2.4 | 2.0 | 2.0 | 1.5 | 1.1 | 0.8 | 0.8 | 1.0 | 2.4 | |
| 6-Aug | 1.1 | 0.6 | 0.4 | 0.7 | 0.6 | 0.4 | 1.1 | 1.4 | 1.0 | 1.7 | 2.4 | 3.1 | 2.8 | 2.6 | 2.2 | 1.8 | 1.4 | 1.3 | 1.3 | 1.4 | 1.3 | 1.2 | 1.7 | 1.1 | 3.1 | |
| 7-Aug | 0.9 | 0.9 | 0.6 | 0.5 | 0.5 | 0.8 | 1.4 | 1.3 | 1.2 | 1.6 | 1.6 | 1.8 | 1.7 | 1.8 | 1.8 | 1.8 | 1.6 | 1.4 | 1.1 | 0.6 | 0.2 | 0.5 | 0.6 | 0.3 | 1.8 | |
| 8-Aug | 0.6 | 0.6 | 1.0 | 0.8 | 0.7 | 0.8 | 1.1 | 1.2 | 1.4 | 1.4 | 1.6 | 1.8 | 1.9 | 1.7 | 1.9 | 1.7 | 1.6 | 1.3 | 1.2 | 1.2 | 1.2 | 1.1 | 1.0 | 1.0 | 1.9 | |
| 9-Aug | 0.8 | 0.8 | 1.2 | 1.3 | 1.3 | 1.0 | 0.9 | 1.0 | 1.1 | 1.5 | 1.5 | 1.5 | 1.3 | 1.8 | 1.7 | 1.5 | 1.5 | 1.4 | 1.2 | 1.2 | 1.1 | 1.0 | 0.5 | 0.4 | 1.8 | |
| 10-Aug | 1.1 | 1.1 | 1.4 | 1.0 | 1.5 | 1.2 | 0.9 | 1.2 | 1.1 | 1.3 | 1.5 | 1.6 | 1.8 | 1.7 | 1.9 | 2.1 | 1.9 | 2.2 | 1.6 | 1.0 | 0.4 | 0.3 | 0.5 | 0.8 | 2.2 | |
| 11-Aug | 0.4 | 0.8 | 0.8 | 1.1 | 1.2 | 1.3 | 1.2 | 1.2 | 1.3 | 1.4 | 1.5 | 1.8 | 2.0 | 2.3 | 2.3 | 2.1 | 2.1 | 1.9 | 1.9 | 1.6 | 1.0 | 1.2 | 1.0 | 1.3 | 2.3 | |
| 12-Aug | 1.2 | 1.2 | 1.4 | 1.0 | 0.9 | 1.1 | 1.5 | 1.8 | 2.3 | 2.4 | 2.5 | 3.4 | 3.7 | 3.6 | 3.3 | 3.2 | 3.0 | 2.9 | 2.7 | 1.9 | 1.3 | 1.3 | 1.4 | 1.2 | 3.7 | |
| 13-Aug | 1.7 | 1.9 | 1.9 | 1.8 | 2.0 | 2.1 | 2.3 | 2.1 | 2.2 | 2.5 | 3.2 | 3.3 | 3.1 | 3.2 | 3.0 | 3.2 | 3.2 | 2.9 | 2.6 | 2.0 | 1.9 | 1.9 | 1.8 | 1.8 | 3.3 | |
| 14-Aug | 1.7 | 1.9 | 1.8 | 1.9 | 1.9 | 1.9 | 1.8 | 2.0 | 2.2 | 1.8 | 2.2 | 2.0 | 2.3 | 2.2 | 2.5 | 2.2 | 1.7 | 1.0 | 0.9 | 1.1 | 1.2 | 1.2 | 1.2 | 1.4 | 2.5 | |
| 15-Aug | 1.5 | 1.6 | 1.0 | 1.3 | 1.1 | 1.0 | 0.8 | 0.8 | 0.7 | 0.8 | 1.1 | 1.1 | 1.3 | 1.4 | 1.3 | 1.3 | 1.3 | 1.2 | 1.5 | 1.8 | 1.4 | 0.8 | 0.7 | 0.8 | 1.8 | |
| 16-Aug | 0.9 | 0.9 | 1.0 | 0.4 | 0.7 | 0.6 | 0.6 | 0.9 | 1.3 | 1.3 | 1.5 | 1.6 | 1.9 | 1.9 | 1.7 | 1.6 | 1.4 | 1.6 | 1.2 | 0.9 | 0.7 | 0.6 | 0.4 | 0.5 | 1.9 | |
| 17-Aug | 0.5 | 0.3 | 0.3 | 0.4 | 0.7 | 0.9 | 1.2 | 1.1 | 0.9 | 1.3 | 1.6 | 1.7 | 1.6 | 1.9 | 2.1 | 1.9 | 1.8 | 1.6 | 1.0 | 0.4 | 0.7 | 1.2 | 1.6 | 1.4 | 2.1 | |
| 18-Aug | 0.8 | 0.6 | 0.6 | 0.9 | 0.7 | 0.9 | 1.7 | 2.2 | 2.4 | 2.6 | 2.5 | 3.2 | 3.4 | 3.6 | 3.2 | 3.5 | 3.1 | 3.1 | 2.6 | 2.6 | 2.7 | 2.7 | 2.5 | 2.4 | 3.6 | |
| 19-Aug | 2.3 | 2.2 | 2.1 | 1.9 | 1.9 | 2.0 | 2.1 | 2.3 | 3.1 | 3.2 | 3.5 | 3.1 | 3.3 | 3.4 | 3.7 | 3.6 | 2.2 | 1.6 | 0.8 | 1.0 | 0.9 | 1.1 | 1.0 | 0.9 | 3.7 | |
| 20-Aug | 1.1 | 1.8 | 2.0 | 1.8 | 1.9 | 1.7 | 1.7 | 2.0 | 2.3 | 2.9 | 3.1 | 3.1 | 3.0 | 2.7 | 3.1 | 3.8 | 3.6 | 2.8 | 2.3 | 1.4 | 1.2 | 1.9 | 1.8 | 1.5 | 3.8 | |
| 21-Aug | 1.6 | 0.7 | 0.9 | 0.8 | 0.5 | 0.7 | 1.0 | 1.2 | 1.2 | 1.3 | 1.7 | 2.5 | 2.6 | 2.4 | 2.3 | 2.5 | 2.0 | 1.6 | 1.7 | 1.0 | 0.6 | 0.5 | 0.8 | 1.1 | 2.6 | |
| 22-Aug | 1.1 | 0.9 | 1.0 | 1.3 | 0.8 | 0.8 | 0.9 | 0.9 | 1.1 | 1.1 | 1.4 | 1.3 | 1.5 | 1.5 | 1.4 | 1.3 | 1.1 | 1.1 | 1.0 | 0.4 | 0.3 | 0.8 | 1.3 | 1.4 | 1.5 | |
| 23-Aug | 1.7 | 1.4 | 1.6 | 1.5 | 1.5 | 1.3 | 1.7 | 1.4 | 1.7 | 2.2 | 1.8 | 2.6 | 1.8 | 1.4 | 1.8 | 2.1 | 2.5 | 2.4 | 2.6 | 2.6 | 2.5 | 2.4 | 2.1 | 1.7 | 2.6 | |
| 24-Aug | 1.9 | 1.6 | 2.2 | 2.8 | 1.8 | 1.3 | 1.4 | 1.3 | 1.6 | 1.7 | 1.9 | 1.5 | 2.0 | 1.6 | 2.4 | 2.4 | 1.8 | 2.3 | 1.9 | 1.7 | 1.3 | 2.3 | 2.0 | 1.9 | 2.8 | |
| 25-Aug | 2.3 | 2.0 | 1.7 | 1.8 | 2.0 | 1.8 | 1.8 | 2.5 | 2.7 | 2.8 | 2.7 | 2.9 | 3.2 | 3.6 | 3.6 | 3.7 | 3.6 | 3.6 | 3.1 | 2.1 | 1.9 | 2.4 | 2.5 | 2.1 | 3.7 | |
| 26-Aug | 3.2 | 2.8 | 2.5 | 2.3 | 2.1 | 1.1 | 1.6 | 1.7 | 1.7 | 1.8 | 2.0 | 2.2 | 2.5 | 2.6 | 2.8 | 2.6 | 2.5 | 2.4 | 2.3 | 1.2 | 1.5 | 1.5 | 1.6 | 1.6 | 3.2 | |
| 27-Aug | 1.5 | 1.8 | 1.7 | 1.7 | 1.6 | 1.5 | 1.7 | 2.3 | 2.2 | 2.5 | 2.9 | 3.2 | 3.1 | 3.2 | 2.8 | 2.7 | 2.4 | 2.0 | 1.3 | 0.6 | 0.3 | 0.3 | 0.4 | 0.3 | 3.2 | |
| 28-Aug | 0.7 | 0.9 | 0.7 | 0.6 | 0.7 | 0.7 | 0.9 | 1.0 | 1.2 | 1.7 | 2.2 | 2.2 | 2.5 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.0 | 1.4 | 1.3 | 0.9 | 0.4 | 0.3 | 0.6 | 2.6 |
| 29-Aug | 0.3 | 0.4 | 0.4 | 0.6 | 0.6 | 0.5 | 0.6 | 0.9 | 1.2 | 1.3 | 1.4 | 1.6 | 1.8 | 1.8 | 1.9 | 1.8 | 1.4 | 1.2 | 0.9 | 0.9 | 0.9 | 1.3 | 1.9 | 2.0 | 2.0 | |
| 30-Aug | 1.7 | 1.9 | 1.9 | 2.2 | 2.3 | 2.4 | 2.8 | 2.5 | 2.9 | 2.6 | 2.9 | 3.3 | 3.4 | 3.2 | 3.2 | 3.2 | 2.6 | 2.4 | 2.3 | 2.1 | 2.2 | 2.2 | 1.7 | 1.7 | 3.4 | |
| 31-Aug | 1.4 | 1.2 | 0.9 | 1.0 | 0.8 | 1.2 | 1.4 | 1.4 | 1.4 | 1.7 | 1.9 | 1.9 | 2.4 | 2.5 | 3.0 | 2.8 | 2.7 | 2.7 | 2.3 | 2.1 | 1.4 | 1.4 | 1.8 | 1.8 | 3.0 | |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | | |



| Maximum Value: 3.0 km/h on Aug 30 15:00 | | Maximum Daily Average: 1.9 km/h on Aug 13 | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|---|------|---------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------|-----------------|
| Minimum Value: -0.9 km/h on Aug 19 15:00 | | Minimum Daily Average: -0.3 km/h on Aug 28 | | Hours of Data: 744 | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 0.6 km/h at hour 11 | | Minimum Diurnal Average: 0.3 km/h at hour 21 | | Hours of Missing Data: 0 | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 0.42 km/h | | Percentiles: P ₁ = -0.6 P ₁₀ = -0.3 Q ₁ = -0.1 Median = 0.2 Q ₃ = 0.9 P ₉₀ = 1.5 P ₉₉ = 2.6 | | Hours of Calibration: 0 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | -0.2 | -0.2 | -0.1 | -0.3 | -0.4 | -0.1 | 0.1 | 0.4 | 0.4 | 0.6 | 0.1 | 0.4 | 0.2 | 0.2 | -0.1 | -0.3 | 0.3 | -0.1 | -0.4 | -0.2 | -0.1 | -0.4 | -0.1 | 0.2 | 0.0 | 0.6 |
| 2-Aug | -0.2 | -0.1 | 0.0 | 0.1 | 0.4 | 0.4 | 0.3 | 0.3 | 0.4 | 0.3 | 0.0 | 0.2 | 0.0 | 0.3 | 0.3 | 0.0 | 0.1 | 0.5 | 0.0 | 0.1 | 0.0 | -0.1 | 0.1 | 0.3 | 0.2 | 0.5 |
| 3-Aug | 0.0 | 0.4 | 1.0 | 0.9 | 1.1 | 1.3 | 1.1 | 0.7 | 0.5 | 0.6 | 1.3 | 0.7 | 1.1 | 1.1 | 1.3 | 0.9 | 0.7 | 0.6 | 0.5 | -0.3 | -0.2 | 0.9 | 0.5 | 0.7 | 0.7 | 1.3 |
| 4-Aug | 0.1 | -0.1 | 0.0 | -0.1 | 0.4 | 0.2 | -0.1 | 0.1 | 0.3 | -0.2 | 0.4 | -0.1 | 0.4 | 1.1 | 0.7 | 0.7 | 0.6 | 0.2 | 0.3 | 0.9 | 0.3 | 0.4 | 0.2 | 0.6 | 0.3 | 1.1 |
| 5-Aug | -0.2 | -0.2 | 0.0 | 0.1 | 0.1 | 0.2 | 0.3 | 0.2 | 0.4 | 0.6 | 0.8 | 0.7 | 1.6 | 0.6 | 0.8 | 1.5 | 0.9 | 1.1 | 0.9 | 0.9 | 0.8 | 0.2 | 0.2 | 0.5 | 0.5 | 1.6 |
| 6-Aug | 0.8 | 0.4 | 0.2 | 0.1 | -0.2 | -0.1 | 0.2 | 0.3 | 0.3 | -0.2 | -0.4 | -0.6 | -0.8 | -0.7 | -0.7 | -0.3 | -0.4 | -0.1 | 0.2 | 0.1 | -0.6 | -0.5 | -0.4 | 0.0 | -0.1 | 0.8 |
| 7-Aug | -0.6 | -0.5 | -0.3 | -0.4 | -0.3 | -0.6 | 0.0 | 0.1 | 0.6 | 0.2 | 0.5 | -0.3 | 0.3 | -0.6 | -0.2 | 0.0 | -0.2 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | -0.3 | 0.0 | -0.1 | 0.6 |
| 8-Aug | 0.3 | 0.5 | 0.5 | 0.4 | 0.6 | 0.6 | 0.8 | 0.7 | 0.7 | 1.1 | 1.3 | 0.3 | 0.1 | -0.3 | 0.1 | -0.1 | -0.2 | 0.4 | 0.3 | 0.7 | 0.8 | 0.7 | 0.9 | 1.0 | 0.5 | 1.3 |
| 9-Aug | 0.9 | 0.7 | 1.2 | 1.1 | 0.7 | 0.6 | 0.6 | 0.5 | 0.4 | 1.0 | 0.6 | 0.3 | -0.2 | 1.1 | 0.1 | 0.2 | 0.5 | 0.9 | 1.0 | 0.6 | -0.1 | 0.0 | -0.1 | 0.0 | 0.5 | 1.2 |
| 10-Aug | 1.1 | 0.6 | 1.1 | 0.5 | 1.1 | 0.4 | 0.5 | 0.8 | 0.4 | 0.6 | 0.2 | 0.6 | 0.5 | 0.7 | 1.1 | 1.2 | 1.0 | 1.3 | 0.7 | 0.4 | -0.1 | -0.1 | 0.2 | 0.7 | 0.6 | 1.3 |
| 11-Aug | 0.3 | 0.5 | 0.7 | 1.2 | 1.4 | 1.0 | 1.0 | 0.8 | 0.7 | 0.2 | 0.4 | 1.2 | 1.7 | 1.5 | 1.0 | 1.8 | 1.8 | 1.5 | 1.4 | 1.5 | 1.4 | 1.4 | 1.3 | 1.5 | 1.1 | 1.8 |
| 12-Aug | 1.5 | 1.4 | 1.6 | 1.2 | 1.2 | 1.3 | 1.3 | 1.7 | 1.8 | 1.4 | 1.9 | 2.1 | 2.4 | 2.3 | 1.7 | 2.0 | 2.3 | 2.5 | 1.3 | 1.0 | 1.1 | 1.8 | 1.8 | 1.6 | 1.7 | 2.5 |
| 13-Aug | 1.7 | 1.6 | 1.5 | 1.3 | 1.5 | 1.8 | 1.6 | 1.3 | 1.6 | 1.7 | 2.3 | 2.6 | 2.3 | 2.6 | 2.3 | 2.1 | 2.7 | 2.5 | 2.6 | 2.3 | 1.9 | 1.9 | 1.5 | 1.4 | 1.9 | 2.7 |
| 14-Aug | 1.1 | 1.1 | 1.0 | 1.2 | 1.0 | 0.9 | 0.8 | 1.2 | 1.4 | 1.3 | 1.5 | 1.2 | 0.7 | 0.6 | 0.3 | -0.2 | -0.1 | 0.5 | 0.4 | 0.8 | 1.2 | 1.3 | 1.2 | 1.4 | 0.9 | 1.5 |
| 15-Aug | 1.4 | 1.3 | 0.7 | 1.1 | 0.8 | 0.7 | 0.2 | 0.2 | 0.0 | 0.0 | 0.4 | 0.1 | 0.2 | -0.6 | -0.5 | 0.1 | 0.5 | 0.2 | 0.0 | -0.2 | -0.5 | -0.2 | 0.0 | -0.1 | 0.2 | 1.4 |
| 16-Aug | -0.2 | -0.3 | 0.0 | -0.1 | -0.2 | -0.2 | -0.2 | 0.0 | 0.6 | 0.5 | 0.7 | -0.4 | 0.1 | -0.2 | -0.1 | -0.3 | 0.0 | 0.2 | 0.1 | -0.3 | -0.2 | -0.2 | -0.3 | -0.2 | -0.1 | 0.7 |
| 17-Aug | -0.1 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 | 0.7 | 0.0 | 0.2 | -0.1 | 0.5 | -0.1 | 0.0 | -0.1 | -0.3 | -0.2 | 0.0 | -0.1 | -0.2 | -0.2 | -0.3 | 0.0 | 0.7 |
| 18-Aug | -0.2 | 0.5 | 0.5 | 0.1 | 0.3 | 0.4 | 0.1 | 0.3 | 0.5 | -0.2 | 0.4 | 0.5 | -0.1 | -0.3 | 0.0 | 0.5 | 1.3 | 0.2 | 0.5 | 0.4 | 0.0 | -0.1 | -0.1 | 0.0 | 0.2 | 1.3 |
| 19-Aug | 0.2 | -0.1 | -0.4 | -0.3 | -0.2 | -0.2 | -0.3 | 0.1 | -0.5 | -0.1 | -0.5 | -0.1 | -0.2 | -0.4 | -0.9 | -0.3 | -0.2 | -0.1 | -0.2 | -0.2 | -0.2 | -0.3 | -0.3 | -0.4 | -0.3 | 0.2 |
| 20-Aug | -0.3 | -0.5 | -0.4 | -0.5 | -0.5 | -0.2 | 0.2 | 0.3 | 0.0 | -0.5 | -0.4 | -0.1 | -0.1 | -0.2 | -0.5 | 0.0 | -0.4 | -0.2 | -0.1 | -0.1 | -0.3 | -0.4 | -0.2 | -0.1 | -0.2 | 0.3 |
| 21-Aug | -0.5 | -0.2 | -0.1 | -0.1 | 0.0 | 0.0 | -0.1 | 0.0 | 0.8 | 0.6 | 0.3 | -0.1 | 0.1 | -0.3 | -0.5 | -0.1 | 0.1 | -0.3 | -0.1 | -0.3 | -0.4 | -0.4 | -0.2 | -0.5 | -0.1 | 0.8 |
| 22-Aug | -0.4 | -0.7 | -0.5 | -0.4 | -0.3 | -0.3 | -0.1 | -0.1 | 0.2 | -0.1 | 0.8 | -0.1 | 1.1 | 0.7 | 0.3 | 0.5 | -0.2 | 0.2 | 0.8 | 0.2 | 0.3 | 0.5 | 0.7 | 0.8 | 0.2 | 1.1 |
| 23-Aug | 1.2 | 1.3 | 1.3 | 1.2 | 1.0 | 1.3 | 1.0 | 1.2 | 1.2 | 1.6 | 1.6 | 1.2 | 0.5 | 1.2 | 1.5 | 1.9 | 1.8 | 1.6 | 1.4 | 1.4 | 1.6 | 1.7 | 1.5 | 1.4 | 1.4 | 1.9 |
| 24-Aug | 1.6 | 1.3 | 1.5 | 1.8 | 0.9 | 1.1 | 0.8 | 1.1 | 0.6 | 0.9 | 0.8 | 1.1 | 1.1 | 0.9 | 1.6 | 1.0 | 1.0 | 1.1 | 1.0 | 1.5 | 0.7 | 0.4 | -0.1 | 0.1 | 1.0 | 1.8 |
| 25-Aug | 0.1 | 0.1 | 0.3 | 0.4 | 0.3 | 0.5 | 0.9 | 0.5 | 0.7 | 0.3 | 0.7 | 0.4 | 0.2 | -0.4 | -0.1 | -0.2 | -0.5 | -0.2 | -0.2 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.9 |
| 26-Aug | -0.4 | -0.5 | -0.2 | -0.2 | -0.2 | -0.1 | 0.0 | 0.3 | -0.1 | 0.1 | 0.4 | 0.6 | 0.5 | 0.0 | 0.0 | 0.2 | -0.3 | -0.2 | 0.2 | -0.1 | -0.2 | -0.1 | -0.1 | -0.1 | 0.0 | 0.6 |
| 27-Aug | 0.0 | 0.0 | 0.0 | -0.3 | -0.3 | 0.0 | 0.1 | -0.3 | -0.1 | -0.3 | -0.2 | 0.0 | 0.0 | -0.6 | -0.5 | -0.3 | -0.5 | -0.1 | 0.0 | -0.2 | -0.2 | -0.3 | -0.1 | 0.0 | -0.2 | 0.1 |
| 28-Aug | -0.2 | -0.3 | -0.1 | -0.3 | -0.3 | -0.2 | 0.1 | 0.5 | 0.1 | -0.4 | -0.4 | -0.1 | -0.5 | 0.1 | -0.5 | -0.3 | -0.6 | -0.6 | -0.3 | -0.5 | -0.5 | -0.6 | -0.4 | -0.7 | -0.3 | 0.5 |
| 29-Aug | -0.5 | -0.3 | -0.3 | 0.0 | 0.0 | -0.3 | -0.1 | 0.3 | 0.3 | 0.1 | 0.3 | 0.9 | 0.3 | 0.1 | 0.2 | 0.8 | 0.4 | 0.9 | 0.4 | 0.6 | 0.7 | 0.8 | 1.4 | 1.5 | 0.3 | 1.5 |
| 30-Aug | 1.2 | 1.6 | 0.8 | 1.0 | 1.2 | 1.6 | 1.5 | 1.3 | 1.4 | 1.5 | 2.1 | 2.1 | 2.4 | 2.7 | 3.0 | 2.6 | 2.0 | 1.8 | 2.1 | 1.5 | 1.0 | 1.2 | 1.5 | 1.7 | 1.7 | 3.0 |
| 31-Aug | 1.4 | 1.0 | 1.1 | 0.8 | 0.6 | 1.1 | 1.1 | 0.8 | 0.6 | 0.7 | 0.1 | 0.7 | -0.2 | -0.1 | -0.1 | -0.6 | 0.1 | -0.3 | -0.3 | -0.5 | -0.3 | -0.2 | -0.4 | -0.3 | 0.3 | 1.4 |
| | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.6 | 0.5 | 0.5 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.3 | 0.3 | 0.3 | 0.4 | | Diurnal Average |
| | 1.7 | 1.6 | 1.6 | 1.8 | 1.5 | 1.8 | 1.6 | 1.7 | 1.8 | 1.7 | 2.3 | 2.6 | 2.4 | 2.7 | 3.0 | 2.6 | 2.7 | 2.5 | 2.6 | 2.3 | 1.9 | 1.9 | 1.8 | 1.7 | | Diurnal Maximum |



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Vertical Wind Speed 45 m (VW45m) - km/h
Mannix - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.3 km/h on Aug 25 16:00 Minimum Value: 0.2 km/h on Aug 5 06:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.5 Q ₁ = 0.9 Median = 1.6 Q ₃ = 2.3 P ₉₀ = 2.9 P ₉₉ = 3.9 | | | | | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | |
|--|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 0.4 | 0.3 | 0.3 | 0.3 | 0.2 | 0.7 | 0.7 | 1.4 | 2.0 | 2.2 | 2.6 | 3.0 | 3.1 | 3.2 | 3.1 | 3.0 | 3.2 | 2.4 | 2.0 | 1.4 | 1.1 | 0.9 | 0.4 | 0.2 | 3.2 |
| 2-Aug | 0.3 | 0.2 | 0.2 | 0.2 | 0.4 | 0.5 | 0.9 | 1.1 | 1.3 | 1.7 | 1.9 | 2.2 | 2.5 | 2.4 | 2.6 | 2.1 | 1.5 | 1.8 | 1.1 | 0.4 | 0.5 | 0.3 | 0.4 | 0.6 | 2.6 |
| 3-Aug | 0.7 | 0.6 | 0.7 | 0.8 | 0.8 | 1.0 | 1.1 | 1.3 | 1.5 | 1.9 | 2.5 | 2.5 | 2.3 | 2.3 | 2.2 | 2.0 | 1.8 | 1.2 | 0.7 | 2.1 | 1.2 | 1.5 | 1.5 | 1.2 | 2.5 |
| 4-Aug | 0.7 | 0.4 | 0.5 | 0.5 | 0.6 | 0.7 | 0.6 | 0.5 | 0.9 | 0.8 | 1.2 | 1.4 | 1.9 | 2.3 | 2.0 | 1.7 | 1.3 | 0.8 | 0.4 | 0.9 | 0.7 | 0.4 | 0.4 | 0.9 | 2.3 |
| 5-Aug | 0.5 | 0.7 | 0.2 | 0.2 | 0.2 | 0.2 | 0.7 | 0.9 | 1.3 | 1.8 | 2.3 | 2.4 | 2.4 | 2.6 | 2.5 | 2.2 | 2.3 | 1.4 | 1.8 | 1.2 | 0.5 | 0.3 | 0.3 | 0.5 | 2.6 |
| 6-Aug | 0.5 | 0.4 | 0.5 | 0.4 | 0.3 | 0.5 | 1.2 | 1.6 | 1.2 | 1.9 | 2.4 | 2.8 | 2.5 | 2.3 | 2.0 | 2.0 | 1.6 | 1.4 | 1.5 | 1.6 | 1.4 | 1.4 | 1.8 | 1.4 | 2.8 |
| 7-Aug | 1.0 | 0.9 | 0.6 | 0.7 | 0.6 | 0.7 | 1.6 | 1.6 | 1.6 | 1.8 | 2.0 | 2.2 | 2.2 | 2.2 | 2.4 | 2.4 | 2.2 | 1.8 | 1.4 | 0.7 | 0.2 | 0.4 | 0.7 | 0.5 | 2.4 |
| 8-Aug | 0.5 | 0.4 | 0.4 | 0.7 | 0.6 | 0.7 | 1.0 | 1.1 | 1.3 | 1.8 | 1.9 | 2.3 | 2.5 | 2.2 | 2.3 | 2.5 | 2.2 | 1.7 | 1.3 | 0.8 | 0.5 | 0.6 | 0.5 | 0.4 | 2.5 |
| 9-Aug | 0.7 | 1.0 | 0.7 | 0.6 | 0.6 | 0.7 | 0.7 | 0.9 | 1.2 | 1.8 | 2.0 | 1.9 | 1.7 | 2.4 | 2.4 | 2.1 | 1.7 | 1.8 | 1.3 | 0.9 | 0.2 | 0.2 | 0.5 | 0.5 | 2.4 |
| 10-Aug | 0.8 | 1.1 | 1.1 | 0.8 | 0.8 | 0.6 | 0.9 | 1.4 | 1.4 | 1.5 | 1.9 | 2.1 | 2.4 | 2.3 | 2.7 | 2.5 | 2.1 | 1.9 | 1.1 | 0.8 | 0.5 | 0.3 | 0.4 | 0.5 | 2.7 |
| 11-Aug | 0.4 | 0.5 | 0.5 | 0.9 | 1.2 | 0.9 | 1.0 | 1.2 | 1.5 | 1.6 | 1.8 | 2.3 | 2.5 | 2.8 | 2.5 | 2.6 | 2.3 | 2.0 | 1.7 | 1.4 | 0.6 | 0.9 | 0.5 | 0.6 | 2.8 |
| 12-Aug | 0.6 | 0.7 | 1.0 | 1.0 | 0.9 | 1.2 | 1.5 | 1.8 | 2.2 | 2.4 | 2.8 | 3.3 | 3.4 | 3.3 | 3.1 | 3.2 | 3.1 | 2.8 | 2.2 | 1.6 | 0.7 | 0.8 | 0.8 | 1.0 | 3.4 |
| 13-Aug | 1.7 | 1.8 | 2.0 | 1.9 | 1.9 | 1.9 | 2.3 | 2.4 | 2.6 | 3.1 | 3.6 | 3.8 | 3.7 | 3.4 | 3.4 | 3.6 | 3.7 | 3.5 | 3.2 | 2.6 | 2.2 | 2.0 | 1.9 | 2.0 | 3.8 |
| 14-Aug | 1.6 | 1.8 | 1.8 | 2.0 | 1.8 | 2.2 | 1.9 | 2.1 | 2.1 | 2.1 | 2.5 | 2.5 | 2.6 | 2.3 | 2.6 | 1.9 | 1.4 | 1.3 | 0.9 | 1.1 | 0.9 | 1.0 | 0.9 | 1.1 | 2.6 |
| 15-Aug | 1.5 | 1.4 | 0.8 | 1.2 | 1.1 | 0.7 | 0.7 | 0.9 | 0.8 | 0.9 | 1.4 | 1.5 | 1.9 | 1.8 | 1.7 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.4 | 0.9 | 0.6 | 0.8 | 1.9 |
| 16-Aug | 0.7 | 0.8 | 0.6 | 0.4 | 0.5 | 0.4 | 0.3 | 0.7 | 1.5 | 1.5 | 2.1 | 2.1 | 2.3 | 2.1 | 2.3 | 1.9 | 1.9 | 2.0 | 1.4 | 0.8 | 0.3 | 0.4 | 0.4 | 0.5 | 2.3 |
| 17-Aug | 0.6 | 0.5 | 0.3 | 0.3 | 0.3 | 0.4 | 0.6 | 1.3 | 1.1 | 1.7 | 2.0 | 2.2 | 2.5 | 2.7 | 2.2 | 2.3 | 1.9 | 1.6 | 0.9 | 0.2 | 0.3 | 0.5 | 1.3 | 1.1 | 2.7 |
| 18-Aug | 0.8 | 0.8 | 0.7 | 1.2 | 0.7 | 0.6 | 1.2 | 1.6 | 2.3 | 2.9 | 2.8 | 3.1 | 3.3 | 3.5 | 3.4 | 3.3 | 2.7 | 2.6 | 2.4 | 2.2 | 2.8 | 2.7 | 2.4 | 2.4 | 3.5 |
| 19-Aug | 2.6 | 2.6 | 2.2 | 1.9 | 1.8 | 2.1 | 2.2 | 2.4 | 3.3 | 3.4 | 3.8 | 3.5 | 3.7 | 3.5 | 4.2 | 3.6 | 2.5 | 1.9 | 0.9 | 1.2 | 0.9 | 0.9 | 0.7 | 0.8 | 4.2 |
| 20-Aug | 0.9 | 1.5 | 1.9 | 1.8 | 1.8 | 1.7 | 2.1 | 2.5 | 2.6 | 2.9 | 3.3 | 3.4 | 3.3 | 3.3 | 3.5 | 4.1 | 3.7 | 3.0 | 2.2 | 1.4 | 0.9 | 1.8 | 1.9 | 1.5 | 4.1 |
| 21-Aug | 1.2 | 0.8 | 0.8 | 0.9 | 0.7 | 1.0 | 1.1 | 1.5 | 1.3 | 1.5 | 2.0 | 2.9 | 3.1 | 3.0 | 2.5 | 2.6 | 2.4 | 1.5 | 1.7 | 0.8 | 0.3 | 0.5 | 0.6 | 1.1 | 3.1 |
| 22-Aug | 1.3 | 0.9 | 1.0 | 1.4 | 0.5 | 0.5 | 0.8 | 1.1 | 1.3 | 1.4 | 1.9 | 1.7 | 1.7 | 2.1 | 1.9 | 1.9 | 1.5 | 1.3 | 1.4 | 0.6 | 0.4 | 0.9 | 1.5 | 1.8 | 2.1 |
| 23-Aug | 1.8 | 1.6 | 1.6 | 1.4 | 1.5 | 1.4 | 1.8 | 1.5 | 2.0 | 2.0 | 2.0 | 2.3 | 1.6 | 1.2 | 2.0 | 2.4 | 2.8 | 2.6 | 2.8 | 2.7 | 2.5 | 2.6 | 2.2 | 1.7 | 2.8 |
| 24-Aug | 2.1 | 1.7 | 2.2 | 2.6 | 1.6 | 1.3 | 1.4 | 1.4 | 1.8 | 2.1 | 2.3 | 1.8 | 2.3 | 1.7 | 2.7 | 2.9 | 2.2 | 2.7 | 2.2 | 1.8 | 0.9 | 2.1 | 2.0 | 1.7 | 2.9 |
| 25-Aug | 2.3 | 1.7 | 1.5 | 1.4 | 1.6 | 1.5 | 1.6 | 2.3 | 2.5 | 2.5 | 2.5 | 2.6 | 3.3 | 3.9 | 3.9 | 4.3 | 4.1 | 4.1 | 3.4 | 2.2 | 1.9 | 2.8 | 2.6 | 2.0 | 4.3 |
| 26-Aug | 3.4 | 3.0 | 2.6 | 2.5 | 2.4 | 1.5 | 1.6 | 1.9 | 2.0 | 2.0 | 2.4 | 2.6 | 3.0 | 3.1 | 3.1 | 3.1 | 2.8 | 2.5 | 2.5 | 1.2 | 1.1 | 1.0 | 1.4 | 1.4 | 3.4 |
| 27-Aug | 1.4 | 1.6 | 1.8 | 1.7 | 1.8 | 1.4 | 1.9 | 2.8 | 2.5 | 2.6 | 3.2 | 3.5 | 3.6 | 3.4 | 3.1 | 3.2 | 2.5 | 2.5 | 1.4 | 0.5 | 0.3 | 0.4 | 0.6 | 0.2 | 3.6 |
| 28-Aug | 0.5 | 0.8 | 0.3 | 0.3 | 0.4 | 0.7 | 0.6 | 1.2 | 1.6 | 2.0 | 2.3 | 2.6 | 2.9 | 3.0 | 2.9 | 2.7 | 2.5 | 2.0 | 1.3 | 1.0 | 0.8 | 0.5 | 0.2 | 0.6 | 3.0 |
| 29-Aug | 0.3 | 0.4 | 0.6 | 0.5 | 0.2 | 0.3 | 0.4 | 1.0 | 1.3 | 1.7 | 1.7 | 2.0 | 2.4 | 2.4 | 2.4 | 2.2 | 1.8 | 1.5 | 1.1 | 0.9 | 1.1 | 1.6 | 2.0 | 1.8 | 2.4 |
| 30-Aug | 1.5 | 1.5 | 2.0 | 2.2 | 2.1 | 2.1 | 2.7 | 2.4 | 2.8 | 2.7 | 3.4 | 3.6 | 3.7 | 3.9 | 3.6 | 3.7 | 3.1 | 2.5 | 2.3 | 1.5 | 1.7 | 1.5 | 1.1 | 1.2 | 3.9 |
| 31-Aug | 1.0 | 1.0 | 0.7 | 0.6 | 0.4 | 1.0 | 1.3 | 1.3 | 1.2 | 1.6 | 1.9 | 2.3 | 2.4 | 3.0 | 3.6 | 3.2 | 3.1 | 2.6 | 2.3 | 1.9 | 1.1 | 1.2 | 1.7 | 1.9 | 3.6 |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |



| Maximum Value: 1.8 km/h on Aug 10 15:00 | | | | | | | | | | | | | | | | | | | | Maximum Daily Average: 1.0 km/h on Aug 12 | | | | | Hours in Service: 744 | |
|--|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|------|------|------|-----------------|---------------------------------|---------------|
| Minimum Value: -0.7 km/h on Aug 7 14:00 | | | | | | | | | | | | | | | | | | | | Minimum Daily Average: 0.0 km/h on Aug 6 | | | | | Hours of Data: 744 | |
| Maximum Diurnal Average: 0.5 km/h at hour 13 | | | | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 0.1 km/h at hour 5 | | | | | Hours of Missing Data: 0 | |
| Monthly Average: 0.29 km/h | | | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = -0.5 P ₁₀ = -0.1 Q ₁ = 0.0 Median = 0.2 Q ₃ = 0.5 P ₉₀ = 0.8 P ₉₉ = 1.4 | | | | | Hours of Calibration: 0 | |
| | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.3 | 0.1 | 0.5 | 0.9 | 0.8 | 0.2 | 1.0 | 0.6 | 0.9 | 0.6 | 0.2 | 0.9 | 0.6 | 0.1 | 0.1 | 0.3 | -0.1 | -0.1 | 0.2 | 0.4 | 1.0 |
| 2-Aug | 0.2 | 0.0 | 0.0 | 0.2 | 0.2 | 0.2 | 0.3 | 0.1 | 0.2 | 0.1 | -0.3 | 0.1 | -0.2 | 0.2 | 0.6 | 0.0 | 0.2 | 0.8 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.8 |
| 3-Aug | 0.1 | 0.1 | 0.5 | 0.4 | 0.7 | 1.0 | 0.5 | 0.1 | 0.1 | 0.2 | 0.6 | 0.7 | 1.1 | 0.7 | 1.1 | 0.1 | 0.4 | 0.4 | 0.4 | 0.0 | -0.3 | 0.5 | 0.4 | 0.1 | 0.4 | 1.1 |
| 4-Aug | 0.2 | 0.4 | 0.2 | 0.1 | 0.3 | 0.0 | 0.1 | 0.2 | 0.3 | -0.2 | 0.7 | 0.1 | 0.3 | 0.6 | 0.0 | -0.3 | 0.2 | 0.1 | 0.2 | 0.3 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.7 |
| 5-Aug | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.2 | 0.1 | 0.0 | 0.0 | 0.5 | 0.3 | 0.2 | 1.8 | 0.5 | 0.3 | 0.8 | 0.6 | 0.7 | 0.5 | 0.5 | 0.3 | 0.0 | 0.0 | 0.0 | 0.3 | 1.8 |
| 6-Aug | 0.3 | 0.0 | 0.1 | 0.1 | -0.1 | 0.1 | 0.1 | 0.3 | 0.3 | 0.3 | 0.1 | -0.2 | -0.5 | -0.5 | -0.5 | -0.1 | -0.3 | -0.1 | 0.4 | 0.4 | -0.1 | -0.2 | 0.2 | 0.8 | 0.0 | 0.8 |
| 7-Aug | -0.5 | -0.2 | 0.0 | 0.0 | -0.1 | -0.3 | 0.5 | 0.7 | 1.1 | 0.5 | 0.9 | -0.1 | 0.7 | -0.7 | -0.2 | 0.2 | -0.2 | 0.4 | 0.2 | 0.5 | 0.1 | 0.0 | -0.2 | 0.1 | 0.1 | 1.1 |
| 8-Aug | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.2 | 0.4 | 0.3 | 0.4 | 0.7 | 1.4 | 0.7 | 0.3 | -0.1 | 0.4 | 0.1 | -0.3 | 0.5 | 0.3 | 0.4 | 0.6 | 0.2 | 0.2 | 0.3 | 0.3 | 1.4 |
| 9-Aug | 0.5 | 0.5 | 0.3 | 0.2 | 0.0 | 0.2 | 0.3 | 0.1 | 0.3 | 0.8 | 0.1 | 0.2 | -0.4 | 1.2 | -0.4 | -0.1 | 0.8 | 0.8 | 0.5 | 0.4 | -0.2 | -0.1 | 0.0 | 0.1 | 0.3 | 1.2 |
| 10-Aug | 0.9 | 0.3 | 0.6 | 0.4 | 0.6 | 0.5 | 0.3 | 0.3 | 0.1 | 0.7 | 0.2 | 1.0 | 0.5 | 1.1 | 1.8 | 0.7 | 0.0 | 0.3 | 0.4 | 0.2 | 0.0 | 0.1 | 0.2 | 0.5 | 0.5 | 1.8 |
| 11-Aug | 0.1 | 0.1 | 0.3 | 0.8 | 1.4 | 0.8 | 0.5 | 0.4 | 0.3 | -0.2 | 0.0 | 0.6 | 1.2 | 0.5 | 0.0 | 0.8 | 0.8 | 0.5 | 0.6 | 0.9 | 1.1 | 1.0 | 0.9 | 0.9 | 0.6 | 1.4 |
| 12-Aug | 0.6 | 1.0 | 1.4 | 0.9 | 0.7 | 0.6 | 0.6 | 1.0 | 0.9 | 0.7 | 1.4 | 1.5 | 1.2 | 1.3 | 1.1 | 1.3 | 1.2 | 1.4 | 0.8 | 0.8 | 0.8 | 1.3 | 1.2 | 1.1 | 1.0 | 1.5 |
| 13-Aug | 0.5 | 0.3 | 0.0 | 0.0 | 0.2 | 0.6 | 0.1 | 0.2 | 0.4 | 0.6 | 0.4 | 1.0 | 0.7 | 1.2 | 1.0 | 0.5 | 1.4 | 0.6 | 1.1 | 1.0 | 0.7 | 0.7 | 0.2 | 0.3 | 0.6 | 1.4 |
| 14-Aug | -0.2 | -0.4 | -0.3 | 0.2 | -0.4 | -0.2 | -0.2 | 0.6 | 0.7 | 0.7 | 1.0 | 0.4 | 0.0 | 0.3 | 0.3 | -0.2 | -0.1 | 0.6 | 0.2 | 0.3 | 0.8 | 0.8 | 0.8 | 0.7 | 0.3 | 1.0 |
| 15-Aug | 0.7 | 0.5 | 0.5 | 0.3 | 0.2 | 0.5 | 0.3 | 0.3 | 0.1 | 0.1 | 0.6 | 0.3 | 0.4 | -0.6 | -0.5 | 0.3 | 0.5 | 0.2 | 0.2 | 0.4 | 0.0 | 0.3 | 0.4 | 0.4 | 0.3 | 0.7 |
| 16-Aug | 0.3 | 0.2 | 0.4 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.2 | 0.4 | -0.6 | 0.2 | 0.0 | 0.1 | -0.1 | -0.1 | 0.7 | 0.3 | 0.0 | -0.1 | -0.1 | -0.2 | -0.2 | 0.1 | 0.7 |
| 17-Aug | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.2 | 0.5 | 0.3 | 0.5 | 0.3 | 1.1 | 0.1 | 0.1 | 0.3 | -0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 1.1 |
| 18-Aug | 0.0 | 0.2 | 0.1 | 0.0 | 0.1 | 0.1 | -0.1 | 0.0 | 0.2 | 0.1 | 0.4 | 0.3 | -0.1 | 0.0 | 0.2 | 0.1 | 0.8 | 0.0 | 0.2 | -0.1 | -0.2 | 0.0 | -0.2 | 0.1 | 0.1 | 0.8 |
| 19-Aug | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.4 | 0.1 | 0.1 | 0.0 | -0.1 | -0.2 | 0.6 | 0.7 | 0.4 | 0.7 | 1.1 | 0.7 | 0.3 | -0.1 | 0.2 | 0.2 | 0.1 | 0.1 | -0.2 | 0.3 | 1.1 |
| 20-Aug | 0.0 | -0.1 | 0.0 | -0.1 | -0.4 | 0.3 | 0.7 | 0.6 | 0.2 | -0.1 | 0.2 | 0.8 | 0.8 | 0.6 | 0.7 | 1.0 | 0.4 | 0.5 | 0.4 | 0.4 | 0.2 | 0.4 | 0.4 | 0.5 | 0.3 | 1.0 |
| 21-Aug | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.2 | -0.1 | -0.1 | 0.4 | 0.5 | 0.6 | 0.1 | 0.6 | -0.2 | 0.2 | 0.1 | 0.3 | 0.2 | 0.3 | 0.2 | 0.0 | 0.1 | 0.2 | -0.2 | 0.2 | 0.6 |
| 22-Aug | -0.2 | -0.5 | -0.2 | 0.0 | 0.0 | -0.1 | -0.1 | 0.0 | 0.4 | 0.0 | 1.1 | 0.0 | 1.8 | 0.8 | 0.3 | 0.5 | -0.2 | 0.1 | 0.9 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.2 | 1.8 |
| 23-Aug | 0.7 | 0.5 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.4 | 0.8 | 0.8 | 0.6 | 0.2 | 0.8 | 0.5 | 0.9 | 0.4 | 0.2 | 0.0 | -0.1 | -0.1 | 0.3 | 0.2 | 0.2 | 0.3 | 0.9 |
| 24-Aug | 0.2 | 0.1 | 0.3 | 0.7 | 0.4 | 0.7 | 0.0 | 0.8 | -0.2 | 0.2 | 0.0 | 0.8 | 0.0 | 0.2 | 0.5 | 0.6 | 0.6 | -0.1 | 0.0 | 0.4 | 0.5 | 0.3 | 0.2 | 0.0 | 0.3 | 0.8 |
| 25-Aug | 0.1 | 0.1 | 0.0 | 0.1 | -0.1 | 0.2 | 0.4 | 0.0 | 0.4 | 0.0 | 0.2 | 0.0 | 0.0 | -0.1 | 0.2 | 0.2 | 0.2 | 0.1 | 0.5 | 0.1 | 0.2 | 0.1 | 0.3 | 0.1 | 0.1 | 0.5 |
| 26-Aug | 0.2 | 0.1 | 0.1 | 0.0 | 0.1 | -0.2 | -0.3 | 0.1 | 0.2 | 0.0 | 0.5 | 0.6 | 0.5 | 1.0 | 0.2 | 0.9 | 0.0 | 0.0 | 0.5 | 0.1 | -0.1 | -0.2 | -0.1 | 0.1 | 0.2 | 1.0 |
| 27-Aug | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.2 | 0.4 | 0.2 | 0.0 | 0.0 | 0.3 | 0.3 | 0.7 | 0.1 | 0.1 | 0.4 | 0.3 | 0.6 | 0.3 | 0.2 | 0.1 | 0.0 | 0.4 | 0.4 | 0.2 | 0.7 |
| 28-Aug | 0.2 | 0.3 | 0.2 | 0.0 | 0.0 | -0.1 | 0.1 | 0.3 | 0.2 | -0.1 | 0.2 | 0.5 | 0.2 | 0.9 | 0.1 | 0.6 | 0.2 | 0.2 | 0.3 | 0.1 | 0.0 | -0.2 | 0.2 | -0.1 | 0.2 | 0.9 |
| 29-Aug | 0.0 | 0.4 | 0.3 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.0 | 0.6 | 1.2 | 0.5 | 0.5 | 0.2 | 0.5 | 0.1 | 0.9 | 0.1 | 0.3 | 0.7 | 0.2 | 0.1 | 0.0 | 0.3 | 1.2 |
| 30-Aug | -0.1 | 0.2 | -0.3 | -0.4 | -0.3 | 0.0 | -0.2 | -0.2 | -0.2 | -0.4 | 0.4 | 0.1 | 0.4 | 1.0 | 1.4 | 1.2 | 0.5 | 0.3 | 1.1 | 0.9 | 0.6 | 0.6 | 0.8 | 1.0 | 0.4 | 1.4 |
| 31-Aug | 0.7 | 0.5 | 0.6 | 0.3 | 0.2 | 0.4 | 0.7 | 0.5 | 0.3 | 0.3 | 0.0 | 0.4 | 0.1 | 0.3 | 0.5 | 0.1 | 0.6 | 0.2 | 0.3 | 0.1 | 0.0 | 0.0 | 0.1 | 0.1 | 0.3 | 0.7 |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Vertical Wind Speed 75 m (VW75m) - km/h
Mannix - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.4 km/h on Aug 19 15:00 Minimum Value: 0.1 km/h on Aug 9 21:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.5 Q ₁ = 0.8 Median = 1.6 Q ₃ = 2.5 P ₉₀ = 3.1 P ₉₉ = 3.9 | | | | | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | |
|--|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.7 | 0.6 | 1.3 | 2.3 | 2.6 | 2.8 | 3.4 | 3.3 | 3.8 | 3.6 | 3.5 | 3.5 | 2.7 | 2.2 | 1.5 | 0.6 | 0.5 | 0.2 | 0.5 | 3.8 |
| 2-Aug | 0.6 | 0.2 | 0.3 | 0.3 | 0.2 | 0.3 | 0.6 | 0.9 | 1.2 | 1.6 | 1.8 | 2.6 | 2.8 | 2.7 | 3.0 | 2.4 | 1.6 | 2.0 | 1.2 | 0.3 | 0.5 | 0.2 | 0.3 | 0.7 | 3.0 |
| 3-Aug | 0.5 | 0.7 | 0.8 | 0.5 | 0.6 | 0.7 | 0.9 | 1.1 | 1.5 | 1.9 | 2.7 | 2.9 | 2.7 | 2.7 | 2.6 | 2.2 | 2.1 | 1.3 | 0.7 | 2.6 | 1.5 | 2.0 | 1.2 | 1.5 | 2.9 |
| 4-Aug | 0.8 | 0.6 | 0.4 | 0.5 | 0.8 | 0.9 | 0.6 | 0.5 | 0.8 | 0.7 | 1.3 | 1.4 | 2.3 | 3.0 | 2.3 | 1.8 | 1.2 | 0.7 | 0.3 | 0.7 | 0.3 | 0.7 | 0.5 | 1.0 | 3.0 |
| 5-Aug | 0.5 | 0.7 | 0.3 | 0.2 | 0.2 | 0.2 | 0.4 | 0.8 | 1.0 | 2.1 | 2.5 | 2.6 | 2.9 | 2.9 | 2.9 | 2.3 | 2.6 | 1.1 | 1.6 | 1.0 | 0.5 | 0.2 | 0.2 | 0.3 | 2.9 |
| 6-Aug | 0.5 | 0.4 | 0.5 | 0.5 | 0.4 | 0.4 | 1.1 | 1.7 | 1.3 | 2.0 | 2.3 | 2.5 | 2.2 | 2.1 | 1.9 | 2.2 | 1.5 | 1.2 | 1.7 | 1.6 | 1.4 | 1.6 | 1.3 | 1.6 | 2.5 |
| 7-Aug | 1.5 | 1.0 | 0.8 | 1.1 | 0.9 | 0.8 | 1.5 | 1.7 | 1.7 | 1.8 | 2.2 | 2.5 | 2.6 | 2.5 | 2.7 | 2.7 | 2.6 | 2.2 | 1.4 | 0.8 | 0.2 | 0.4 | 0.4 | 0.4 | 2.7 |
| 8-Aug | 0.6 | 0.6 | 0.4 | 1.0 | 0.7 | 0.6 | 0.8 | 0.8 | 1.1 | 1.8 | 2.3 | 2.7 | 2.8 | 2.8 | 2.6 | 2.8 | 2.3 | 2.1 | 1.5 | 0.9 | 0.3 | 0.6 | 0.6 | 0.4 | 2.8 |
| 9-Aug | 0.6 | 0.7 | 0.6 | 0.5 | 0.3 | 0.4 | 0.5 | 0.8 | 1.0 | 1.9 | 2.2 | 2.2 | 1.9 | 2.8 | 2.6 | 2.2 | 2.0 | 2.0 | 1.3 | 0.6 | 0.1 | 0.2 | 0.7 | 0.5 | 2.8 |
| 10-Aug | 0.6 | 1.7 | 1.4 | 0.8 | 0.6 | 0.5 | 0.8 | 1.2 | 1.4 | 1.6 | 2.2 | 2.5 | 2.8 | 2.5 | 3.1 | 3.1 | 2.2 | 1.8 | 0.7 | 0.8 | 0.5 | 0.3 | 0.4 | 0.4 | 3.1 |
| 11-Aug | 0.4 | 0.5 | 0.4 | 0.7 | 0.6 | 0.7 | 0.8 | 0.9 | 1.2 | 1.5 | 2.0 | 2.5 | 2.9 | 3.2 | 2.9 | 2.8 | 2.6 | 1.9 | 1.6 | 1.2 | 0.5 | 0.7 | 0.4 | 0.7 | 3.2 |
| 12-Aug | 0.6 | 0.6 | 0.6 | 1.0 | 0.7 | 0.9 | 1.2 | 1.8 | 2.0 | 2.4 | 3.2 | 3.5 | 3.4 | 3.3 | 3.4 | 3.5 | 3.3 | 2.9 | 2.2 | 1.6 | 0.6 | 0.8 | 0.7 | 0.8 | 3.5 |
| 13-Aug | 1.2 | 1.2 | 1.4 | 1.3 | 1.4 | 1.7 | 2.2 | 2.1 | 2.4 | 3.3 | 3.8 | 3.8 | 4.0 | 3.8 | 3.8 | 3.7 | 3.9 | 3.5 | 3.2 | 2.5 | 1.9 | 1.8 | 1.5 | 1.6 | 4.0 |
| 14-Aug | 2.0 | 2.2 | 2.3 | 2.4 | 2.2 | 2.4 | 2.1 | 2.1 | 2.3 | 2.1 | 2.6 | 2.6 | 2.8 | 2.6 | 2.7 | 1.6 | 1.2 | 1.3 | 0.8 | 0.8 | 0.6 | 0.6 | 0.6 | 0.8 | 2.8 |
| 15-Aug | 1.2 | 1.2 | 0.6 | 1.4 | 1.1 | 0.7 | 0.5 | 0.7 | 0.8 | 0.9 | 1.4 | 1.6 | 2.0 | 1.9 | 1.9 | 1.9 | 1.8 | 1.6 | 1.4 | 1.4 | 1.3 | 1.1 | 0.7 | 0.9 | 2.0 |
| 16-Aug | 0.6 | 0.6 | 0.3 | 0.5 | 0.4 | 0.4 | 0.3 | 0.5 | 1.4 | 1.4 | 2.2 | 2.3 | 2.7 | 2.3 | 2.6 | 2.3 | 2.0 | 2.1 | 1.5 | 0.8 | 0.3 | 0.4 | 0.4 | 0.5 | 2.7 |
| 17-Aug | 0.7 | 0.7 | 0.7 | 0.7 | 0.4 | 0.3 | 0.5 | 1.3 | 0.9 | 1.7 | 2.3 | 2.6 | 2.9 | 3.1 | 2.4 | 2.5 | 1.9 | 1.5 | 0.7 | 0.2 | 0.2 | 0.6 | 1.3 | 0.7 | 3.1 |
| 18-Aug | 0.5 | 1.0 | 0.9 | 1.5 | 0.9 | 0.7 | 0.8 | 1.4 | 2.4 | 3.1 | 2.7 | 3.2 | 3.3 | 3.7 | 3.0 | 3.1 | 2.8 | 2.5 | 2.4 | 2.3 | 2.6 | 2.5 | 2.0 | 2.3 | 3.7 |
| 19-Aug | 2.7 | 2.6 | 2.2 | 1.6 | 1.6 | 2.0 | 2.1 | 2.3 | 3.2 | 3.4 | 3.8 | 3.5 | 3.8 | 3.7 | 4.4 | 3.7 | 2.6 | 1.7 | 1.1 | 1.3 | 0.9 | 0.8 | 0.6 | 0.7 | 4.4 |
| 20-Aug | 0.8 | 1.1 | 1.7 | 1.8 | 1.8 | 1.7 | 1.9 | 2.2 | 2.7 | 3.0 | 3.2 | 3.6 | 3.5 | 3.5 | 3.7 | 3.9 | 3.9 | 3.0 | 2.0 | 1.4 | 0.9 | 1.6 | 2.0 | 1.6 | 3.9 |
| 21-Aug | 0.9 | 0.7 | 0.8 | 1.2 | 0.9 | 1.3 | 1.2 | 1.3 | 1.2 | 1.4 | 2.2 | 2.8 | 3.3 | 3.5 | 2.8 | 2.5 | 2.5 | 1.3 | 1.6 | 0.7 | 0.3 | 0.6 | 0.6 | 1.0 | 3.5 |
| 22-Aug | 1.2 | 0.7 | 0.8 | 1.2 | 0.5 | 0.4 | 0.7 | 1.0 | 1.3 | 1.3 | 2.0 | 1.9 | 2.0 | 2.3 | 2.3 | 2.1 | 1.8 | 1.6 | 1.4 | 0.8 | 0.6 | 1.4 | 2.2 | 2.5 | 2.5 |
| 23-Aug | 2.4 | 2.0 | 1.8 | 1.3 | 1.5 | 1.6 | 1.7 | 1.4 | 1.8 | 2.0 | 2.0 | 2.5 | 1.6 | 1.1 | 1.9 | 2.4 | 2.6 | 2.4 | 2.7 | 2.6 | 2.2 | 2.2 | 1.8 | 1.4 | 2.7 |
| 24-Aug | 1.7 | 1.4 | 2.0 | 2.3 | 1.3 | 1.9 | 1.7 | 1.8 | 1.8 | 2.4 | 2.8 | 2.3 | 2.7 | 1.8 | 3.0 | 3.9 | 3.1 | 2.9 | 2.2 | 1.8 | 0.8 | 2.0 | 1.9 | 1.6 | 3.9 |
| 25-Aug | 2.4 | 1.7 | 1.4 | 1.2 | 1.5 | 1.6 | 1.6 | 2.3 | 2.6 | 2.5 | 2.5 | 2.6 | 3.2 | 4.0 | 3.9 | 4.3 | 4.1 | 3.8 | 3.0 | 1.9 | 2.0 | 2.7 | 2.7 | 2.1 | 4.3 |
| 26-Aug | 3.4 | 2.7 | 2.4 | 2.7 | 2.4 | 2.0 | 1.6 | 2.0 | 2.0 | 2.3 | 2.8 | 3.1 | 3.1 | 3.4 | 3.2 | 3.1 | 2.7 | 2.4 | 2.6 | 1.1 | 0.9 | 0.7 | 1.1 | 1.3 | 3.4 |
| 27-Aug | 1.5 | 1.7 | 1.9 | 1.9 | 1.8 | 1.5 | 2.2 | 3.0 | 2.6 | 2.7 | 3.5 | 3.5 | 3.7 | 3.4 | 3.2 | 3.2 | 2.7 | 2.7 | 1.5 | 0.5 | 0.3 | 0.4 | 0.7 | 0.3 | 3.7 |
| 28-Aug | 0.6 | 0.8 | 0.5 | 0.3 | 0.5 | 0.7 | 0.5 | 1.2 | 1.7 | 2.1 | 2.7 | 3.0 | 3.2 | 3.4 | 3.2 | 3.1 | 2.5 | 2.1 | 1.4 | 1.2 | 0.9 | 0.6 | 0.4 | 0.5 | 3.4 |
| 29-Aug | 0.3 | 0.6 | 0.5 | 0.4 | 0.2 | 0.3 | 0.4 | 0.7 | 1.2 | 1.8 | 2.0 | 2.2 | 3.1 | 3.0 | 2.8 | 2.8 | 2.2 | 1.8 | 1.2 | 1.1 | 2.2 | 2.4 | 2.1 | 1.3 | 3.1 |
| 30-Aug | 2.0 | 1.7 | 2.3 | 2.5 | 2.7 | 2.5 | 2.8 | 2.5 | 3.1 | 2.7 | 3.5 | 3.6 | 3.9 | 4.2 | 3.9 | 3.8 | 3.1 | 2.6 | 2.1 | 1.5 | 1.5 | 1.4 | 1.0 | 1.1 | 4.2 |
| 31-Aug | 1.1 | 0.9 | 0.7 | 0.8 | 0.5 | 1.0 | 1.2 | 1.2 | 1.1 | 1.4 | 1.8 | 2.3 | 2.4 | 3.2 | 3.8 | 3.5 | 3.2 | 2.5 | 2.5 | 1.7 | 0.7 | 1.0 | 1.4 | 1.9 | 3.8 |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |



| Maximum Value: 2.2 km/h on Aug 10 15:00 | | Maximum Daily Average: 0.7 km/h on Aug 1 | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|---|------|--------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|---------------|---------------|
| Minimum Value: -1.0 km/h on Aug 25 14:00 | | Minimum Daily Average: -0.4 km/h on Aug 25 | | Hours of Data: 743 | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 0.4 km/h at hour 11 | | Minimum Diurnal Average: 0.0 km/h at hour 5 | | Hours of Missing Data: 1 | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 0.17 km/h | | Percentiles: $P_1 = -0.7$ $P_{10} = -0.4$ $Q_1 = -0.1$ Median = 0.1 $Q_3 = 0.4$ $P_{90} = 0.7$ $P_{99} = 1.5$ | | Hours of Calibration: 0 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Percent Operational Time: 99.9 | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0.3 | 0.2 | 0.1 | 0.2 | 0.2 | 0.5 | 0.2 | 0.7 | 1.4 | 1.1 | 0.5 | 1.7 | 1.1 | 1.5 | 1.0 | 0.9 | 1.6 | 1.3 | 0.7 | 0.7 | 1.0 | 0.5 | 0.3 | 0.3 | 0.7 | 1.7 |
| 2-Aug | 0.2 | 0.2 | 0.1 | 0.2 | 0.2 | 0.1 | 0.2 | -0.1 | 0.1 | 0.1 | -0.4 | 0.0 | -0.4 | -0.1 | 0.4 | -0.2 | 0.2 | 0.8 | -0.1 | -0.1 | -0.3 | -0.2 | -0.2 | -0.3 | 0.0 | 0.8 |
| 3-Aug | -0.1 | -0.2 | 0.0 | -0.1 | 0.1 | 0.5 | 0.1 | -0.1 | 0.0 | 0.3 | 0.6 | 0.5 | 1.0 | 0.7 | 1.1 | -0.1 | 0.4 | 0.4 | 0.3 | 0.3 | -0.3 | 0.8 | 0.8 | 0.5 | 0.3 | 1.1 |
| 4-Aug | 0.3 | 0.5 | 0.2 | 0.2 | 0.3 | 0.2 | 0.3 | 0.1 | 0.3 | -0.1 | 0.8 | 0.2 | 0.3 | 0.4 | -0.1 | -0.4 | 0.0 | 0.0 | 0.2 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.8 |
| 5-Aug | 0.3 | 0.4 | -0.1 | 0.1 | 0.0 | 0.1 | 0.0 | -0.2 | -0.1 | 0.4 | 0.2 | 0.0 | 1.9 | 0.6 | -0.1 | 0.6 | 0.1 | 0.0 | -0.1 | 0.1 | -0.2 | -0.4 | -0.4 | -0.4 | 0.1 | 1.9 |
| 6-Aug | -0.3 | -0.2 | 0.1 | 0.0 | 0.0 | 0.3 | 0.6 | 0.5 | 0.3 | 0.8 | 1.2 | 1.2 | 0.6 | 0.6 | 0.2 | 0.8 | 0.3 | 0.5 | 0.9 | 1.1 | 0.6 | 0.4 | 1.1 | 1.5 | 0.5 | 1.5 |
| 7-Aug | -0.1 | 0.3 | 0.7 | 0.4 | 0.3 | 0.1 | 1.1 | 1.3 | 1.3 | 0.9 | 1.3 | 0.2 | 1.0 | -0.6 | -0.3 | 0.4 | -0.3 | 0.3 | 0.2 | 0.4 | 0.0 | -0.2 | -0.6 | -0.1 | 0.3 | 1.3 |
| 8-Aug | -0.1 | -0.3 | -0.3 | -0.2 | -0.2 | -0.1 | 0.1 | 0.1 | 0.2 | 0.5 | 1.5 | 0.8 | 0.1 | -0.1 | 0.4 | 0.1 | -0.3 | 0.4 | 0.2 | 0.0 | -0.1 | -0.5 | -0.4 | -0.4 | 0.1 | 1.5 |
| 9-Aug | 0.0 | 0.0 | -0.2 | -0.2 | -0.4 | -0.1 | 0.0 | -0.1 | 0.2 | 0.6 | -0.2 | -0.1 | -0.5 | 1.2 | -0.6 | -0.3 | 0.8 | 0.6 | 0.3 | 0.0 | -0.6 | -0.6 | -0.2 | 0.0 | 0.0 | 1.2 |
| 10-Aug | 0.2 | 0.3 | 0.5 | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | 0.0 | 0.9 | 0.2 | 1.3 | 0.7 | 1.4 | 2.2 | 0.8 | 0.0 | 0.1 | -0.1 | -0.3 | -0.2 | 0.0 | 0.1 | 0.1 | 0.4 | 2.2 |
| 11-Aug | 0.0 | -0.1 | 0.0 | 0.3 | 0.8 | 0.3 | 0.2 | 0.1 | 0.3 | -0.2 | -0.1 | 0.6 | 1.3 | 0.6 | -0.3 | 0.6 | 0.5 | 0.3 | 0.4 | 0.6 | 0.5 | 0.2 | 0.0 | 0.0 | 0.3 | 1.3 |
| 12-Aug | -0.1 | 0.1 | 0.3 | 0.4 | 0.2 | 0.1 | 0.5 | 0.7 | 0.2 | 0.1 | 0.9 | 0.6 | 0.1 | 0.3 | 0.4 | 0.6 | 0.6 | 0.9 | 0.2 | 0.1 | 0.0 | 0.2 | 0.1 | 0.5 | 0.3 | 0.9 |
| 13-Aug | 0.7 | 0.5 | 0.4 | 0.5 | 1.2 | 1.3 | 0.5 | 0.4 | 0.4 | 0.6 | 0.6 | 0.8 | 0.7 | 0.8 | 0.8 | 0.5 | 1.4 | 0.6 | 0.5 | 0.4 | 0.5 | 0.6 | 0.6 | 0.7 | 0.7 | 1.4 |
| 14-Aug | 0.0 | -0.8 | -0.4 | 0.0 | -0.6 | -0.3 | -0.1 | 0.4 | 0.2 | 0.6 | 0.8 | 0.1 | -0.4 | -0.1 | -0.1 | -0.7 | -0.4 | 0.5 | 0.0 | 0.3 | 0.3 | 0.6 | 0.4 | 0.5 | 0.0 | 0.8 |
| 15-Aug | 0.6 | 0.7 | 0.2 | 0.4 | 0.3 | 0.4 | 0.1 | 0.2 | 0.0 | 0.1 | 0.6 | 0.2 | 0.4 | -0.7 | -0.6 | 0.5 | 0.8 | 0.4 | 0.0 | 0.3 | UO | 0.5 | 0.4 | 0.4 | 0.3 | 0.8 |
| 16-Aug | 0.3 | 0.2 | 0.4 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.0 | 0.4 | -0.7 | 0.0 | -0.1 | 0.1 | -0.1 | -0.3 | 0.6 | 0.1 | -0.2 | -0.4 | -0.5 | -0.7 | -0.5 | 0.0 | 0.6 |
| 17-Aug | -0.1 | 0.1 | 0.1 | 0.0 | 0.0 | -0.1 | -0.1 | -0.1 | 0.0 | 0.4 | 0.3 | 0.4 | 0.1 | 0.9 | -0.2 | -0.1 | 0.2 | -0.4 | 0.0 | -0.1 | -0.2 | -0.4 | -0.4 | -0.2 | 0.0 | 0.9 |
| 18-Aug | -0.1 | -0.2 | -0.3 | -0.3 | -0.2 | -0.2 | -0.5 | -0.8 | -0.3 | -0.3 | -0.1 | -0.1 | -0.7 | -0.5 | -0.3 | -0.7 | 0.0 | -0.6 | -0.3 | -0.8 | -0.6 | -0.6 | -0.7 | -0.4 | -0.4 | 0.0 |
| 19-Aug | -0.4 | -0.3 | 0.1 | 0.1 | -0.1 | 0.1 | -0.1 | -0.3 | -0.5 | -0.8 | -0.7 | 0.2 | 0.4 | -0.1 | 0.4 | 0.9 | 0.4 | 0.2 | -0.1 | 0.1 | 0.2 | 0.0 | 0.0 | -0.3 | 0.0 | 0.9 |
| 20-Aug | -0.2 | -0.3 | -0.3 | -0.3 | -0.7 | 0.0 | 0.7 | 0.4 | -0.1 | -0.4 | 0.0 | 0.5 | 0.6 | 0.4 | 0.5 | 0.6 | 0.0 | 0.2 | 0.1 | 0.3 | 0.1 | 0.2 | 0.1 | 0.4 | 0.1 | 0.7 |
| 21-Aug | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | -0.2 | -0.3 | 0.3 | 0.3 | 0.5 | -0.2 | 0.3 | -0.4 | 0.1 | -0.1 | 0.2 | 0.0 | 0.1 | 0.1 | 0.0 | 0.1 | 0.5 | 0.3 | 0.1 | 0.5 |
| 22-Aug | 0.5 | 0.1 | 0.3 | 0.9 | 0.3 | 0.1 | 0.3 | 0.2 | 0.5 | 0.1 | 1.4 | 0.1 | 1.8 | 0.8 | 0.3 | 0.4 | -0.1 | 0.3 | 0.9 | 0.4 | 0.4 | 0.4 | 0.1 | -0.2 | 0.4 | 1.8 |
| 23-Aug | 0.4 | 0.5 | 0.0 | 0.5 | 0.2 | 0.0 | 0.5 | 0.5 | 0.4 | 0.4 | 0.6 | 0.0 | -0.2 | 0.3 | 0.6 | 0.7 | 0.4 | 0.5 | 0.2 | 0.1 | 0.4 | 0.7 | 0.6 | 0.4 | 0.4 | 0.7 |
| 24-Aug | 0.6 | 0.4 | 0.9 | 0.6 | 0.3 | 0.9 | -0.2 | 0.7 | -0.3 | -0.1 | -0.1 | 0.9 | -0.1 | 0.1 | 0.5 | 0.2 | 0.4 | -0.2 | -0.1 | 0.6 | 0.0 | -0.3 | -0.1 | -0.5 | 0.2 | 0.9 |
| 25-Aug | -0.3 | -0.4 | -0.4 | -0.5 | -0.6 | -0.3 | -0.1 | -0.4 | -0.1 | -0.6 | -0.4 | -0.6 | -0.6 | -1.0 | -0.6 | -0.6 | -0.3 | -0.4 | 0.0 | -0.2 | -0.3 | -0.4 | -0.3 | -0.4 | -0.4 | 0.0 |
| 26-Aug | -0.4 | -0.2 | -0.3 | -0.3 | -0.2 | -0.3 | -0.6 | -0.2 | 0.0 | -0.3 | 0.2 | 0.4 | 0.2 | 0.8 | 0.0 | 0.7 | -0.4 | -0.3 | 0.0 | -0.3 | -0.4 | -0.5 | -0.5 | -0.3 | -0.1 | 0.8 |
| 27-Aug | -0.3 | -0.3 | -0.4 | -0.4 | -0.2 | -0.1 | 0.2 | 0.0 | -0.2 | -0.5 | -0.1 | 0.0 | 0.4 | -0.3 | -0.3 | 0.1 | 0.1 | 0.4 | 0.3 | 0.2 | 0.1 | 0.1 | 0.4 | 0.3 | 0.0 | 0.4 |
| 28-Aug | 0.1 | 0.5 | 0.2 | -0.1 | -0.1 | -0.1 | 0.0 | 0.1 | 0.1 | -0.3 | 0.1 | 0.4 | -0.1 | 0.6 | -0.1 | 0.5 | 0.1 | 0.3 | 0.4 | 0.4 | 0.2 | 0.0 | 0.2 | 0.1 | 0.2 | 0.6 |
| 29-Aug | 0.1 | 0.5 | 0.4 | 0.1 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.1 | 0.7 | 1.4 | 0.6 | 0.8 | 0.4 | 0.4 | 0.1 | 1.1 | 0.3 | 0.7 | 0.4 | 0.0 | 0.3 | 0.6 | 0.4 | 1.4 |
| 30-Aug | 0.1 | 0.8 | -0.1 | -0.7 | -0.5 | -0.4 | -0.8 | -0.1 | -0.1 | -0.3 | 0.5 | 0.3 | 0.4 | 1.0 | 1.2 | 1.1 | 0.8 | 0.4 | 0.8 | 0.2 | 0.0 | -0.1 | -0.1 | 0.2 | 0.2 | 1.2 |
| 31-Aug | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.3 | 0.4 | 0.2 | 0.0 | 0.0 | -0.3 | 0.1 | -0.3 | -0.1 | 0.0 | -0.2 | 0.4 | -0.1 | 0.1 | -0.1 | -0.1 | -0.2 | -0.2 | 0.0 | 0.0 | 0.4 |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| 0.1 0.1 0.1 0.1 0.0 0.1 0.1 0.1 0.1 0.2 0.1 0.4 0.4 0.4 0.3 0.2 0.3 0.3 0.3 0.2 0.2 0.0 0.0 0.0 0.1 0.1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.7 0.8 0.9 0.9 1.2 1.3 1.1 1.3 1.4 1.1 1.5 1.7 1.9 1.5 2.2 1.1 1.6 1.3 0.9 1.1 1.0 0.8 1.1 1.5 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| UO - Unstable Operation | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Vertical Wind Speed 90 m (VW90m) - km/h
Mannix - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.5 km/h on Aug 19 15:00 Minimum Value: 0.1 km/h on Aug 9 21:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.4 Q ₁ = 0.8 Median = 1.6 Q ₃ = 2.5 P ₉₀ = 3.2 P ₉₉ = 4.1 | | | | | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9 | |
|--|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 0.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.6 | 0.6 | 1.5 | 2.4 | 2.7 | 2.9 | 3.7 | 3.5 | 3.9 | 3.9 | 3.8 | 3.8 | 2.8 | 2.3 | 1.4 | 0.5 | 0.4 | 0.2 | 0.5 | 3.9 |
| 2-Aug | 0.3 | 0.2 | 0.2 | 0.3 | 0.2 | 0.3 | 0.5 | 0.9 | 1.1 | 1.7 | 1.9 | 2.7 | 2.9 | 2.8 | 3.2 | 2.5 | 1.7 | 2.1 | 1.2 | 0.3 | 0.6 | 0.2 | 0.4 | 0.9 | 3.2 |
| 3-Aug | 0.4 | 0.7 | 1.0 | 0.6 | 0.6 | 0.6 | 0.8 | 1.0 | 1.5 | 1.9 | 2.6 | 3.2 | 3.1 | 2.7 | 2.8 | 2.3 | 2.2 | 1.4 | 0.8 | 2.9 | 2.0 | 1.5 | 1.2 | 1.2 | 3.2 |
| 4-Aug | 0.8 | 0.6 | 0.5 | 0.5 | 0.7 | 0.6 | 0.6 | 0.6 | 0.8 | 0.7 | 1.4 | 1.4 | 2.3 | 2.6 | 2.4 | 1.7 | 1.3 | 0.7 | 0.3 | 0.6 | 0.4 | 0.4 | 0.5 | 1.1 | 2.6 |
| 5-Aug | 0.6 | 0.8 | 0.4 | 0.2 | 0.2 | 0.2 | 0.3 | 0.7 | 0.9 | 2.1 | 2.6 | 2.8 | 3.0 | 2.8 | 3.1 | 2.5 | 2.7 | 1.1 | 1.5 | 1.0 | 0.4 | 0.3 | 0.2 | 0.3 | 3.1 |
| 6-Aug | 0.5 | 0.4 | 0.6 | 0.5 | 0.4 | 0.5 | 1.1 | 1.7 | 1.3 | 2.0 | 2.2 | 2.3 | 2.2 | 2.0 | 2.0 | 2.3 | 1.7 | 1.1 | 1.7 | 1.6 | 1.5 | 1.7 | 1.1 | 1.6 | 2.3 |
| 7-Aug | 1.7 | 1.1 | 1.0 | 1.3 | 1.1 | 0.9 | 1.5 | 1.7 | 1.8 | 1.8 | 2.3 | 2.5 | 2.7 | 2.8 | 2.8 | 2.8 | 2.6 | 2.4 | 1.6 | 0.9 | 0.2 | 0.4 | 0.4 | 0.4 | 2.8 |
| 8-Aug | 0.6 | 0.7 | 0.5 | 1.2 | 0.8 | 0.5 | 0.7 | 0.7 | 1.1 | 1.8 | 2.4 | 2.8 | 2.9 | 3.0 | 2.8 | 2.9 | 2.5 | 2.1 | 1.6 | 0.8 | 0.4 | 0.4 | 0.4 | 0.4 | 3.0 |
| 9-Aug | 0.7 | 0.7 | 0.6 | 0.6 | 0.3 | 0.2 | 0.4 | 0.7 | 0.9 | 1.9 | 2.2 | 2.4 | 2.0 | 3.0 | 2.9 | 2.4 | 2.0 | 2.1 | 1.3 | 0.7 | 0.1 | 0.3 | 0.8 | 0.6 | 3.0 |
| 10-Aug | 0.5 | 1.0 | 1.2 | 0.8 | 0.6 | 0.5 | 0.8 | 1.1 | 1.3 | 1.7 | 2.5 | 2.5 | 2.9 | 2.5 | 3.3 | 2.9 | 2.2 | 1.7 | 0.7 | 0.8 | 0.6 | 0.3 | 0.4 | 0.4 | 3.3 |
| 11-Aug | 0.4 | 0.5 | 0.4 | 0.5 | 0.4 | 0.6 | 0.6 | 0.8 | 1.2 | 1.3 | 1.9 | 2.6 | 3.1 | 3.4 | 3.0 | 3.0 | 2.8 | 2.1 | 1.6 | 1.2 | 0.6 | 0.6 | 0.4 | 0.6 | 3.4 |
| 12-Aug | 0.5 | 0.4 | 0.4 | 0.7 | 0.7 | 0.9 | 1.1 | 1.8 | 2.1 | 2.6 | 3.5 | 3.9 | 3.7 | 3.5 | 3.5 | 3.8 | 3.5 | 3.1 | 2.0 | 1.6 | 0.5 | 0.8 | 0.7 | 0.8 | 3.9 |
| 13-Aug | 1.0 | 1.1 | 1.1 | 1.0 | 1.2 | 1.2 | 1.9 | 2.1 | 2.7 | 3.4 | 4.0 | 4.1 | 4.3 | 4.2 | 4.1 | 3.8 | 3.9 | 3.6 | 3.3 | 2.5 | 1.9 | 1.6 | 1.4 | 1.4 | 4.3 |
| 14-Aug | 1.8 | 1.8 | 2.1 | 2.4 | 2.1 | 2.4 | 2.0 | 2.2 | 2.5 | 2.3 | 2.9 | 2.7 | 2.9 | 2.7 | 2.9 | 1.6 | 1.3 | 1.4 | 0.8 | 0.7 | 0.4 | 0.4 | 0.5 | 0.6 | 2.9 |
| 15-Aug | 1.0 | 1.0 | 0.6 | 1.3 | 0.8 | 0.7 | 0.5 | 0.7 | 0.8 | 0.8 | 1.5 | 1.6 | 2.1 | 2.0 | 1.9 | 2.0 | 1.7 | 1.5 | 1.4 | 1.3 | UO | 1.3 | 0.7 | 0.8 | 2.1 |
| 16-Aug | 0.5 | 0.5 | 0.3 | 0.6 | 0.4 | 0.4 | 0.3 | 0.5 | 1.4 | 1.3 | 2.1 | 2.3 | 2.8 | 2.4 | 2.6 | 2.4 | 1.9 | 2.1 | 1.5 | 0.8 | 0.3 | 0.4 | 0.4 | 0.5 | 2.8 |
| 17-Aug | 0.7 | 0.9 | 0.8 | 0.9 | 0.4 | 0.3 | 0.4 | 1.4 | 0.9 | 1.8 | 2.4 | 2.7 | 2.9 | 3.2 | 2.5 | 2.4 | 1.9 | 1.6 | 0.8 | 0.2 | 0.2 | 0.6 | 1.2 | 0.5 | 3.2 |
| 18-Aug | 0.6 | 1.1 | 0.9 | 1.7 | 1.0 | 0.8 | 0.8 | 1.2 | 2.4 | 3.2 | 3.0 | 3.4 | 3.4 | 3.9 | 3.1 | 3.2 | 2.8 | 2.6 | 2.4 | 2.4 | 2.5 | 2.4 | 2.1 | 2.4 | 3.9 |
| 19-Aug | 2.8 | 2.6 | 2.2 | 1.5 | 1.5 | 2.0 | 2.1 | 2.4 | 3.2 | 3.6 | 3.9 | 3.6 | 3.9 | 3.9 | 4.5 | 3.6 | 2.7 | 1.8 | 1.2 | 1.4 | 0.9 | 0.8 | 0.7 | 0.7 | 4.5 |
| 20-Aug | 0.8 | 1.0 | 1.6 | 1.8 | 1.9 | 1.8 | 1.9 | 2.2 | 2.6 | 3.1 | 3.5 | 3.8 | 3.5 | 3.6 | 3.9 | 4.0 | 4.1 | 3.1 | 1.9 | 1.3 | 0.9 | 1.6 | 2.1 | 1.7 | 4.1 |
| 21-Aug | 0.9 | 0.7 | 0.8 | 1.2 | 1.1 | 1.3 | 1.2 | 1.3 | 1.3 | 1.4 | 2.3 | 2.9 | 3.5 | 3.6 | 3.0 | 2.7 | 2.6 | 1.3 | 1.6 | 0.6 | 0.2 | 0.6 | 0.7 | 0.9 | 3.6 |
| 22-Aug | 1.2 | 0.7 | 0.7 | 1.0 | 0.6 | 0.4 | 0.7 | 1.0 | 1.4 | 1.2 | 2.1 | 2.0 | 2.0 | 2.4 | 2.5 | 2.0 | 1.9 | 1.7 | 1.4 | 0.7 | 0.5 | 0.8 | 2.0 | 2.3 | 2.5 |
| 23-Aug | 2.2 | 2.0 | 1.6 | 1.0 | 1.3 | 1.1 | 1.2 | 1.2 | 1.7 | 2.1 | 2.2 | 2.7 | 1.7 | 1.1 | 1.9 | 2.5 | 2.7 | 2.5 | 2.7 | 2.7 | 2.3 | 2.3 | 1.9 | 1.3 | 2.7 |
| 24-Aug | 1.6 | 1.3 | 1.6 | 2.3 | 3.0 | 1.5 | 1.6 | 1.7 | 1.9 | 2.4 | 2.6 | 2.1 | 2.6 | 1.8 | 2.6 | 2.9 | 2.4 | 2.9 | 2.3 | 1.7 | 0.8 | 2.1 | 2.0 | 1.6 | 3.0 |
| 25-Aug | 2.4 | 1.7 | 1.5 | 1.2 | 1.6 | 1.8 | 1.6 | 2.4 | 2.7 | 2.6 | 2.6 | 2.7 | 3.4 | 4.2 | 4.1 | 4.3 | 4.2 | 4.1 | 3.1 | 2.0 | 2.1 | 2.9 | 2.9 | 2.2 | 4.3 |
| 26-Aug | 3.6 | 2.8 | 2.5 | 2.8 | 2.5 | 2.3 | 1.7 | 2.2 | 2.1 | 2.4 | 3.0 | 3.4 | 3.3 | 3.5 | 3.5 | 3.5 | 2.9 | 2.5 | 2.8 | 1.2 | 0.8 | 0.8 | 1.2 | 1.3 | 3.6 |
| 27-Aug | 1.6 | 1.7 | 1.9 | 1.9 | 1.9 | 1.6 | 2.2 | 3.2 | 2.8 | 2.8 | 3.7 | 3.5 | 3.8 | 3.4 | 3.3 | 3.2 | 2.8 | 2.6 | 1.5 | 0.5 | 0.3 | 0.4 | 0.7 | 0.3 | 3.8 |
| 28-Aug | 0.7 | 0.7 | 0.5 | 0.3 | 0.5 | 0.6 | 0.5 | 1.1 | 1.7 | 2.2 | 2.7 | 3.2 | 3.3 | 3.5 | 3.3 | 3.2 | 2.5 | 2.0 | 1.3 | 1.3 | 1.0 | 0.6 | 0.4 | 0.4 | 3.5 |
| 29-Aug | 0.3 | 0.6 | 0.5 | 0.4 | 0.2 | 0.3 | 0.4 | 0.7 | 1.1 | 1.9 | 2.1 | 2.3 | 3.2 | 3.1 | 2.9 | 2.6 | 2.2 | 1.9 | 1.2 | 0.9 | 1.5 | 1.9 | 2.1 | 1.3 | 3.2 |
| 30-Aug | 1.6 | 1.7 | 1.9 | 2.3 | 2.5 | 2.3 | 2.5 | 2.4 | 3.0 | 2.8 | 3.6 | 3.8 | 4.0 | 4.4 | 4.0 | 4.0 | 3.2 | 2.7 | 2.2 | 1.4 | 1.5 | 1.4 | 1.0 | 1.1 | 4.4 |
| 31-Aug | 1.1 | 0.9 | 0.7 | 0.9 | 0.5 | 0.9 | 1.2 | 1.3 | 1.0 | 1.4 | 1.8 | 2.3 | 2.5 | 3.3 | 3.8 | 3.4 | 3.2 | 2.4 | 2.5 | 1.6 | 0.6 | 0.9 | 1.3 | 2.0 | 3.8 |
| 3.6 2.8 2.5 2.8 3.0 2.4 2.5 3.2 3.2 3.6 4.0 4.1 4.3 4.4 4.5 4.3 4.2 4.1 3.3 2.9 2.5 2.9 2.9 2.4 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |
| UO - Unstable Operation | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association

SO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|--------------|
| Station Name: | Mannix | Station number: | AMS 05 |
| Calibration Date: | August 14, 2017 | Last Cal Date: | July 6, 2017 |
| Start time (MST): | 9:42 | End time (MST): | 12:40 |
| Reason: | Routine | | |

Calibration Standards

| | | | | |
|-----------------------|------------------|-----|------------------|------------------|
| Cal Gas Concentration | <u>49.2</u> | ppm | Cal Gas Exp Date | November 4, 2019 |
| Cal Gas Cylinder # | <u>EY0000646</u> | | | |
| Calibrator Make/Model | Sabio 4010 | | Serial Number | 14300410 |
| ZAG Make/Model | API 701 | | Serial Number | 146 |

Analyzer Information

Analyzer make: Thermo 43i

Analyzer serial #: 108841399

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|----------------------|--------------|---------------|--------------|--------------|---------------|
| Analyzer Range | 0 - 1000 ppb | | PMT voltage | -635 | -635 |
| Calculated slope | 1.002378 | 1.003448 | Lamp voltage | 815 | 816 |
| Calculated intercept | 0.360876 | 0.582550 | Pressure | 690.3 | 694.0 |
| Analyzer Background | 7.2 | 7.2 | Flow | 0.466 | 0.469 |
| Analyzer Coefficient | 0.911 | 0.911 | Intensity | 91 | 90 |

SO₂ Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 4998 | 0.0 | 0.0 | -0.2 | ---- |
| as found span | 4935 | 61.0 | 600.7 | 598.6 | 1.004 |
| calibrator zero | 4998 | 0.0 | 0.0 | -0.2 | ---- |
| high point | 4933 | 61.0 | 601.0 | 598.6 | 1.004 |
| second point | 4970 | 30.5 | 300.1 | 298.0 | 1.007 |
| third point | 4981 | 15.2 | 149.7 | 148.4 | 1.009 |
| as left zero | 4998 | 0.0 | 0.0 | 0.0 | ---- |
| as left span | 4933 | 61.0 | 601.0 | 600.0 | 1.002 |
| Average Correction Factor | | | | | 1.007 |
| Corrected As found | 598.80 | Previous response | 598.93 | *% change | 0.0% |

* = > +/-5% change initiates investigation

Notes:

Changed inlet filter after asfinds. No adjustments made.

Calibration Performed By:

Jayme Marcoux



Wood Buffalo Environmental Association

SO₂ Calibration Summary

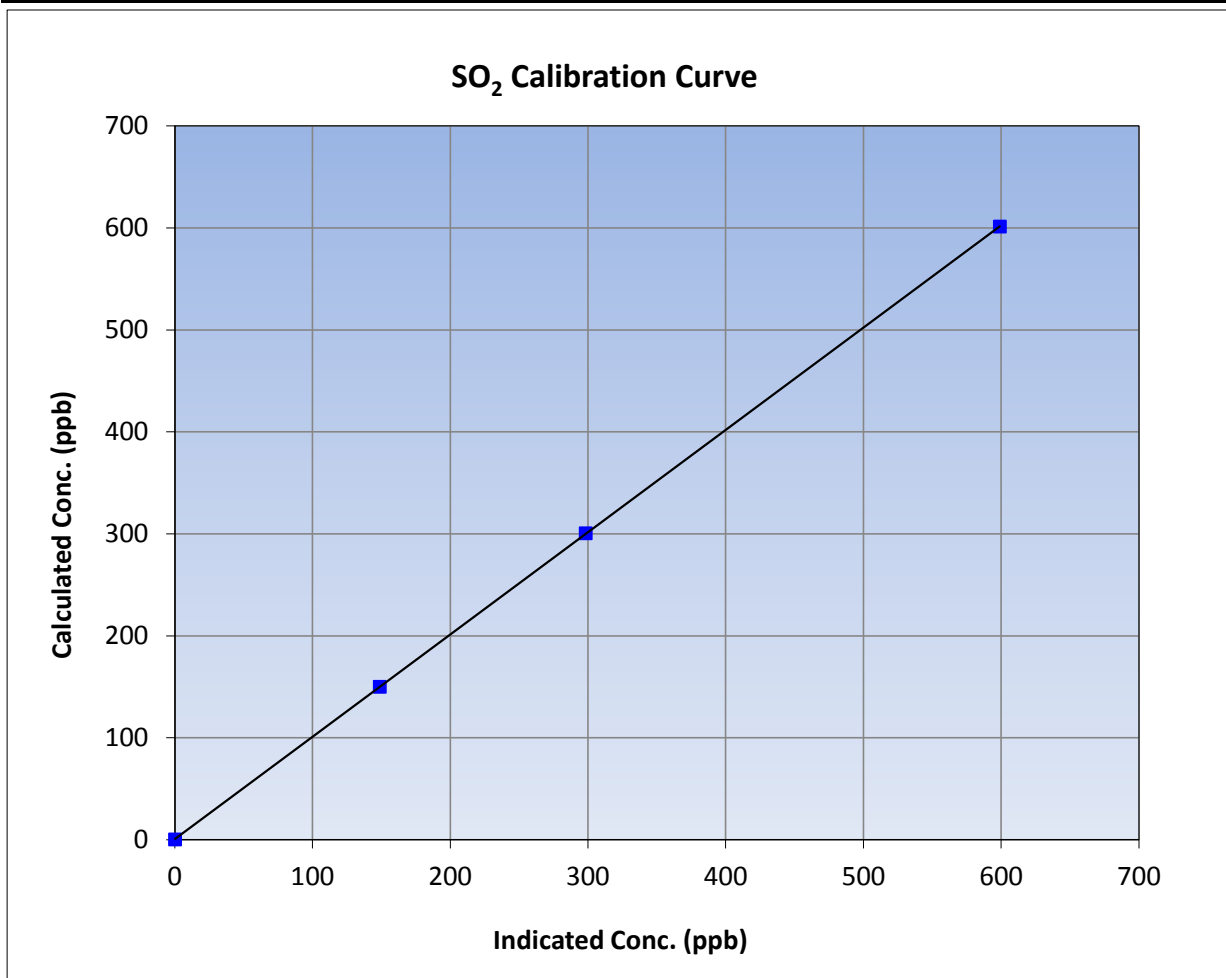
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|--------------|
| Calibration Date | August 14, 2017 | Previous Calibration | July 6, 2017 |
| Station Name | Mannix | Station Number | AMS 05 |
| Start Time (MST) | 9:42 | End Time (MST) | 12:40 |
| Analyzer make | Thermo 43i | Analyzer serial # | 108841399 |

Calibration Data

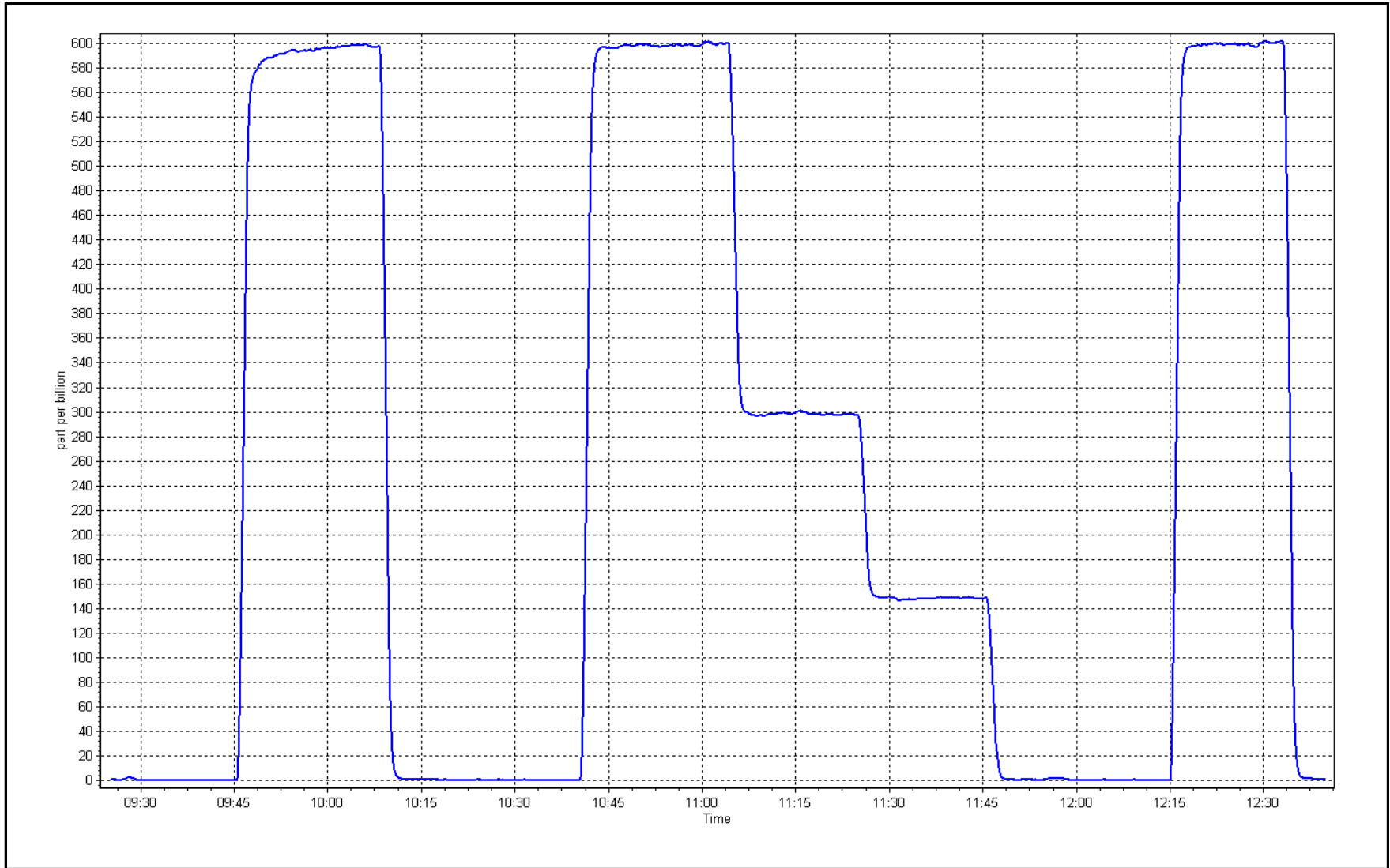
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-------------|
| 0.0 | -0.2 | ---- | Correlation Coefficient | ≥0.995 |
| 601.0 | 598.6 | 1.0039 | | |
| 300.1 | 298.0 | 1.0070 | Slope | 0.90 - 1.10 |
| 149.7 | 148.4 | 1.0086 | | |
| | | | Intercept | +/-30 |



SO2 Calibration Plot

Date: August 14, 2017

Location: Mannix





Wood Buffalo Environmental Association

H₂S Calibration Report

Version-06-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|--------------|
| Station Name: | Mannix | Station number: | AMS 05 |
| Calibration Date: | August 10, 2017 | Last Cal Date: | July 7, 2017 |
| Start time (MST): | 8:33 | End time (MST): | 12:42 |
| Reason: | Routine | | |

Calibration Standards

| | | | | |
|-----------------------|------------------|-----|------------------|------------------|
| Cal Gas Concentration | <u>5.03</u> | ppm | Cal Gas Exp Date | December 2, 2019 |
| Cal Gas Cylinder # | <u>ET0005008</u> | | | |
| Calibrator Make/Model | Sabio 4010 | | Serial Number | 14300410 |
| ZAG Make/Model | API T701 | | Serial Number | 138 |

Analyzer Information

| | | | | | |
|----------------------|--------------|--------------------|--------------|---------------|-------|
| Analyzer make: | Thermo 430i | Analyzer serial #: | 815129108 | | |
| | <u>Start</u> | <u>Finish</u> | <u>Start</u> | <u>Finish</u> | |
| Analyzer Range | 0 - 100 ppb | PMT voltage | -644 | -644 | |
| Calculated slope | 0.996260 | 0.998932 | Lamp voltage | 794 | 796 |
| Calculated intercept | 0.039194 | -0.033394 | Pressure | 537.4 | 536.5 |
| Analyzer Background | 16.5 | 16.7 | Flow | 1.003 | 1.038 |
| Analyzer Coefficient | 0.971 | 0.973 | Intensity | 96 | 96 |

H₂S Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5997 | 0.0 | 0.0 | 0.2 | ---- |
| as found span | 5912 | 85.2 | 71.5 | 70.3 | 1.016 |
| calibrator zero | 5997 | 0.0 | 0.0 | 0.0 | ---- |
| high point | 5912 | 85.2 | 71.5 | 71.5 | 0.999 |
| second point | 5953 | 45.5 | 38.2 | 38.4 | 0.994 |
| third point | 5967 | 28.5 | 23.9 | 23.9 | 1.000 |
| as left zero | 5997 | 0.0 | 0.0 | 0.1 | ---- |
| as left span | 5912 | 85.2 | 71.5 | 71.9 | 0.994 |
| SO2 Scrubber Check | 4982 | 15.2 | 152.1 | 0.9 | ---- |
| Average Correction Factor | | | | | 0.998 |
| Corrected As found | 70.10 | Previous response | 71.69 | *% change | 2.3% |

* = > +/-5% change initiates investigation

Notes: Changed inlet filter after asfinds. Installed new pump. Flow was low and pressure was low. The blue separator for the inlet filters was in the filter holder blocking the flow. Removed it and flows and pressure returned to normal. Adjusted the zero and the span.

Calibration Performed By: Jayme Marcoux



Wood Buffalo Environmental Association

H₂S Calibration Summary

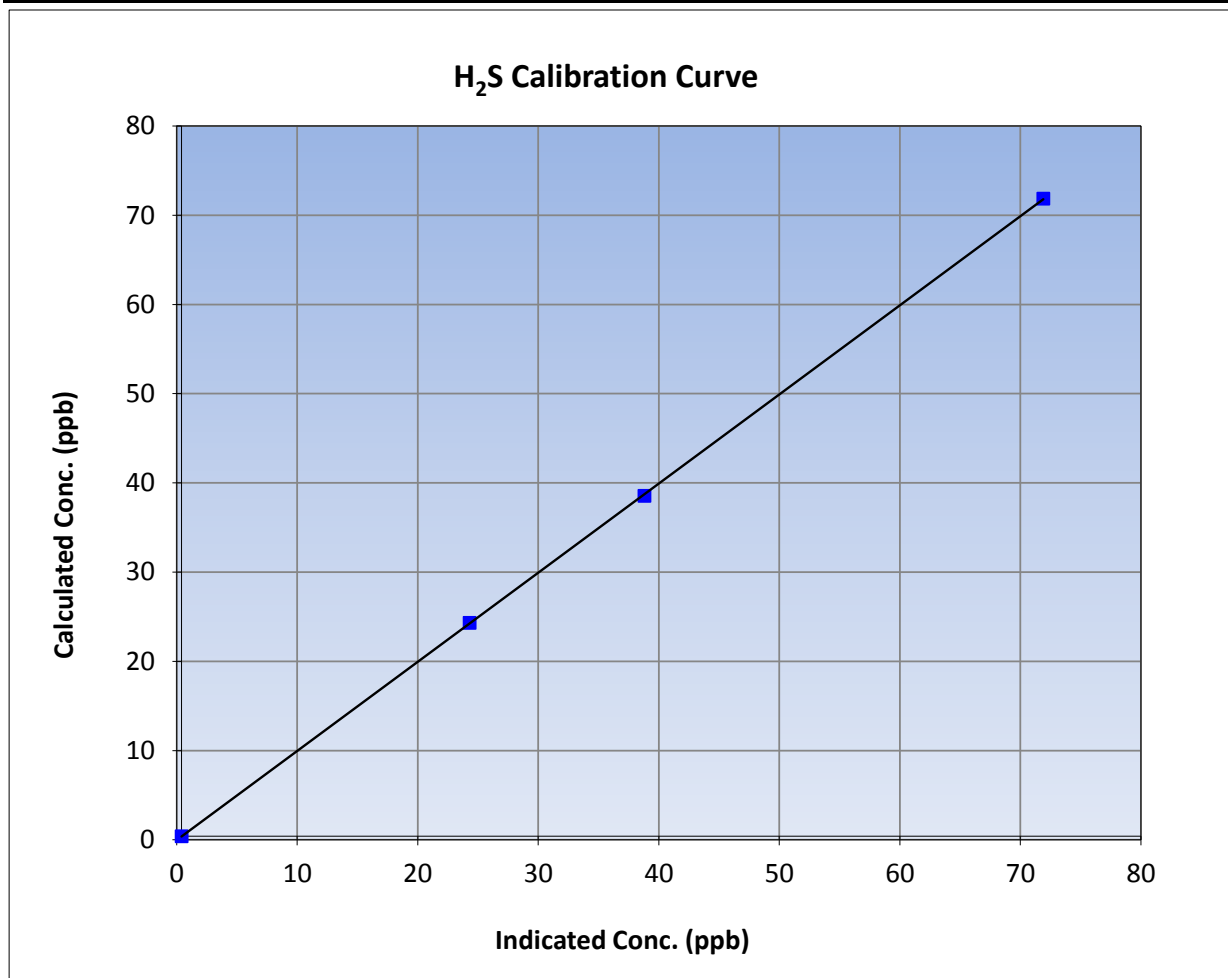
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|--------------|
| Calibration Date | August 10, 2017 | Previous Calibration | July 7, 2017 |
| Station Name | Mannix | Station Number | AMS 05 |
| Start Time (MST) | 8:33 | End Time (MST) | 12:42 |
| Analyzer make | Thermo 430i | Analyzer serial # | 815129108 |

Calibration Data

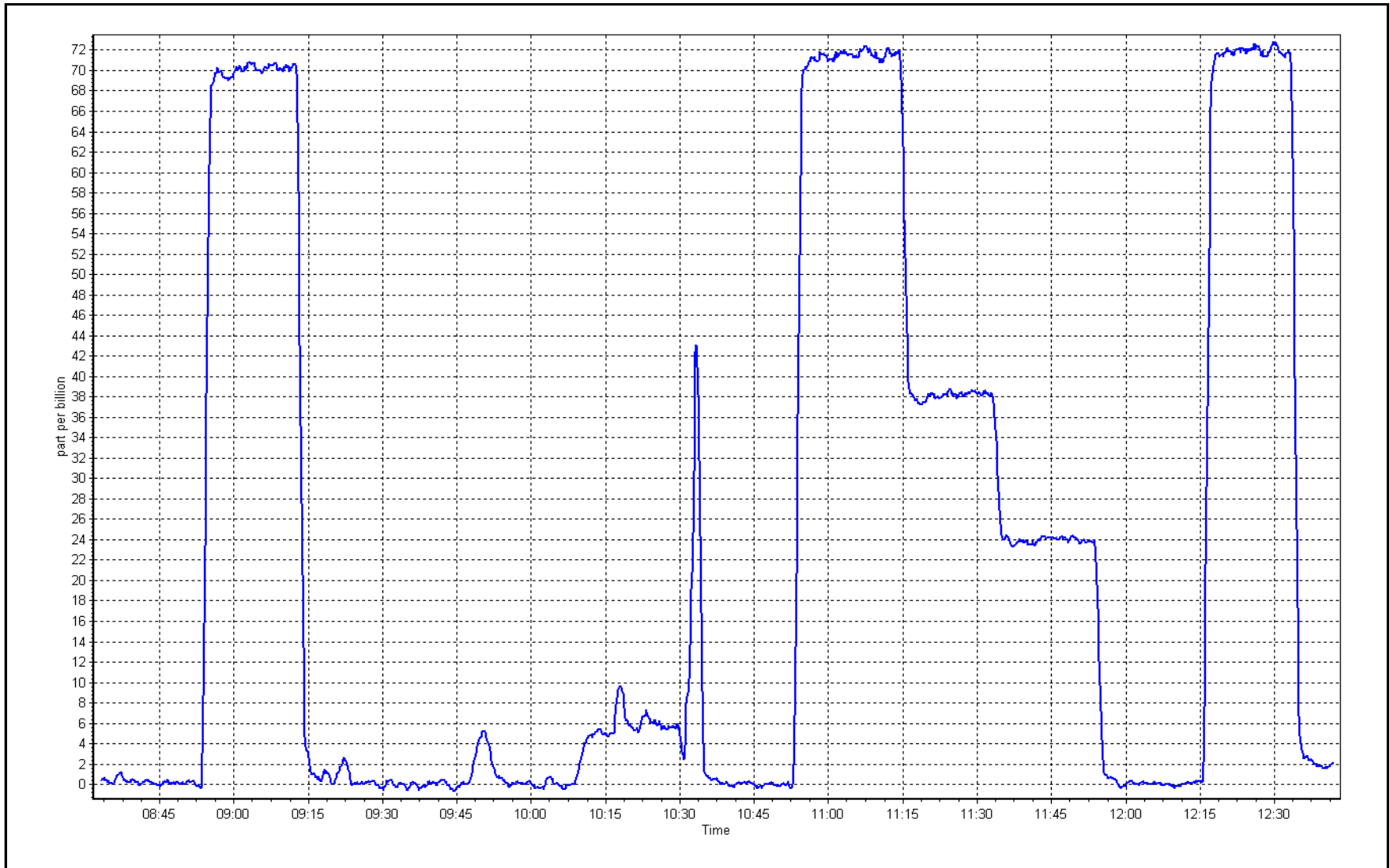
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | ≥0.995 |
| 71.5 | 71.5 | 0.9994 | | |
| 38.2 | 38.4 | 0.9936 | Slope | 0.90 - 1.10 |
| 23.9 | 23.9 | 1.0004 | | |
| | | | Intercept | +/-3 |



H₂S Calibration Plot

Date: August 10, 2017

Location: Mannix





Wood Buffalo Environmental Association

THC Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|--------------|
| Station Name: | Mannix | Station number: | AMS 05 |
| Calibration Date: | August 14, 2017 | Last Cal Date: | July 6, 2017 |
| Start time (MST): | 9:24 | End time (MST): | 12:35 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|-----------------------|------------------|---------------------|------------------|
| Gas Cert Reference | EY0000646 | Cal Gas Expiry Date | November 4, 2019 |
| CH4 Cal Gas Conc. | <u>514.0</u> ppm | CH4 Equiv Conc. | 1064.0 ppm |
| C3H8 Cal Gas Conc. | <u>200.0</u> ppm | Station temp. | 22 Deg C |
| Calibrator Make/Model | Sabio 4080 | Serial Number | 14300410 |
| ZAG Make/Model | Teledyne API 701 | Serial Number | 146 |

Analyzer Information

| | | | |
|----------------------|---------------|---------------------|---------------|
| Analyzer make: | Thermo 51i-LT | Analyzer serial #: | 1317958295 |
| | <u>Start</u> | <u>Finish</u> | <u>Start</u> |
| Analyzer Range | 0 - 25 ppm | Bias voltage supply | -296 |
| Calculated slope | 1.004572 | Sample pressure | 9.4 |
| Calculated intercept | 0.000143 | Fuel pressure | 20.2 |
| Analyzer Background | 3.41 | Air pressure | 42.3 |
| Analyzer Coefficient | 3.584 | Flame temperature | 162.0 |
| | | | <u>Finish</u> |

THC Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 4997 | 0.0 | 0.00 | -0.06 | ---- |
| as found span | 4935 | 61.0 | 12.99 | 12.63 | 1.029 |
| calibrator zero | 4997 | 0.0 | 0.00 | -0.02 | ---- |
| high point | 4935 | 61.0 | 12.99 | 12.93 | 1.005 |
| second point | 4970 | 30.5 | 6.49 | 6.41 | 1.013 |
| third point | 4983 | 15.2 | 3.24 | 3.22 | 1.004 |
| as left zero | 4997 | 0.0 | 0.00 | -0.04 | ---- |
| as left span | 4933 | 61.0 | 13.00 | 12.97 | 1.002 |
| Average Correction Factor | | | | | 1.007 |
| Corrected As found | 12.69 | Previous response | 12.93 | *% change | 1.9% |

* = > +/-5% change initiates investigation

Notes: Changed inlet filter after as founds. Adjusted the zero and the span.

Calibration Performed By: Jayme Marcoux



Wood Buffalo Environmental Association

THC Calibration Summary

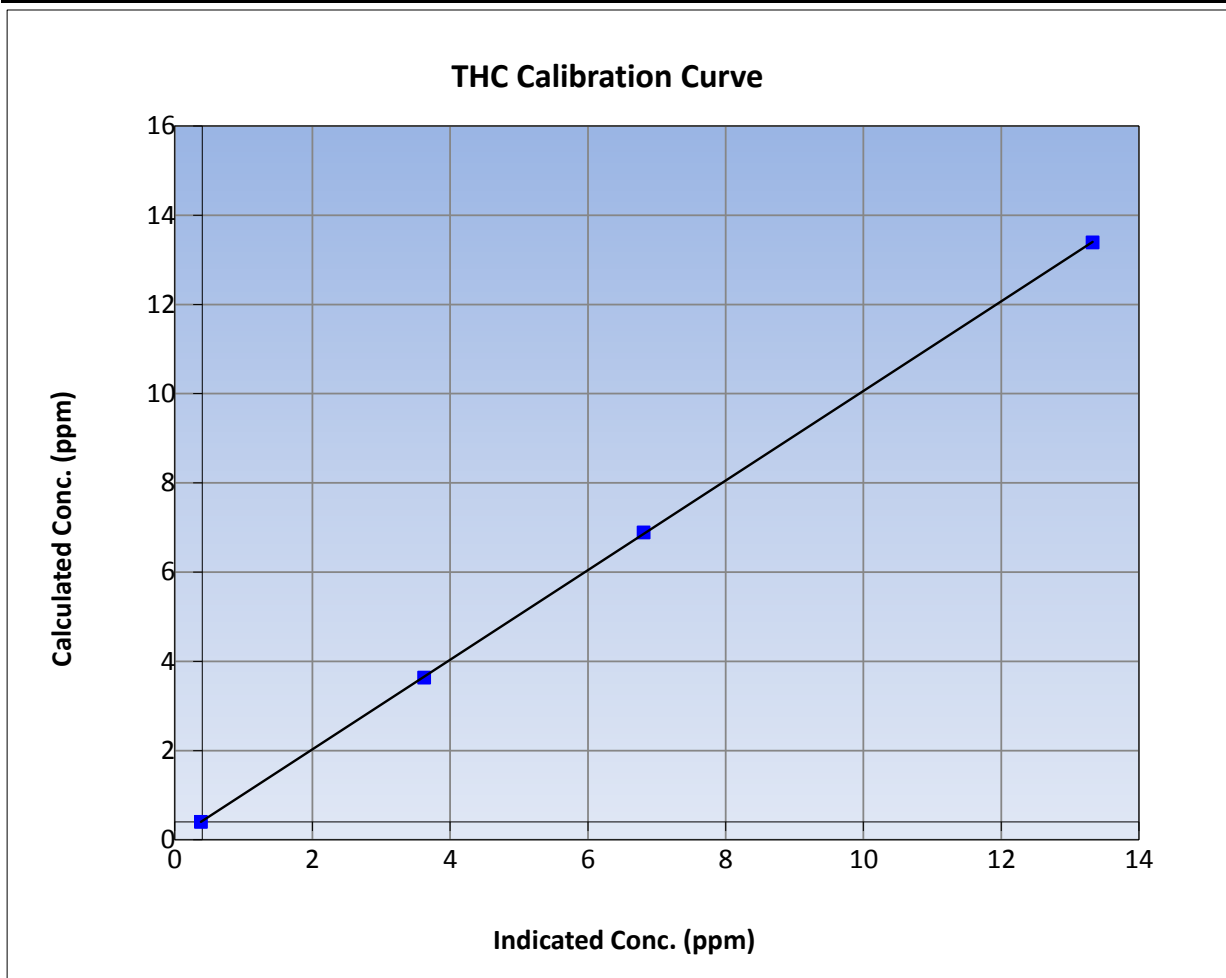
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|--------------|
| Calibration Date | August 14, 2017 | Previous Calibration | July 6, 2017 |
| Station Name | Mannix | Station Number | AMS 05 |
| Start Time (MST) | 9:24 | End Time (MST) | 12:35 |
| Analyzer make | Thermo 51i-LT | Analyzer serial # | 1317958295 |

Calibration Data

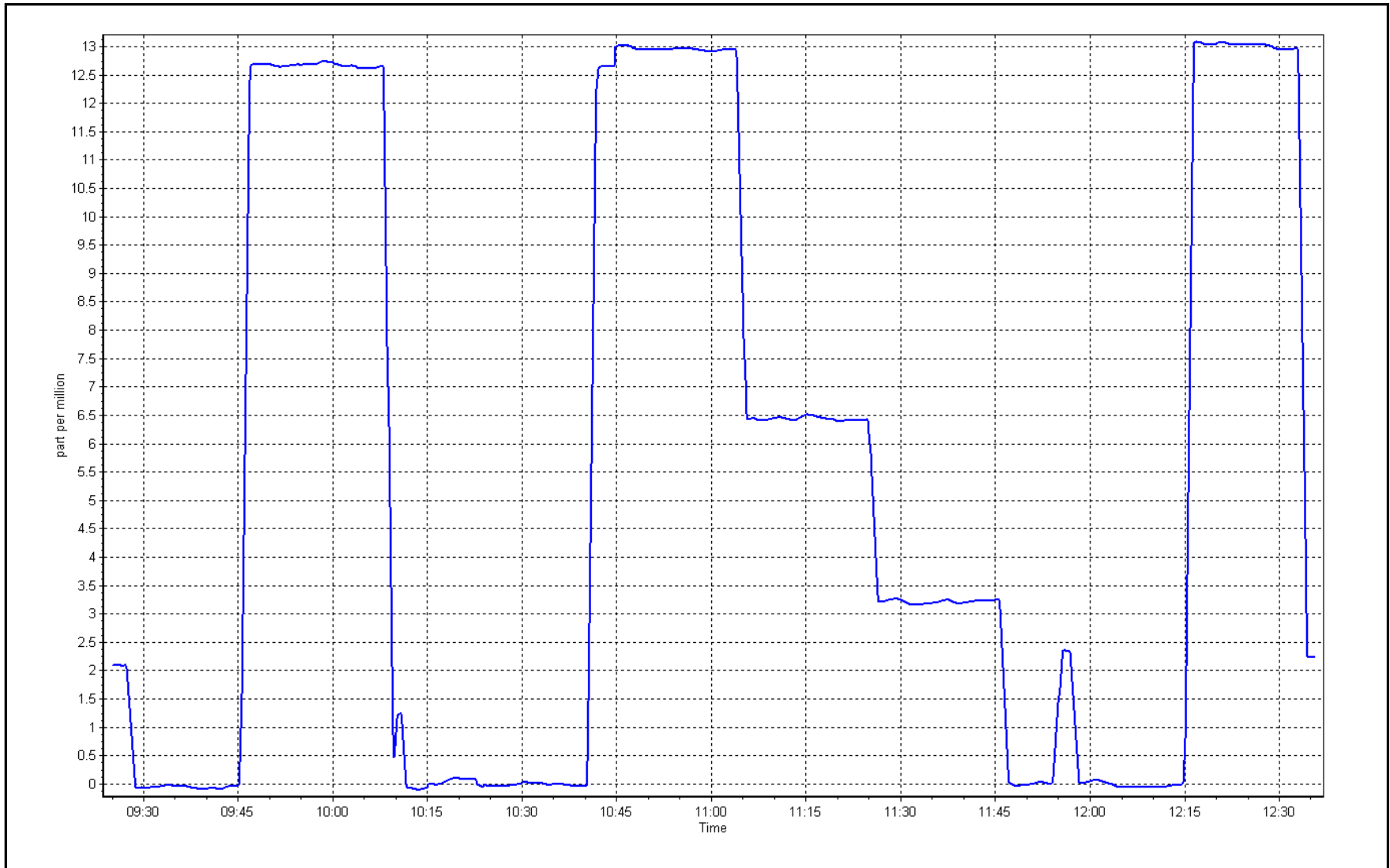
| Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (lc) | Correction factor (Cc/lc) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | 0.999981 | ≥0.995 |
| 13.0 | 12.9 | 1.0049 | | | |
| 6.5 | 6.4 | 1.0128 | Slope | 1.004153 | 0.90 - 1.10 |
| 3.2 | 3.2 | 1.0039 | | | |
| | | | Intercept | 0.021018 | +/-1.5 |



THC Calibration Plot

Date: August 14, 2017

Location: Mannix





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 6
PATRICIA MCINNES
AUGUST 2017

Operations, Data Collection,
QA/QC, Data Validation and Reporting by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

September 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)
AUGUST 2017

MONTHLY SUMMARY for
AMD SECTION III.B.1(c)

| Parameter | Hours of Data | Hours of Calibration | Hours without Data | Operational Time | Maximum 1-Hour Value | 1-Hour Exceedances | Maximum 24-Hour Value | 24-Hour Exceedances |
|-----------------------------------|---------------|----------------------|--------------------|------------------|----------------------|--------------------|-----------------------|---------------------|
| SO2 (ppb) Average | 707 | 36 | 37 | 99.87 | 21 | 0 | 4 | 0 |
| TRS (ppb) Average | 708 | 35 | 36 | 99.87 | 2 | 0 | 1 | 0 |
| THC (ppm) Average | 707 | 36 | 37 | 99.87 | 2.4 | - | 2.1 | - |
| NMHC(ppm) Average | 707 | 36 | 37 | 99.87 | 0.063 | - | 0.004 | - |
| CH4(ppm) Average | 707 | 36 | 37 | 99.87 | 2.4 | - | 2.1 | - |
| O3 (ppb) Average | 708 | 35 | 36 | 99.87 | 58 | 0 | 49 | - |
| NO2 (ppb) Average | 706 | 37 | 38 | 99.87 | 17 | 0 | 9 | - |
| NO (ppb) Average | 706 | 37 | 38 | 99.87 | 28 | - | 5 | - |
| NOX (ppb) Average | 706 | 37 | 38 | 99.87 | 45 | - | 14 | - |
| NH3 (ppb) Average | 641 | 47 | 103 | 92.47 | 0 | 0 | 0 | - |
| PM2.5 (ug/m3) Average | 742 | 2 | 2 | 100 | 97.9 | - | 29.5 | 0 |
| Temperature 2 m (C) Average | 744 | 0 | 0 | 100 | 30.6 | - | 23.9 | - |
| Relative Humidity (%) Average | 744 | 0 | 0 | 100 | 100 | - | 88 | - |
| Wind Speed 10 m (km/h) Average | 744 | 0 | 0 | 100 | 28 | - | 18 | - |
| Wind Direction 10 m (deg) Average | 744 | 0 | 0 | 100 | - | - | - | - |

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)
AUGUST 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

| Parameter | Number | Mean | StnDev | Total | Percentile | | | | | | |
|-----------------------------------|--------|-------|--------|-------|------------|------|------|--------|------|------|-------|
| | | | | | Min | P10 | Q1 | Median | Q3 | P90 | Max |
| SO2 (ppb) Average | 707 | 0.4 | 1 | - | 0 | 0 | 0 | 0 | 0 | 1 | 21 |
| TRS (ppb) Average | 708 | 0.3 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| THC (ppm) Average | 707 | 1.92 | 0.1 | - | 1.8 | 1.8 | 1.9 | 1.9 | 2 | 2 | 2.4 |
| NMHC(ppm) Average | 707 | 0.001 | 0.004 | - | 0 | 0 | 0 | 0 | 0 | 0 | 0.063 |
| CH4(ppm) Average | 707 | 1.92 | 0.1 | - | 1.8 | 1.8 | 1.9 | 1.9 | 2 | 2 | 2.4 |
| O3 (ppb) Average | 708 | 28.6 | 10 | - | 7 | 15 | 22 | 28 | 35 | 42 | 58 |
| NO2 (ppb) Average | 706 | 2 | 2 | - | 0 | 0 | 1 | 1 | 3 | 5 | 17 |
| NO (ppb) Average | 706 | 0.8 | 2 | - | 0 | 0 | 0 | 0 | 1 | 2 | 28 |
| NOX (ppb) Average | 706 | 2.8 | 4 | - | 0 | 0 | 1 | 2 | 3 | 5 | 45 |
| NH3 (ppb) Average | 641 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PM2.5 (ug/m3) Average | 742 | 8.36 | 9.8 | - | 0.9 | 1.7 | 2.8 | 5.6 | 9.8 | 18.3 | 97.9 |
| Temperature 2 m (C) Average | 744 | 17.65 | 5.3 | - | 3.4 | 11.1 | 13.6 | 17.5 | 21.9 | 24.4 | 30.6 |
| Relative Humidity (%) Average | 744 | 61.2 | 20 | - | 24 | 32 | 44 | 62 | 77 | 90 | 100 |
| Wind Speed 10 m (km/h) Average | 744 | 10.3 | 6 | - | 0 | 4 | 6 | 9 | 14 | 19 | 28 |
| Wind Direction 10 m (deg) Average | 744 | - | - | - | - | - | - | - | - | - | - |

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)
AUGUST 2017

OPERATIONAL NOTES

| Parameter | Period Start | Period End | Duration (Hours) | Notes |
|------------------------|-------------------|-------------------|---------------------|--|
| NOX, O3, SO2, THC, TRS | 10 Aug 2017 09:00 | 10 Aug 2017 09:00 | 1 | Maintenance - Station operator on site |
| NH3 | 01 Aug 2017 05:00 | 31 Aug 2017 06:00 | 56 | Stabilization after daily span |



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Patricia McInnes - August 2017

| | | | | |
|---|--|----------|---------------------------|------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 21 ppb on Aug 22 19:00 | Maximum Daily Average: 3.7 ppb on Aug 22 | | Hours of Data: | 707 |
| Minimum Value: 0 ppb on Aug 3 20:00 | Minimum Daily Average: 0.0 ppb on Aug 21 | | Hours of Missing Data: | 37 |
| Maximum Diurnal Average: 1.2 ppb at hour 19 | Minimum Diurnal Average: 0.1 ppb at hour 6 | | Hours of Calibration: | 36 |
| Monthly Average: 0.4 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 8 | | Percent Operational Time: | 99.9 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | C | C | C | C | C | 3 | 3 | 2 | 3 | 2 | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 1.2 | 3 |
| 2-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0.4 | 1 |
| 4-Aug | 2 | 1 | Z | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 2 |
| 5-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 6-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.2 | 1 |
| 7-Aug | 0 | 0 | 0 | 0 | 0 | Z | 1 | 2 | 3 | 5 | 10 | 5 | 2 | 2 | 4 | 7 | 8 | 5 | 5 | 3 | 1 | 0 | 0 | 0 | 2.8 | 10 |
| 8-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 9-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 10-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | M | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 3 |
| 11-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 12-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 13-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 14-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 15-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 16-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 17-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 18-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 19-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 20-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 22-Aug | 0 | 0 | Z | 0 | 1 | 1 | 1 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 1 | 8 | 21 | 15 | 9 | 6 | 5 | 2 | 3.7 | 21 |
| 23-Aug | 2 | 1 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 2 |
| 24-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 25-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 26-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 28-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 29-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 9 | 4 | 4 | 3 | 2 | 1 | 4 | 5 | 1 | 1 | 1 | 1 | 1 | 1.7 | 9 |
| 30-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.4 | 1 |
| 31-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |

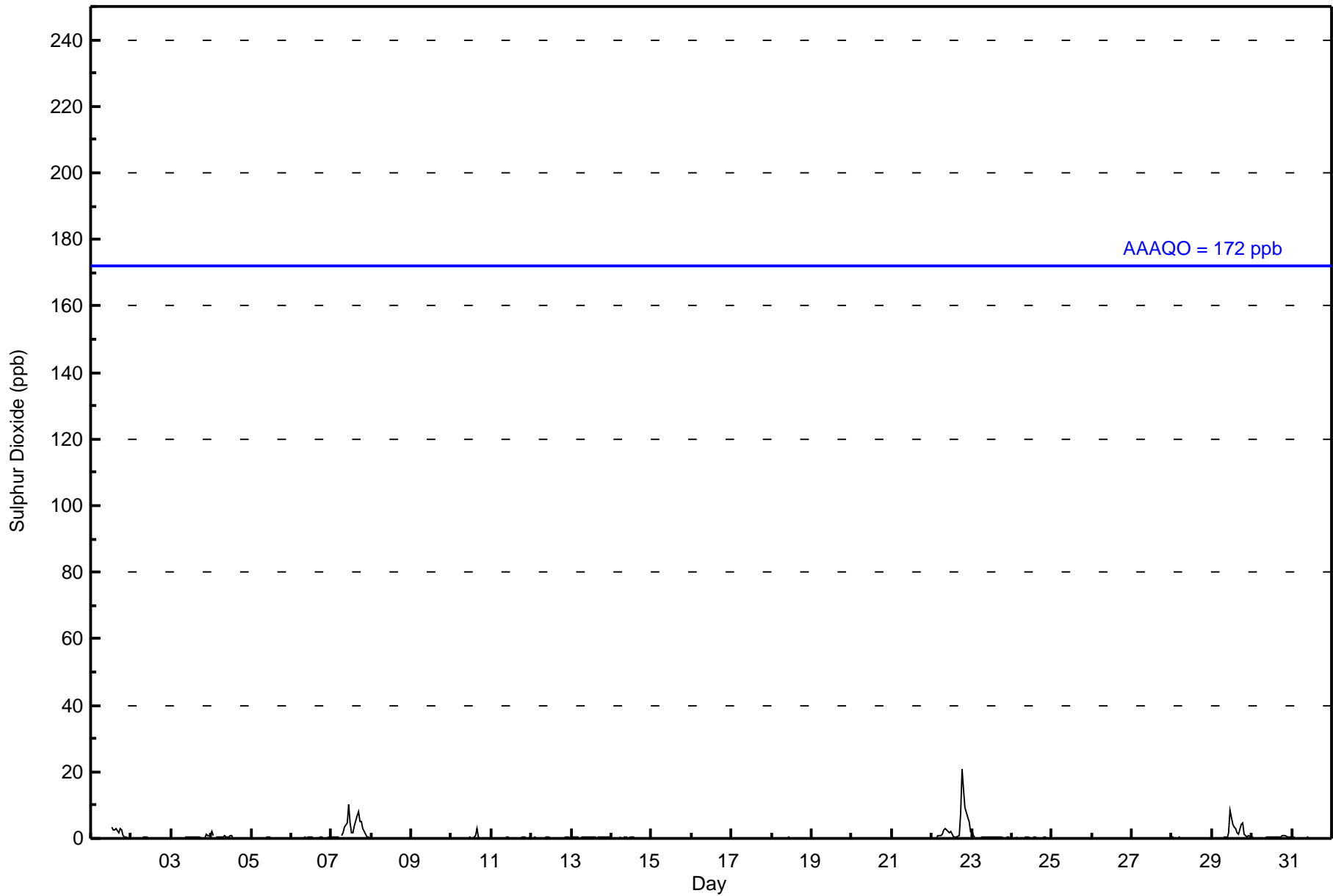
| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|--|
| 0.3 | 0.2 | 0.1 | 0.1 | 0.2 | 0.1 | 0.2 | 0.3 | 0.4 | 0.4 | 0.6 | 0.7 | 0.5 | 0.4 | 0.4 | 0.6 | 0.5 | 0.8 | 1.2 | 0.8 | 0.5 | 0.4 | 0.4 | 0.2 | Diurnal Average | |
| 2 | 1 | 0 | 1 | 1 | 1 | 1 | 3 | 3 | 5 | 10 | 9 | 4 | 4 | 4 | 7 | 8 | 8 | 21 | 15 | 9 | 6 | 5 | 2 | Diurnal Maximum | |

Z - zerospan C - Calibration M - Maintenance
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Patricia McInnes - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Patricia McInnes - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 10 | 705 | 99.72 | 99.72 |
| 11 - 20 | 1 | 0.14 | 99.86 |
| 21 - 60 | 1 | 0.14 | 100.00 |
| 61 - 110 | 0 | 0.00 | 100.00 |
| 111 - 172 | 0 | 0.00 | 100.00 |
| > 172 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Patricia McInnes - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 10 | 19 | 10 | 7 | 7 | 17 | 46 | 69 | 31 | 69 | 84 | 122 | 82 | 64 | 36 | 24 | 18 | 705 |
| 11 - 20 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 21 - 60 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 61 - 110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 111 - 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 19 | 10 | 7 | 7 | 19 | 46 | 69 | 31 | 69 | 84 | 122 | 82 | 64 | 36 | 24 | 18 | 707 |

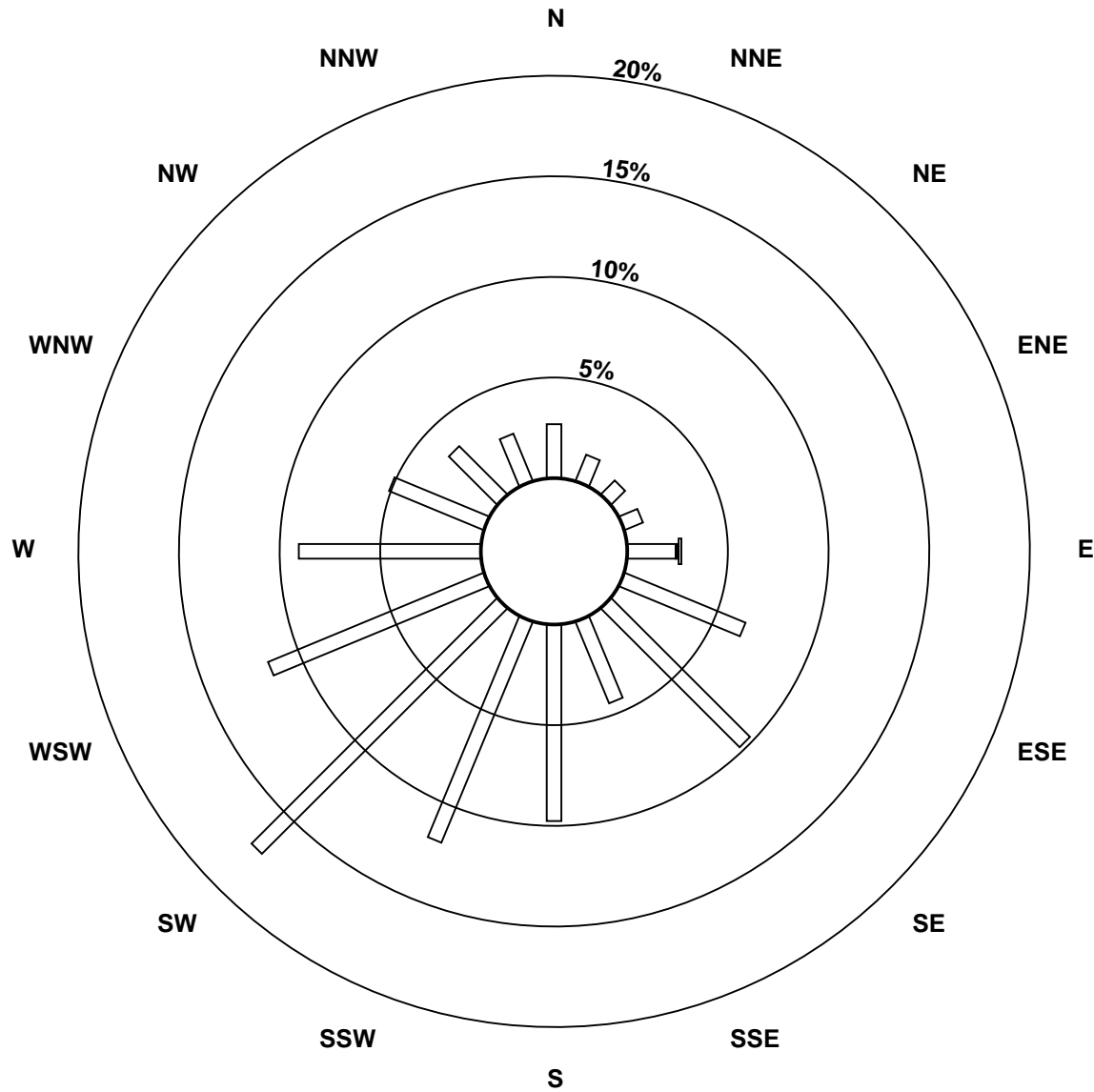
Total Number of Valid Hours: 707

Total Number of Hours: 744

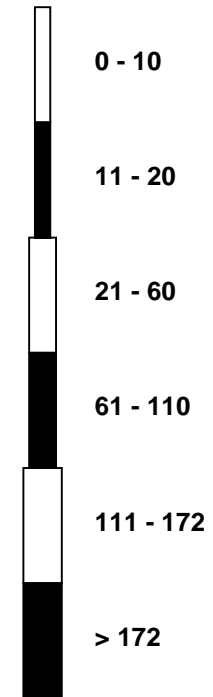


**Wood Buffalo Environmental Association
Wind Rose Aug 2017**

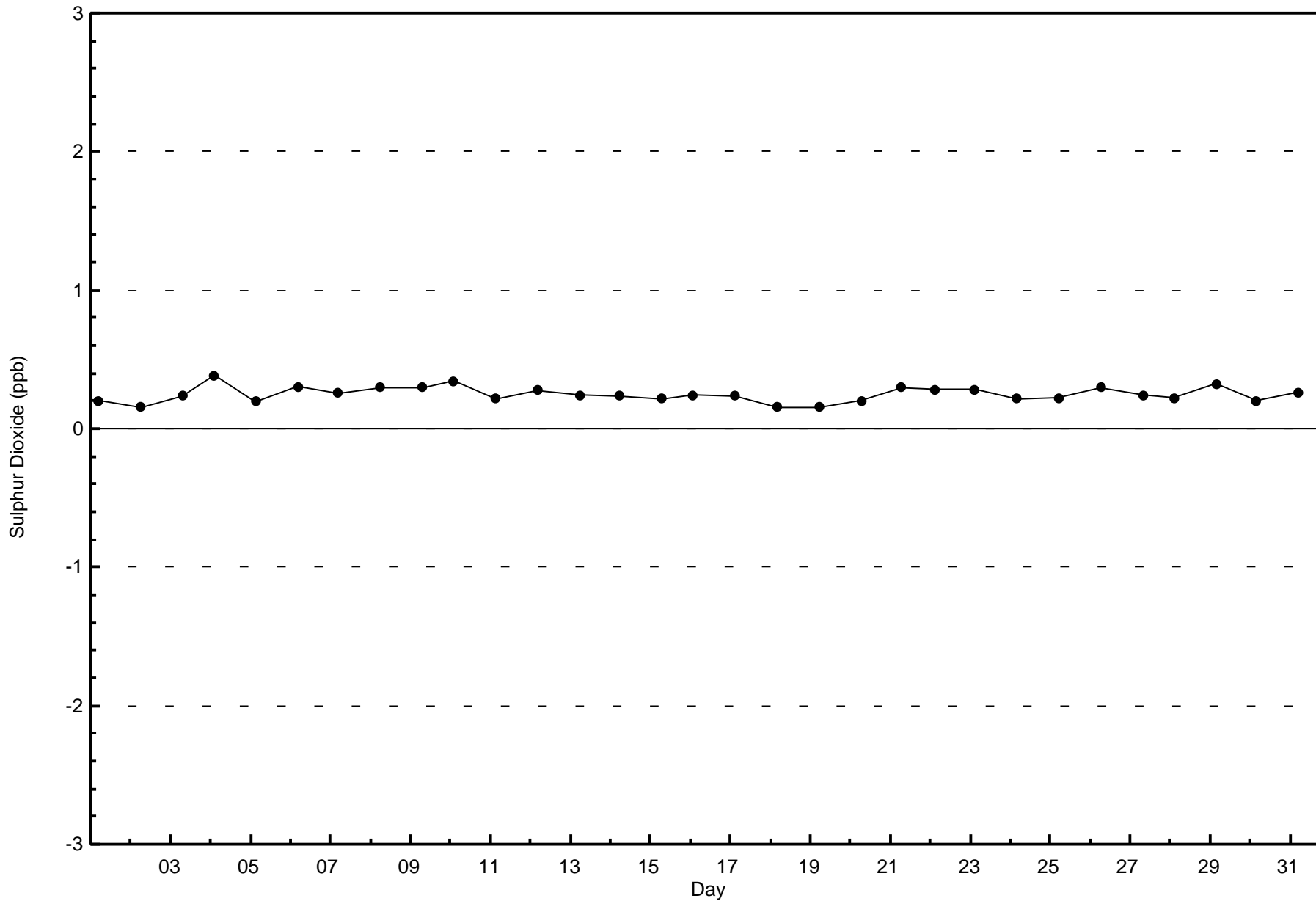
**Sulphur Dioxide (SO₂) - ppb
Patricia McInnes (AMS 6)**

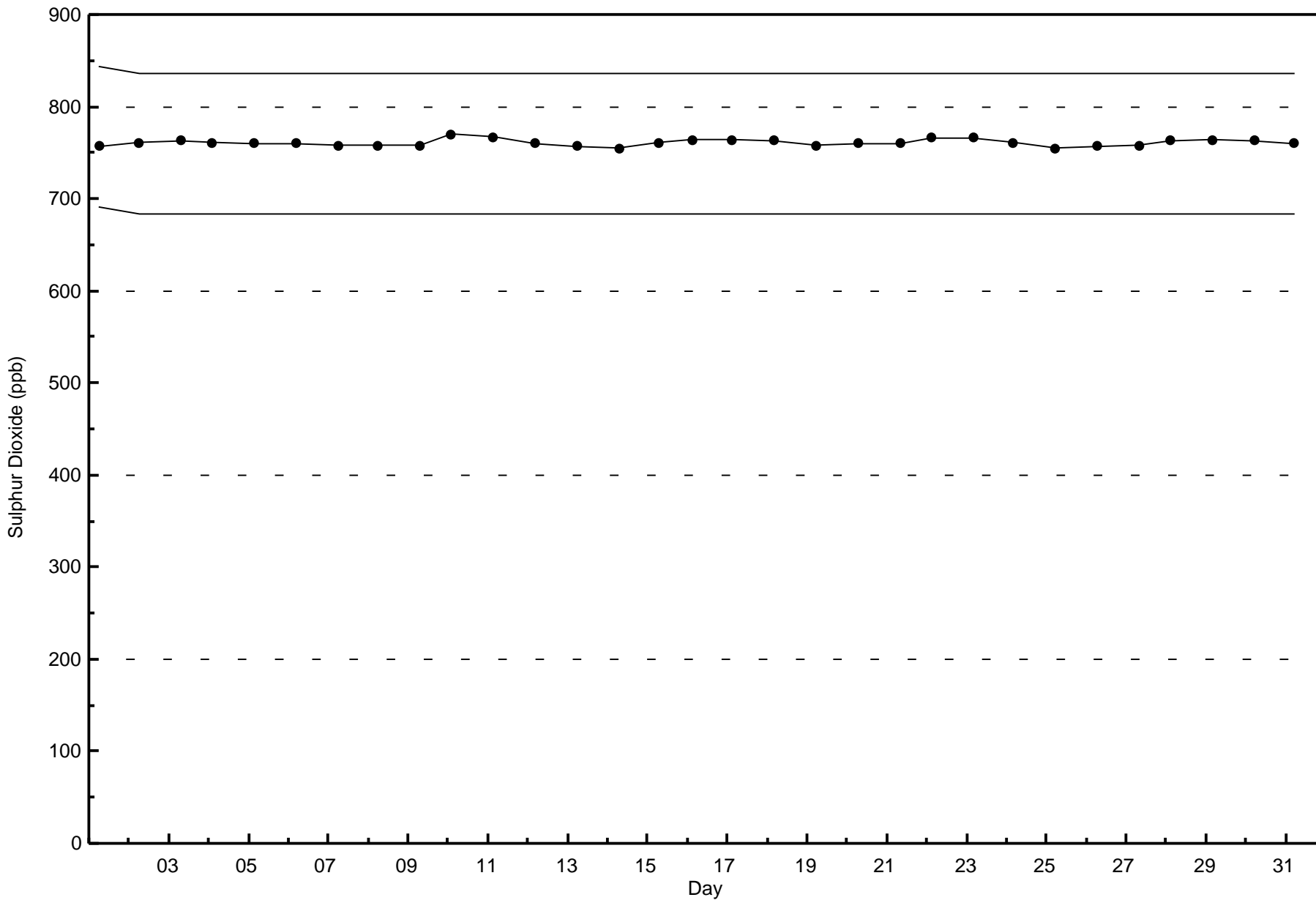


Classes (ppb)



Total Number of Valid Hours: 707







Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

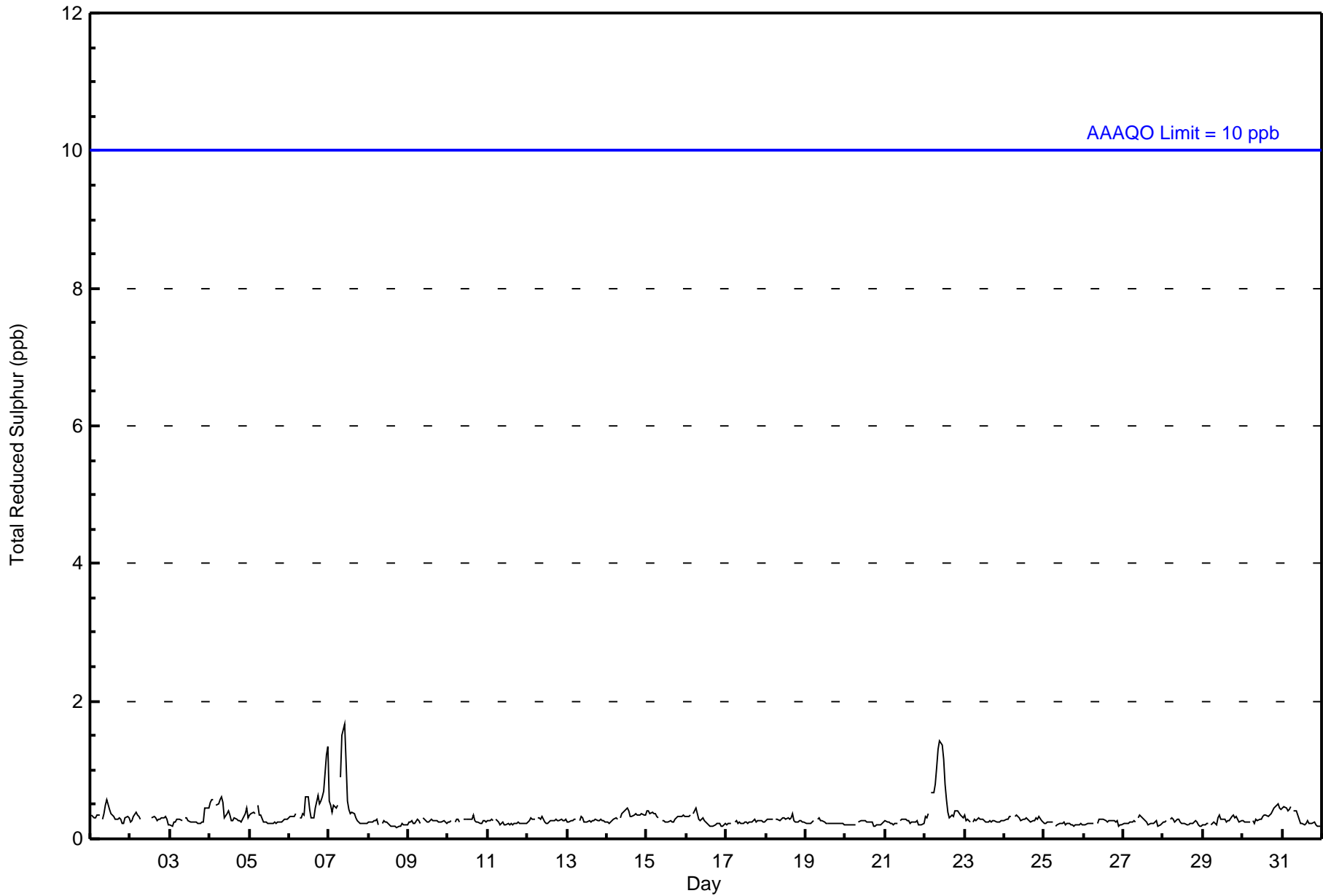
Patricia McInnes - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 2 ppb on Aug 7 10:00 Maximum Daily Average: 0.6 ppb on Aug 22 | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 708 Hours of Missing Data: 36 Hours of Calibration: 35 Percent Operational Time: 99.9 | | | | | | | | | |
|---|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|--|----|----|----|----|----|----|-----------------|---------------|---------------|
| Minimum Value: 0 ppb on Aug 8 18:00 Minimum Daily Average: 0.2 ppb on Aug 25 Maximum Diurnal Average: 0.4 ppb at hour 9 Minimum Diurnal Average: 0.3 ppb at hour 16 Monthly Average: 0.3 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 O ₃ = 0 P ₉₀ = 0 P ₉₉ = 1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 2-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | C | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 4-Aug | 1 | 1 | 1 | Z | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 5-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 6-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0.5 | 1 |
| 7-Aug | 1 | 0 | 0 | 0 | 0 | 0 | Z | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 2 |
| 8-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 9-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 10-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 11-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 12-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 13-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 14-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 15-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 16-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 17-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 18-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 19-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 20-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 22-Aug | 0 | 0 | 0 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 1 |
| 23-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 24-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 25-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 26-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 28-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 29-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 30-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0.3 | 1 |
| 31-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.4 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| 1 1 1 0 1 1 1 1 1 1 2 1 1 1 1 0 0 0 1 0 1 1 1 1 1 1 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| Z - zerospan C - Calibration M - Maintenance Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Patricia McInnes - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Patricia McInnes - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2 | 708 | 100.00 | 100.00 |
| 3 - 4 | 0 | 0.00 | 100.00 |
| 5 - 7 | 0 | 0.00 | 100.00 |
| 8 - 11 | 0 | 0.00 | 100.00 |
| > 11 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Patricia McInnes - August 2017

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---|-----------------------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2 | 20 | 11 | 7 | 7 | 18 | 47 | 68 | 32 | 63 | 88 | 122 | 83 | 63 | 36 | 25 | 18 | 708 |
| 3 - 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 - 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 - 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 20 | 11 | 7 | 7 | 18 | 47 | 68 | 32 | 63 | 88 | 122 | 83 | 63 | 36 | 25 | 18 | 708 |

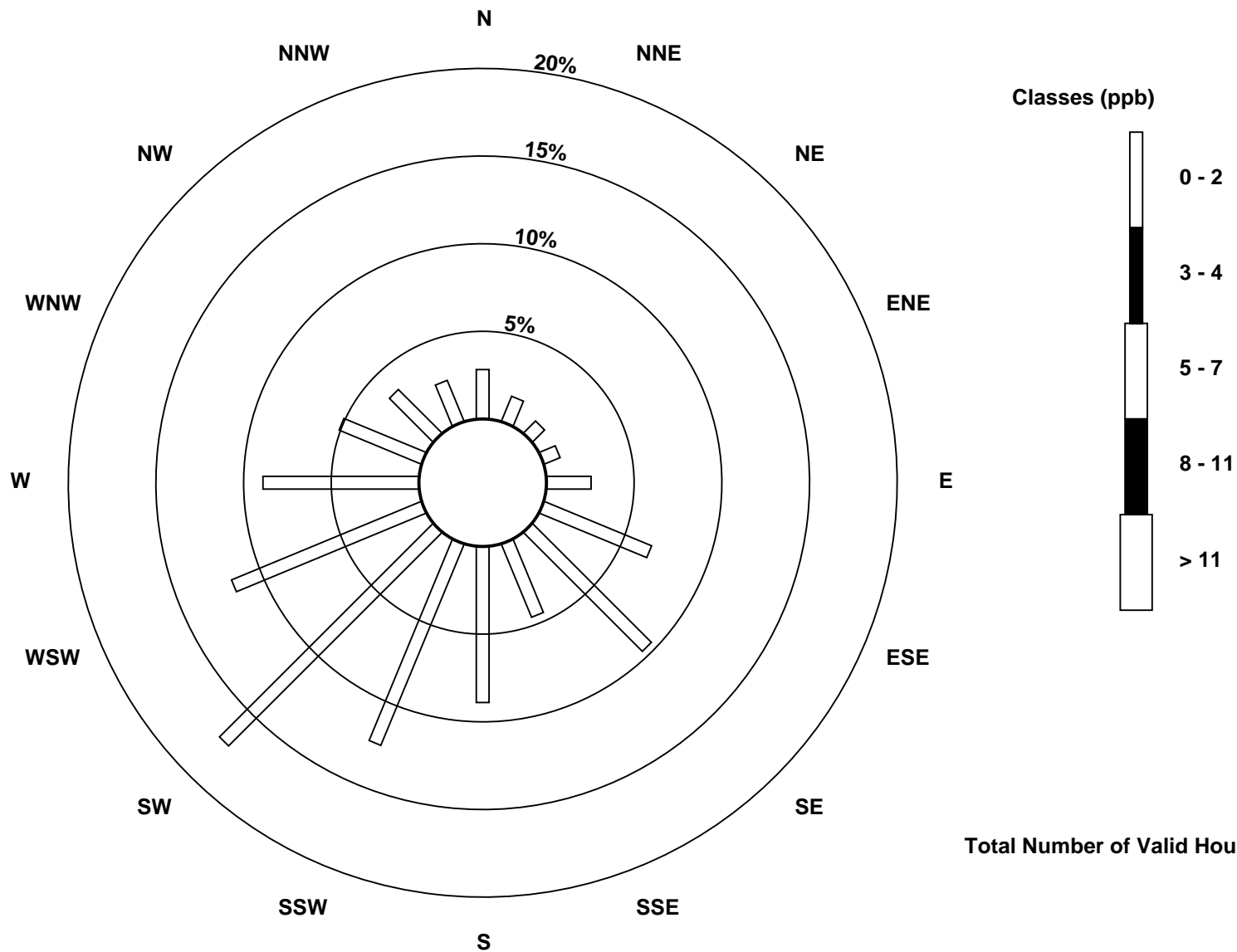
Total Number of Valid Hours: 708

Total Number of Hours: 744

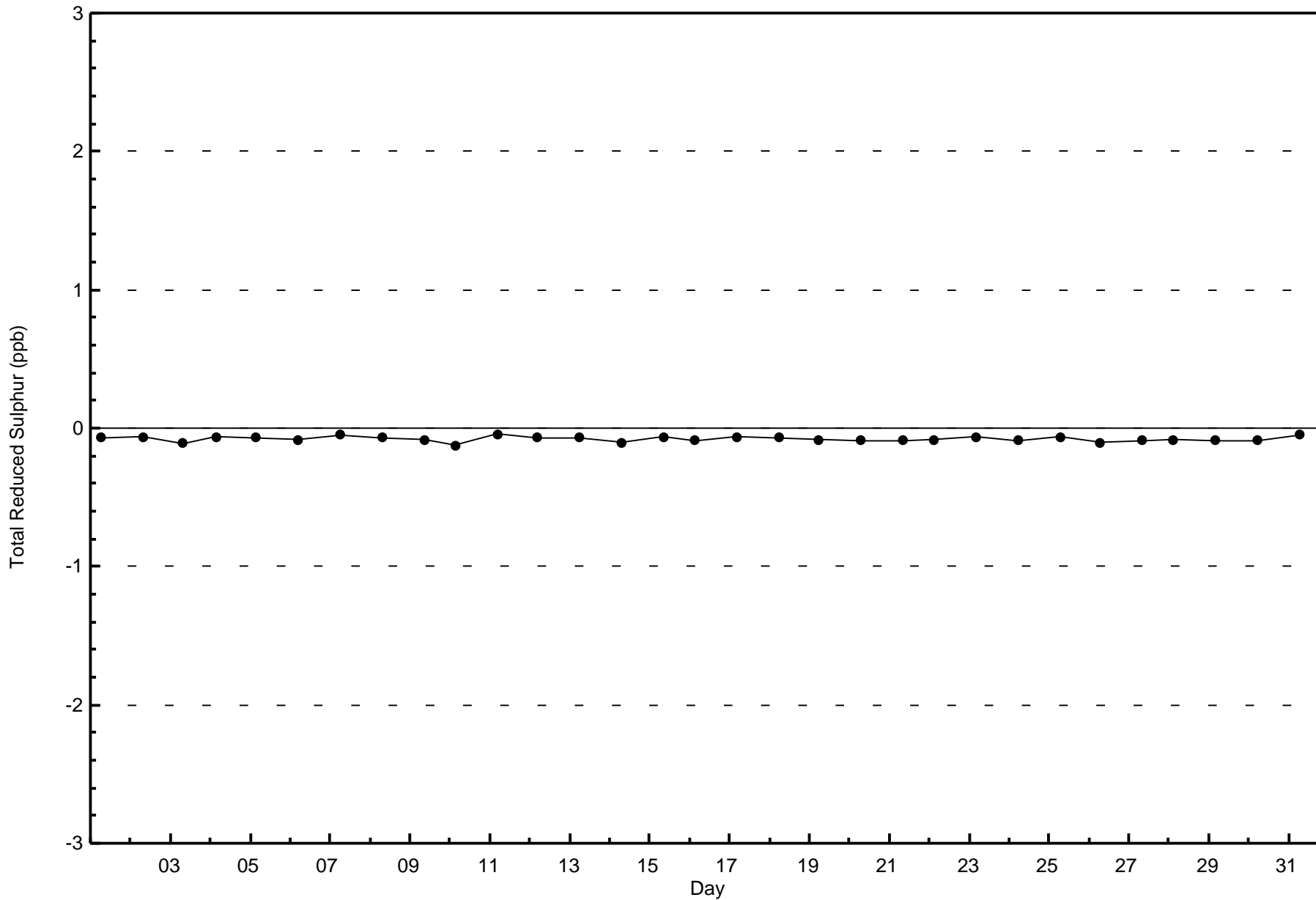


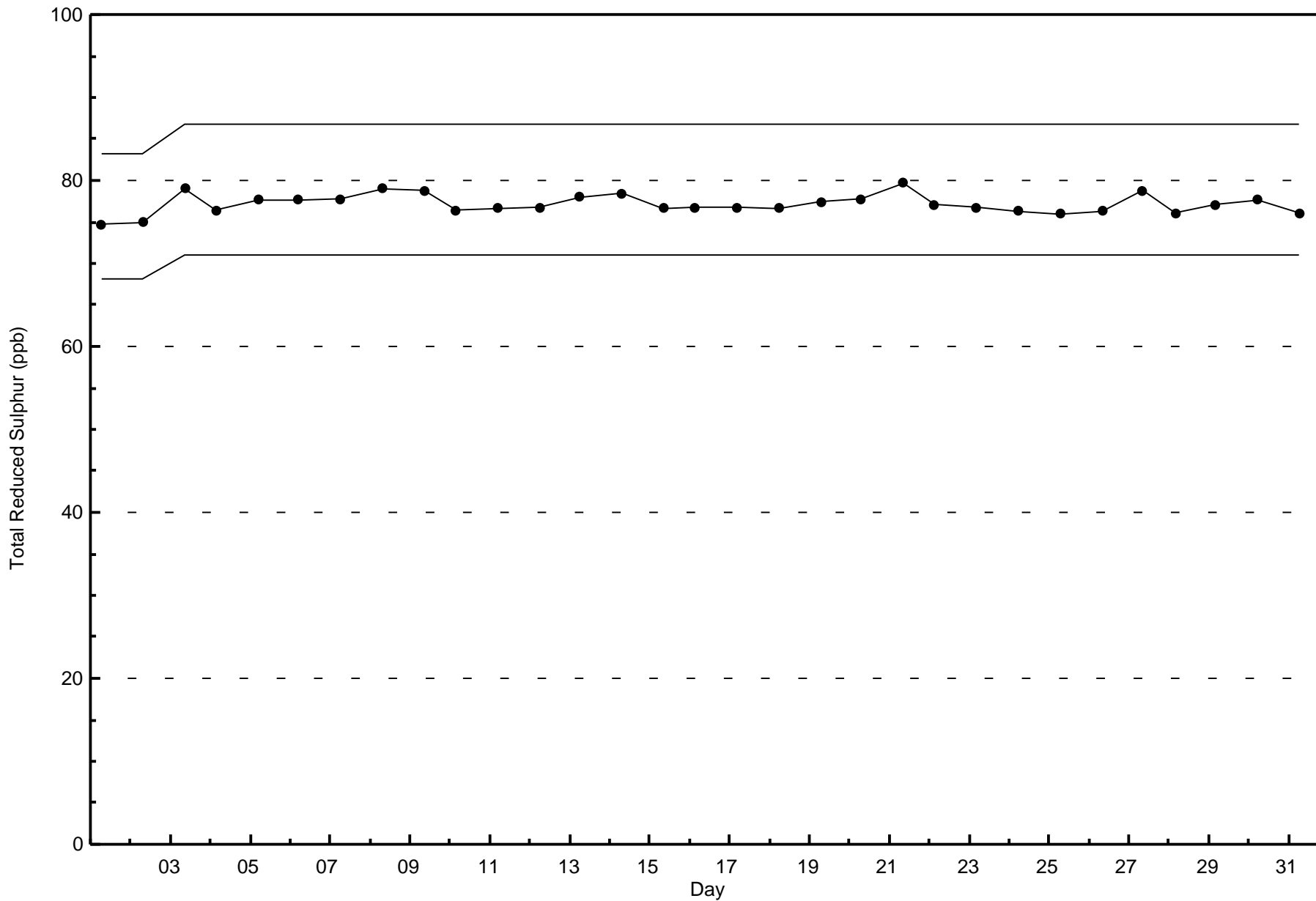
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Total Reduced Sulphur (TRS) - ppb
Patricia McInnes (AMS 6)



Total Number of Valid Hours: 708







Wood Buffalo Environmental Association
Summary of Hour Averages

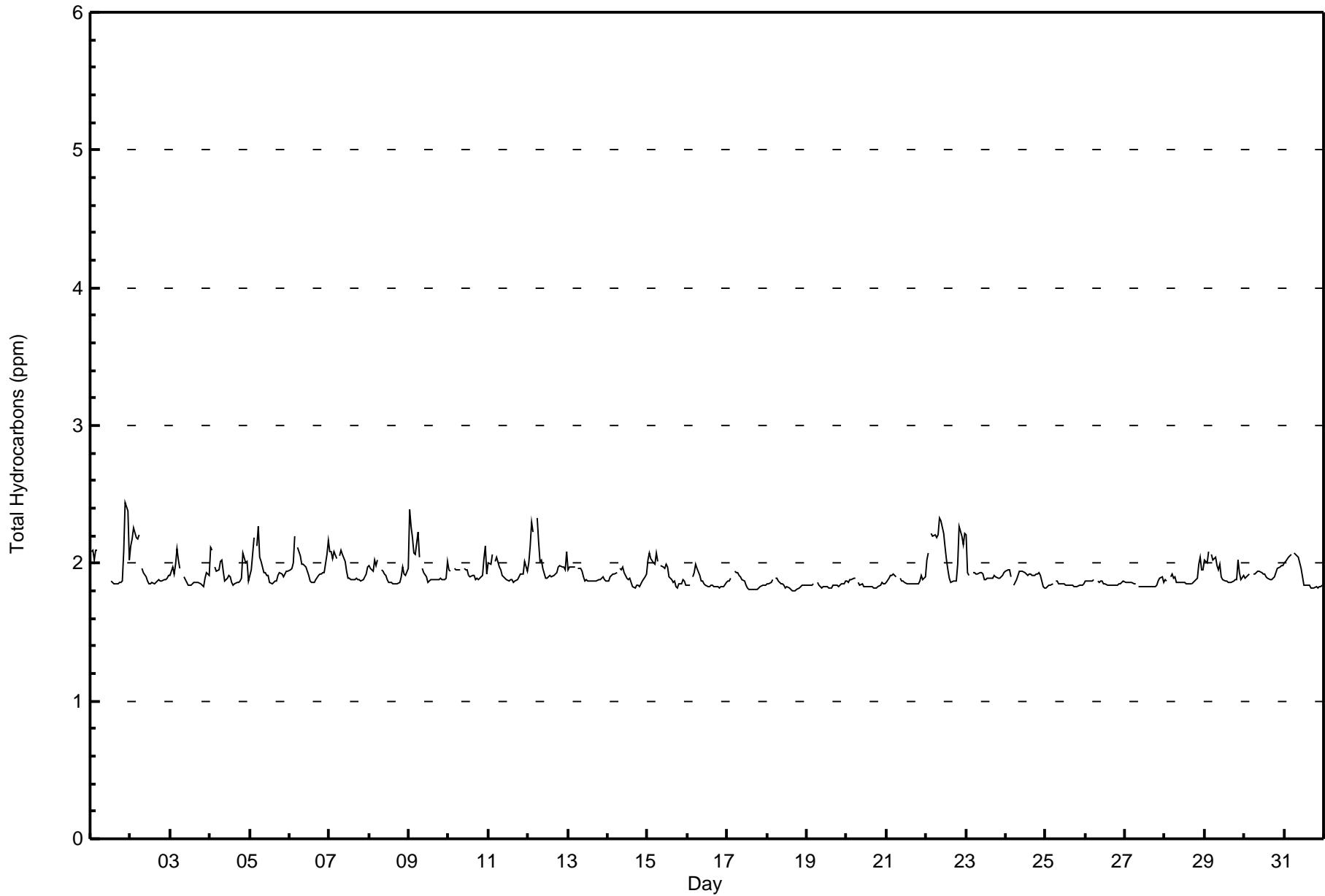
Total Hydrocarbons (THC) - ppm
Patricia McInnes - August 2017

| Maximum Value: 2.4 ppm on Aug 1 22:00 | | | | | | | | | | | | | | | | | Maximum Daily Average: 2.1 ppm on Aug 22 | | | | | | | | | | Hours in Service: 744 | |
|--|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|-----|-----|-----|-----|-----|-----|-----------------|---------------|---------------|--------------------------------|--|
| Minimum Value: 1.8 ppm on Aug 18 17:00 | | | | | | | | | | | | | | | | | Minimum Daily Average: 1.8 ppm on Aug 19 | | | | | | | | | | Hours of Data: 707 | |
| Maximum Diurnal Average: 2.0 ppm at hour 6 | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 1.9 ppm at hour 17 | | | | | | | | | | Hours of Missing Data: 37 | |
| Monthly Average: 1.92 ppm | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 1.8 P ₁₀ = 1.8 Q ₁ = 1.9 Median = 1.9 Q ₃ = 2.0 P ₉₀ = 2.0 P ₉₉ = 2.3 | | | | | | | | | | Hours of Calibration: 36 | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 99.9 | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | |
| 1-Aug | 2.1 | 2.1 | 2.0 | 2.1 | 2.1 | Z | 2.1 | C | C | C | C | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.1 | 2.4 | 2.4 | 2.0 | 2.0 | 2.4 | | |
| 2-Aug | 2.1 | 2.2 | 2.3 | 2.2 | 2.2 | 2.2 | Z | 2.0 | 1.9 | 1.9 | 1.9 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.3 | | |
| 3-Aug | 1.9 | 2.0 | 1.9 | 2.0 | 2.1 | 2.0 | 2.0 | Z | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 2.1 | | |
| 4-Aug | 2.1 | 2.1 | Z | 2.0 | 1.9 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.1 | 2.0 | 2.0 | 1.9 | 1.9 | 2.1 | | |
| 5-Aug | 1.9 | 2.0 | 2.2 | Z | 2.1 | 2.3 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.3 | | |
| 6-Aug | 2.0 | 2.0 | 2.0 | 2.2 | Z | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.1 | 2.2 | 2.0 | 2.2 | | |
| 7-Aug | 2.1 | 2.1 | 2.0 | 2.1 | 2.0 | Z | 2.1 | 2.1 | 2.1 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.1 | | |
| 8-Aug | 2.0 | 2.0 | 1.9 | 2.0 | 2.0 | 2.0 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 2.0 | 1.9 | 2.0 | | |
| 9-Aug | 2.4 | 2.3 | 2.2 | 2.1 | 2.1 | 2.2 | 2.0 | Z | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.4 | | |
| 10-Aug | 2.0 | 1.9 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | M | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.1 | 1.9 | 1.9 | 2.1 | | |
| 11-Aug | 2.0 | 2.0 | 2.1 | Z | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 2.1 | | |
| 12-Aug | 2.0 | 2.1 | 2.3 | 2.2 | Z | 2.3 | 2.2 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | 2.3 | | |
| 13-Aug | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | Z | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | | |
| 14-Aug | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | Z | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 2.0 | | |
| 15-Aug | 2.0 | 2.1 | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.9 | 1.9 | 1.8 | 1.9 | 2.1 | | |
| 16-Aug | 1.8 | 1.8 | Z | 1.9 | 1.9 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 2.0 | | |
| 17-Aug | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | | |
| 18-Aug | 1.8 | 1.8 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | | |
| 19-Aug | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | Z | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.8 | 1.9 | | |
| 20-Aug | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.8 | 1.9 | | |
| 21-Aug | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | | |
| 22-Aug | 2.0 | 2.1 | Z | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.2 | 2.1 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.3 | 2.2 | 2.1 | 2.2 | 2.1 | 2.3 | |
| 23-Aug | 2.2 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.2 | |
| 24-Aug | 1.9 | 1.9 | 2.0 | 1.9 | Z | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 2.0 | |
| 25-Aug | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.8 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.8 | 1.9 | |
| 26-Aug | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | |
| 27-Aug | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | Z | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.9 | |
| 28-Aug | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | |
| 29-Aug | 2.0 | 2.0 | 2.1 | Z | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.1 | |
| 30-Aug | 1.9 | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 2.0 | |
| 31-Aug | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | Z | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 2.1 | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | |
| Z - zerospan C - Calibration M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Patricia McInnes - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Patricia McInnes - August 2017

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2.0 | 638 | 90.24 | 90.24 |
| 2.1 - 3.0 | 69 | 9.76 | 100.00 |
| 3.1 - 10.0 | 0 | 0.00 | 100.00 |
| > 10.0 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Patricia McInnes - August 2017

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-----------------------------------|-----------------------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2.0 | 14 | 9 | 6 | 7 | 19 | 45 | 65 | 29 | 62 | 73 | 110 | 78 | 60 | 32 | 16 | 13 | 638 |
| 2.1 - 3.0 | 5 | 1 | 1 | 0 | 0 | 1 | 4 | 2 | 7 | 11 | 12 | 4 | 4 | 4 | 8 | 5 | 69 |
| 3.1 - 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 19 | 10 | 7 | 7 | 19 | 46 | 69 | 31 | 69 | 84 | 122 | 82 | 64 | 36 | 24 | 18 | 707 |

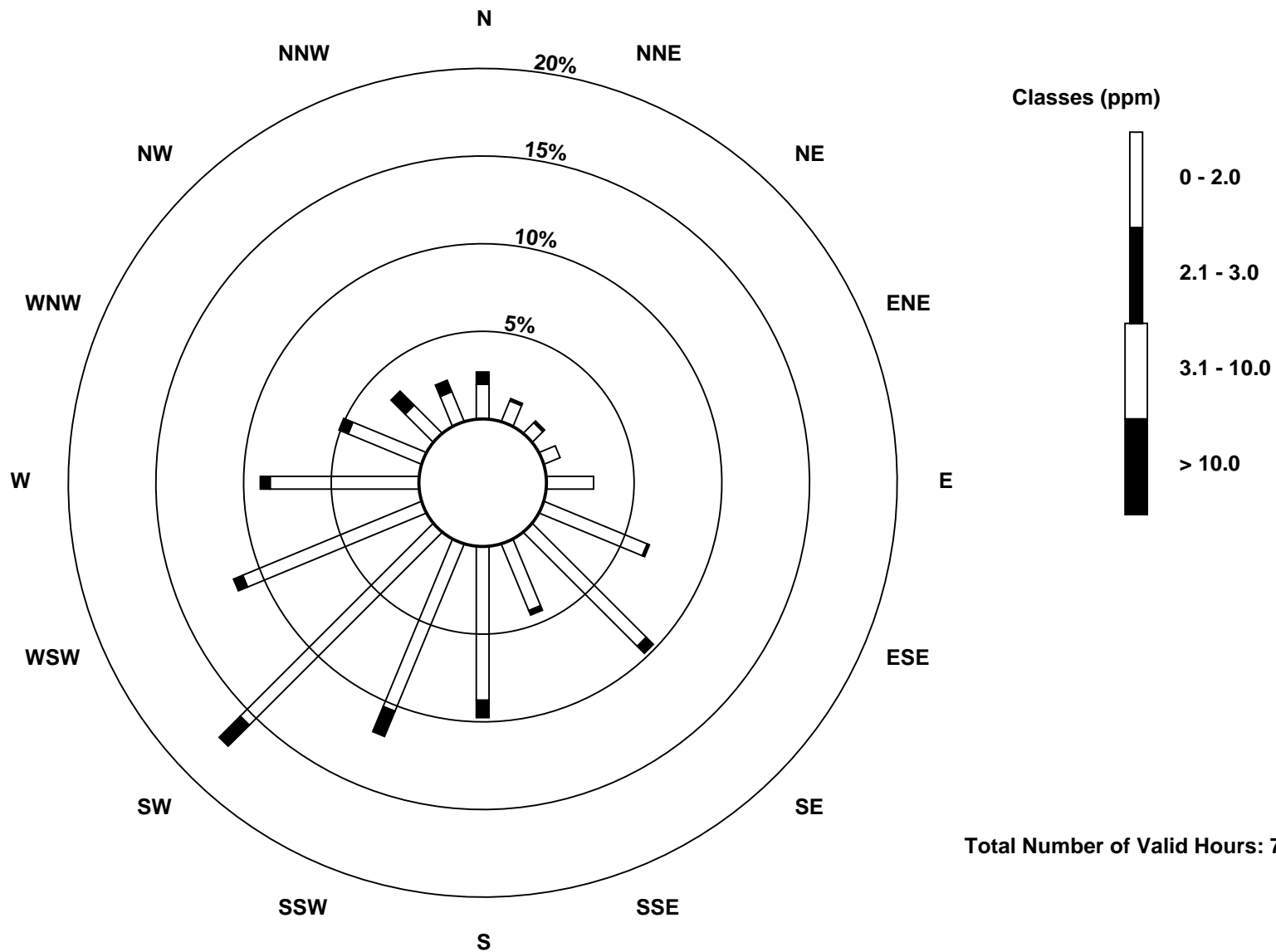
Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

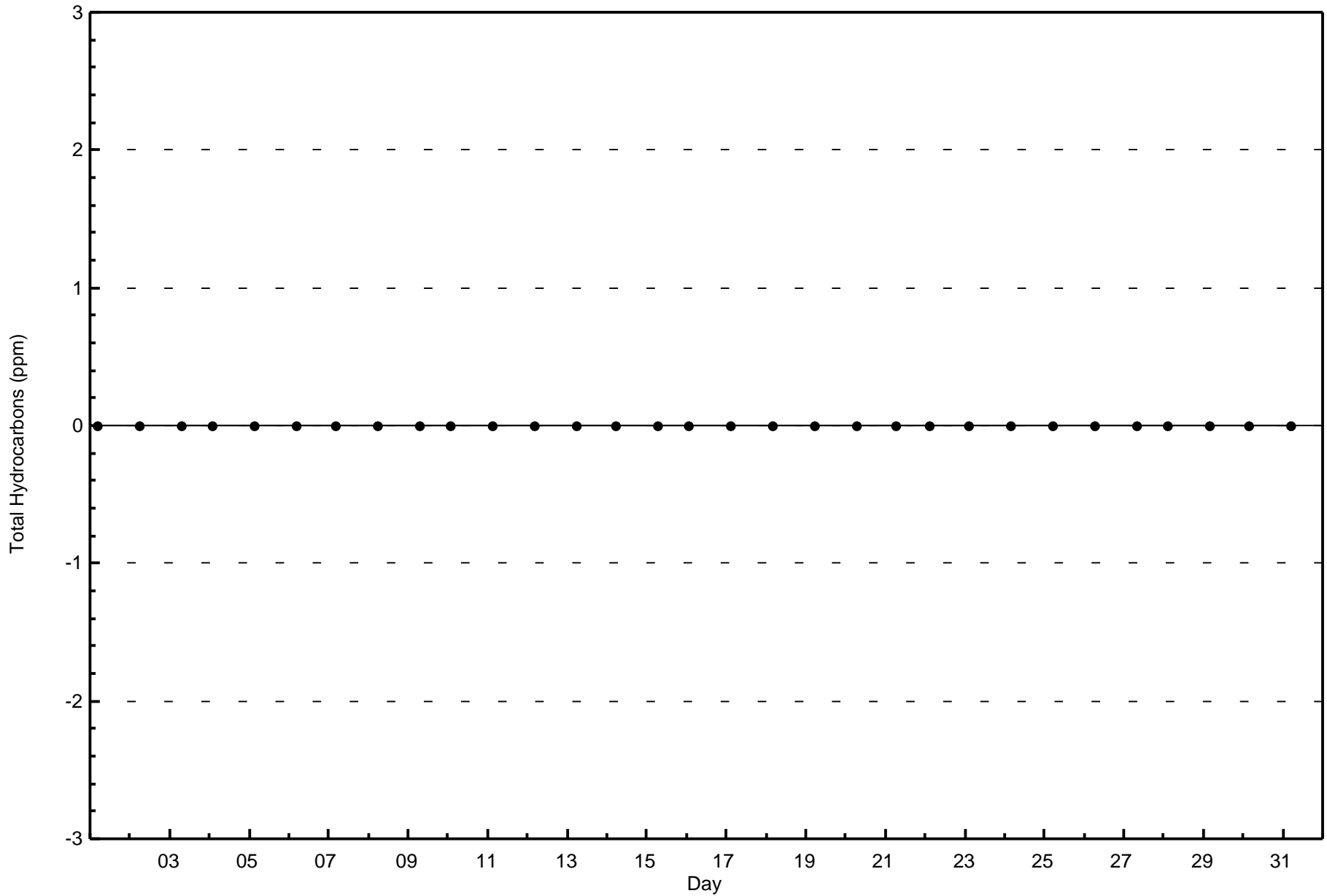
Total Hydrocarbons (THC) - ppm
Patricia McInnes (AMS 6)

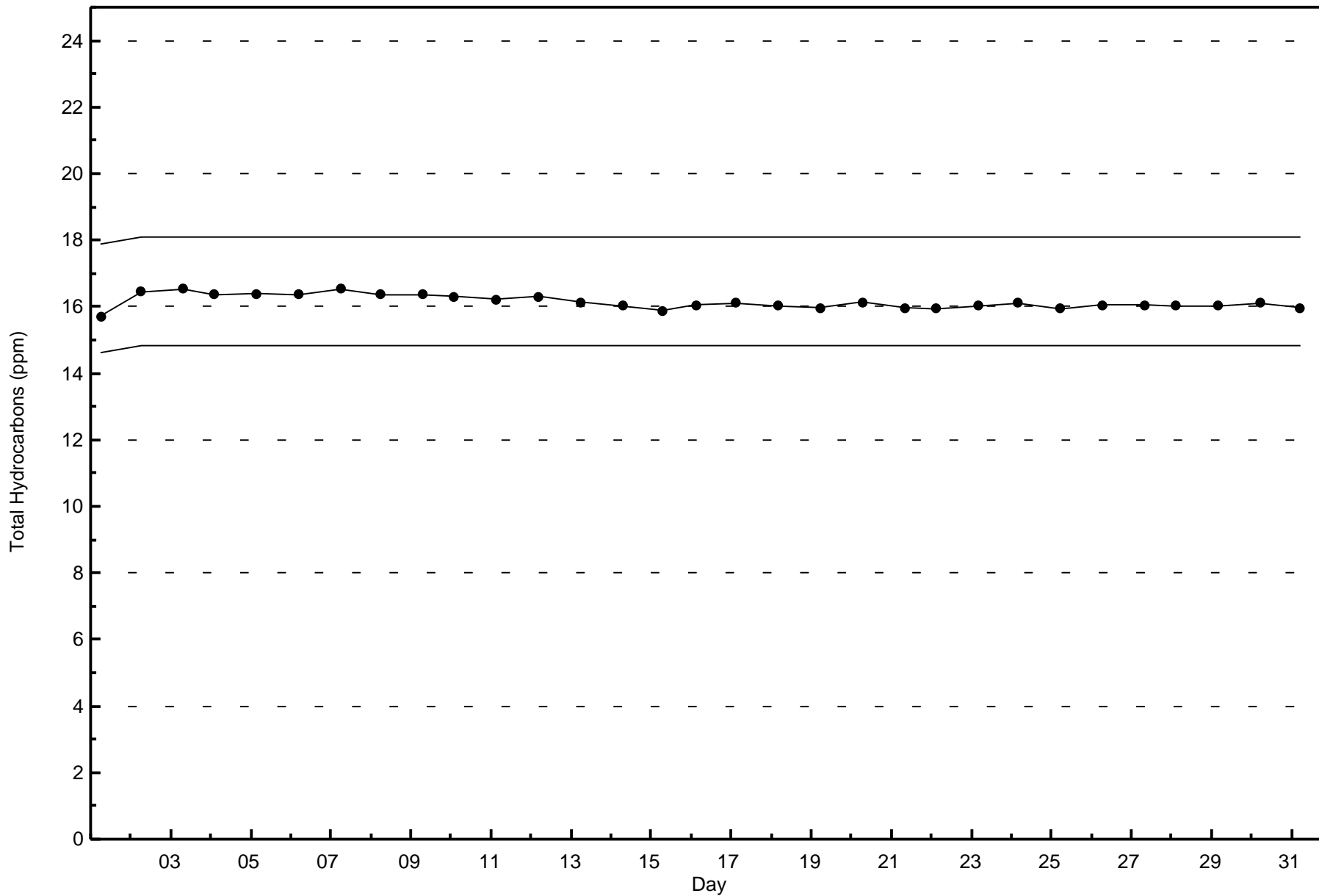




Wood Buffalo Environmental Association
Zero Responses

Total Hydrocarbons (THC) - ppm
Patricia McInnes - August 2017





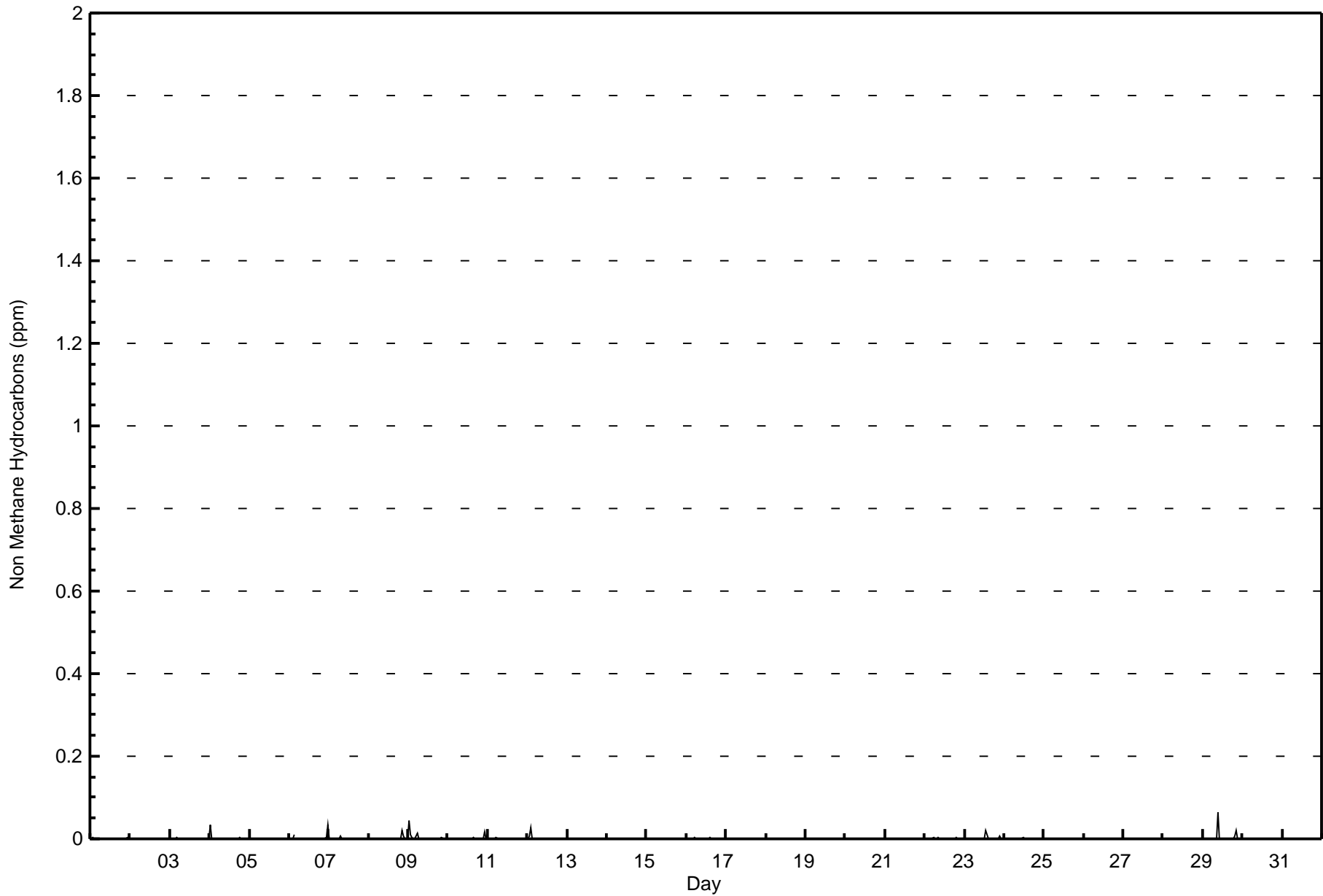


| Maximum Value: 0.063 ppm on Aug 29 10:00 | | Maximum Daily Average: 0.004 ppm on Aug 29 | | Hours in Service: | 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|--|-------|---------------------------|-------|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----------------|-----------------|--|
| Minimum Value: 0.000 ppm on Aug 1 01:00 | | Minimum Daily Average: 0.000 ppm on Aug 2 | | Hours of Data: | 707 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 0.003 ppm at hour 1 | | Minimum Diurnal Average: 0.000 ppm at hour 11 | | Hours of Missing Data: | 37 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 0.001 ppm | | Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.0 | | Hours of Calibration: | 36 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Percent Operational Time: | 99.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 0.000 | 0.003 | 0.000 | 0.000 | 0.000 | Z | 0.000 | C | C | C | C | C | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.005 | 0.000 | 0.000 | 0.005 | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 0.035 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.035 | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 0.000 | 0.000 | 0.000 | 0.011 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.004 | 0.035 | 0.002 | 0.035 | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.006 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.019 | 0.007 | 0.000 | 0.000 | 0.001 | 0.019 | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 0.043 | 0.010 | 0.005 | 0.000 | 0.000 | 0.012 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 | 0.000 | 0.003 | 0.003 | 0.043 | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | M | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.003 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.017 | 0.000 | 0.001 | 0.017 | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 0.000 | 0.006 | 0.027 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.027 | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.003 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.003 | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.005 | 0.002 | 0.001 | 0.004 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.004 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.005 | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.022 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.006 | 0.000 | 0.000 | 0.001 | 0.022 | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.003 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.003 | 0.003 | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.063 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.005 | 0.020 | 0.000 | 0.000 | 0.004 | 0.063 | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.003 | 0.001 | 0.001 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.001 | 0.001 | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.043 | 0.010 | 0.027 | 0.011 | 0.002 | 0.012 | 0.002 | 0.006 | 0.004 | 0.063 | 0.000 | 0.003 | 0.000 | 0.022 | 0.003 | 0.003 | 0.000 | 0.000 | 0.002 | 0.005 | 0.020 | 0.007 | 0.017 | 0.035 | Diurnal Maximum | |
| Z - zerospan | | C - Calibration | | | | M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm
Patricia McInnes - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Patricia McInnes - August 2017

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 0.005 | 692 | 97.88 | 97.88 |
| 0.006 - 0.05 | 14 | 1.98 | 99.86 |
| 0.06 - 0.1 | 1 | 0.14 | 100.00 |
| > 0.1 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Patricia McInnes - August 2017**

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 0.005 | 18 | 10 | 7 | 6 | 19 | 45 | 69 | 29 | 67 | 80 | 120 | 82 | 64 | 36 | 24 | 16 | 692 |
| 0.006 - 0.05 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 2 | 4 | 2 | 0 | 0 | 0 | 0 | 2 | 14 |
| 0.06 - 0.1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| > 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 19 | 10 | 7 | 7 | 19 | 46 | 69 | 31 | 69 | 84 | 122 | 82 | 64 | 36 | 24 | 18 | 707 |

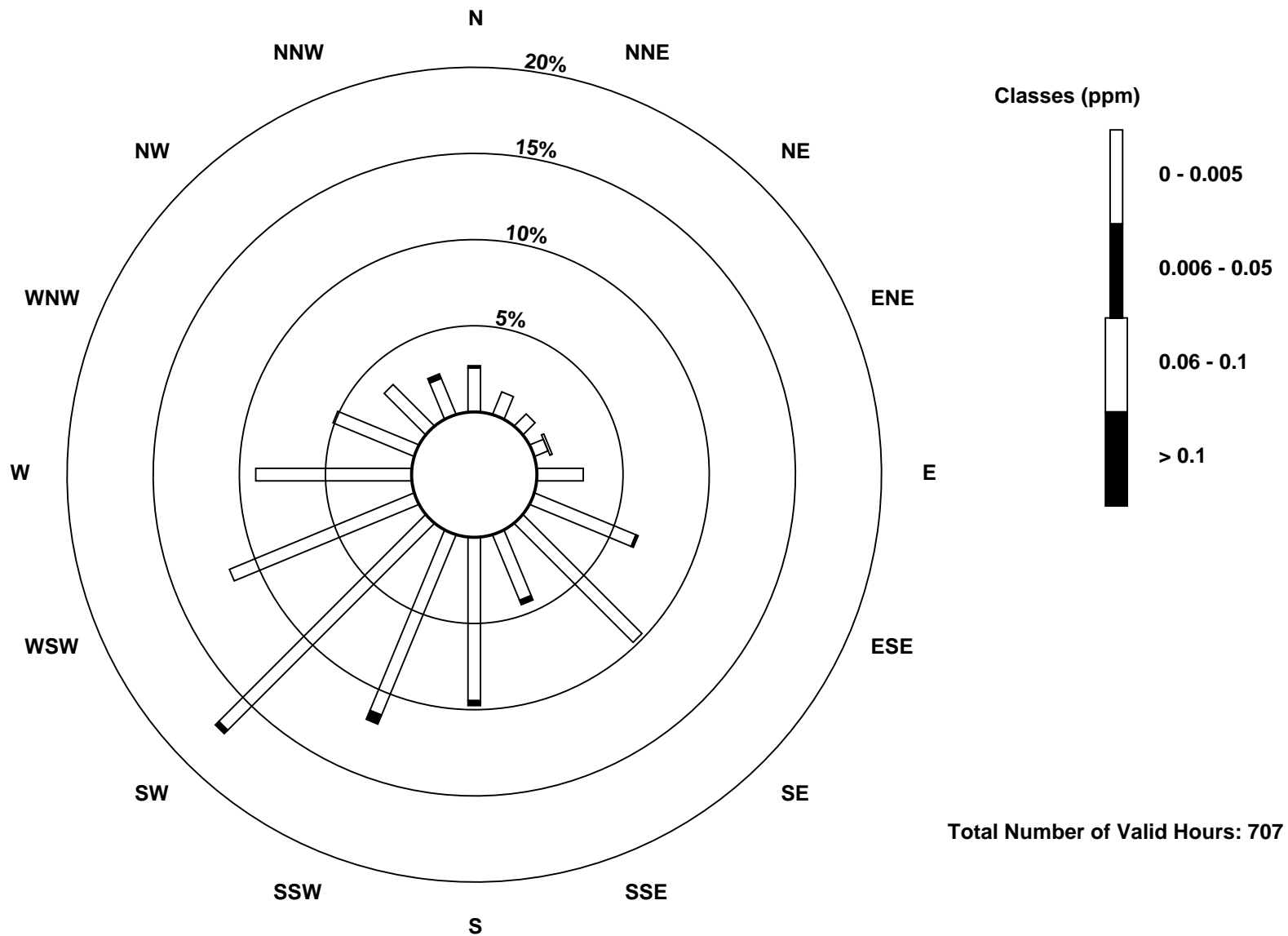
Total Number of Valid Hours: 707

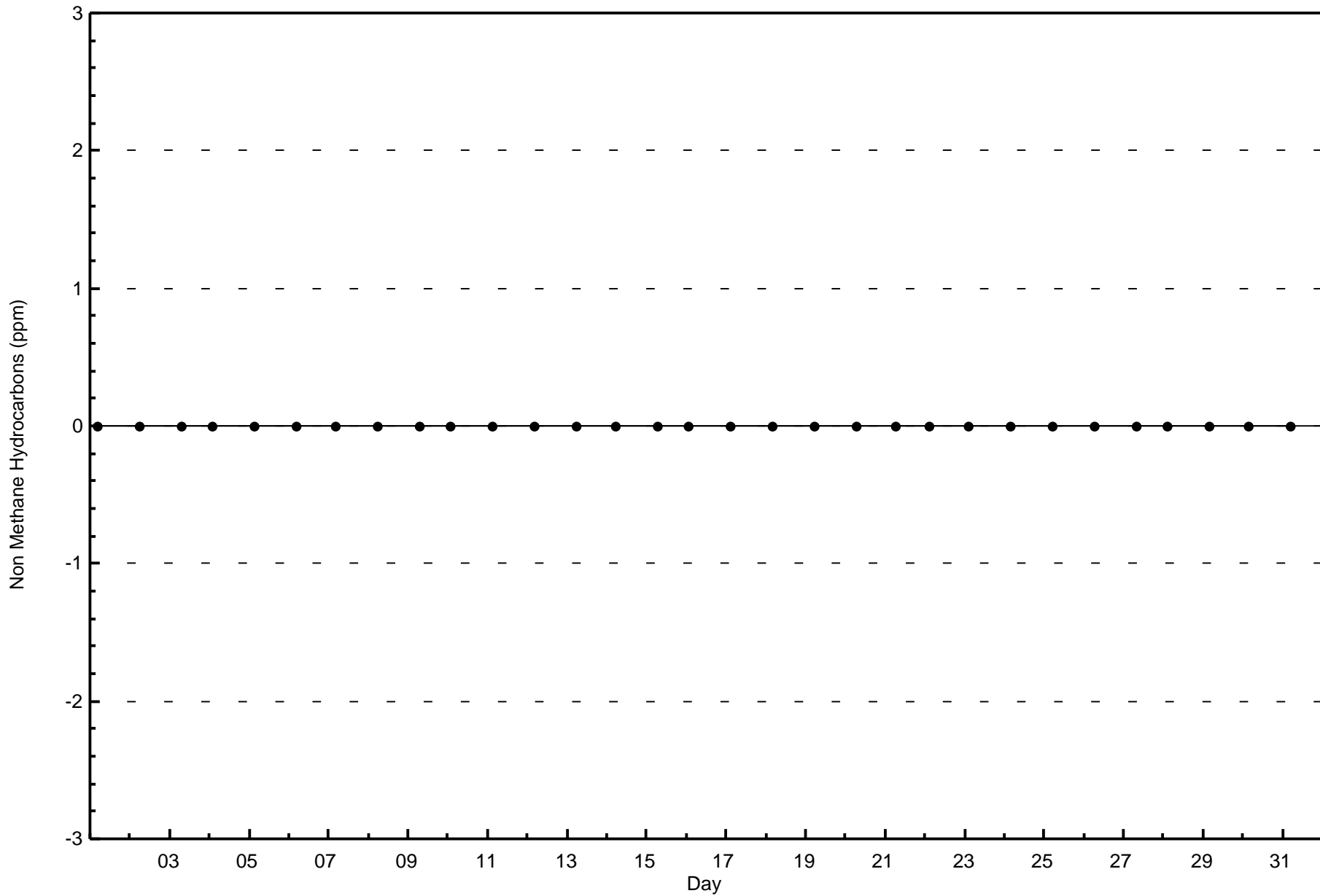
Total Number of Hours: 744

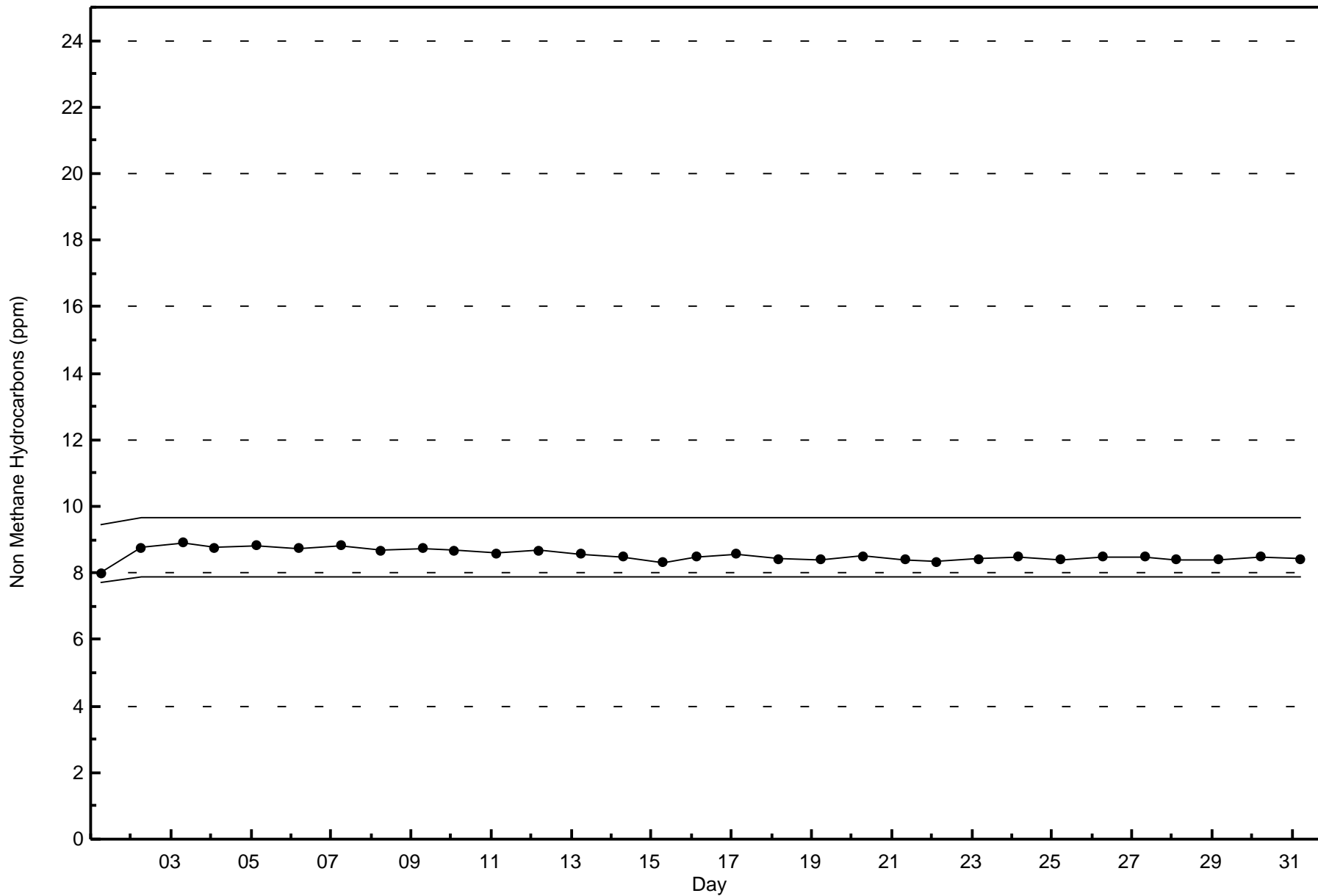


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Non Methane Hydrocarbons (NMHC) - ppm
Patricia McInnes (AMS 6)









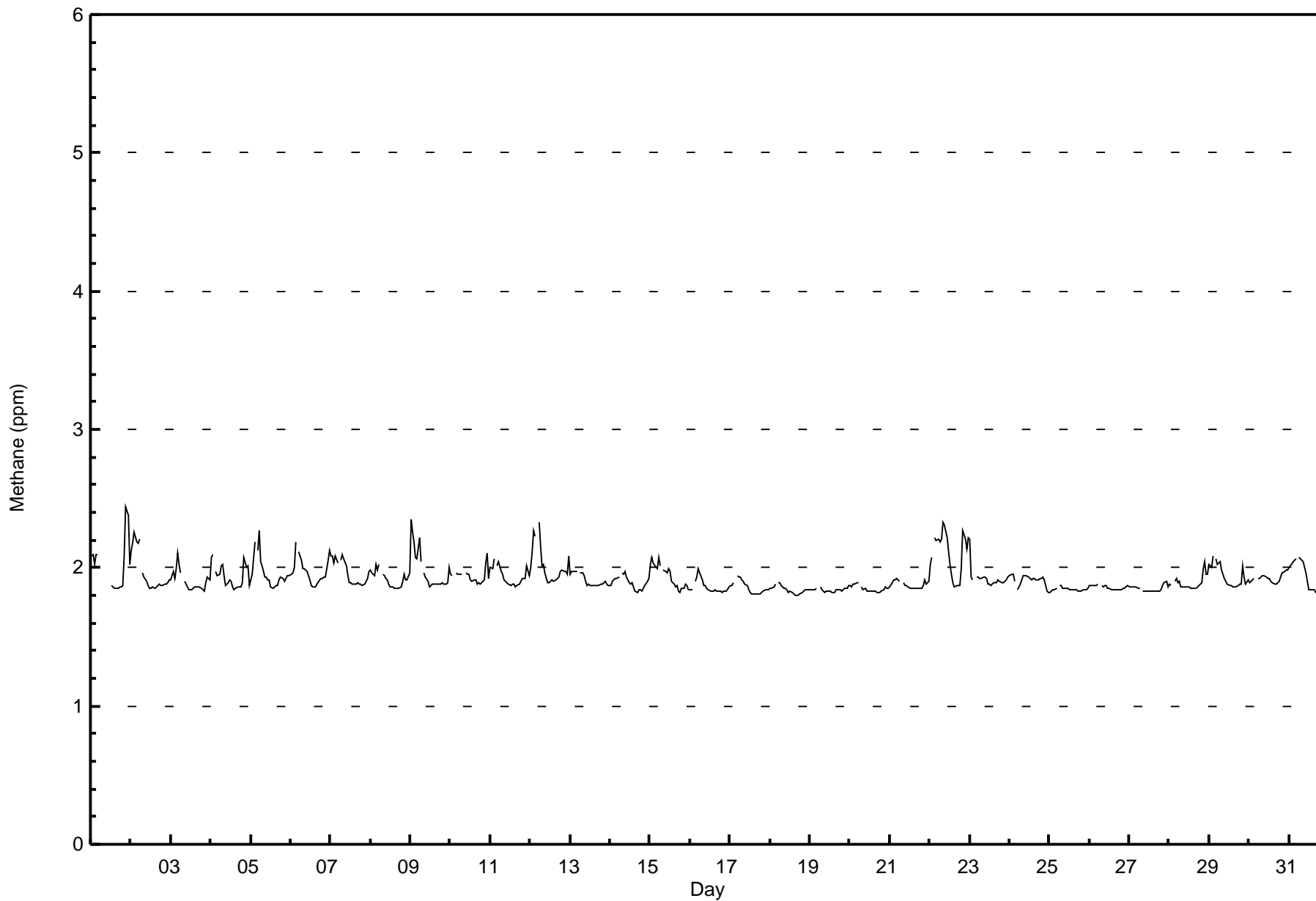
Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH₄) - ppm

Patricia McInnes - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 2.4 ppm on Aug 1 22:00 Maximum Daily Average: 2.1 ppm on Aug 22 | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 707 Hours of Missing Data: 37 Hours of Calibration: 36 Percent Operational Time: 99.9 | | | | | | | | | |
|---|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|-----|-----|-----|-----|-----|-----|-----------------|---------------|---------------|
| Minimum Value: 1.8 ppm on Aug 18 17:00 Minimum Daily Average: 1.8 ppm on Aug 19 Maximum Diurnal Average: 2.0 ppm at hour 6 Minimum Diurnal Average: 1.9 ppm at hour 17 Monthly Average: 1.92 ppm Percentiles: P ₁ = 1.8 P ₁₀ = 1.8 Q ₁ = 1.9 Median = 1.9 Q ₃ = 2.0 P ₉₀ = 2.0 P ₉₉ = 2.3 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 2.1 | 2.1 | 2.0 | 2.1 | 2.1 | Z | 2.1 | C | C | C | C | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.1 | 2.4 | 2.4 | 2.0 | 2.0 | 2.4 |
| 2-Aug | 2.1 | 2.2 | 2.3 | 2.2 | 2.2 | 2.2 | Z | 2.0 | 1.9 | 1.9 | 1.9 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.3 |
| 3-Aug | 1.9 | 2.0 | 1.9 | 2.0 | 2.1 | 2.0 | 2.0 | Z | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 2.1 |
| 4-Aug | 2.1 | 2.1 | Z | 2.0 | 1.9 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.1 | 2.0 | 2.0 | 1.9 | 1.9 | 2.1 |
| 5-Aug | 1.9 | 2.0 | 2.2 | Z | 2.1 | 2.3 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.3 |
| 6-Aug | 2.0 | 2.0 | 2.0 | 2.2 | Z | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.1 | 2.1 | 2.0 | 2.2 |
| 7-Aug | 2.1 | 2.1 | 2.0 | 2.1 | 2.0 | Z | 2.1 | 2.1 | 2.1 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.1 |
| 8-Aug | 2.0 | 2.0 | 1.9 | 2.0 | 2.0 | 2.0 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 2.0 | 1.9 | 2.0 |
| 9-Aug | 2.3 | 2.3 | 2.2 | 2.1 | 2.1 | 2.2 | 2.0 | Z | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.3 |
| 10-Aug | 2.0 | 1.9 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | M | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.1 | 1.9 | 1.9 | 2.1 |
| 11-Aug | 2.0 | 2.0 | 2.1 | Z | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 2.1 |
| 12-Aug | 2.0 | 2.1 | 2.3 | 2.2 | Z | 2.3 | 2.2 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | 2.3 |
| 13-Aug | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | Z | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 |
| 14-Aug | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | Z | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 2.0 |
| 15-Aug | 2.0 | 2.1 | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.8 | 1.9 | 2.1 |
| 16-Aug | 1.8 | 1.8 | Z | 1.9 | 1.9 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 2.0 |
| 17-Aug | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 |
| 18-Aug | 1.8 | 1.8 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 |
| 19-Aug | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | Z | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.8 | 1.9 |
| 20-Aug | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.8 | 1.9 |
| 21-Aug | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| 22-Aug | 2.0 | 2.1 | Z | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.2 | 2.1 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.3 | 2.2 | 2.1 | 2.2 | 2.3 |
| 23-Aug | 2.2 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.2 |
| 24-Aug | 1.9 | 1.9 | 2.0 | 1.9 | Z | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.9 | 2.0 |
| 25-Aug | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.8 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.8 | 1.9 |
| 26-Aug | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| 27-Aug | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | Z | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| 28-Aug | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 2.0 |
| 29-Aug | 2.0 | 2.0 | 2.1 | Z | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 2.1 |
| 30-Aug | 1.9 | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 2.0 |
| 31-Aug | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | Z | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 2.1 |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| Z - zerspan C - Calibration M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | |





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Patricia McInnes - August 2017

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2.0 | 638 | 90.24 | 90.24 |
| 2.1 - 3.0 | 69 | 9.76 | 100.00 |
| 3.1 - 10.0 | 0 | 0.00 | 100.00 |
| > 10.0 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Methane (CH₄) - ppm
Patricia McInnes - August 2017

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---|-----------------------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2.0 | 14 | 9 | 6 | 7 | 19 | 45 | 65 | 29 | 62 | 73 | 110 | 78 | 60 | 32 | 16 | 13 | 638 |
| 2.1 - 3.0 | 5 | 1 | 1 | 0 | 0 | 1 | 4 | 2 | 7 | 11 | 12 | 4 | 4 | 4 | 8 | 5 | 69 |
| 3.1 - 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 19 | 10 | 7 | 7 | 19 | 46 | 69 | 31 | 69 | 84 | 122 | 82 | 64 | 36 | 24 | 18 | 707 |

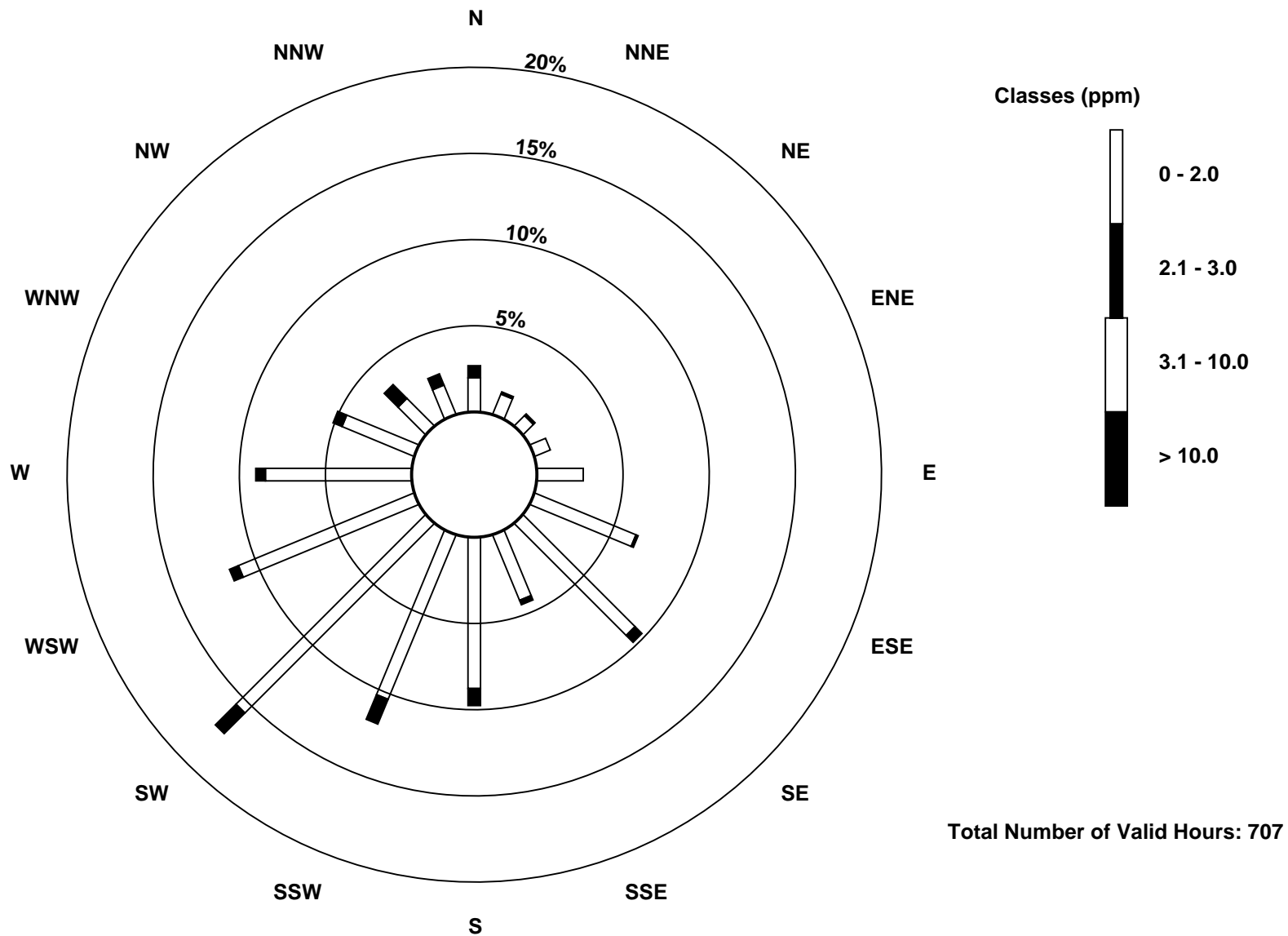
Total Number of Valid Hours: 707

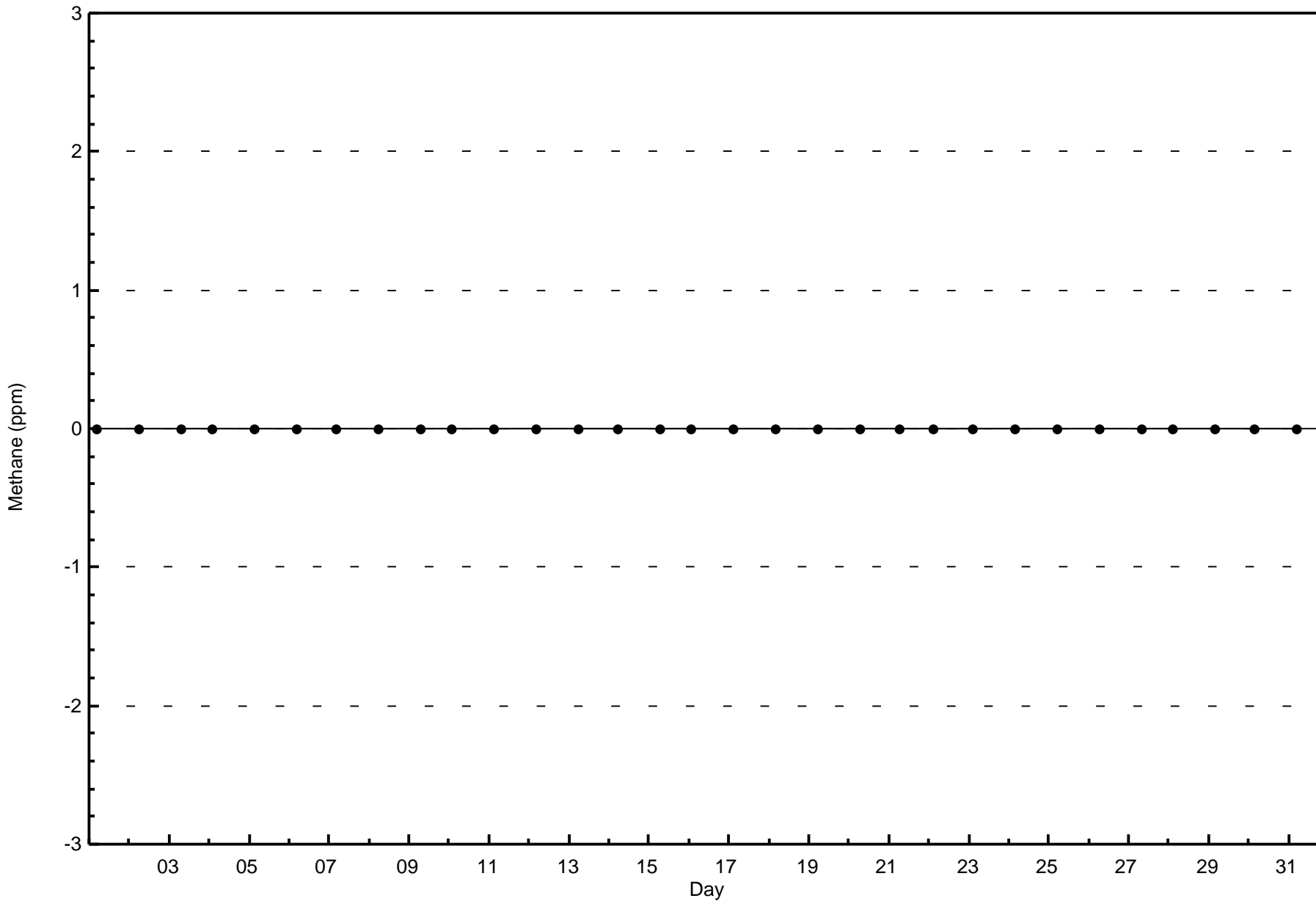
Total Number of Hours: 744

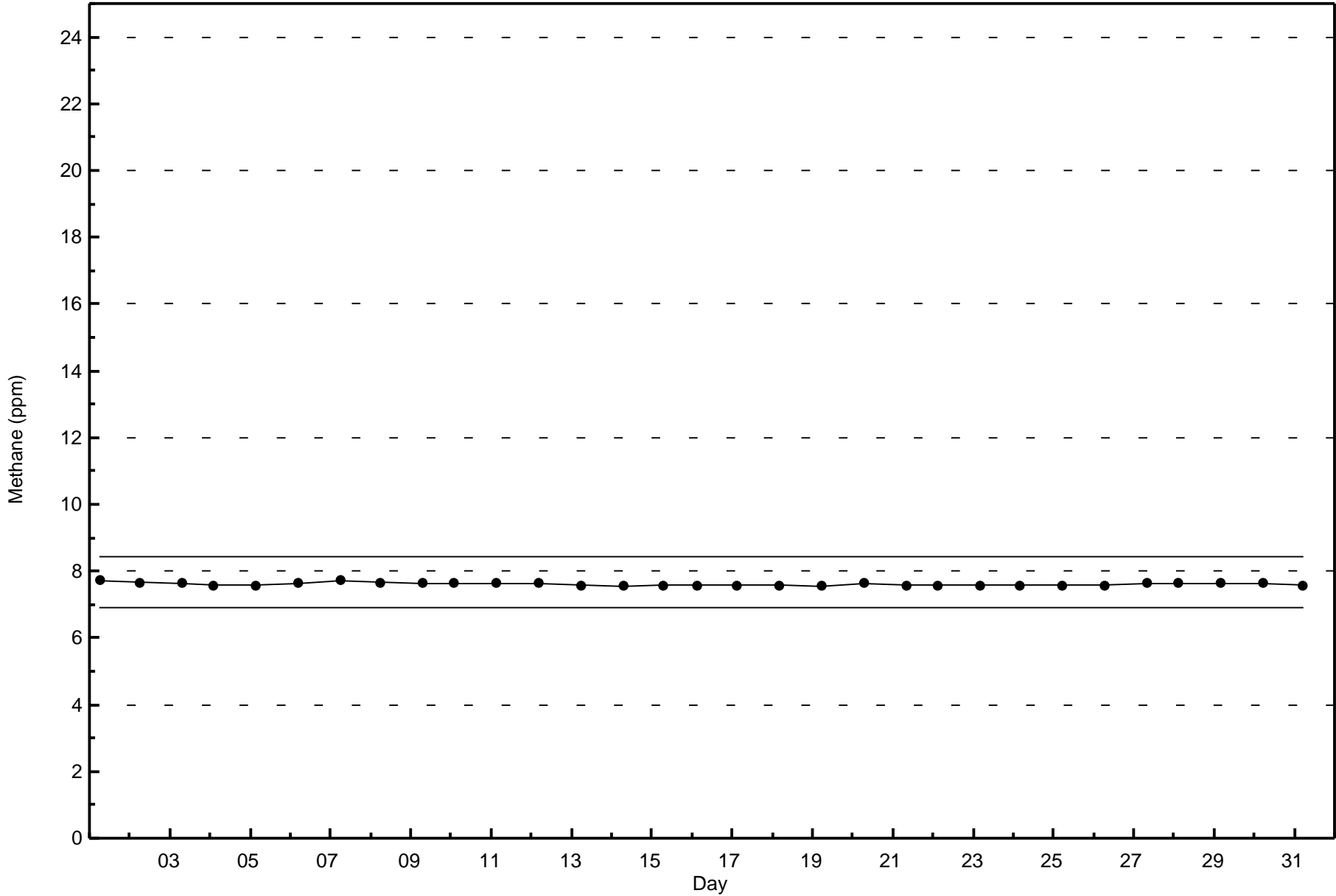


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Methane (CH₄) - ppm
Patricia McInnes (AMS 6)









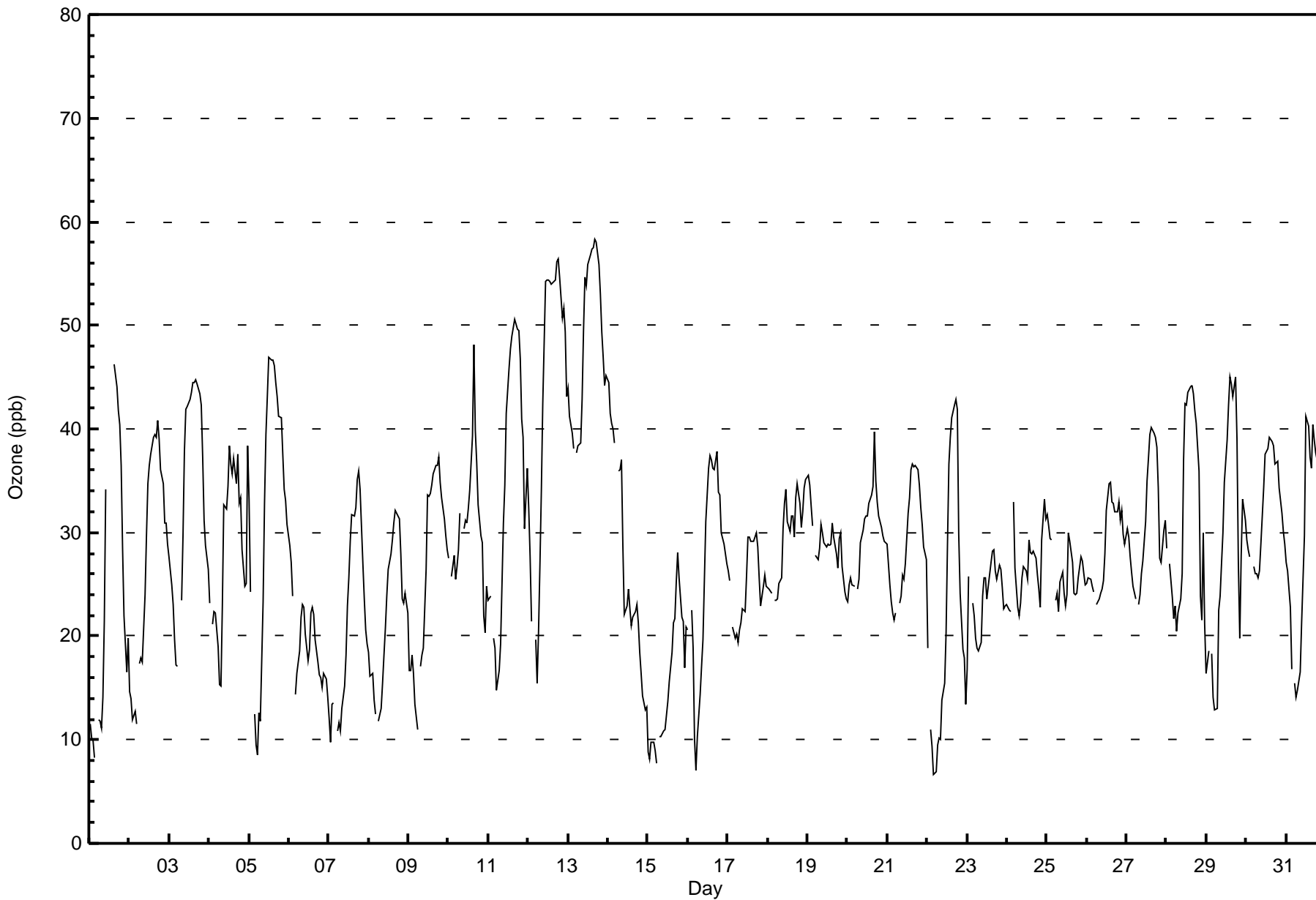
Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Patricia McInnes - August 2017

| Number of Exceedences (AAAQO): | | 1-hr: 0 | 24-hr: 0 | Hours in Service: 744 | | | | | | | | | | | | | | | | | | Daily Average | | Daily Maximum | | |
|---|-------------------------------|--|----------|--------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|----|-----------------|---------------|---------------|
| Maximum Value: 58 ppb on Aug 13 17:00 | | Maximum Daily Average: 48.6 ppb on Aug 13 | | Hours of Data: 708 | | | | | | | | | | | | | | | | | | 23.1 | | 46 | | |
| Minimum Value: 7 ppb on Aug 22 05:00 | | Minimum Daily Average: 15.6 ppb on Aug 15 | | Hours of Missing Data: 36 | | | | | | | | | | | | | | | | | | 27.8 | | 41 | | |
| Maximum Diurnal Average: 37.0 ppb at hour 16 | | Minimum Diurnal Average: 18.3 ppb at hour 6 | | Hours of Calibration: 35 | | | | | | | | | | | | | | | | | | 33.8 | | 45 | | |
| Monthly Average: 28.6 ppb | | Percentiles: P ₁ = 9 P ₁₀ = 15 Q ₁ = 22 Median = 28 Q ₃ = 35 P ₉₀ = 42 P ₉₉ = 56 | | Percent Operational Time: 99.9 | | | | | | | | | | | | | | | | | | 28.9 | | 38 | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 12 | 10 | 10 | 8 | Z | 12 | 12 | 11 | 14 | 21 | 34 | C | C | C | C | 46 | 44 | 42 | 40 | 37 | 28 | 22 | 17 | 20 | 23.1 | 46 |
| 2-Aug | 15 | 14 | 12 | 13 | 11 | Z | 17 | 18 | 17 | 24 | 30 | 35 | 36 | 38 | 39 | 39 | 39 | 41 | 39 | 36 | 35 | 31 | 31 | 29 | 27.8 | 41 |
| 3-Aug | 28 | 25 | 23 | 20 | 17 | 17 | Z | 24 | 30 | 38 | 42 | 42 | 43 | 43 | 44 | 44 | 45 | 44 | 43 | 42 | 37 | 31 | 29 | 26 | 33.8 | 45 |
| 4-Aug | 23 | Z | 21 | 22 | 22 | 19 | 15 | 15 | 23 | 33 | 32 | 34 | 38 | 37 | 36 | 37 | 35 | 38 | 33 | 33 | 28 | 25 | 25 | 38 | 28.9 | 38 |
| 5-Aug | 33 | 24 | Z | 13 | 9 | 9 | 13 | 12 | 23 | 33 | 39 | 43 | 47 | 47 | 47 | 46 | 44 | 43 | 41 | 41 | 38 | 34 | 33 | 31 | 32.3 | 47 |
| 6-Aug | 29 | 27 | 24 | Z | 14 | 16 | 19 | 22 | 23 | 23 | 20 | 18 | 19 | 22 | 23 | 22 | 20 | 18 | 16 | 16 | 15 | 16 | 16 | 14 | 19.6 | 29 |
| 7-Aug | 12 | 10 | 13 | 14 | Z | 11 | 12 | 11 | 13 | 15 | 18 | 23 | 26 | 29 | 32 | 32 | 32 | 35 | 36 | 34 | 27 | 24 | 21 | 19 | 21.6 | 36 |
| 8-Aug | 18 | 16 | 16 | 14 | 12 | Z | 12 | 13 | 15 | 18 | 21 | 24 | 26 | 28 | 29 | 31 | 32 | 32 | 31 | 28 | 24 | 23 | 24 | 22 | 22.2 | 32 |
| 9-Aug | 17 | 17 | 18 | 16 | 13 | 11 | Z | 17 | 18 | 19 | 26 | 34 | 33 | 34 | 35 | 36 | 37 | 37 | 37 | 35 | 33 | 31 | 30 | 28 | 26.6 | 37 |
| 10-Aug | 28 | Z | 26 | 28 | 25 | 27 | 28 | 32 | M | 30 | 31 | 31 | 32 | 34 | 39 | 48 | 40 | 37 | 33 | 30 | 29 | 22 | 20 | 25 | 30.7 | 48 |
| 11-Aug | 23 | 24 | Z | 20 | 19 | 15 | 17 | 19 | 25 | 31 | 35 | 41 | 46 | 48 | 49 | 50 | 51 | 50 | 50 | 47 | 41 | 39 | 30 | 36 | 35.0 | 51 |
| 12-Aug | 32 | 28 | 21 | Z | 20 | 15 | 20 | 27 | 34 | 42 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 56 | 56 | 55 | 51 | 52 | 49 | 43 | 42.7 | 56 |
| 13-Aug | 44 | 41 | 40 | 38 | Z | 38 | 38 | 39 | 43 | 49 | 55 | 54 | 56 | 57 | 57 | 58 | 58 | 58 | 56 | 53 | 49 | 47 | 44 | 45 | 48.6 | 58 |
| 14-Aug | 44 | 42 | 41 | 40 | 39 | Z | 36 | 36 | 37 | 29 | 22 | 23 | 24 | 23 | 21 | 22 | 22 | 23 | 21 | 18 | 16 | 14 | 13 | 13 | 26.9 | 44 |
| 15-Aug | 9 | 8 | 10 | 10 | 9 | 8 | Z | 10 | 10 | 11 | 11 | 12 | 14 | 16 | 18 | 21 | 22 | 25 | 28 | 26 | 22 | 21 | 17 | 21 | 15.6 | 28 |
| 16-Aug | 21 | Z | 22 | 19 | 10 | 7 | 10 | 14 | 17 | 20 | 25 | 31 | 36 | 37 | 37 | 36 | 36 | 38 | 34 | 34 | 30 | 29 | 29 | 27 | 26.1 | 38 |
| 17-Aug | 26 | 25 | Z | 21 | 20 | 20 | 19 | 21 | 21 | 23 | 22 | 26 | 30 | 30 | 29 | 29 | 30 | 30 | 29 | 26 | 23 | 25 | 26 | 25 | 25.0 | 30 |
| 18-Aug | 25 | 25 | 24 | Z | 23 | 24 | 24 | 25 | 26 | 30 | 33 | 34 | 31 | 30 | 32 | 32 | 30 | 33 | 35 | 33 | 30 | 32 | 34 | 35 | 29.5 | 35 |
| 19-Aug | 35 | 35 | 33 | 31 | Z | 28 | 27 | 29 | 31 | 30 | 29 | 29 | 29 | 29 | 29 | 31 | 30 | 28 | 27 | 29 | 30 | 27 | 24 | 24 | 29.2 | 35 |
| 20-Aug | 23 | 25 | 26 | 25 | 25 | Z | 25 | 25 | 29 | 30 | 31 | 32 | 32 | 33 | 34 | 34 | 40 | 35 | 33 | 32 | 31 | 30 | 29 | 29 | 29.8 | 40 |
| 21-Aug | 29 | 25 | 23 | 22 | 22 | 22 | Z | 23 | 24 | 26 | 25 | 27 | 32 | 33 | 36 | 37 | 36 | 37 | 36 | 35 | 32 | 31 | 29 | 27 | 29.1 | 37 |
| 22-Aug | 19 | Z | 11 | 9 | 7 | 7 | 9 | 10 | 10 | 14 | 15 | 20 | 29 | 37 | 39 | 41 | 42 | 43 | 42 | 30 | 24 | 19 | 18 | 13 | 22.1 | 43 |
| 23-Aug | 17 | 26 | Z | 23 | 22 | 20 | 19 | 19 | 19 | 24 | 26 | 26 | 24 | 25 | 27 | 28 | 28 | 26 | 25 | 27 | 27 | 25 | 23 | 23 | 23.8 | 28 |
| 24-Aug | 23 | 23 | 22 | Z | 33 | 27 | 23 | 22 | 23 | 26 | 27 | 26 | 26 | 29 | 28 | 28 | 28 | 27 | 26 | 25 | 23 | 29 | 33 | 31 | 26.4 | 33 |
| 25-Aug | 32 | 31 | 29 | 29 | Z | 24 | 24 | 22 | 25 | 26 | 24 | 23 | 24 | 30 | 29 | 27 | 24 | 24 | 24 | 26 | 28 | 27 | 26 | 25 | 26.2 | 32 |
| 26-Aug | 25 | 26 | 25 | 25 | 24 | Z | 23 | 24 | 24 | 25 | 25 | 28 | 32 | 35 | 35 | 33 | 33 | 32 | 32 | 33 | 31 | 32 | 30 | 29 | 28.7 | 35 |
| 27-Aug | 30 | 30 | 28 | 26 | 25 | 24 | Z | 23 | 24 | 26 | 27 | 31 | 35 | 37 | 39 | 40 | 40 | 39 | 38 | 34 | 28 | 27 | 30 | 31 | 31.0 | 40 |
| 28-Aug | 28 | Z | 27 | 24 | 22 | 23 | 20 | 22 | 24 | 26 | 37 | 42 | 42 | 44 | 44 | 44 | 43 | 42 | 40 | 36 | 24 | 22 | 30 | 21 | 31.7 | 44 |
| 29-Aug | 16 | 19 | Z | 18 | 14 | 13 | 13 | 22 | 24 | 27 | 30 | 35 | 39 | 42 | 45 | 44 | 43 | 45 | 39 | 27 | 20 | 28 | 33 | 31 | 29.1 | 45 |
| 30-Aug | 29 | 28 | 28 | Z | 27 | 26 | 26 | 26 | 26 | 29 | 34 | 38 | 38 | 38 | 39 | 39 | 38 | 37 | 37 | 37 | 34 | 32 | 30 | 29 | 32.4 | 39 |
| 31-Aug | 27 | 26 | 23 | 17 | Z | 15 | 14 | 15 | 16 | 21 | 26 | 30 | 41 | 40 | 37 | 36 | 40 | 39 | 38 | 36 | 35 | 35 | 35 | 36 | 29.6 | 41 |
| 24.9 24.1 22.9 20.9 19.4 18.3 19.8 20.9 23.0 26.4 29.3 31.5 33.8 35.2 36.1 37.0 36.7 36.5 35.3 33.2 29.8 28.4 27.7 27.4 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| 44 42 41 40 39 38 38 39 43 49 55 54 56 57 57 58 58 58 56 55 51 52 49 45 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| Z - zerospan C - Calibration M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | |





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Patricia McInnes - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 143 | 20.20 | 20.20 |
| 21 - 50 | 542 | 76.55 | 96.75 |
| 51 - 82 | 23 | 3.25 | 100.00 |
| > 83 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Ozone (O₃) - ppb
Patricia McInnes - August 2017

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---|-----------------------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 9 | 1 | 1 | 1 | 0 | 3 | 12 | 6 | 19 | 30 | 22 | 5 | 8 | 6 | 7 | 13 | 143 |
| 21 - 50 | 10 | 7 | 6 | 6 | 19 | 43 | 47 | 25 | 39 | 55 | 98 | 78 | 58 | 28 | 17 | 6 | 542 |
| 51 - 82 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 1 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 |
| > 83 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 19 | 8 | 7 | 7 | 19 | 46 | 70 | 32 | 69 | 85 | 120 | 83 | 66 | 34 | 24 | 19 | 708 |

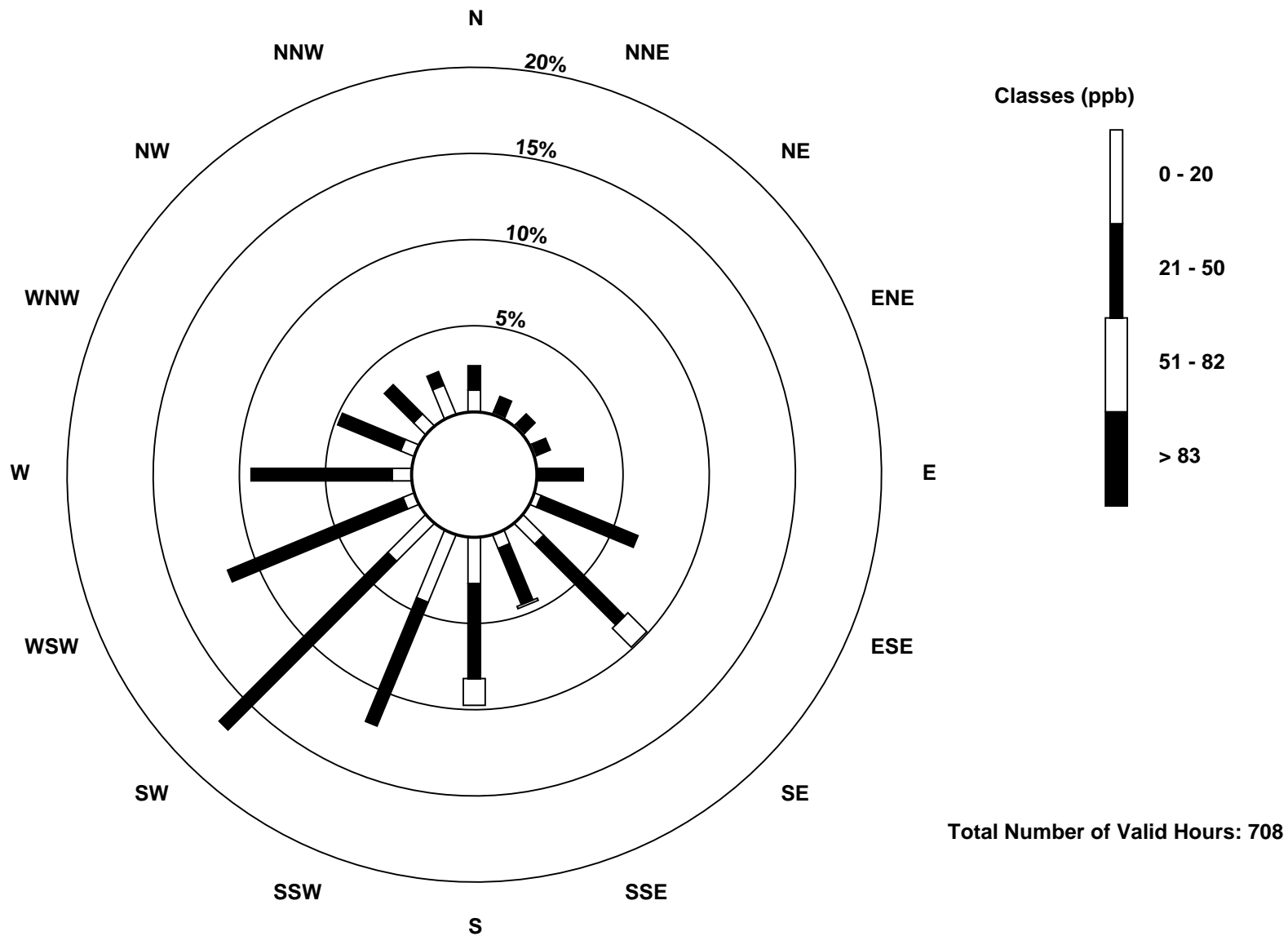
Total Number of Valid Hours: 708

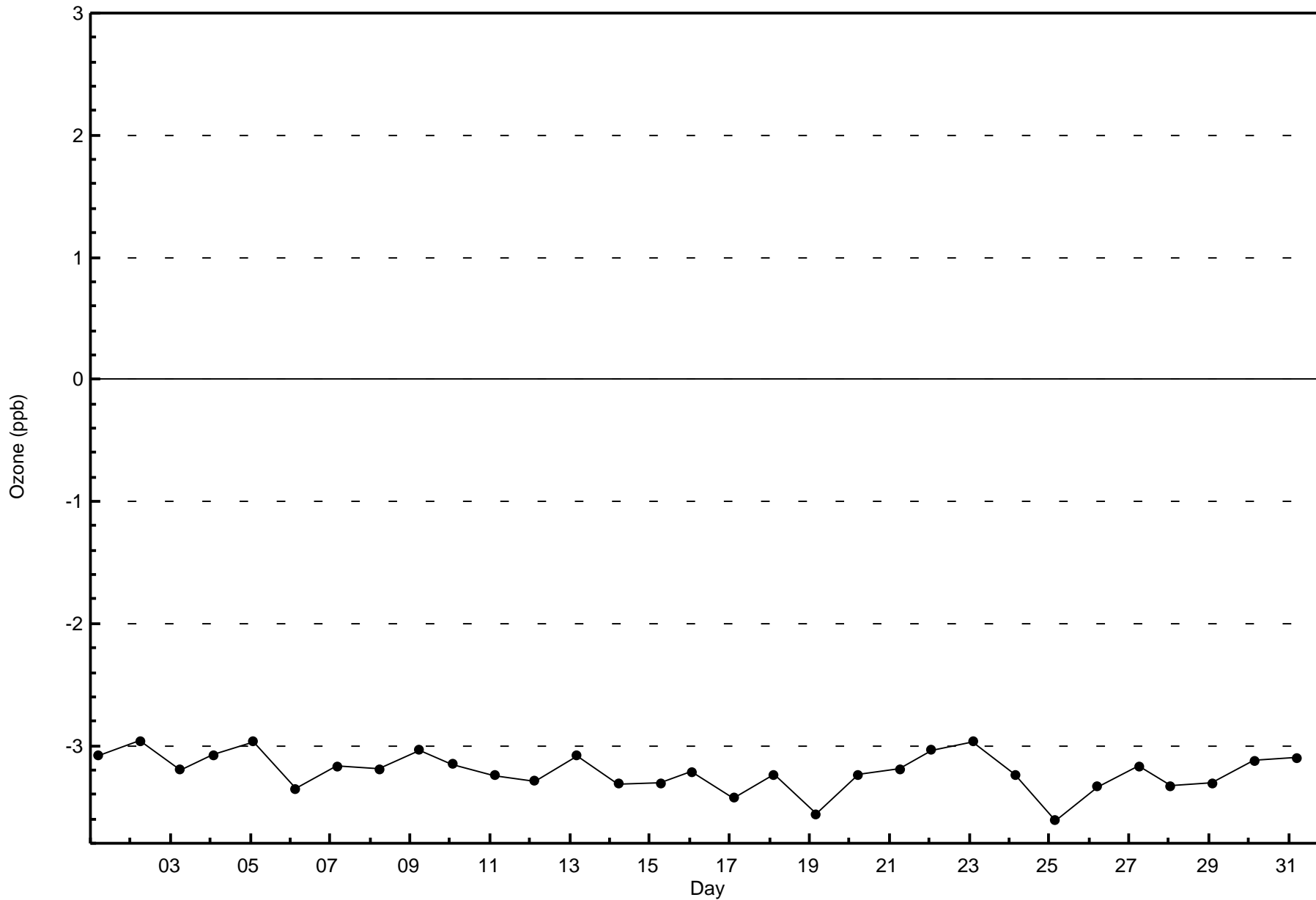
Total Number of Hours: 744

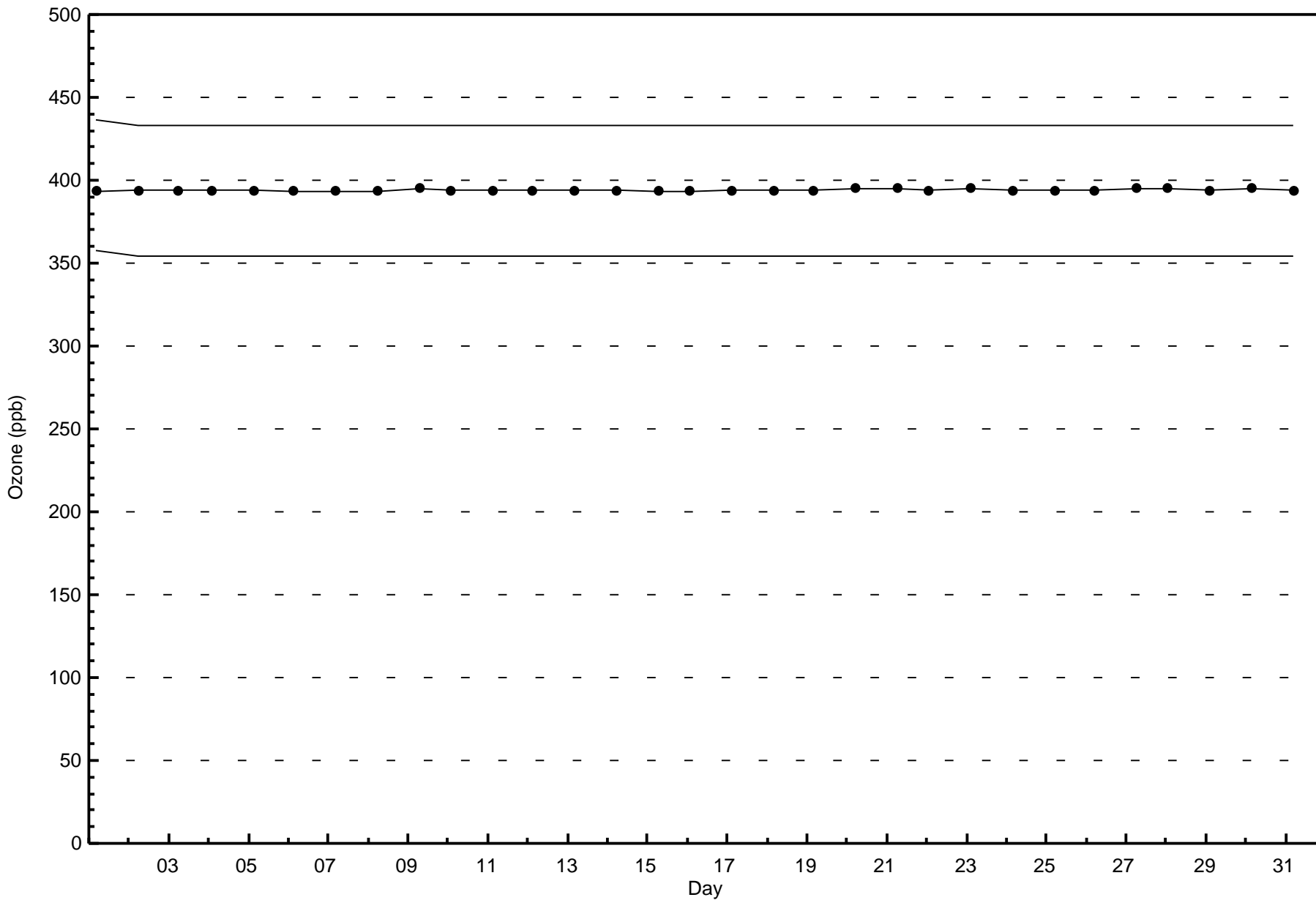


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Ozone (O₃) - ppb
Patricia McInnes (AMS 6)







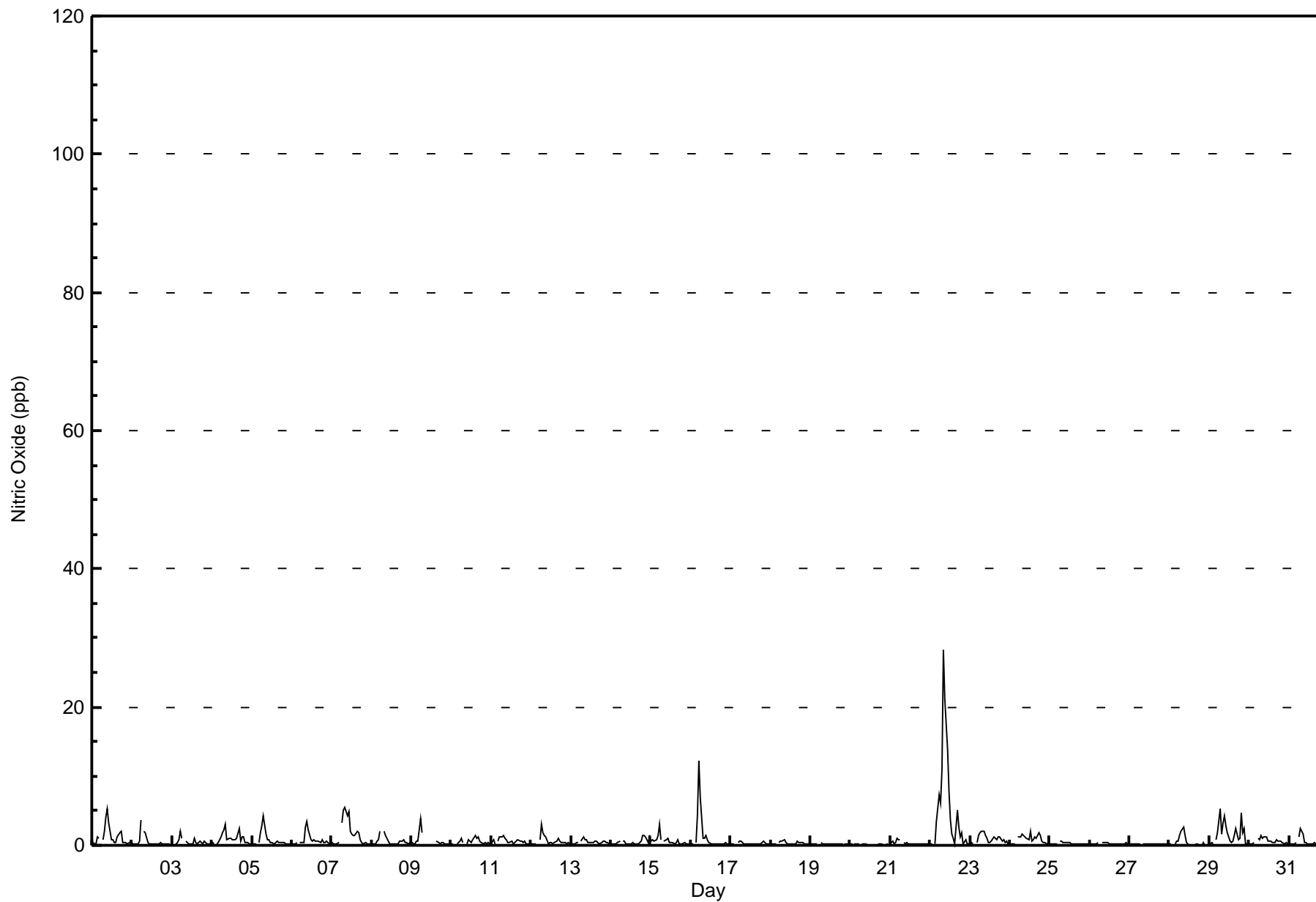


| Maximum Value: 28 ppb on Aug 22 09:00 | | Maximum Daily Average: 5.1 ppb on Aug 22 | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|--|-----|--------------------------------|-----|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------|-----------------|--|
| Minimum Value: 0 ppb on Aug 28 16:00 | | Minimum Daily Average: 0.1 ppb on Aug 20 | | Hours of Data: 706 | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 2.3 ppb at hour 9 | | Minimum Diurnal Average: 0.2 ppb at hour 3 | | Hours of Missing Data: 38 | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 0.8 ppb | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 7 | | Hours of Calibration: 37 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Percent Operational Time: 99.9 | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 0 | 0 | 0 | 1 | 1 | Z | 1 | 2 | 4 | 5 | 3 | 1 | 1 | 0 | 0 | 1 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 1.2 | 5 | |
| 2-Aug | 0 | 0 | 0 | 0 | 1 | 4 | Z | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 4 | |
| 3-Aug | 0 | 0 | 0 | 0 | 1 | 2 | 1 | Z | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0.5 | 2 | |
| 4-Aug | 0 | 0 | Z | 0 | 0 | 1 | 2 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1.0 | 3 | |
| 5-Aug | 0 | 0 | 0 | Z | 0 | 2 | 3 | 4 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.8 | 4 | |
| 6-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0.7 | 3 | |
| 7-Aug | 0 | 0 | 0 | 0 | 0 | Z | 3 | 5 | 6 | 4 | 5 | 2 | 2 | 1 | 1 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1.6 | 6 | |
| 8-Aug | 0 | 0 | 0 | 1 | 1 | 2 | Z | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0.6 | 2 | |
| 9-Aug | 0 | 0 | 0 | 1 | 1 | 4 | 2 | Z | 1 | C | C | C | C | C | C | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -- | 4 | |
| 10-Aug | 0 | 0 | Z | 0 | 0 | 1 | 1 | 0 | M | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 1 | |
| 11-Aug | 0 | 1 | 0 | Z | 1 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0.6 | 2 | |
| 12-Aug | 0 | 0 | 0 | 0 | Z | 1 | 3 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 3 | |
| 13-Aug | 0 | 0 | 0 | 0 | 0 | Z | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0.4 | 1 | |
| 14-Aug | 0 | 0 | 0 | 0 | 0 | 1 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0.5 | 1 | |
| 15-Aug | 1 | 1 | 1 | 1 | 1 | 3 | 1 | Z | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 3 | |
| 16-Aug | 0 | 0 | Z | 0 | 5 | 12 | 7 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.4 | 12 | |
| 17-Aug | 0 | 0 | 0 | Z | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0.3 | 1 | |
| 18-Aug | 0 | 0 | 0 | 0 | Z | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | |
| 19-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | |
| 20-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | |
| 21-Aug | 0 | 1 | 0 | 0 | 1 | 1 | 1 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | |
| 22-Aug | 0 | 0 | Z | 0 | 3 | 7 | 6 | 11 | 28 | 21 | 14 | 8 | 4 | 2 | 1 | 0 | 5 | 3 | 1 | 2 | 0 | 1 | 0 | 0 | 5.1 | 28 | |
| 23-Aug | 0 | 0 | 0 | Z | 0 | 1 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0.9 | 2 | |
| 24-Aug | 0 | 0 | 0 | 0 | Z | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0.9 | 2 | |
| 25-Aug | 0 | 0 | 0 | 0 | 0 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | |
| 26-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | |
| 28-Aug | 0 | 0 | Z | 0 | 1 | 1 | 1 | 2 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 3 | |
| 29-Aug | 0 | 0 | 0 | Z | 1 | 2 | 5 | 2 | 3 | 4 | 3 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 5 | 2 | 2 | 0 | 0 | 1.7 | 5 | |
| 30-Aug | 0 | 0 | 0 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0.6 | 1 | |
| 31-Aug | 0 | 0 | 0 | 0 | 0 | Z | 1 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 2 | |
| | | 0.2 | 0.2 | 0.2 | 0.3 | 0.8 | 2.0 | 1.8 | 1.9 | 2.3 | 1.8 | 1.3 | 0.7 | 0.6 | 0.4 | 0.5 | 0.5 | 0.8 | 0.6 | 0.5 | 0.6 | 0.4 | 0.4 | 0.2 | 0.2 | Diurnal Average | |
| | | 1 | 1 | 1 | 1 | 5 | 12 | 7 | 11 | 28 | 21 | 14 | 8 | 4 | 2 | 1 | 2 | 5 | 3 | 1 | 5 | 2 | 2 | 1 | 1 | Diurnal Maximum | |
| Z - zerospan | | C - Calibration | | | | M - Maintenance | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Patricia McInnes - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Patricia McInnes - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 704 | 99.72 | 99.72 |
| 21 - 40 | 2 | 0.28 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 706

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Nitric Oxide (NO) - ppb
Patricia McInnes - August 2017

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---|-----------------------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 19 | 11 | 6 | 7 | 19 | 46 | 69 | 30 | 68 | 83 | 122 | 83 | 63 | 35 | 25 | 18 | 704 |
| 21 - 40 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 20 | 11 | 7 | 7 | 19 | 46 | 69 | 30 | 68 | 83 | 122 | 83 | 63 | 35 | 25 | 18 | 706 |

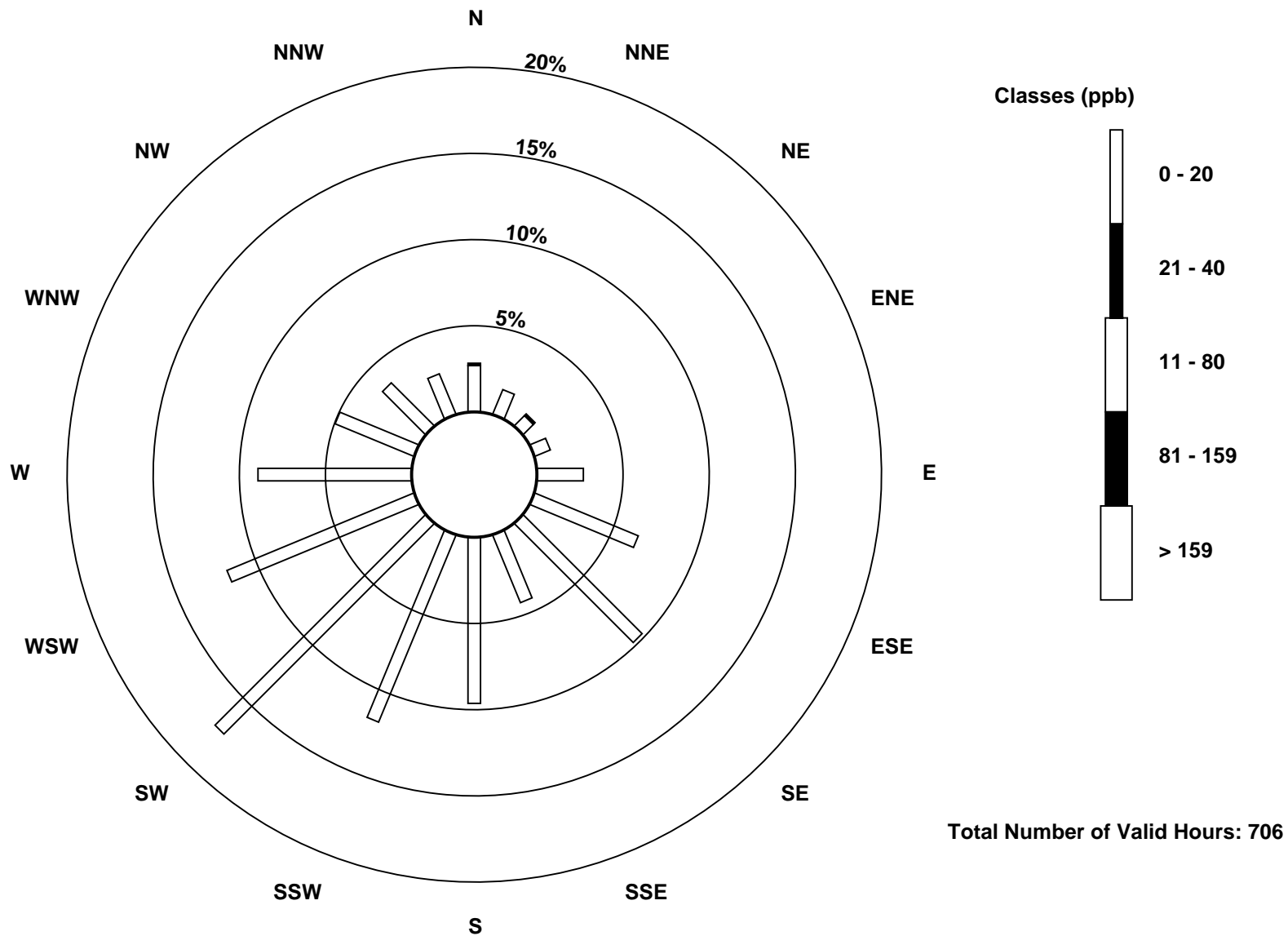
Total Number of Valid Hours: 706

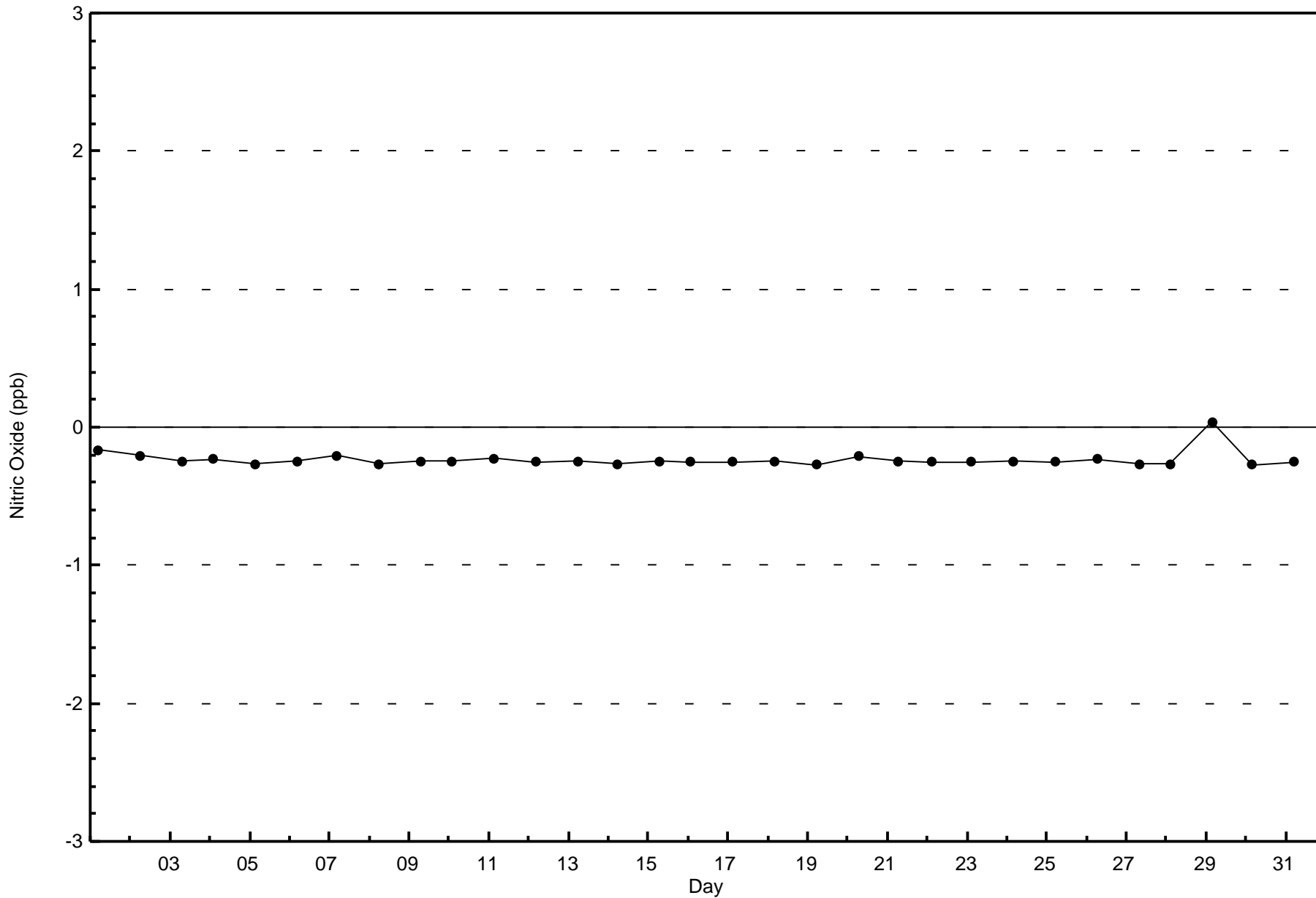
Total Number of Hours: 744

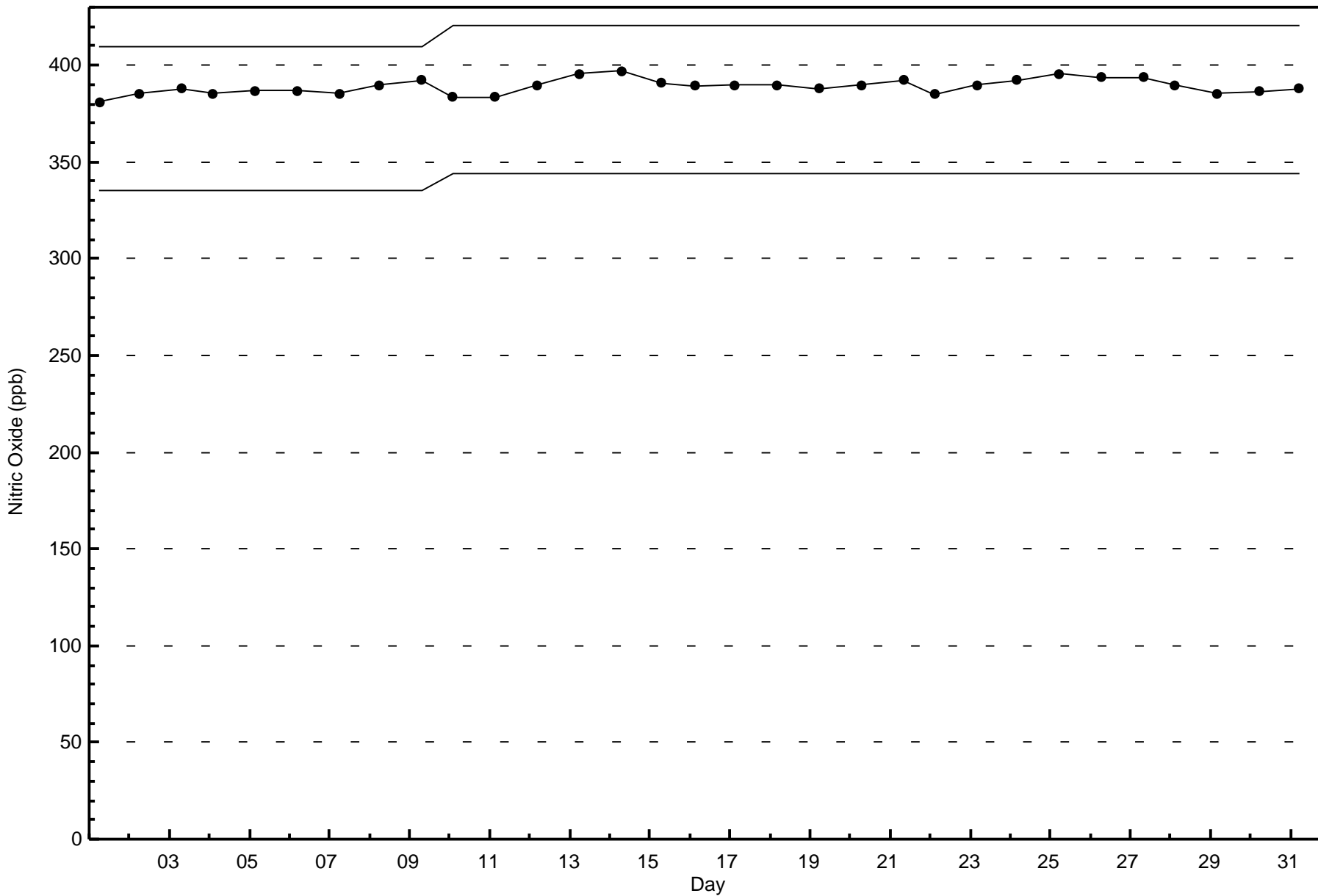


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitric Oxide (NO) - ppb
Patricia McInnes (AMS 6)









Wood Buffalo Environmental Association
Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes - August 2017

| | | | | |
|--|---|----------|---------------------------|------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 17 ppb on Aug 22 09:00 | Maximum Daily Average: 8.9 ppb on Aug 22 | | Hours of Data: | 706 |
| Minimum Value: 0 ppb on Aug 8 13:00 | Minimum Daily Average: 0.2 ppb on Aug 20 | | Hours of Missing Data: | 38 |
| Maximum Diurnal Average: 3.8 ppb at hour 6 | Minimum Diurnal Average: 1.0 ppb at hour 14 | | Hours of Calibration: | 37 |
| Monthly Average: 2.0 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 14 | | Percent Operational Time: | 99.9 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 3 | 2 | 1 | 1 | 3 | Z | 1 | 3 | 5 | 7 | 7 | 4 | 4 | 2 | 2 | 3 | 4 | 4 | 3 | 4 | 6 | 2 | 2 | 2 | 3.2 | 7 |
| 2-Aug | 2 | 2 | 2 | 2 | 3 | 6 | Z | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 3 | 5 | 3 | 1 | 1.6 | 6 |
| 3-Aug | 0 | 1 | 1 | 2 | 4 | 4 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 4 | 4 | 4 | 4 | 1.9 | 4 |
| 4-Aug | 5 | 5 | Z | 5 | 5 | 8 | 7 | 6 | 7 | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 4 | 4 | 6 | 5 | 3 | 6 | 4 | 1 | 4.4 | 8 |
| 5-Aug | 2 | 1 | 2 | Z | 1 | 2 | 4 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 3 | 2 | 1 | 1.8 | 4 |
| 6-Aug | 1 | 1 | 1 | 3 | Z | 1 | 1 | 1 | 5 | 7 | 6 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 5 | 2.4 | 7 |
| 7-Aug | 7 | 8 | 3 | 2 | 3 | Z | 7 | 8 | 6 | 5 | 5 | 3 | 2 | 2 | 3 | 5 | 5 | 3 | 3 | 3 | 5 | 2 | 1 | 1 | 4.0 | 8 |
| 8-Aug | 1 | 1 | 0 | 1 | 1 | 2 | Z | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 3 | 6 | 3 | 2 | 3 | 1.3 | 6 |
| 9-Aug | 4 | 3 | 1 | 3 | 4 | 7 | 3 | Z | 1 | C | C | C | C | C | C | 1 | 1 | 0 | 1 | 2 | 1 | 3 | 3 | 1 | -- | 7 |
| 10-Aug | 1 | 1 | Z | 2 | 3 | 2 | 4 | 1 | M | 1 | 1 | 1 | 0 | 1 | 2 | 3 | 3 | 2 | 1 | 2 | 4 | 5 | 5 | 1 | 2.1 | 5 |
| 11-Aug | 1 | 1 | 1 | Z | 2 | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 5 | 4 | 2 | 1 | 1.9 | 5 |
| 12-Aug | 2 | 2 | 5 | 2 | Z | 3 | 6 | 4 | 4 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 3 | 2 | 3 | 3 | 2.4 | 6 |
| 13-Aug | 2 | 2 | 2 | 3 | 3 | Z | 2 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 2 | 1 | 1.8 | 3 |
| 14-Aug | 1 | 1 | 0 | 1 | 2 | 3 | Z | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 3 | 3 | 1.6 | 4 |
| 15-Aug | 4 | 3 | 1 | 2 | 3 | 4 | 2 | Z | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 2 | 2 | 1 | 0 | 1.3 | 4 |
| 16-Aug | 0 | 0 | Z | 2 | 8 | 12 | 7 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 3 | 2 | 1 | 1 | 1.8 | 12 |
| 17-Aug | 1 | 1 | 1 | Z | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 1 | 0 | 0 | 0.7 | 3 |
| 18-Aug | 0 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0.9 | 2 |
| 19-Aug | 0 | 0 | 0 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0.2 | 1 |
| 20-Aug | 0 | 0 | 0 | 1 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 21-Aug | 0 | 2 | 1 | 1 | 2 | 2 | 1 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 0.7 | 2 |
| 22-Aug | 7 | 5 | Z | 9 | 16 | 14 | 13 | 13 | 17 | 17 | 17 | 14 | 10 | 6 | 3 | 1 | 5 | 5 | 6 | 10 | 5 | 5 | 6 | 3 | 8.9 | 17 |
| 23-Aug | 4 | 2 | 1 | Z | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 1 | 2 | 2 | 3 | 2 | 2 | 3 | 4 | 2 | 2 | 2 | 1 | 1 | 2.4 | 4 |
| 24-Aug | 1 | 1 | 1 | 1 | Z | 7 | 4 | 3 | 3 | 2 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 3 | 3 | 1 | 1 | 1 | 1 | 1.9 | 7 |
| 25-Aug | 1 | 0 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 26-Aug | 0 | 0 | 0 | 0 | 1 | 1 | Z | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 2 | 1 | 0.6 | 2 |
| 27-Aug | 1 | 0 | 0 | 1 | 1 | 1 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 1 | 0 | 0.5 | 2 |
| 28-Aug | 1 | 1 | Z | 1 | 3 | 2 | 3 | 2 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 2 | 1 | 0 | 2 | 1.2 | 3 |
| 29-Aug | 3 | 2 | 0 | Z | 2 | 4 | 6 | 3 | 5 | 8 | 6 | 4 | 2 | 2 | 2 | 2 | 3 | 5 | 9 | 17 | 13 | 7 | 2 | 2 | 4.7 | 17 |
| 30-Aug | 2 | 1 | 1 | 1 | Z | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 1.9 | 3 |
| 31-Aug | 2 | 1 | 2 | 2 | 2 | Z | 3 | 2 | 2 | 1 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.1 | 3 |

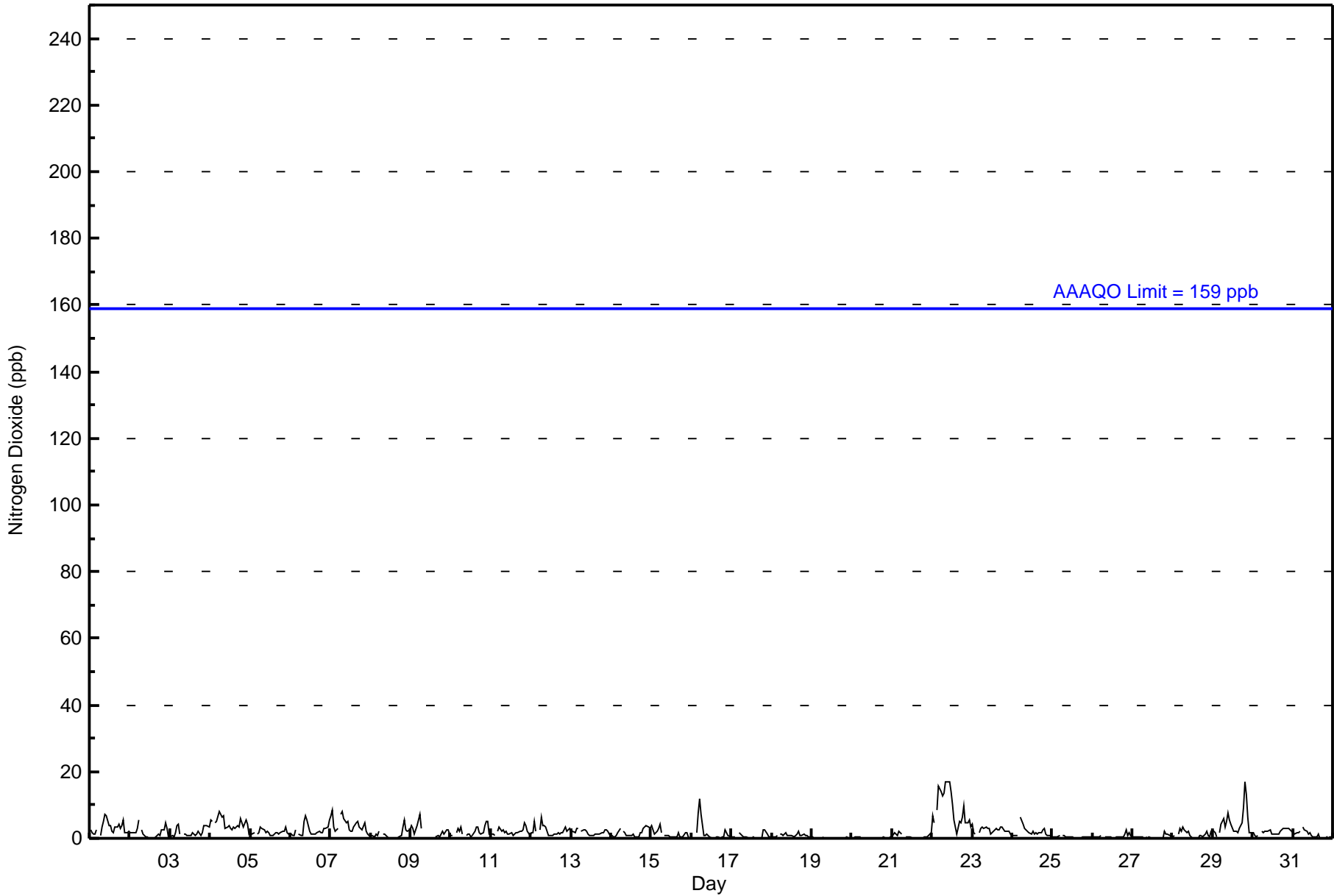
| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|--|
| 1.8 | 1.6 | 1.1 | 1.8 | 2.8 | 3.8 | 3.3 | 2.7 | 2.7 | 2.5 | 2.2 | 1.6 | 1.3 | 1.0 | 1.1 | 1.2 | 1.5 | 1.5 | 1.8 | 2.6 | 2.9 | 2.4 | 1.9 | 1.4 | Diurnal Average | |
| 7 | 8 | 5 | 9 | 16 | 14 | 13 | 13 | 17 | 17 | 17 | 14 | 10 | 6 | 3 | 5 | 5 | 5 | 9 | 17 | 13 | 7 | 6 | 5 | Diurnal Maximum | |

Z - zerospan C - Calibration M - Maintenance
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 706 | 100.00 | 100.00 |
| 21 - 40 | 0 | 0.00 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 706

Total Number of Hours: 744



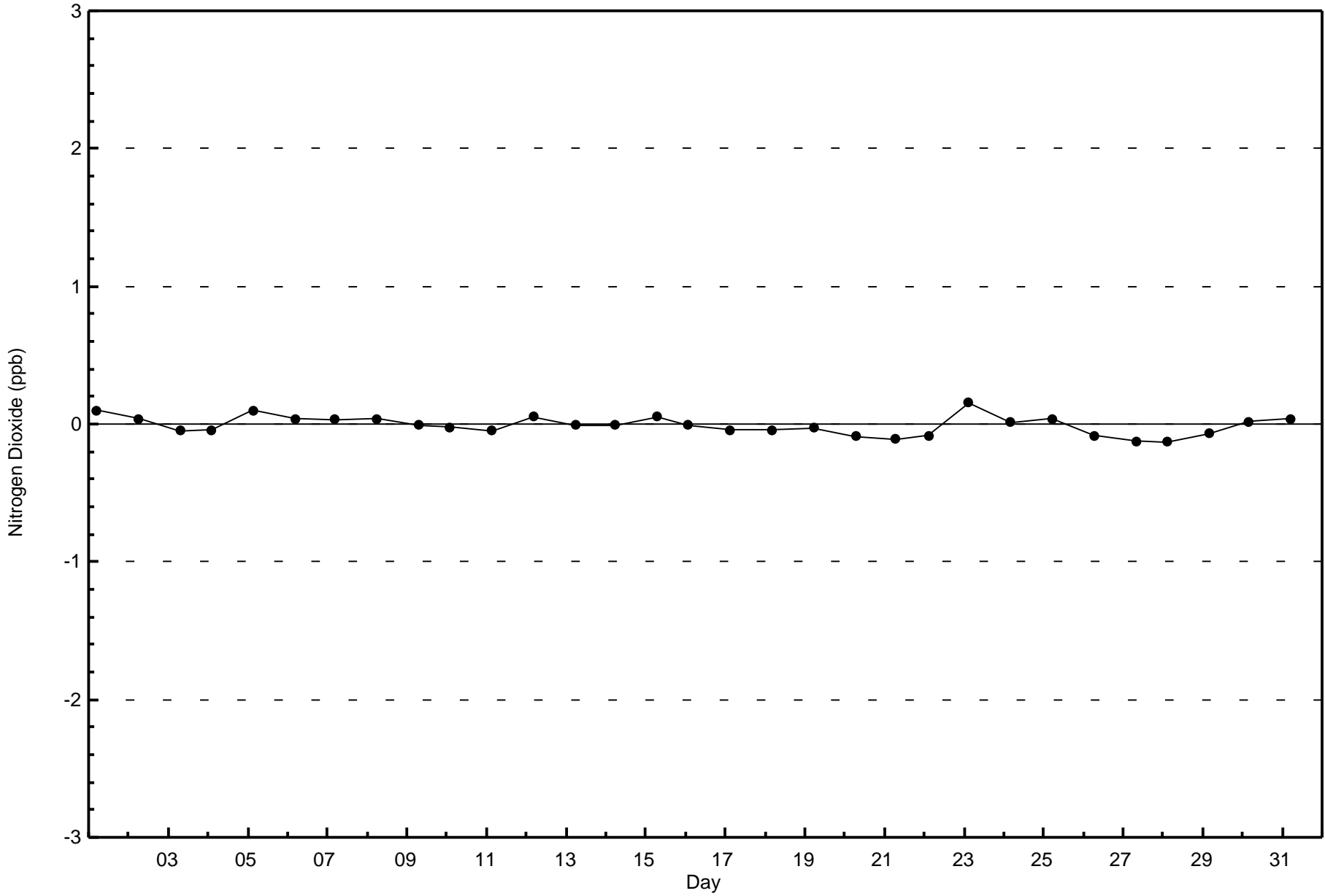
**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 20 | 11 | 7 | 7 | 19 | 46 | 69 | 30 | 68 | 83 | 122 | 83 | 63 | 35 | 25 | 18 | 706 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 41 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 20 | 11 | 7 | 7 | 19 | 46 | 69 | 30 | 68 | 83 | 122 | 83 | 63 | 35 | 25 | 18 | 706 |

Total Number of Valid Hours: 706

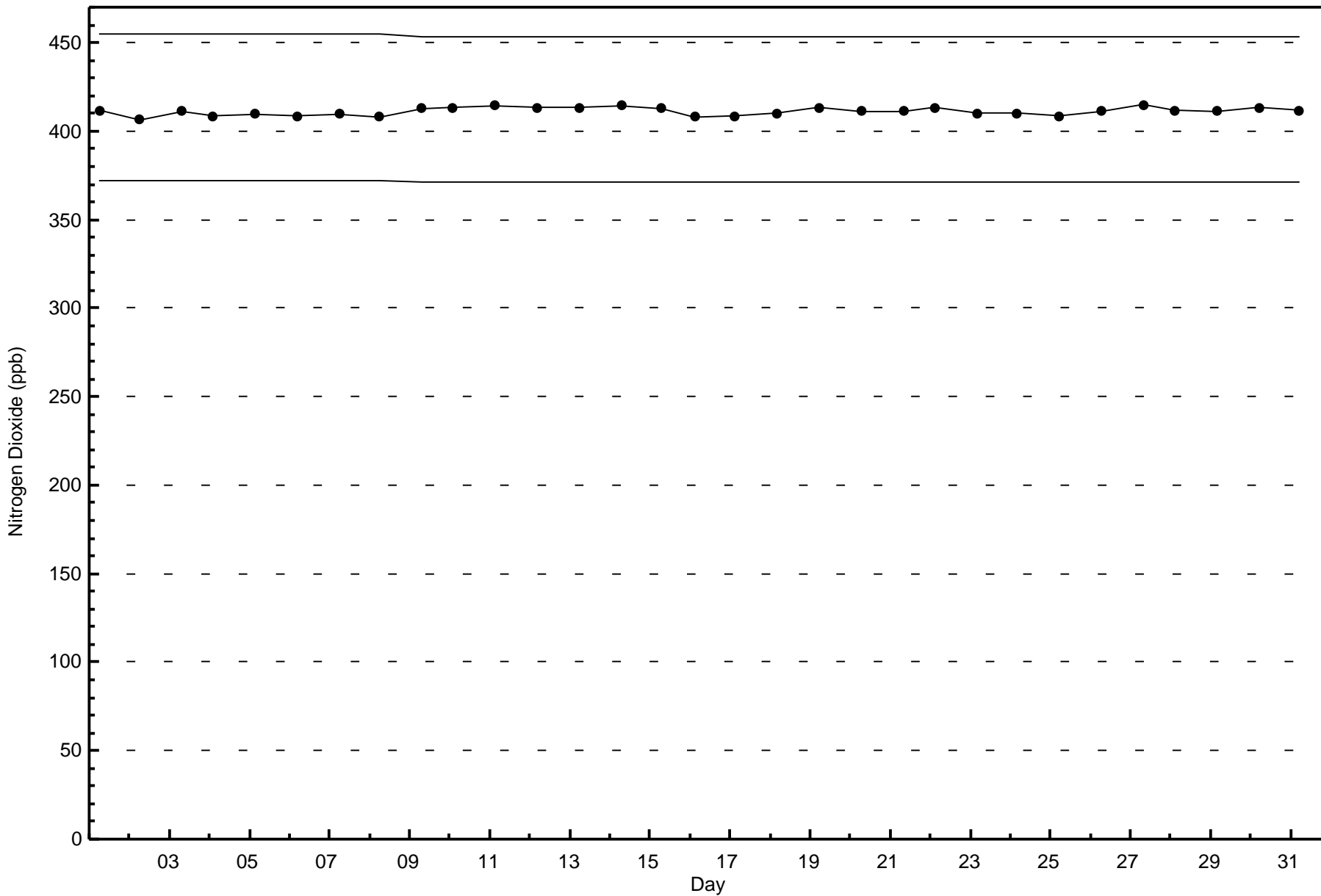
Total Number of Hours: 744





Wood Buffalo Environmental Association
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes - August 2017





Wood Buffalo Environmental Association
Summary of Hour Averages

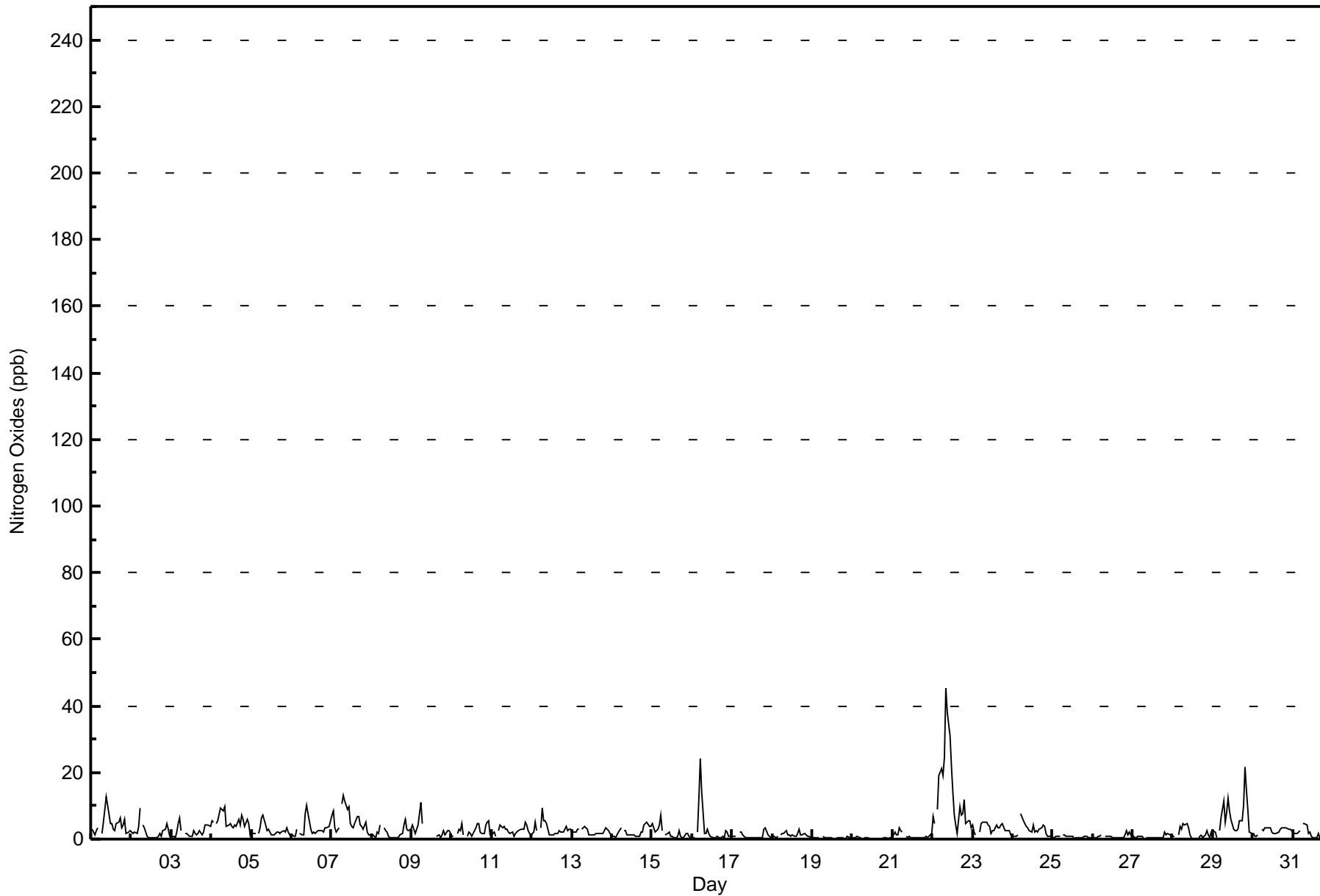
Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - August 2017

| Maximum Value: 45 ppb on Aug 22 09:00 | | Maximum Daily Average: 14.1 ppb on Aug 22 | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|---|---|--------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----------------|---------------|---------------|-----|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|--|
| Minimum Value: 0 ppb on Aug 20 15:00 | | Minimum Daily Average: 0.3 ppb on Aug 20 | | Hours of Data: 706 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 5.8 ppb at hour 6 | | Minimum Diurnal Average: 1.3 ppb at hour 3 | | Hours of Missing Data: 38 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 2.8 ppb | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 21 | | Hours of Calibration: 37 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Percent Operational Time: 99.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 3 | 2 | 1 | 2 | 4 | Z | 2 | 5 | 9 | 13 | 10 | 4 | 5 | 3 | 2 | 4 | 5 | 7 | 3 | 4 | 6 | 2 | 2 | 3 | 4.4 | 13 | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 2 | 2 | 2 | 2 | 4 | 9 | Z | 4 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 3 | 3 | 5 | 3 | 1 | 2.1 | 9 | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 1 | 1 | 1 | 2 | 5 | 6 | 2 | Z | 2 | 2 | 1 | 1 | 1 | 3 | 2 | 1 | 2 | 3 | 1 | 2 | 4 | 4 | 4 | 4 | 2.3 | 6 | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 6 | 5 | Z | 5 | 6 | 9 | 9 | 8 | 10 | 4 | 4 | 5 | 4 | 3 | 4 | 4 | 6 | 4 | 7 | 6 | 4 | 6 | 5 | 1 | 5.4 | 10 | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 2 | 2 | 2 | Z | 2 | 3 | 6 | 7 | 4 | 3 | 3 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 1 | 2.6 | 7 | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 1 | 1 | 1 | 3 | Z | 2 | 1 | 1 | 8 | 10 | 8 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 3 | 4 | 4 | 6 | 3.2 | 10 | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 7 | 8 | 3 | 2 | 3 | Z | 11 | 13 | 12 | 9 | 10 | 5 | 4 | 4 | 5 | 7 | 7 | 4 | 4 | 3 | 5 | 2 | 1 | 1 | 5.6 | 13 | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 1 | 1 | 1 | 2 | 2 | 4 | Z | 3 | 3 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 4 | 6 | 3 | 2 | 3 | 1.9 | 6 | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 4 | 3 | 2 | 3 | 4 | 11 | 5 | Z | 2 | C | C | C | C | C | C | 1 | 1 | 1 | 1 | 2 | 1 | 3 | 3 | 2 | -- | 11 | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 1 | 1 | Z | 2 | 3 | 3 | 5 | 1 | M | 1 | 2 | 2 | 1 | 2 | 3 | 5 | 5 | 2 | 2 | 2 | 4 | 5 | 5 | 1 | 2.6 | 5 | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 1 | 2 | 1 | Z | 3 | 4 | 3 | 4 | 3 | 3 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 5 | 4 | 2 | 1 | 2.5 | 5 | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 2 | 2 | 5 | 2 | Z | 3 | 9 | 6 | 5 | 5 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 2 | 2 | 2 | 4 | 2 | 3 | 3 | 3.0 | 9 | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 2 | 2 | 2 | 3 | 3 | Z | 3 | 4 | 3 | 3 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2.3 | 4 | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 1 | 1 | 1 | 1 | 2 | 4 | Z | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 4 | 5 | 5 | 4 | 4 | 2.1 | 5 | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 5 | 4 | 2 | 3 | 4 | 7 | 2 | Z | 1 | 2 | 2 | 1 | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 1 | 0 | 1.9 | 7 | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 0 | 0 | Z | 2 | 12 | 24 | 14 | 2 | 2 | 3 | 2 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 3 | 2 | 1 | 1 | 3.2 | 24 | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 1 | 1 | 1 | Z | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 1 | 1 | 1 | 1.0 | 3 | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 0 | 1 | 1 | 1 | Z | 1 | 2 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1.2 | 3 | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 0 | 0 | 0 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 0 | 0 | 0 | 1 | 1 | 1 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 0 | 2 | 1 | 1 | 3 | 3 | 2 | Z | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 1.0 | 3 | | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 7 | 5 | Z | 9 | 19 | 21 | 19 | 24 | 45 | 38 | 31 | 22 | 14 | 7 | 4 | 2 | 10 | 7 | 8 | 12 | 5 | 5 | 6 | 4 | 14.1 | 45 | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 4 | 2 | 1 | Z | 2 | 5 | 5 | 5 | 5 | 4 | 4 | 2 | 2 | 3 | 4 | 3 | 3 | 4 | 5 | 3 | 3 | 2 | 3 | 1 | 3.3 | 5 | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 1 | 1 | 1 | 1 | Z | 8 | 5 | 4 | 4 | 3 | 3 | 2 | 4 | 2 | 3 | 2 | 3 | 4 | 4 | 4 | 2 | 1 | 1 | 1 | 2.7 | 8 | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 1 | 1 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0.7 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 0 | 1 | 1 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 3 | 1 | 2 | 1 | 0.8 | 3 | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 2 | 1 | 0 | 0.7 | 2 | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 1 | 1 | Z | 1 | 4 | 3 | 5 | 4 | 5 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 3 | 1 | 0 | 2 | 1.7 | 5 | | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 3 | 2 | 1 | Z | 2 | 6 | 11 | 5 | 8 | 12 | 8 | 6 | 3 | 3 | 3 | 3 | 5 | 5 | 10 | 21 | 15 | 9 | 2 | 2 | 6.4 | 21 | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 2 | 1 | 1 | 1 | Z | 3 | 2 | 3 | 3 | 3 | 4 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 2 | 2.5 | 4 | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 2 | 2 | 2 | 2 | 3 | Z | 5 | 5 | 4 | 2 | 2 | 1 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.5 | 5 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 2.0 | 1.8 | 1.3 | 2.1 | 3.6 | 5.8 | 5.1 | 4.6 | 5.0 | 4.3 | 3.6 | 2.3 | 1.8 | 1.4 | 1.5 | 1.7 | 2.3 | 2.1 | 2.3 | 3.2 | 3.3 | 2.7 | 2.2 | 1.7 | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | | | | | | | 7 | 8 | 5 | 9 | 19 | 24 | 19 | 24 | 45 | 38 | 31 | 22 | 14 | 7 | 5 | 7 | 10 | 7 | 10 | 21 | 15 | 9 | 6 | 6 | Diurnal Maximum | |
| Z - zerospan | | | | | | | | | | | | | | | | | | | | | | | | C - Calibration | | | | M - Maintenance | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 698 | 98.87 | 98.87 |
| 21 - 40 | 7 | 0.99 | 99.86 |
| 41 - 80 | 1 | 0.14 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 706

Total Number of Hours: 744



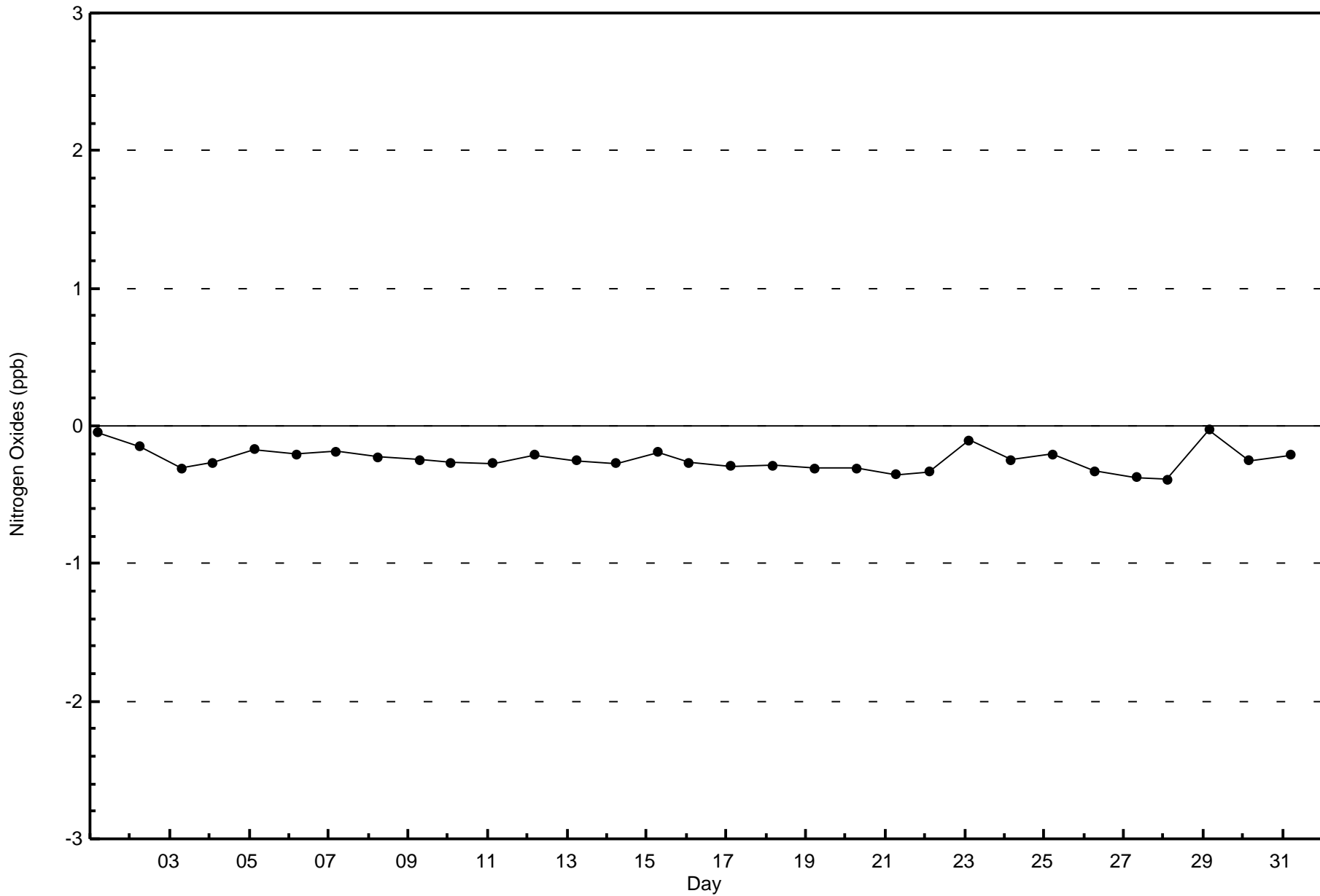
**Wood Buffalo Environmental Association
Frequency Distribution**

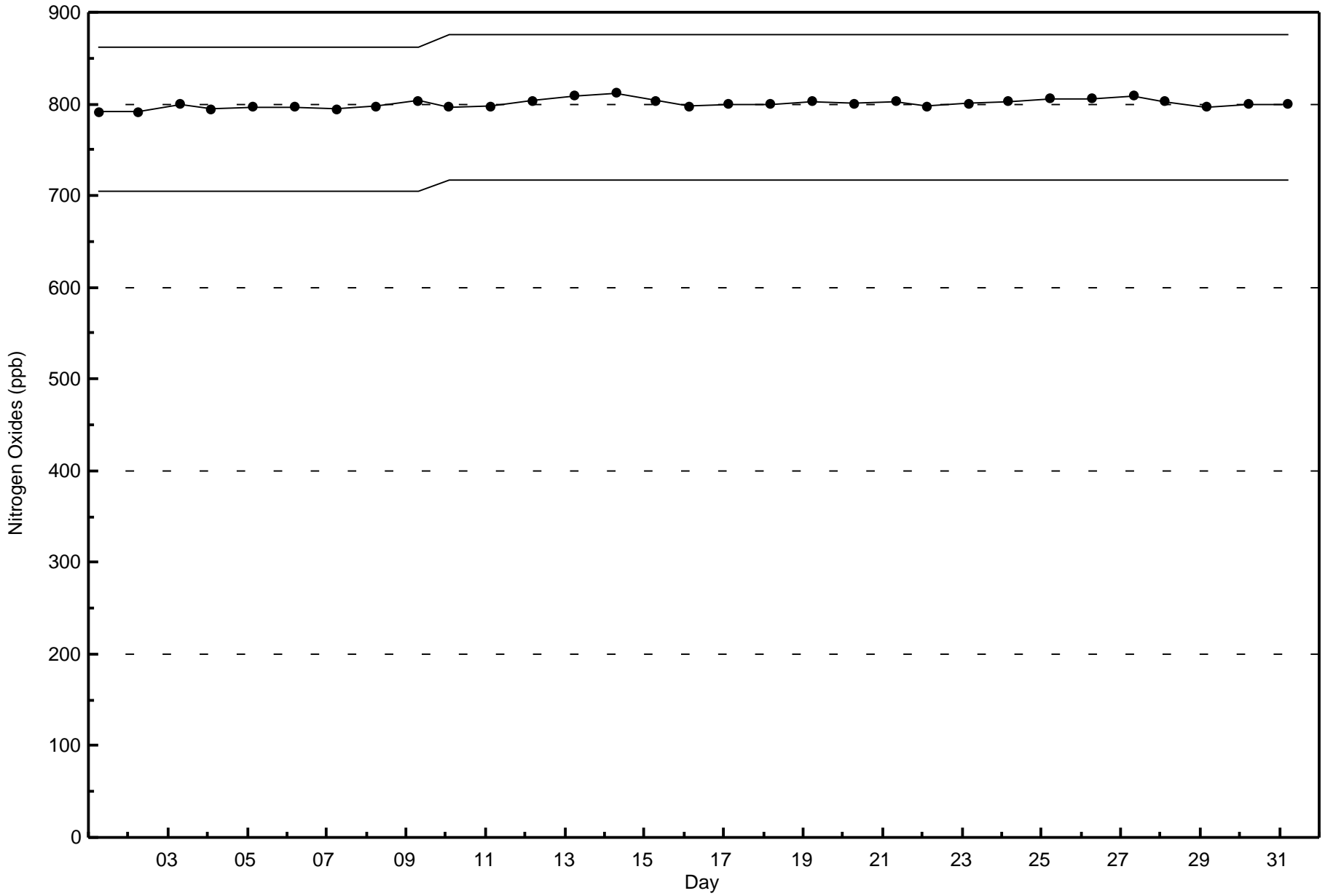
**Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 19 | 10 | 6 | 7 | 19 | 45 | 69 | 29 | 68 | 83 | 121 | 83 | 63 | 34 | 25 | 17 | 698 |
| 21 - 40 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 7 |
| 11 - 80 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 20 | 11 | 7 | 7 | 19 | 46 | 69 | 30 | 68 | 83 | 122 | 83 | 63 | 35 | 25 | 18 | 706 |

Total Number of Valid Hours: 706

Total Number of Hours: 744







| | | | |
|--|--|---|--------------------------------|
| Number of Exceedences (AAAQO): 1-hr: 0 | Maximum Value: 0 ppb on Aug 1 01:00 | Maximum Daily Average: 0.0 ppb on Aug 1 | Hours in Service: 744 |
| Minimum Value: 0 ppb on Aug 1 01:00 | Maximum Diurnal Average: 0.0 ppb at hour 1 | Minimum Daily Average: 0.0 ppb on Aug 1 | Hours of Data: 641 |
| Monthly Average: 0.0 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 O ₃ = 0 P ₉₀ = 0 P ₉₉ = 0 | | Hours of Missing Data: 103 |
| | | | Hours of Calibration: 47 |
| | | | Percent Operational Time: 92.5 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0 | 0 | 0 | Z | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 2-Aug | 0 | 0 | 0 | 0 | Z | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | Z | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 4-Aug | Z | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 5-Aug | 0 | Z | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 6-Aug | 0 | 0 | Z | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 7-Aug | 0 | 0 | 0 | Z | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 8-Aug | 0 | 0 | 0 | 0 | Z | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 9-Aug | 0 | 0 | 0 | 0 | 0 | Z | RE | 0 | 0 | C | C | C | C | C | C | C | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -- | 0 |
| 10-Aug | Z | RE | 0 | 0 | 0 | 0 | 0 | C | C | C | C | C | C | C | C | C | C | RE | RE | RE | RE | RE | RE | RE | -- | 0 |
| 11-Aug | RE | Z | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 12-Aug | 0 | 0 | Z | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 13-Aug | 0 | 0 | 0 | Z | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 14-Aug | 0 | 0 | 0 | 0 | Z | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 15-Aug | 0 | 0 | 0 | 0 | 0 | Z | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 16-Aug | Z | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 17-Aug | 0 | Z | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 18-Aug | 0 | 0 | Z | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 19-Aug | 0 | 0 | 0 | Z | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 20-Aug | 0 | 0 | 0 | 0 | Z | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | Z | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 22-Aug | Z | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 23-Aug | 0 | Z | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 24-Aug | 0 | 0 | Z | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 25-Aug | 0 | 0 | 0 | Z | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 26-Aug | 0 | 0 | 0 | 0 | Z | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | Z | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 28-Aug | Z | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 29-Aug | 0 | Z | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 30-Aug | 0 | 0 | Z | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 31-Aug | 0 | 0 | 0 | Z | RE | RE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |

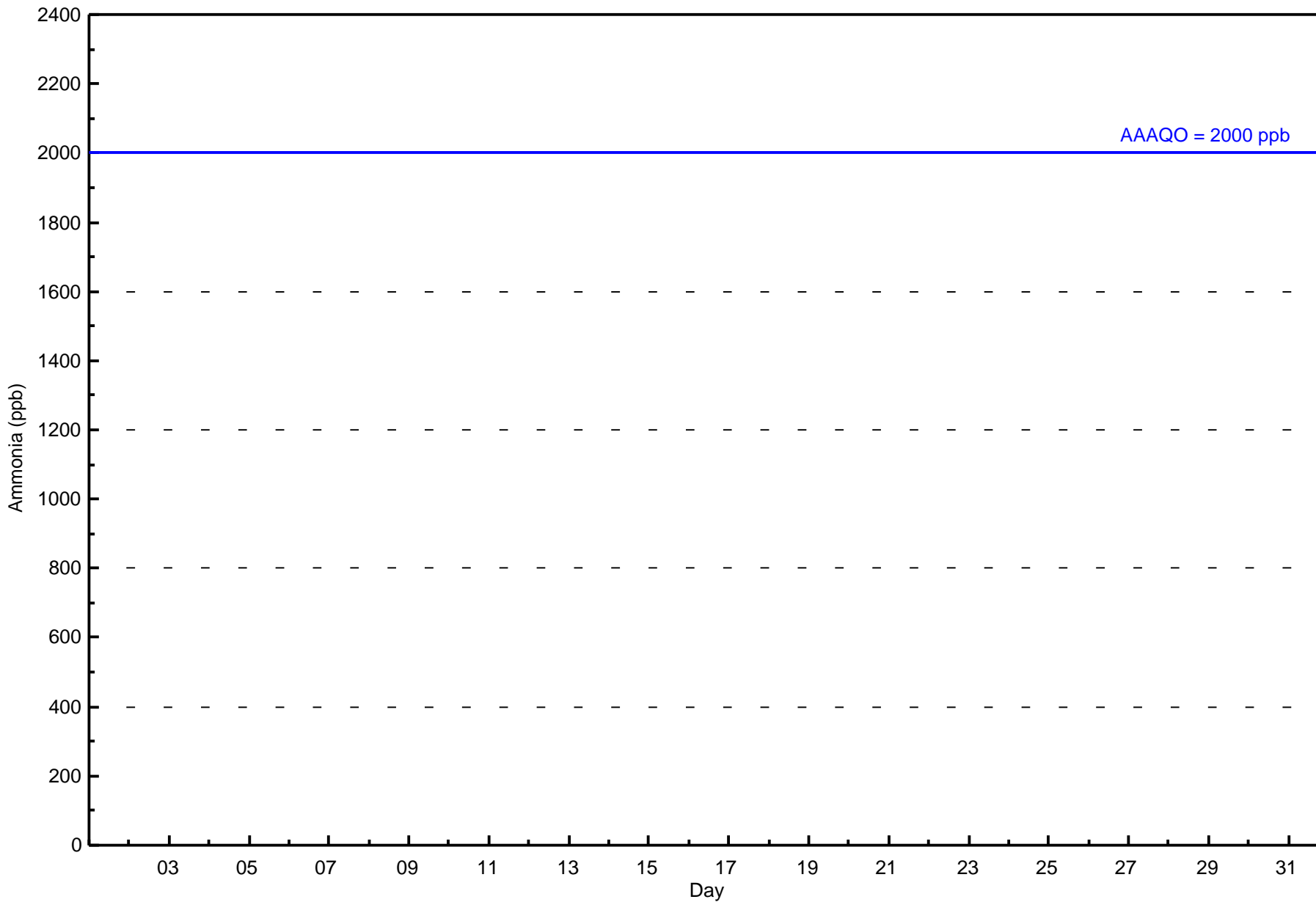
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | Diurnal Average |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Diurnal Maximum |

Z - zerospan C - Calibration RE - Recovery
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 2000 ppb



Wood Buffalo Environmental Association
Hourly Averages

Ammonia (NH₃) - ppb
Patricia McInnes - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ammonia (NH₃) - ppb
Patricia McInnes - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 5 | 641 | 100.00 | 100.00 |
| 6 - 10 | 0 | 0.00 | 100.00 |
| 11 - 15 | 0 | 0.00 | 100.00 |
| 16 - 20 | 0 | 0.00 | 100.00 |
| 21 - 25 | 0 | 0.00 | 100.00 |
| > 26 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 641

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Ammonia (NH₃) - ppb
Patricia McInnes - August 2017

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 5 | 19 | 11 | 7 | 6 | 18 | 44 | 65 | 27 | 64 | 66 | 102 | 80 | 60 | 33 | 21 | 18 | 641 |
| 6 - 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 - 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16 - 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21 - 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 26 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 19 | 11 | 7 | 6 | 18 | 44 | 65 | 27 | 64 | 66 | 102 | 80 | 60 | 33 | 21 | 18 | 641 |

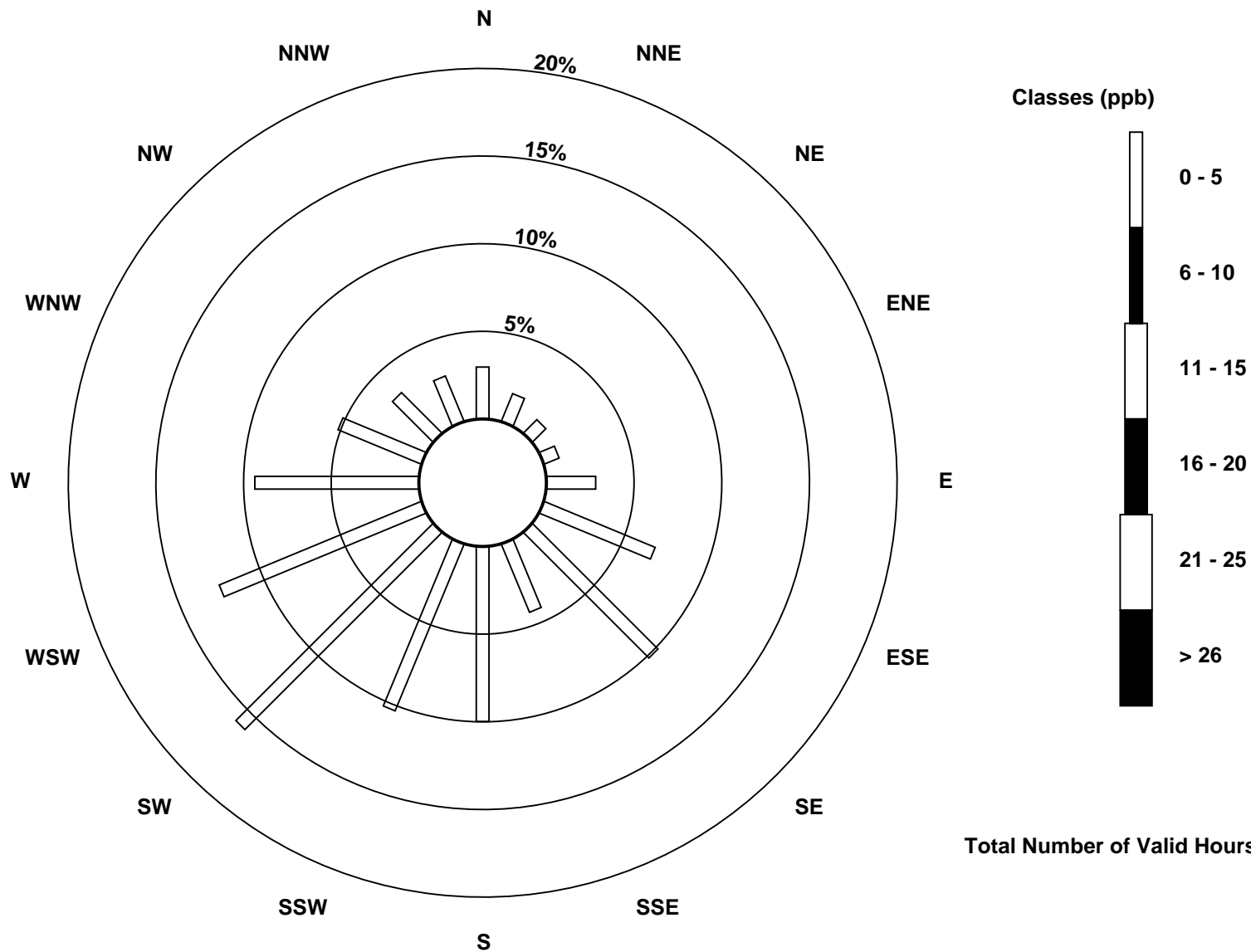
Total Number of Valid Hours: 641

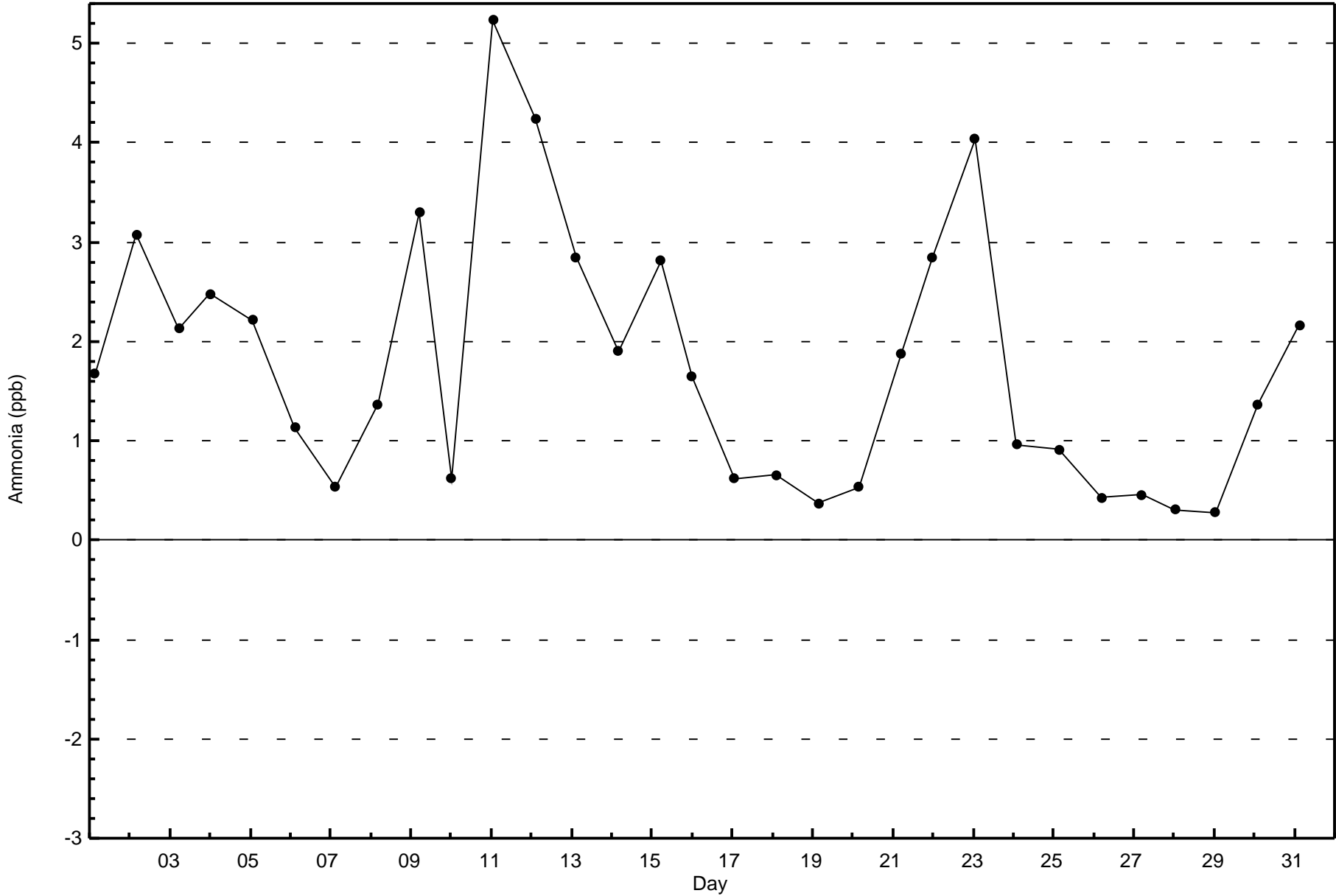
Total Number of Hours: 744

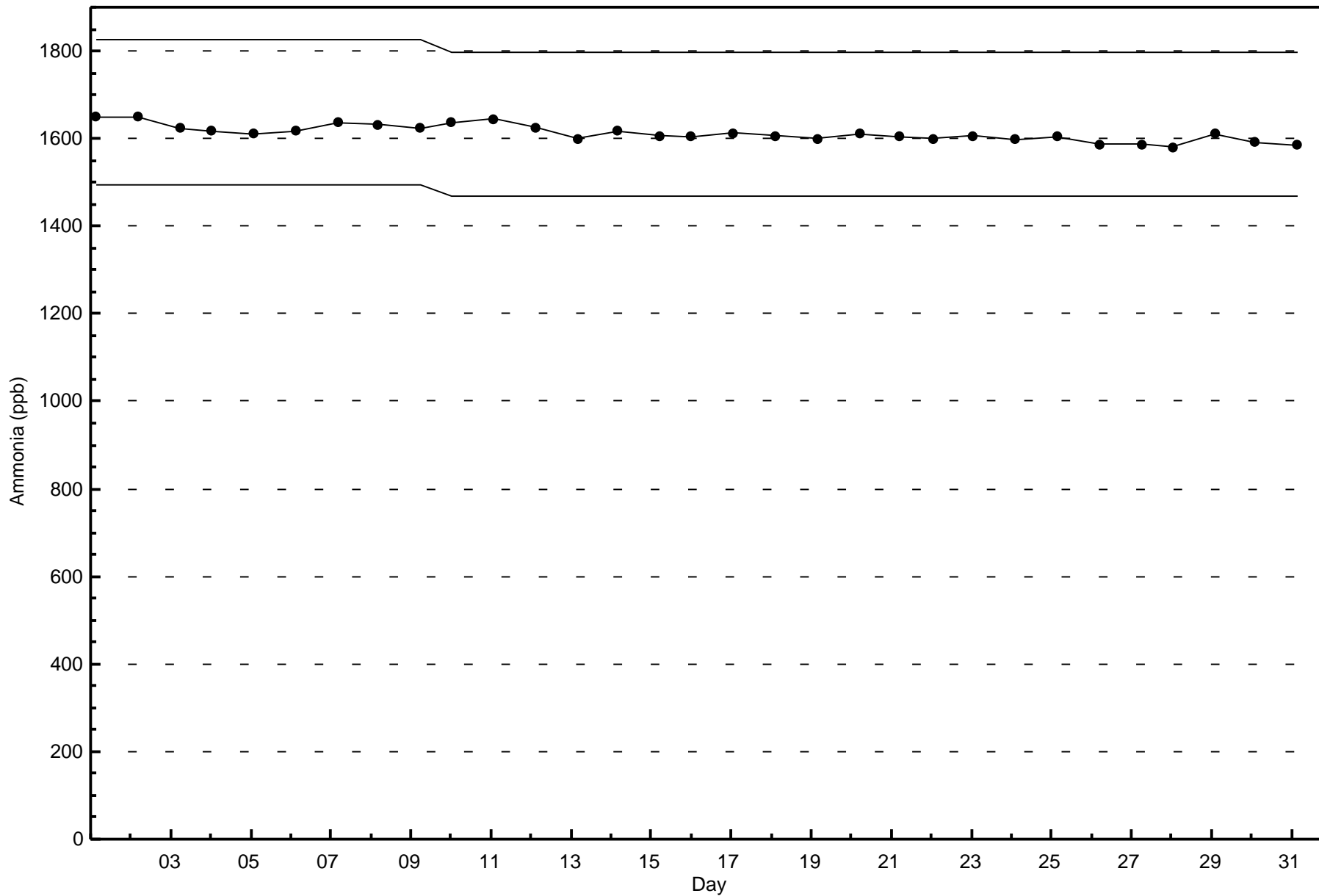


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Ammonia (NH₃) - ppb
Patricia McInnes (AMS 6)







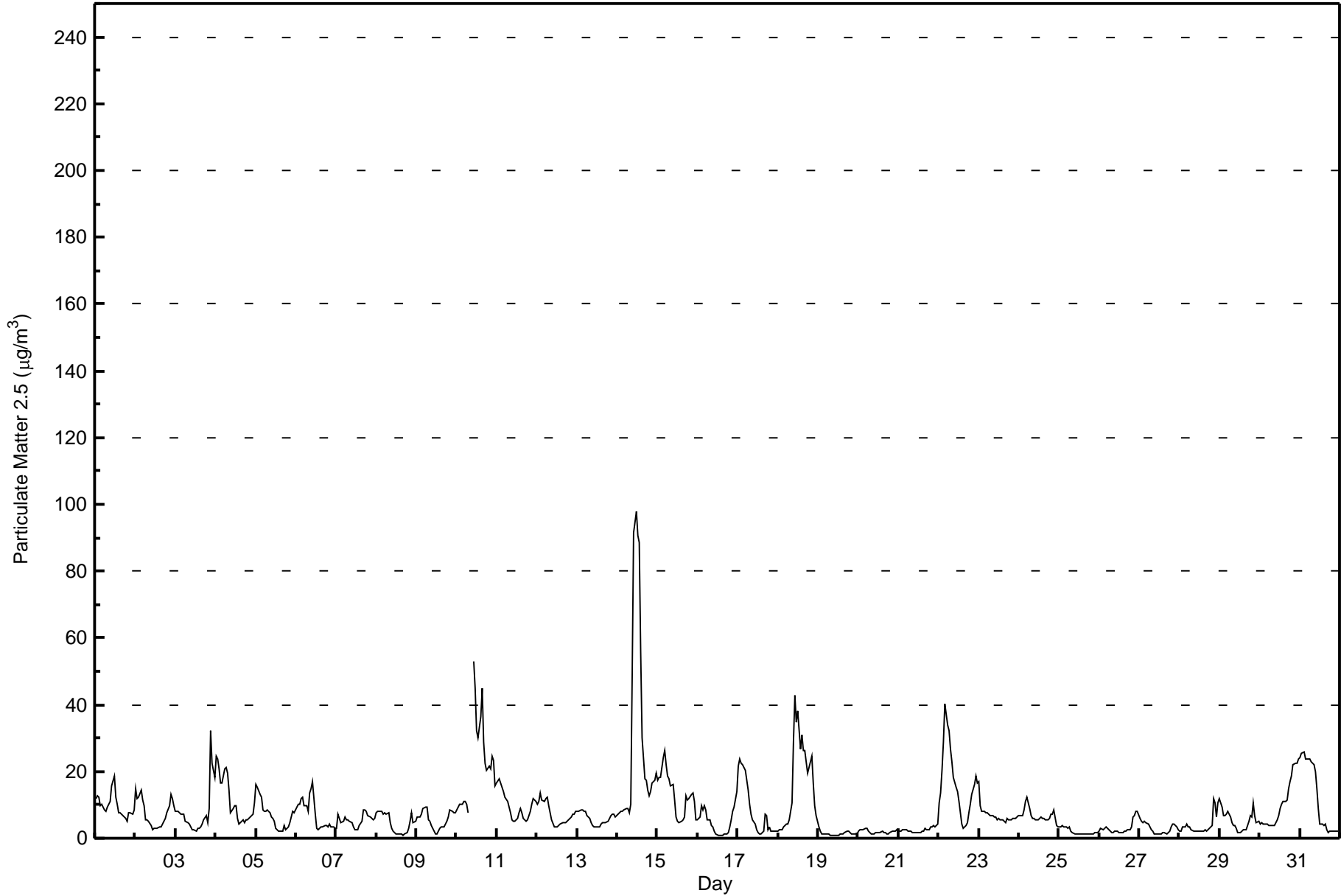


| Number of Exceedences (AAAQO): | | 24-hr: 0 | | Hours in Service: | | 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|--|------|---------------------------|------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|
| Maximum Value: 97.9 µg/m ³ on Aug 14 12:00 | | Maximum Daily Average: 29.5 µg/m ³ on Aug 14 | | Hours of Data: | | 742 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum Value: 0.9 µg/m ³ on Aug 16 14:00 | | Minimum Daily Average: 1.4 µg/m ³ on Aug 19 | | Hours of Missing Data: | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 10.9 µg/m ³ at hour 11 | | Minimum Diurnal Average: 6.0 µg/m ³ at hour 17 | | Hours of Calibration: | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 8.36 µg/m ³ | | Percentiles: P ₁ = 1.0 P ₁₀ = 1.7 Q ₁ = 2.8 Median = 5.6 Q ₃ = 9.8 P ₉₀ = 18.3 P ₉₉ = 45.1 | | Percent Operational Time: | | 100.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 12.0 | 12.5 | 12.2 | 9.7 | 10.3 | 8.6 | 8.0 | 9.4 | 10.1 | 10.9 | 15.6 | 18.8 | 12.5 | 10.0 | 7.7 | 7.7 | 6.7 | 6.2 | 5.9 | 5.0 | 7.8 | 7.4 | 7.0 | 8.6 | 9.6 | 18.8 | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 14.8 | 11.8 | 12.4 | 14.3 | 11.6 | 9.9 | 5.6 | 5.5 | 5.1 | 3.8 | 2.6 | 2.8 | 2.8 | 3.1 | 3.3 | 3.5 | 4.2 | 5.3 | 5.8 | 7.6 | 9.8 | 13.2 | 12.0 | 9.6 | 7.5 | 14.8 | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 7.9 | 8.1 | 7.8 | 7.3 | 7.4 | 7.3 | 5.1 | 4.8 | 4.3 | 3.3 | 2.5 | 2.4 | 2.2 | 2.9 | 2.9 | 3.2 | 4.4 | 5.4 | 6.9 | 4.5 | 8.9 | 32.0 | 22.5 | 18.2 | 7.6 | 32.0 | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 24.4 | 23.7 | 20.6 | 16.5 | 16.5 | 20.6 | 21.2 | 19.7 | 14.5 | 7.8 | 8.8 | 9.7 | 9.8 | 5.8 | 4.2 | 4.7 | 5.5 | 4.7 | 5.6 | 5.6 | 5.8 | 6.6 | 7.1 | 10.6 | 11.7 | 24.4 | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 16.3 | 15.1 | 13.0 | 12.1 | 8.5 | 7.9 | 8.0 | 8.6 | 7.8 | 6.2 | 6.0 | 5.2 | 2.9 | 2.3 | 2.0 | 1.9 | 2.1 | 3.9 | 2.6 | 3.6 | 4.7 | 6.4 | 8.1 | 7.5 | 6.8 | 16.3 | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 9.4 | 10.2 | 10.3 | 12.0 | 12.1 | 9.7 | 9.9 | 7.9 | 13.6 | 14.9 | 17.0 | 7.1 | 2.9 | 2.6 | 2.8 | 3.2 | 3.3 | 3.9 | 3.6 | 3.4 | 4.0 | 3.6 | 3.2 | 3.0 | 7.2 | 17.0 | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 3.0 | 7.3 | 6.0 | 4.8 | 5.2 | 6.1 | 5.6 | 5.5 | 5.1 | 4.5 | 3.3 | 2.7 | 2.5 | 2.7 | 3.8 | 5.2 | 8.5 | 8.3 | 7.9 | 6.7 | 6.2 | 5.7 | 5.5 | 6.0 | 5.3 | 8.5 | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 7.6 | 7.9 | 8.0 | 8.2 | 7.1 | 7.6 | 7.3 | 7.4 | 4.6 | 2.8 | 1.9 | 1.5 | 1.2 | 1.2 | 1.1 | 1.1 | 1.0 | 1.3 | 1.7 | 2.9 | 5.2 | 7.8 | 4.8 | 4.9 | 4.4 | 8.2 | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 6.3 | 6.5 | 6.2 | 7.4 | 9.0 | 9.5 | 9.4 | 5.4 | 5.2 | 3.6 | 1.9 | 1.3 | 1.4 | 2.1 | 2.8 | 3.5 | 3.3 | 4.0 | 4.9 | 6.3 | 8.4 | 8.0 | 7.7 | 7.7 | 5.5 | 9.5 | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 8.6 | 9.5 | 10.2 | 10.3 | 11.1 | 11.1 | 10.1 | 7.5 | C | C | 52.9 | 44.9 | 32.1 | 30.2 | 36.5 | 44.9 | 28.8 | 22.5 | 20.5 | 21.7 | 20.9 | 24.5 | 23.2 | 15.7 | 22.6 | 52.9 | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 16.7 | 17.9 | 16.5 | 15.1 | 13.9 | 12.5 | 11.0 | 9.5 | 7.5 | 5.7 | 5.0 | 4.9 | 6.0 | 7.7 | 8.8 | 7.5 | 6.1 | 4.9 | 5.3 | 6.7 | 8.0 | 10.0 | 11.8 | 10.8 | 9.6 | 17.9 | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 10.1 | 11.1 | 13.5 | 11.5 | 11.1 | 11.7 | 12.1 | 9.7 | 7.6 | 5.6 | 3.3 | 3.3 | 3.4 | 3.9 | 4.2 | 4.5 | 4.6 | 4.7 | 4.9 | 5.4 | 6.5 | 7.4 | 7.4 | 8.3 | 7.3 | 13.5 | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 8.0 | 8.2 | 8.6 | 8.4 | 8.0 | 7.9 | 6.7 | 5.8 | 4.9 | 4.0 | 3.3 | 3.2 | 3.2 | 3.5 | 4.2 | 4.7 | 4.7 | 4.6 | 5.1 | 5.8 | 6.8 | 7.2 | 7.2 | 6.4 | 5.8 | 8.6 | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 7.1 | 7.8 | 7.8 | 7.9 | 8.3 | 8.8 | 9.0 | 7.8 | 10.3 | 48.8 | 91.3 | 97.9 | 90.8 | 88.7 | 56.1 | 30.1 | 18.0 | 17.3 | 14.4 | 12.7 | 13.9 | 16.4 | 17.3 | 19.6 | 29.5 | 97.9 | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 17.2 | 18.3 | 18.1 | 24.0 | 26.2 | 22.2 | 18.7 | 17.8 | 15.6 | 15.9 | 11.6 | 6.2 | 5.1 | 4.6 | 5.0 | 5.6 | 6.2 | 12.6 | 11.6 | 11.7 | 13.2 | 13.5 | 11.2 | 5.5 | 13.2 | 26.2 | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 5.4 | 6.2 | 9.7 | 8.4 | 9.7 | 8.3 | 5.7 | 5.6 | 3.9 | 3.5 | 2.2 | 1.3 | 1.0 | 0.9 | 0.9 | 1.0 | 1.2 | 1.3 | 1.6 | 3.3 | 5.6 | 8.2 | 9.4 | 14.1 | 4.9 | 14.1 | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 21.4 | 23.6 | 22.3 | 22.0 | 20.2 | 17.6 | 14.4 | 10.1 | 7.1 | 5.4 | 4.2 | 2.6 | 1.5 | 1.3 | 1.3 | 2.0 | 7.0 | 6.6 | 2.7 | 3.2 | 2.2 | 2.3 | 2.2 | 2.0 | 8.5 | 23.6 | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 2.1 | 2.5 | 2.7 | 3.2 | 3.9 | 4.1 | 4.4 | 5.4 | 10.7 | 28.6 | 42.8 | 34.8 | 38.3 | 26.7 | 30.8 | 26.4 | 26.3 | 22.9 | 19.4 | 22.7 | 24.5 | 16.7 | 9.6 | 6.9 | 17.4 | 42.8 | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 3.5 | 2.1 | 1.3 | 1.2 | 1.2 | 1.3 | 1.2 | 1.0 | 0.9 | 0.9 | 0.9 | 1.0 | 0.9 | 1.1 | 1.1 | 1.2 | 1.7 | 2.2 | 2.2 | 1.5 | 1.3 | 1.3 | 1.4 | 1.4 | 1.4 | 3.5 | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 2.1 | 2.5 | 2.6 | 2.7 | 2.8 | 2.8 | 2.1 | 1.5 | 1.3 | 1.3 | 1.5 | 1.8 | 1.9 | 1.9 | 2.2 | 1.8 | 1.5 | 1.5 | 1.5 | 1.7 | 2.1 | 2.1 | 2.1 | 2.5 | 2.0 | 2.8 | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 2.0 | 2.3 | 2.4 | 2.5 | 2.7 | 2.7 | 2.0 | 1.9 | 1.9 | 1.8 | 1.9 | 1.9 | 1.8 | 1.9 | 2.0 | 2.3 | 2.9 | 2.4 | 2.5 | 3.4 | 3.4 | 3.9 | 3.3 | 4.2 | 2.5 | 4.2 | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 10.8 | 13.4 | 20.3 | 29.0 | 40.1 | 33.9 | 32.2 | 26.7 | 23.1 | 18.1 | 15.4 | 13.9 | 11.1 | 7.5 | 4.1 | 2.9 | 3.7 | 4.7 | 7.5 | 10.2 | 13.2 | 16.1 | 18.5 | 16.7 | 16.4 | 40.1 | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 16.8 | 9.9 | 7.9 | 8.0 | 7.5 | 7.7 | 7.2 | 6.6 | 6.8 | 6.2 | 6.2 | 5.7 | 6.1 | 5.6 | 5.5 | 5.1 | 4.6 | 6.1 | 5.6 | 5.6 | 5.9 | 5.9 | 6.1 | 6.5 | 6.9 | 16.8 | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 6.6 | 6.6 | 6.7 | 8.3 | 10.9 | 12.2 | 9.0 | 6.8 | 6.1 | 6.1 | 5.6 | 5.5 | 6.0 | 6.3 | 6.0 | 5.8 | 5.6 | 5.4 | 5.7 | 7.1 | 7.4 | 8.5 | 3.7 | 3.6 | 6.7 | 12.2 | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 3.3 | 3.3 | 3.8 | 3.6 | 3.4 | 3.0 | 3.4 | 2.3 | 1.6 | 1.4 | 1.3 | 1.1 | 1.3 | 1.3 | 1.1 | 1.3 | 1.4 | 1.4 | 1.4 | 1.5 | 1.4 | 1.5 | 1.7 | 1.6 | 2.0 | 3.8 | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 2.3 | 2.9 | 2.7 | 3.0 | 3.2 | 3.1 | 2.4 | 1.9 | 1.9 | 2.0 | 2.1 | 2.0 | 1.9 | 1.9 | 1.8 | 2.1 | 2.3 | 2.5 | 2.7 | 3.5 | 6.5 | 7.0 | 8.1 | 8.0 | 3.2 | 8.1 | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 6.1 | 5.0 | 4.9 | 4.9 | 4.5 | 4.1 | 3.5 | 2.7 | 2.0 | 1.4 | 1.2 | 1.2 | 1.4 | 1.4 | 1.6 | 1.6 | 1.4 | 1.5 | 2.1 | 3.3 | 4.1 | 4.1 | 3.4 | 2.7 | 2.9 | 6.1 | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 2.3 | 2.2 | 3.4 | 3.3 | 4.1 | 3.5 | 3.5 | 2.6 | 1.9 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.4 | 2.3 | 2.4 | 2.8 | 3.8 | 11.8 | 10.5 | 6.3 | 10.5 | 3.8 | 11.8 | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 12.1 | 9.2 | 6.9 | 6.7 | 7.0 | 8.0 | 6.5 | 4.5 | 3.7 | 3.6 | 3.0 | 1.8 | 1.5 | 2.2 | 2.7 | 2.6 | 2.7 | 4.9 | 6.6 | 6.2 | 10.8 | 6.9 | 4.7 | 5.1 | 5.4 | 12.1 | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 4.4 | 4.6 | 4.3 | 4.3 | 4.0 | 4.0 | 3.8 | 3.6 | 3.8 | 3.9 | 5.5 | 6.8 | 8.9 | 10.1 | 10.9 | 10.9 | 11.3 | 14.6 | 16.8 | 18.8 | 21.9 | 22.6 | 22.5 | 23.6 | 10.2 | 23.6 | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 24.0 | 25.3 | 25.8 | 23.8 | 23.6 | 23.9 | 23.7 | 22.7 | 22.2 | 20.0 | 14.7 | 9.0 | 4.1 | 4.1 | 4.0 | 4.3 | 2.6 | 1.9 | 2.0 | 2.1 | 2.1 | 2.0 | 2.0 | 1.9 | 12.2 | 25.8 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 9.5 | 9.6 | 9.6 | 9.8 | 10.2 | 9.7 | 8.8 | 7.7 | 7.2 | 8.1 | 10.9 | 9.8 | 8.7 | 8.0 | 7.2 | 6.6 | 6.0 | 6.2 | 6.1 | 6.7 | 8.2 | 9.3 | 8.4 | 8.2 | Diurnal Average |
| | | | | | | | | | | | | | | | | | | | | | | | | 24.4 | 25.3 | 25.8 | 29.0 | 40.1 | 33.9 | 32.2 | 26.7 | 23.1 | 48.8 | 91.3 | 97.9 | 90.8 | 88.7 | 56.1 | 44.9 | 28.8 | 22.9 | 20.5 | 22.7 | 24.5 | 32.0 | 23.2 | 23.6 | Diurnal Maximum |
| C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Patricia McInnes - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Patricia McInnes - August 2017**

| Concentration Ranges ($\mu\text{g}/\text{m}^3$) | Number of Hours | % | Cumulative % |
|---|------------------------|----------|---------------------|
| 1 - 5 | 349 | 47.04 | 47.04 |
| 6 - 15 | 284 | 38.27 | 85.31 |
| 16 - 25 | 71 | 9.57 | 94.88 |
| 26 - 80 | 26 | 3.50 | 98.38 |
| > 81.0 | 4 | 0.54 | 98.92 |

Total Number of Valid Hours: 742

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Patricia McInnes - August 2017

| Concentration Ranges ($\mu\text{g}/\text{m}^3$) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|--|----------------|-----|----|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 1 - 5 | 10 | 1 | 2 | 2 | 9 | 14 | 21 | 8 | 36 | 39 | 46 | 68 | 50 | 22 | 11 | 10 | 349 |
| 6 - 15 | 5 | 9 | 4 | 2 | 9 | 31 | 45 | 17 | 25 | 34 | 54 | 10 | 11 | 10 | 12 | 6 | 284 |
| 16 - 25 | 4 | 1 | 1 | 1 | 0 | 4 | 4 | 5 | 9 | 13 | 19 | 2 | 3 | 1 | 2 | 2 | 71 |
| 26 - 80 | 1 | 0 | 0 | 2 | 1 | 0 | 1 | 2 | 1 | 4 | 6 | 4 | 1 | 1 | 1 | 1 | 26 |
| > 81.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 4 |
| Totals | 20 | 11 | 7 | 7 | 19 | 49 | 71 | 32 | 72 | 91 | 127 | 84 | 65 | 34 | 26 | 19 | 734 |

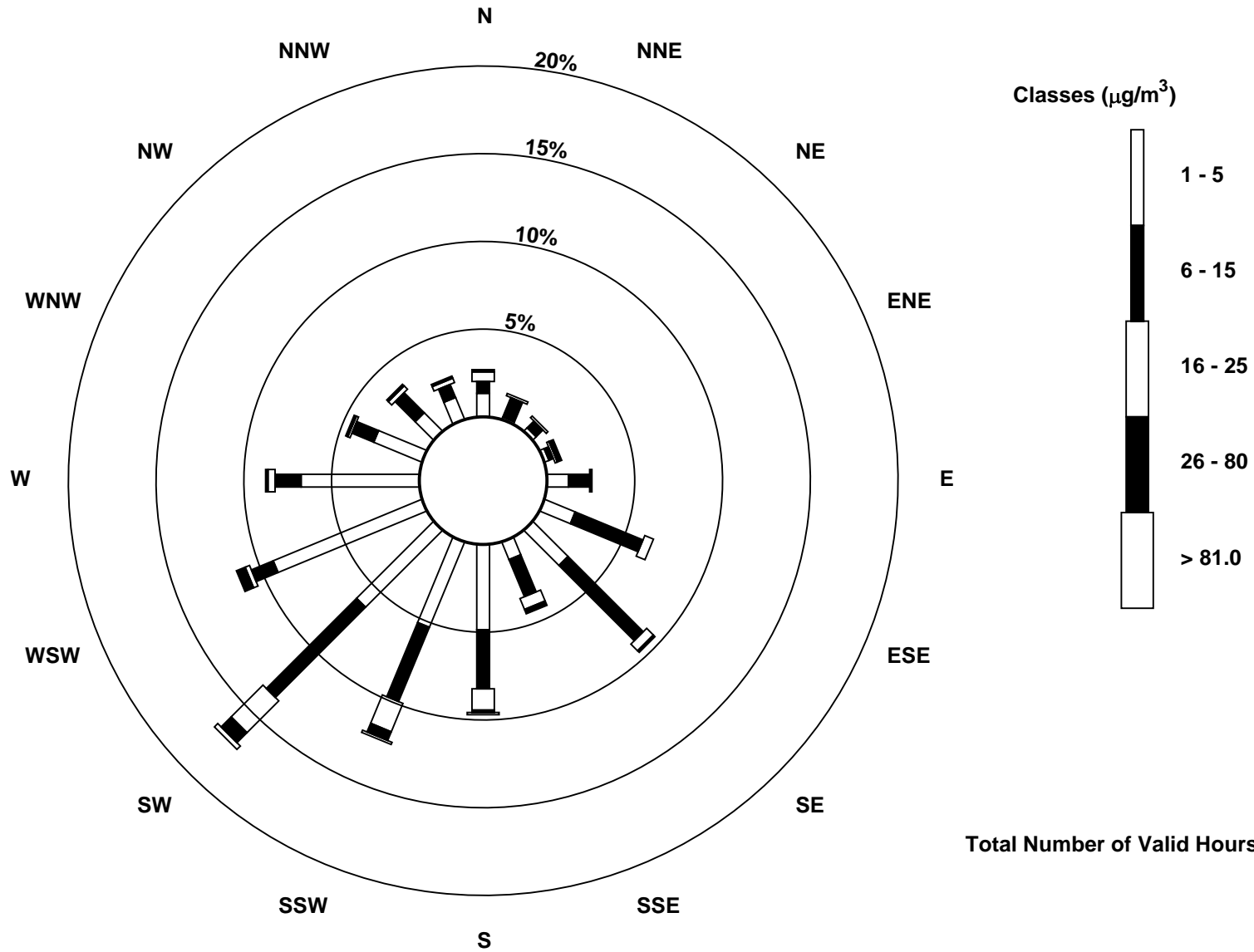
Total Number of Valid Hours: 742

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Patricia McInnes (AMS 6)



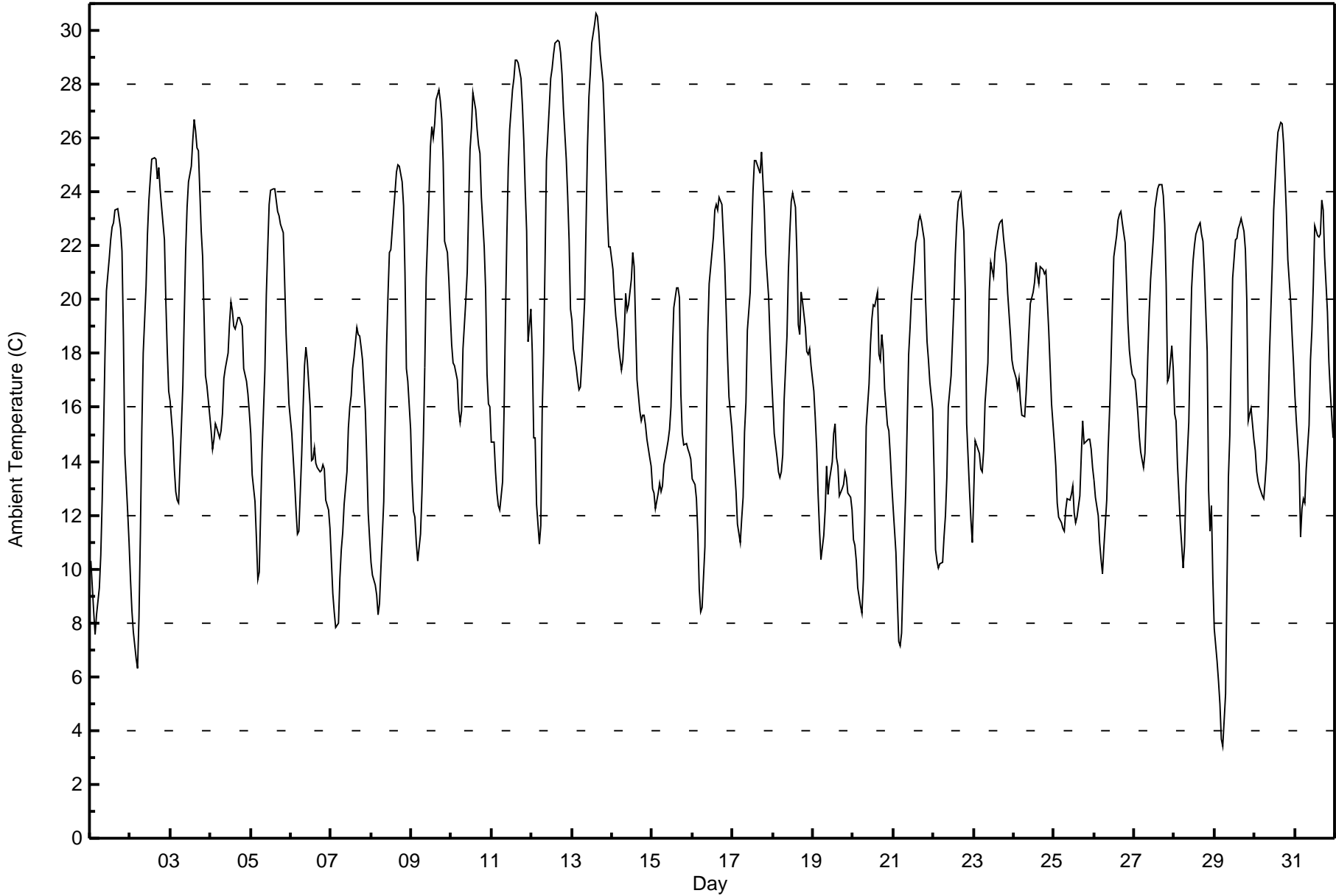
Total Number of Valid Hours: 742



Wood Buffalo Environmental Association
Summary of Hour Averages

Ambient Temperature (AT) - C
Patricia McInnes - August 2017

| Maximum Value: 30.6 C on Aug 13 15:00 Maximum Daily Average: 23.9 C on Aug 13 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 | | | | |
|--|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|------|------|---------------|---------------|
| Minimum Value: 3.4 C on Aug 29 06:00 Minimum Daily Average: 13.2 C on Aug 25 Maximum Diurnal Average: 22.7 C at hour 15 Minimum Diurnal Average: 11.4 C at hour 5 Monthly Average: 17.65 C Percentiles: P ₁ = 6.6 P ₁₀ = 11.1 Q ₁ = 13.6 Median = 17.5 Q ₃ = 21.9 P ₉₀ = 24.4 P ₉₉ = 29.5 | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 10.3 | 9.3 | 8.4 | 7.6 | 8.3 | 9.3 | 10.5 | 12.6 | 15.2 | 18.0 | 20.4 | 21.5 | 22.2 | 22.7 | 22.9 | 23.3 | 23.4 | 23.0 | 22.6 | 21.8 | 18.6 | 14.3 | 12.1 | 11.0 | 16.2 | 23.4 |
| 2-Aug | 9.6 | 8.4 | 7.7 | 6.7 | 6.3 | 8.2 | 11.3 | 15.1 | 18.0 | 20.5 | 22.4 | 23.7 | 24.5 | 25.2 | 25.3 | 25.2 | 24.5 | 24.9 | 24.1 | 23.5 | 22.2 | 19.9 | 18.1 | 16.6 | 18.0 | 25.3 |
| 3-Aug | 16.2 | 14.9 | 13.7 | 12.9 | 12.6 | 12.4 | 13.9 | 16.8 | 19.4 | 21.8 | 23.4 | 24.4 | 24.9 | 25.9 | 26.7 | 26.3 | 25.6 | 25.6 | 22.5 | 21.6 | 19.4 | 17.2 | 16.8 | 15.7 | 19.6 | 26.7 |
| 4-Aug | 15.1 | 14.4 | 14.8 | 15.4 | 15.2 | 14.9 | 15.1 | 15.8 | 17.1 | 17.5 | 18.0 | 19.1 | 19.9 | 19.6 | 19.0 | 18.9 | 19.3 | 19.4 | 19.2 | 19.0 | 17.4 | 17.0 | 16.5 | 15.8 | 17.2 | 19.9 |
| 5-Aug | 15.0 | 13.5 | 12.5 | 11.1 | 9.6 | 9.9 | 12.2 | 14.3 | 17.4 | 20.2 | 21.9 | 23.5 | 24.1 | 24.1 | 24.1 | 23.7 | 23.3 | 23.1 | 22.8 | 22.5 | 20.6 | 18.7 | 17.4 | 16.1 | 18.4 | 24.1 |
| 6-Aug | 15.0 | 14.1 | 13.2 | 12.2 | 11.3 | 11.4 | 14.2 | 15.9 | 17.6 | 18.3 | 17.7 | 16.0 | 14.0 | 14.1 | 14.5 | 13.9 | 13.7 | 13.6 | 13.7 | 13.9 | 13.7 | 12.6 | 12.2 | 11.5 | 14.1 | 18.3 |
| 7-Aug | 10.3 | 9.1 | 8.4 | 7.8 | 8.0 | 9.7 | 10.7 | 11.4 | 12.4 | 13.6 | 15.2 | 16.0 | 16.5 | 17.5 | 17.9 | 19.0 | 18.7 | 18.7 | 18.3 | 17.8 | 15.9 | 14.1 | 12.1 | 11.1 | 13.7 | 19.0 |
| 8-Aug | 10.3 | 9.8 | 9.4 | 9.0 | 8.3 | 8.7 | 10.0 | 12.5 | 15.4 | 18.3 | 20.2 | 21.8 | 21.9 | 23.3 | 24.0 | 24.7 | 25.0 | 25.0 | 24.4 | 23.5 | 21.0 | 17.5 | 17.0 | 15.2 | 17.3 | 25.0 |
| 9-Aug | 13.3 | 12.2 | 11.9 | 11.0 | 10.3 | 11.3 | 12.8 | 14.8 | 17.5 | 20.8 | 23.8 | 25.7 | 26.5 | 26.0 | 26.5 | 27.4 | 27.8 | 27.4 | 26.7 | 25.1 | 22.2 | 21.7 | 20.7 | 19.5 | 20.1 | 27.8 |
| 10-Aug | 18.3 | 17.7 | 17.6 | 17.0 | 15.9 | 15.5 | 15.9 | 18.2 | 19.9 | 21.0 | 23.4 | 25.6 | 26.4 | 27.7 | 27.0 | 26.3 | 25.7 | 25.4 | 23.8 | 22.0 | 20.4 | 17.2 | 16.1 | 16.0 | 20.8 | 27.7 |
| 11-Aug | 14.7 | 14.7 | 13.6 | 12.8 | 12.3 | 12.2 | 13.3 | 15.8 | 19.2 | 22.3 | 24.9 | 26.3 | 27.8 | 28.2 | 28.9 | 28.9 | 28.8 | 28.2 | 27.2 | 25.9 | 24.0 | 22.6 | 18.5 | 19.6 | 21.3 | 28.9 |
| 12-Aug | 18.0 | 14.8 | 14.9 | 12.4 | 10.9 | 11.6 | 15.9 | 18.0 | 21.4 | 25.2 | 27.2 | 28.2 | 28.6 | 29.1 | 29.5 | 29.6 | 29.6 | 29.2 | 28.4 | 27.1 | 25.2 | 23.9 | 22.2 | 19.6 | 22.5 | 29.6 |
| 13-Aug | 19.2 | 18.2 | 17.5 | 17.0 | 16.7 | 16.7 | 17.7 | 20.0 | 22.8 | 25.7 | 27.6 | 28.4 | 29.5 | 30.2 | 30.6 | 30.5 | 30.0 | 29.1 | 28.0 | 26.6 | 24.9 | 23.2 | 22.0 | 21.9 | 23.9 | 30.6 |
| 14-Aug | 21.1 | 20.1 | 19.4 | 18.9 | 18.2 | 17.4 | 17.8 | 18.8 | 20.2 | 19.6 | 19.8 | 20.8 | 21.7 | 21.2 | 19.0 | 17.0 | 15.9 | 15.5 | 15.7 | 15.7 | 15.4 | 14.8 | 14.1 | 13.8 | 18.0 | 21.7 |
| 15-Aug | 13.0 | 12.8 | 12.3 | 12.8 | 13.2 | 12.9 | 13.1 | 13.9 | 14.1 | 14.8 | 15.2 | 16.0 | 18.1 | 19.7 | 20.4 | 20.4 | 20.1 | 16.5 | 15.0 | 14.6 | 14.7 | 14.4 | 14.3 | 14.1 | 15.3 | 20.4 |
| 16-Aug | 13.3 | 13.1 | 12.6 | 11.3 | 9.2 | 8.4 | 8.6 | 10.8 | 15.1 | 18.7 | 20.6 | 21.2 | 22.3 | 23.3 | 23.5 | 23.3 | 23.8 | 23.5 | 22.5 | 21.3 | 19.6 | 17.9 | 16.4 | 15.2 | 17.3 | 23.8 |
| 17-Aug | 14.4 | 13.7 | 12.9 | 11.7 | 11.0 | 11.9 | 12.7 | 15.1 | 16.2 | 18.8 | 20.3 | 22.3 | 24.1 | 25.2 | 25.2 | 24.8 | 24.7 | 25.5 | 24.5 | 23.3 | 21.7 | 20.1 | 18.6 | 17.2 | 19.0 | 25.5 |
| 18-Aug | 16.1 | 15.0 | 14.2 | 13.6 | 13.4 | 13.6 | 14.2 | 16.3 | 18.7 | 21.1 | 22.5 | 23.7 | 23.9 | 23.4 | 21.8 | 19.1 | 18.7 | 20.3 | 19.9 | 18.9 | 18.1 | 18.0 | 18.2 | 17.6 | 18.3 | 23.9 |
| 19-Aug | 16.6 | 15.6 | 14.5 | 12.8 | 11.5 | 10.3 | 11.2 | 12.2 | 13.8 | 12.8 | 13.3 | 14.0 | 15.0 | 15.4 | 14.1 | 13.8 | 12.7 | 13.0 | 13.2 | 13.6 | 13.4 | 12.8 | 12.6 | 12.2 | 13.3 | 16.6 |
| 20-Aug | 11.1 | 10.9 | 10.3 | 9.3 | 8.6 | 8.3 | 9.6 | 12.0 | 15.3 | 16.8 | 18.3 | 19.3 | 19.8 | 19.7 | 20.3 | 18.0 | 17.8 | 18.7 | 18.1 | 16.7 | 15.3 | 15.1 | 14.2 | 13.2 | 14.9 | 20.3 |
| 21-Aug | 12.3 | 10.6 | 8.9 | 7.3 | 7.2 | 7.6 | 9.5 | 13.0 | 15.5 | 18.0 | 19.0 | 20.1 | 21.4 | 22.1 | 22.4 | 22.9 | 23.1 | 22.9 | 22.2 | 19.9 | 18.5 | 17.8 | 16.9 | 15.9 | 16.5 | 23.1 |
| 22-Aug | 13.6 | 10.7 | 10.3 | 10.1 | 10.2 | 10.3 | 11.2 | 12.0 | 13.4 | 16.0 | 17.2 | 18.5 | 19.8 | 21.7 | 22.9 | 23.7 | 24.0 | 23.1 | 22.5 | 20.3 | 15.4 | 12.9 | 11.8 | 11.0 | 15.9 | 24.0 |
| 23-Aug | 12.8 | 14.8 | 14.6 | 14.3 | 13.7 | 13.6 | 14.4 | 16.2 | 17.6 | 20.3 | 21.4 | 21.1 | 20.9 | 21.8 | 22.6 | 22.8 | 22.9 | 22.9 | 22.3 | 21.4 | 20.2 | 19.5 | 18.7 | 17.7 | 18.7 | 22.9 |
| 24-Aug | 17.4 | 17.1 | 16.7 | 17.1 | 16.2 | 15.7 | 15.6 | 16.5 | 17.7 | 18.8 | 19.9 | 20.3 | 20.7 | 21.4 | 20.9 | 20.6 | 21.2 | 21.1 | 21.0 | 21.1 | 20.0 | 18.8 | 16.1 | 15.4 | 18.6 | 21.4 |
| 25-Aug | 14.7 | 13.8 | 12.5 | 11.9 | 11.7 | 11.5 | 11.4 | 12.2 | 12.6 | 12.6 | 12.8 | 13.1 | 12.1 | 11.7 | 12.0 | 12.7 | 14.2 | 15.5 | 14.7 | 14.7 | 14.8 | 14.8 | 14.4 | 13.8 | 13.2 | 15.5 |
| 26-Aug | 13.3 | 12.7 | 12.0 | 11.0 | 10.3 | 9.8 | 10.8 | 12.6 | 14.4 | 15.9 | 17.6 | 19.8 | 21.6 | 22.4 | 23.0 | 23.2 | 23.3 | 22.9 | 22.1 | 20.6 | 19.1 | 18.1 | 17.6 | 17.2 | 17.1 | 23.3 |
| 27-Aug | 17.0 | 16.5 | 15.7 | 14.9 | 14.3 | 13.8 | 14.3 | 15.9 | 17.8 | 19.5 | 20.8 | 22.3 | 23.4 | 23.8 | 24.1 | 24.3 | 24.3 | 23.9 | 22.8 | 20.6 | 17.0 | 17.1 | 18.3 | 17.4 | 19.2 | 24.3 |
| 28-Aug | 15.8 | 15.5 | 13.9 | 11.7 | 10.9 | 10.0 | 10.9 | 13.1 | 15.5 | 18.2 | 20.5 | 21.5 | 22.0 | 22.4 | 22.8 | 22.8 | 22.5 | 22.2 | 21.1 | 18.1 | 12.9 | 11.4 | 12.3 | 9.6 | 16.6 | 22.8 |
| 29-Aug | 7.8 | 6.6 | 5.8 | 5.0 | 3.7 | 3.4 | 5.4 | 9.5 | 13.4 | 15.0 | 18.1 | 20.8 | 22.2 | 22.3 | 22.6 | 22.8 | 23.0 | 22.5 | 21.8 | 20.0 | 15.5 | 15.7 | 16.0 | 14.8 | 14.7 | 23.0 |
| 30-Aug | 14.4 | 13.6 | 13.2 | 13.0 | 12.7 | 12.6 | 13.3 | 14.1 | 15.7 | 17.9 | 21.3 | 23.3 | 24.4 | 25.4 | 26.2 | 26.6 | 26.5 | 25.8 | 24.6 | 23.1 | 21.5 | 19.9 | 18.7 | 17.6 | 19.4 | 26.6 |
| 31-Aug | 16.4 | 15.5 | 13.9 | 11.2 | 12.3 | 12.6 | 12.5 | 13.7 | 15.4 | 17.7 | 18.9 | 20.5 | 22.8 | 22.4 | 22.3 | 22.4 | 23.7 | 23.3 | 21.6 | 19.5 | 17.7 | 16.6 | 15.7 | 14.9 | 17.6 | 23.7 |
| 14.4 13.5 12.8 12.0 11.4 11.5 12.6 14.5 16.6 18.6 20.1 21.3 22.0 22.5 22.7 22.6 22.5 22.3 21.5 20.4 18.6 17.3 16.3 15.4 | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | |
| 21.1 20.1 19.4 18.9 18.2 17.4 17.8 20.0 22.8 25.7 27.6 28.4 29.5 30.2 30.6 30.5 30.0 29.2 28.4 27.1 25.2 23.9 22.2 21.9 | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | |





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Patricia McInnes - August 2017**

| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 45 | 6.05 | 6.05 |
| 10 - 20 | 444 | 59.68 | 65.73 |
| > 20 | 255 | 34.27 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



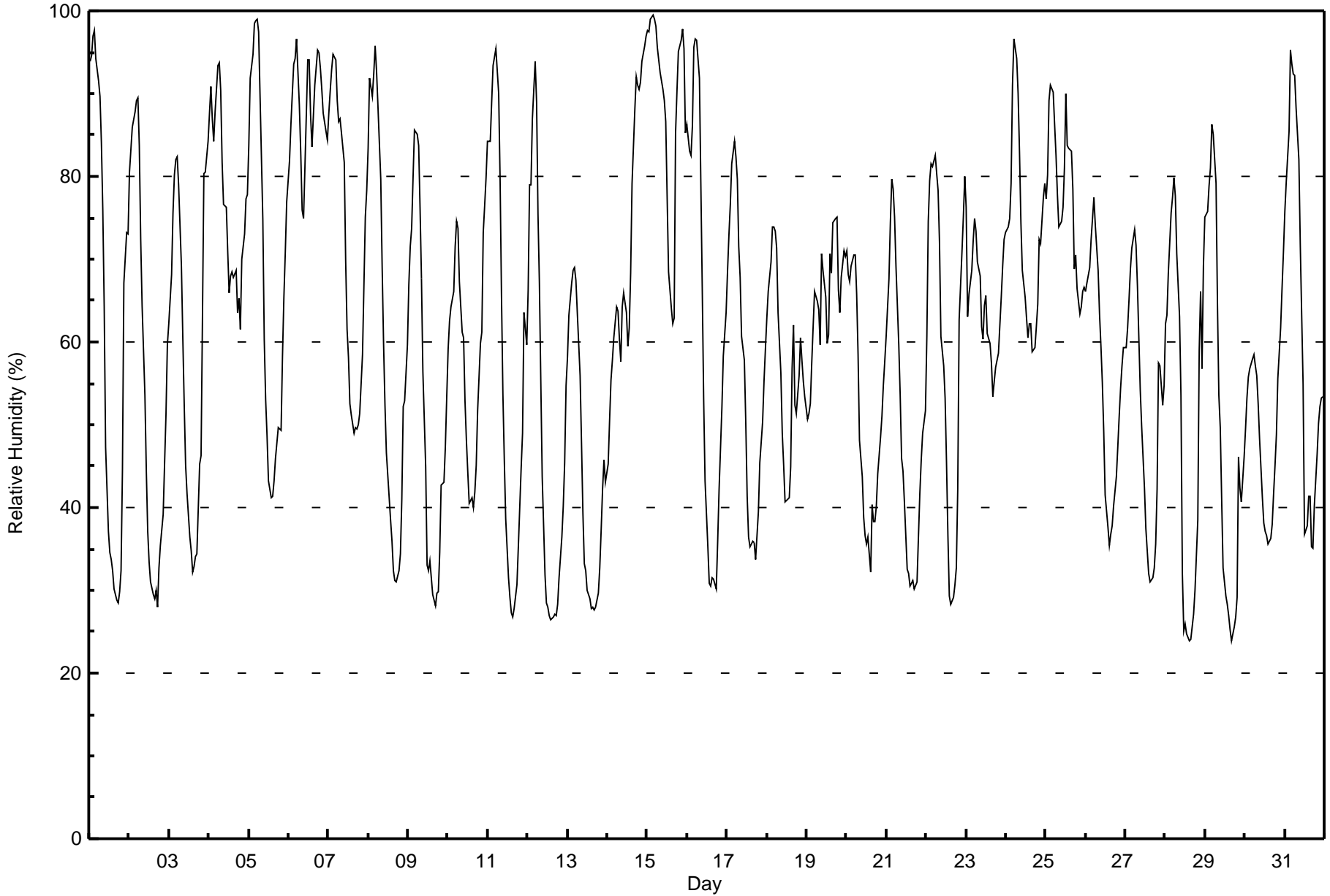
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Patricia McInnes - August 2017

| Maximum Value: 100 % on Aug 15 04:00 | | | | | | | | | | | | | | | | | | | Maximum Daily Average: 88.3 % on Aug 15 | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|----|----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|------|------|------|------|------|---------------------------------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|--|
| Minimum Value: 24 % on Aug 29 17:00 | | | | | | | | | | | | | | | | | | | Minimum Daily Average: 44.4 % on Aug 13 | | | | | | Hours of Data: 744 | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 83.2 % at hour 6 | | | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 43.1 % at hour 15 | | | | | | Hours of Missing Data: 0 | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 61.2 % | | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 26 P ₁₀ = 32 Q ₁ = 44 Median = 62 Q ₃ = 77 P ₉₀ = 90 P ₉₉ = 98 | | | | | | Hours of Calibration: 0 | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 94 | 95 | 97 | 98 | 94 | 91 | 90 | 84 | 76 | 64 | 47 | 37 | 35 | 34 | 32 | 30 | 29 | 29 | 30 | 32 | 45 | 67 | 73 | 73 | 61.5 | 98 | | | | | | | | | | | | | | | | | | |
| 2-Aug | 81 | 83 | 86 | 88 | 89 | 89 | 84 | 72 | 64 | 54 | 44 | 37 | 33 | 31 | 29 | 29 | 30 | 28 | 33 | 36 | 39 | 45 | 51 | 60 | 54.8 | 89 | | | | | | | | | | | | | | | | | | |
| 3-Aug | 62 | 68 | 76 | 80 | 82 | 82 | 79 | 69 | 61 | 52 | 45 | 42 | 36 | 35 | 32 | 33 | 34 | 34 | 45 | 46 | 63 | 80 | 81 | 84 | 58.4 | 84 | | | | | | | | | | | | | | | | | | |
| 4-Aug | 88 | 91 | 87 | 84 | 88 | 93 | 94 | 90 | 82 | 77 | 76 | 71 | 66 | 68 | 68 | 68 | 69 | 63 | 65 | 61 | 70 | 73 | 77 | 78 | 77.0 | 94 | | | | | | | | | | | | | | | | | | |
| 5-Aug | 84 | 92 | 95 | 98 | 99 | 99 | 97 | 90 | 75 | 60 | 53 | 49 | 43 | 41 | 41 | 43 | 46 | 48 | 50 | 49 | 58 | 65 | 71 | 77 | 67.7 | 99 | | | | | | | | | | | | | | | | | | |
| 6-Aug | 82 | 86 | 90 | 94 | 94 | 97 | 89 | 83 | 76 | 75 | 81 | 94 | 94 | 87 | 84 | 87 | 91 | 95 | 95 | 93 | 91 | 88 | 85 | 84 | 88.1 | 97 | | | | | | | | | | | | | | | | | | |
| 7-Aug | 88 | 90 | 93 | 95 | 94 | 89 | 87 | 87 | 85 | 82 | 70 | 61 | 58 | 53 | 51 | 49 | 50 | 49 | 50 | 51 | 58 | 67 | 75 | 78 | 71.3 | 95 | | | | | | | | | | | | | | | | | | |
| 8-Aug | 83 | 92 | 90 | 92 | 96 | 93 | 89 | 80 | 69 | 60 | 52 | 47 | 44 | 39 | 36 | 32 | 31 | 31 | 32 | 34 | 41 | 52 | 53 | 60 | 59.4 | 96 | | | | | | | | | | | | | | | | | | |
| 9-Aug | 67 | 72 | 74 | 80 | 86 | 85 | 84 | 76 | 68 | 57 | 45 | 33 | 32 | 34 | 32 | 29 | 28 | 30 | 30 | 35 | 43 | 43 | 47 | 53 | 52.5 | 86 | | | | | | | | | | | | | | | | | | |
| 10-Aug | 59 | 63 | 64 | 66 | 72 | 75 | 74 | 67 | 61 | 60 | 53 | 48 | 44 | 40 | 41 | 40 | 42 | 45 | 52 | 60 | 61 | 73 | 77 | 80 | 59.0 | 80 | | | | | | | | | | | | | | | | | | |
| 11-Aug | 84 | 84 | 89 | 93 | 94 | 95 | 90 | 80 | 66 | 54 | 46 | 39 | 31 | 29 | 27 | 27 | 28 | 31 | 35 | 40 | 45 | 49 | 64 | 60 | 57.5 | 95 | | | | | | | | | | | | | | | | | | |
| 12-Aug | 66 | 79 | 79 | 87 | 94 | 89 | 75 | 67 | 55 | 44 | 32 | 29 | 28 | 27 | 26 | 27 | 27 | 27 | 28 | 31 | 36 | 40 | 45 | 55 | 49.8 | 94 | | | | | | | | | | | | | | | | | | |
| 13-Aug | 58 | 63 | 67 | 69 | 69 | 67 | 64 | 56 | 48 | 39 | 33 | 32 | 30 | 29 | 28 | 28 | 28 | 28 | 30 | 33 | 37 | 42 | 46 | 43 | 44.4 | 69 | | | | | | | | | | | | | | | | | | |
| 14-Aug | 45 | 51 | 55 | 58 | 60 | 64 | 64 | 60 | 58 | 64 | 66 | 64 | 60 | 62 | 68 | 68 | 79 | 88 | 92 | 91 | 91 | 91 | 94 | 96 | 97 | 71.6 | 97 | | | | | | | | | | | | | | | | | |
| 15-Aug | 98 | 97 | 99 | 100 | 99 | 98 | 96 | 94 | 93 | 91 | 89 | 87 | 78 | 69 | 64 | 62 | 63 | 85 | 90 | 95 | 97 | 98 | 95 | 85 | 88.3 | 100 | | | | | | | | | | | | | | | | | | |
| 16-Aug | 86 | 83 | 83 | 86 | 96 | 97 | 96 | 92 | 79 | 67 | 53 | 43 | 35 | 31 | 30 | 32 | 31 | 30 | 36 | 42 | 47 | 52 | 58 | 64 | 60.4 | 97 | | | | | | | | | | | | | | | | | | |
| 17-Aug | 68 | 73 | 77 | 82 | 84 | 82 | 80 | 72 | 68 | 61 | 58 | 50 | 41 | 36 | 35 | 36 | 36 | 34 | 37 | 40 | 45 | 50 | 55 | 59 | 56.6 | 84 | | | | | | | | | | | | | | | | | | |
| 18-Aug | 63 | 66 | 70 | 74 | 74 | 73 | 71 | 64 | 56 | 49 | 45 | 41 | 41 | 41 | 45 | 57 | 62 | 52 | 51 | 56 | 61 | 58 | 55 | 53 | 57.4 | 74 | | | | | | | | | | | | | | | | | | |
| 19-Aug | 51 | 51 | 53 | 57 | 62 | 66 | 65 | 64 | 60 | 71 | 69 | 65 | 60 | 61 | 71 | 68 | 74 | 75 | 75 | 66 | 64 | 68 | 71 | 70 | 64.8 | 75 | | | | | | | | | | | | | | | | | | |
| 20-Aug | 71 | 68 | 67 | 69 | 71 | 71 | 66 | 58 | 48 | 44 | 39 | 37 | 36 | 37 | 32 | 40 | 38 | 38 | 40 | 44 | 49 | 51 | 55 | 58 | 51.1 | 71 | | | | | | | | | | | | | | | | | | |
| 21-Aug | 61 | 68 | 74 | 80 | 78 | 75 | 69 | 60 | 54 | 46 | 44 | 41 | 32 | 32 | 30 | 31 | 31 | 30 | 31 | 36 | 42 | 46 | 49 | 52 | 49.7 | 80 | | | | | | | | | | | | | | | | | | |
| 22-Aug | 61 | 75 | 80 | 82 | 81 | 83 | 80 | 78 | 72 | 61 | 57 | 53 | 45 | 37 | 29 | 28 | 29 | 31 | 33 | 42 | 63 | 71 | 75 | 80 | 59.4 | 83 | | | | | | | | | | | | | | | | | | |
| 23-Aug | 76 | 63 | 66 | 69 | 72 | 75 | 73 | 70 | 68 | 62 | 60 | 64 | 66 | 61 | 60 | 57 | 53 | 55 | 57 | 59 | 62 | 65 | 69 | 72 | 64.8 | 76 | | | | | | | | | | | | | | | | | | |
| 24-Aug | 73 | 74 | 75 | 79 | 91 | 97 | 94 | 90 | 83 | 74 | 69 | 65 | 63 | 60 | 62 | 62 | 59 | 59 | 62 | 65 | 72 | 72 | 77 | 79 | 73.2 | 97 | | | | | | | | | | | | | | | | | | |
| 25-Aug | 77 | 80 | 89 | 91 | 90 | 86 | 83 | 78 | 74 | 75 | 76 | 81 | 90 | 84 | 83 | 83 | 79 | 69 | 70 | 66 | 63 | 64 | 66 | 67 | 77.7 | 91 | | | | | | | | | | | | | | | | | | |
| 26-Aug | 66 | 67 | 69 | 72 | 75 | 77 | 74 | 69 | 63 | 59 | 55 | 49 | 41 | 38 | 35 | 37 | 38 | 40 | 44 | 47 | 51 | 54 | 57 | 59 | 55.8 | 77 | | | | | | | | | | | | | | | | | | |
| 27-Aug | 59 | 62 | 65 | 69 | 71 | 74 | 72 | 67 | 61 | 54 | 50 | 42 | 37 | 35 | 32 | 31 | 32 | 33 | 36 | 42 | 57 | 57 | 52 | 55 | 51.8 | 74 | | | | | | | | | | | | | | | | | | |
| 28-Aug | 62 | 63 | 68 | 76 | 77 | 80 | 78 | 71 | 63 | 54 | 32 | 25 | 26 | 25 | 24 | 24 | 26 | 27 | 30 | 39 | 59 | 66 | 57 | 69 | 50.8 | 80 | | | | | | | | | | | | | | | | | | |
| 29-Aug | 75 | 76 | 79 | 81 | 86 | 85 | 79 | 65 | 54 | 50 | 41 | 33 | 29 | 28 | 27 | 25 | 24 | 26 | 27 | 29 | 46 | 42 | 41 | 46 | 49.7 | 86 | | | | | | | | | | | | | | | | | | |
| 30-Aug | 50 | 53 | 56 | 57 | 58 | 58 | 57 | 56 | 53 | 48 | 41 | 38 | 37 | 37 | 36 | 36 | 38 | 42 | 45 | 49 | 56 | 62 | 66 | 71 | 49.9 | 71 | | | | | | | | | | | | | | | | | | |
| 31-Aug | 76 | 79 | 85 | 95 | 94 | 92 | 92 | 88 | 82 | 72 | 63 | 55 | 37 | 38 | 41 | 41 | 35 | 35 | 40 | 46 | 50 | 52 | 53 | 53 | 62.4 | 95 | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | 71.4 | 74.4 | 77.2 | 80.6 | 82.9 | 83.2 | 80.1 | 74.0 | 66.8 | 60.5 | 54.4 | 50.1 | 46.1 | 43.7 | 43.1 | 43.7 | 44.1 | 44.9 | 47.4 | 50.2 | 56.8 | 61.6 | 64.3 | 66.9 | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | | 98 | 97 | 99 | 100 | 99 | 99 | 97 | 94 | 93 | 91 | 89 | 94 | 94 | 87 | 84 | 87 | 91 | 95 | 95 | 95 | 97 | 98 | 96 | 97 | Diurnal Maximum | |





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Patricia McInnes - August 2017

| | | |
|--|---|---------------------------------|
| Maximum Speed: 28 km/h on Aug 25 14:00 | Maximum Daily Speed Average: 17.4 km/h on Aug 20 | Hours in Service: 744 |
| Minimum Speed Value: 0 km/h on Aug 1 09:00 | Minimum Daily Speed Average: 1.9 km/h on Aug 22 | Hours of Data: 744 |
| Maximum Diurnal Speed Average: 6.4 km/h at hour 13 | Minimum Diurnal Speed Average: 4.3 km/h at hour 21 | Hours of Missing Data: 0 |
| Monthly Average Velocity: 5.1 km/h 217.3 deg | Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 6 Median = 9 Q ₃ = 14 P ₉₀ = 19 P ₉₉ = 26 | Percent Operational Time: 100.0 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | WSW3 | SSW2 | SW3 | SW3 | SW5 | SW6 | WSW5 | SSW2 | WSW0 | NW3 | N9 | NNE10 | NNE12 | NNE14 | N12 | N13 | NNE13 | NNE14 | NNE12 | NNE9 | N6 | NW5 | WNW6 | W3 | N4.6 | NNE14 |
| 2-Aug | SW3 | W3 | SW2 | SW2 | SSW3 | S4 | SSW6 | S6 | S7 | S9 | S10 | S7 | W2 | W6 | W8 | WSW8 | WSW9 | SSW10 | WSW9 | SW6 | SW7 | SW7 | SW7 | SW10 | SW5.4 | S10 |
| 3-Aug | SW9 | SSW7 | SW8 | S6 | S6 | SSW5 | SSW7 | S8 | S8 | S9 | S11 | SSW7 | SSW9 | SSE9 | S8 | S9 | S7 | SE5 | W15 | SSW6 | NNE10 | ENE9 | ESE3 | NNW9 | SSW4.8 | W15 |
| 4-Aug | N2 | NW7 | NW10 | ESE2 | ESE6 | ENE4 | NNW4 | WNW2 | ESE6 | E3 | NW7 | NE3 | ENE6 | ESE10 | ENE8 | E8 | E6 | SE5 | SE7 | SE7 | NW2 | ESE3 | NE3 | NE7 | ENE2.5 | NW10 |
| 5-Aug | SSW4 | SW4 | WSW1 | SSE2 | W3 | SW2 | S4 | SSE4 | SE5 | E6 | E6 | SE8 | SE12 | SSE12 | SSE11 | SSE11 | S12 | S11 | S7 | SSW6 | SSW6 | SW6 | SW6 | SSE5.2 | SSE12 | |
| 6-Aug | SW6 | SW6 | SW5 | SW1 | SSW4 | SW5 | W1 | NNW3 | NE5 | N9 | N14 | N16 | N19 | N19 | N17 | N16 | N10 | NNW7 | NNW8 | NNW7 | N7 | NNW6 | NNW7 | NNW7 | NNW6.5 | N19 |
| 7-Aug | NW8 | NW6 | NW6 | NW7 | NW6 | NNW9 | NNW12 | NNW12 | N13 | NNW13 | N13 | NNW14 | NW9 | N7 | NW6 | NW7 | NW9 | W10 | W8 | WSW6 | SW6 | SW7 | SW7 | SW6 | NW6.7 | NNW14 |
| 8-Aug | SSW5 | SSW6 | SSW7 | S6 | SSW7 | S7 | S7 | S9 | S9 | SSW9 | S12 | SSW12 | W8 | SSW8 | WSW8 | WSW7 | W6 | S6 | S8 | S6 | SSW5 | SW5 | SW6 | SW5 | SSW6.6 | S12 |
| 9-Aug | SSW5 | SSW5 | S5 | SSW4 | SE1 | S4 | SSW8 | SSW10 | SSW7 | SSW7 | SSW8 | S12 | SSE5 | WNW8 | W5 | SW1 | SSW3 | WSW7 | SSW8 | SW8 | WSW8 | SW6 | SSW5 | S7 | SSW5.3 | S12 |
| 10-Aug | S7 | SSW4 | ESE7 | S8 | SSW7 | SSW9 | SSW10 | SSW10 | SSW12 | SSW11 | S9 | SSE8 | SW8 | SW2 | ENE5 | E11 | SE15 | SSE13 | SW10 | SW7 | SW4 | SSW3 | SSW5 | SW6 | S6.1 | SE15 |
| 11-Aug | SSW5 | SSW6 | S7 | SSW7 | S8 | S7 | S8 | S7 | S7 | S8 | SSE7 | S8 | SSE9 | S11 | SE12 | ESE13 | SE13 | SE15 | SE14 | SSE11 | SSE9 | SSE8 | SSW5 | SSW8 | SSE8.0 | SE15 |
| 12-Aug | SSW6 | SSE4 | SSE5 | SSW3 | SW3 | S3 | SE6 | SE7 | SE6 | SSE9 | S20 | S21 | S23 | S21 | S21 | S20 | S18 | S18 | S16 | S12 | SSE10 | S12 | SSE9 | SE7 | S11.2 | S23 |
| 13-Aug | ESE8 | ESE8 | ESE8 | ESE9 | ESE11 | ESE12 | ESE13 | ESE11 | ESE13 | ESE18 | SE23 | SE25 | SE26 | SE25 | SE24 | SE25 | SE25 | SE24 | SE21 | SE16 | SE12 | SE11 | SE10 | ESE12 | SE16.1 | SE26 |
| 14-Aug | ESE14 | ESE13 | ESE13 | SE12 | SE11 | ESE12 | SE13 | SE12 | SSE8 | SSW13 | S12 | SW11 | SW11 | SSW14 | WSW17 | SW14 | WSW12 | SSW6 | S5 | SE6 | SE6 | SSE4 | SE5 | SSE7.2 | WSW17 | |
| 15-Aug | SSE3 | S2 | SW3 | SE6 | SSW3 | SSW3 | WSW4 | W4 | SW3 | SSW3 | SW5 | WSW5 | NW2 | WNW3 | NNW9 | NNW12 | NNE10 | NW14 | NW14 | WNW10 | NNW5 | NW5 | WNW7 | WNW10 | WNW3.4 | NW14 |
| 16-Aug | W9 | W9 | W10 | W5 | ESE5 | SSE3 | SSW6 | SSW8 | SSW6 | SSE6 | SSE10 | WSW3 | WSW10 | WNW12 | WNW7 | WSW6 | W9 | W13 | WSW11 | W9 | SW7 | SW9 | SW10 | SW11 | WSW6.3 | W13 |
| 17-Aug | SW11 | SW12 | SW8 | SW6 | SSW6 | SW11 | SW8 | SW11 | SW11 | SW11 | SW11 | WSW9 | WSW9 | WNW8 | WNW11 | WNW12 | W11 | WNW8 | W7 | WSW6 | SW8 | SW10 | WSW10 | SW11 | WSW8.4 | SW12 |
| 18-Aug | SW12 | SW12 | SW9 | SW10 | SW10 | SW11 | SW11 | SSW11 | SSW11 | SSW13 | SW14 | WSW22 | WSW23 | W26 | WSW23 | SW18 | SSW15 | SW19 | SW17 | SSW12 | SW13 | SW16 | SW19 | SW16 | SW14.6 | W26 |
| 19-Aug | SW16 | WSW17 | WSW17 | WSW14 | WSW15 | WSW13 | WSW13 | WSW16 | WSW20 | WSW21 | WSW26 | WSW26 | W25 | W26 | W23 | WNW20 | WNW10 | WNW9 | WSW10 | WNW15 | W12 | WSW7 | WSW13 | WSW11 | W15.7 | W26 |
| 20-Aug | WSW11 | WSW15 | WSW16 | WSW15 | WSW16 | WSW15 | WSW15 | W18 | W17 | W23 | W24 | W23 | WNW24 | WNW19 | WNW23 | WNW22 | W24 | W22 | W19 | W13 | W14 | W18 | W15 | W14 | W17.4 | W24 |
| 21-Aug | W10 | S4 | S8 | SSW7 | SSW7 | SW10 | SW8 | SSW8 | SSW10 | SW14 | SW14 | SW15 | WSW18 | W17 | W18 | WNW16 | W19 | W16 | W14 | W10 | W8 | W7 | WSW7 | NNW5 | WSW9.6 | W19 |
| 22-Aug | NW6 | WNW6 | W4 | NW4 | WNW3 | SW2 | N5 | NNW5 | N5 | NE5 | NNE4 | WNW2 | WNW1 | NE4 | N2 | NW3 | E5 | E8 | E7 | E4 | NW2 | W2 | ESE1 | SW1 | N1.9 | E8 |
| 23-Aug | SE2 | SE6 | SE7 | SE8 | SE10 | SE9 | SE9 | SE10 | SE8 | SSE8 | SE7 | SW10 | SW8 | S10 | SE11 | SE13 | SE16 | SE14 | SE13 | ESE15 | SE13 | SE11 | SE9 | SE9 | SE9.1 | SE18 |
| 24-Aug | SE12 | SE10 | SE12 | SSW11 | SSW7 | E7 | ESE5 | ESE7 | E10 | E10 | ESE12 | ESE11 | ESE11 | ESE15 | E17 | ESE18 | ESE17 | ESE11 | S9 | SW11 | SW16 | WSW11 | SW14 | SE7.9 | ESE16 | |
| 25-Aug | SW14 | SW12 | SSW9 | SSW9 | SSW12 | SSW12 | SSW16 | SSW19 | SSW19 | SSW18 | SSW18 | SW24 | WSW28 | SW24 | WSW23 | WSW20 | W22 | WSW17 | WSW15 | SW16 | SW16 | SW16 | SW15 | SW16.2 | WSW28 | |
| 26-Aug | WSW16 | WSW16 | SW15 | SW15 | SW16 | SW16 | SW17 | WSW18 | SW14 | SW16 | SSW14 | SW15 | WSW20 | WSW21 | SW21 | WSW19 | WSW18 | WSW18 | WSW15 | WSW11 | SW7 | SW10 | SW9 | SW9 | SW15.1 | SW21 |
| 27-Aug | SW13 | WSW13 | SW14 | SW14 | SW13 | SW12 | SW14 | WSW17 | WSW19 | WSW21 | WSW21 | W25 | W25 | W25 | W23 | W23 | W19 | W17 | W12 | W6 | WSW5 | WSW6 | W6 | WSW10 | WSW15.0 | WSW25 |
| 28-Aug | W10 | WNW10 | WSW4 | WSW5 | SSW5 | SW6 | S6 | SSW8 | SSW7 | SSW5 | NW7 | WNW15 | WNW15 | W18 | WNW20 | WNW19 | WNW18 | NW15 | NW10 | WNW5 | WNW5 | WNW7 | WNW8 | S1 | WNW7.7 | WNW20 |
| 29-Aug | SW4 | SSW4 | WSW3 | WSW3 | SW3 | SW3 | SSW3 | SSW4 | ESE3 | ENE5 | S2 | E2 | NE5 | E7 | E6 | E7 | E7 | NE9 | ENE6 | ESE6 | ESE6 | SE8 | SE10 | SE11 | ESE3.2 | ESE11 |
| 30-Aug | ESE14 | ESE15 | ESE17 | ESE15 | ESE15 | SE15 | SE16 | ESE17 | ESE16 | ESE17 | ESE18 | SE21 | SE26 | SE25 | SSE24 | SE25 | SE24 | SE17 | S14 | S16 | S11 | S8 | SSE8 | SSE9 | SE15.8 | SE26 |
| 31-Aug | S8 | S8 | SSE3 | SSW3 | SSW7 | S6 | SW6 | SW9 | SW7 | SW12 | SW11 | SW14 | WSW20 | WSW22 | SW18 | SSW16 | W18 | W22 | W23 | W15 | WSW12 | WSW13 | WSW14 | WSW12 | WSW11.2 | W23 |

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----------------|-----------------|--|
| WSW5.1 | WSW5.0 | SSW4.5 | SSW4.8 | SSW5.1 | SSW5.1 | SSW5.7 | SSW5.3 | SSW5.8 | SSW5.9 | SW6.3 | SW6.4 | WSW5.9 | WSW5.4 | SW4.3 | SW4.4 | SW4.8 | SW5.5 | SW4.8 | SW4.3 | SW4.9 | SW5.2 | SW4.8 | Diurnal Average | | |
| WSW16 | WSW17 | WSW17 | SW15 | SW16 | SW16 | SW17 | WSW18 | WSW20 | W23 | WSW26 | WSW26 | SE26 | WSW28 | SSE24 | SE25 | SE25 | SE24 | W23 | SE16 | SW16 | W18 | SW19 | SW16 | Diurnal Maximum | |

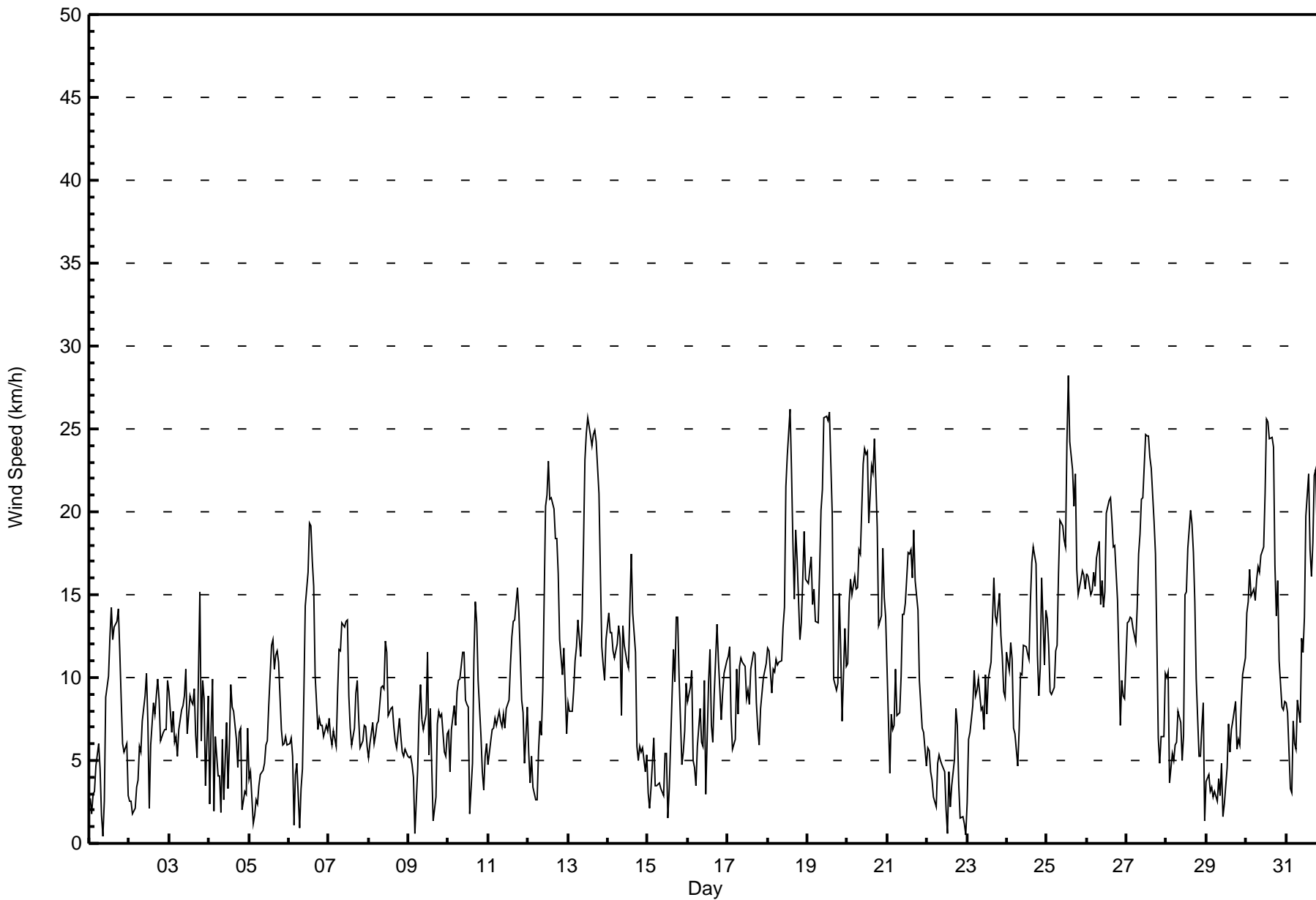
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Patricia McInnes - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Aug 25 13:00 Minimum Value: 0 km/h on Aug 1 22:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 7 | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | |
|---|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 4 | 4 | 4 | 5 | 4 | 4 | 3 | 3 | 2 | 1 | 0 | 0 | 1 | 5 |
| 2-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 3 | 3 | 4 | 4 | 5 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 5 |
| 3-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 3 | 3 | 4 | 4 | 2 | 2 | 6 | 4 | 4 | 2 | 2 | 2 | 6 |
| 4-Aug | 2 | 3 | 2 | 2 | 2 | 3 | 2 | 1 | 1 | 2 | 2 | 3 | 2 | 3 | 2 | 2 | 2 | 1 | 1 | 4 | 1 | 3 | 4 | 4 | 4 |
| 5-Aug | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 4 |
| 6-Aug | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 2 | 3 | 2 | 4 | 4 | 4 | 3 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 4 |
| 7-Aug | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 2 | 4 |
| 8-Aug | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 4 |
| 9-Aug | 1 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 4 | 5 | 3 | 3 | 4 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 5 |
| 10-Aug | 1 | 2 | 2 | 2 | 2 | 2 | 4 | 2 | 3 | 3 | 2 | 3 | 4 | 2 | 3 | 7 | 5 | 4 | 3 | 1 | 1 | 1 | 1 | 2 | 7 |
| 11-Aug | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 5 | 4 | 4 | 4 | 3 | 3 | 2 | 1 | 2 | 2 | 5 |
| 12-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 4 | 5 | 6 | 6 | 5 | 6 | 5 | 5 | 5 | 5 | 3 | 2 | 2 | 2 | 2 | 6 |
| 13-Aug | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 3 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 5 | 4 | 2 | 2 | 2 | 2 | 6 |
| 14-Aug | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 4 |
| 15-Aug | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 1 | 2 | 4 | 3 | 2 | 5 | 3 | 2 | 1 | 1 | 1 | 1 | 5 |
| 16-Aug | 1 | 1 | 2 | 3 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 4 |
| 17-Aug | 1 | 2 | 4 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 4 |
| 18-Aug | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 5 | 5 | 6 | 6 | 6 | 4 | 5 | 4 | 3 | 3 | 4 | 4 | 3 | 6 |
| 19-Aug | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 5 | 5 | 6 | 7 | 6 | 8 | 7 | 5 | 5 | 3 | 2 | 4 | 2 | 2 | 2 | 2 | 8 |
| 20-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 5 | 5 | 6 | 5 | 6 | 7 | 7 | 5 | 5 | 4 | 2 | 2 | 3 | 3 | 3 | 7 |
| 21-Aug | 3 | 2 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 5 | 6 | 5 | 6 | 5 | 4 | 4 | 1 | 1 | 1 | 2 | 3 | 6 |
| 22-Aug | 3 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 2 | 1 | 3 |
| 23-Aug | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 4 |
| 24-Aug | 3 | 2 | 3 | 5 | 2 | 1 | 2 | 2 | 3 | 3 | 3 | 4 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 2 | 2 | 6 | 4 | 5 | 6 |
| 25-Aug | 4 | 3 | 2 | 2 | 2 | 3 | 4 | 5 | 5 | 5 | 5 | 4 | 10 | 6 | 6 | 6 | 5 | 5 | 5 | 3 | 4 | 3 | 3 | 3 | 10 |
| 26-Aug | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 4 | 3 | 3 | 3 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 3 | 2 | 2 | 1 | 1 | 2 | 5 |
| 27-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 5 | 5 | 5 | 6 | 6 | 6 | 6 | 5 | 5 | 3 | 1 | 1 | 1 | 2 | 1 | 6 |
| 28-Aug | 2 | 2 | 1 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 4 | 4 | 5 | 6 | 5 | 5 | 4 | 4 | 3 | 1 | 1 | 1 | 1 | 1 | 6 |
| 29-Aug | 1 | 1 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 3 |
| 30-Aug | 2 | 3 | 4 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 6 | 5 | 6 | 7 | 7 | 6 | 6 | 5 | 4 | 4 | 3 | 2 | 1 | 2 | 7 |
| 31-Aug | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 4 | 4 | 3 | 5 | 5 | 4 | 4 | 5 | 5 | 5 | 3 | 1 | 2 | 2 | 2 | 5 |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Patricia McInnes - August 2017**

| Wind Speed Ranges (km/h) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 5 | 146 | 19.62 | 19.62 |
| 6 - 11 | 332 | 44.62 | 64.25 |
| 12 - 19 | 204 | 27.42 | 91.67 |
| 20 - 28 | 62 | 8.33 | 100.00 |
| 29 - 38 | 0 | 0.00 | 100.00 |
| > 38 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Patricia McInnes - August 2017**

| Wind Speed Ranges (km/h) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-----------------------------|----------------|-----|----|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 5 | 4 | 2 | 5 | 3 | 4 | 7 | 6 | 10 | 10 | 29 | 24 | 12 | 10 | 7 | 8 | 5 | 146 |
| 6 - 11 | 6 | 4 | 2 | 4 | 14 | 17 | 30 | 19 | 45 | 48 | 59 | 25 | 20 | 15 | 15 | 9 | 332 |
| 12 - 19 | 10 | 5 | 0 | 0 | 1 | 25 | 21 | 2 | 11 | 16 | 41 | 34 | 21 | 9 | 3 | 5 | 204 |
| 20 - 28 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 1 | 6 | 0 | 3 | 17 | 16 | 5 | 0 | 0 | 62 |
| 29 - 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 20 | 11 | 7 | 7 | 19 | 49 | 71 | 32 | 72 | 93 | 127 | 88 | 67 | 36 | 26 | 19 | 744 |

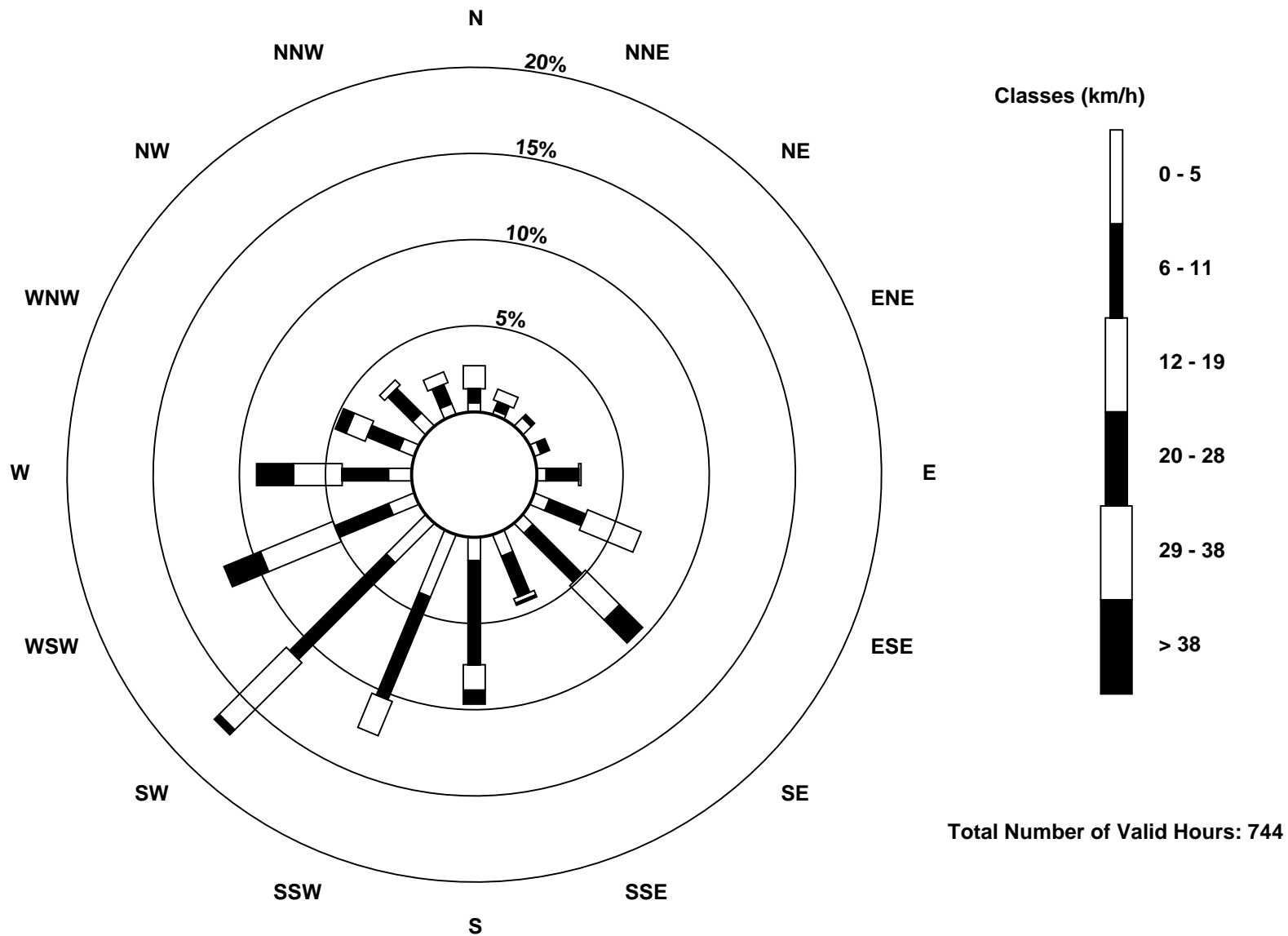
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Wind Speed (WS) - km/h
Patricia McInnes (AMS 6)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Patricia McInnes - August 2017

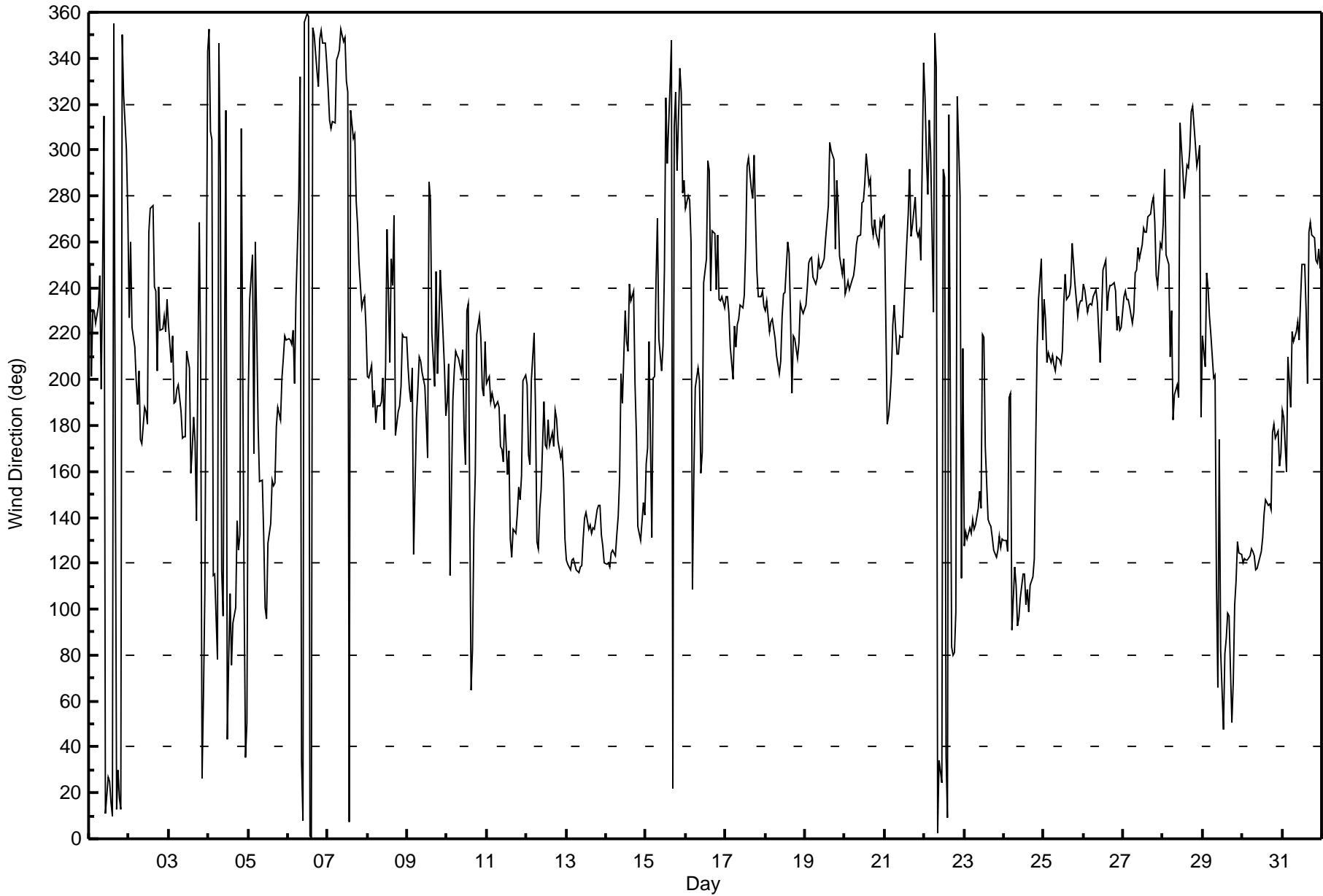
| Direction of Maximum Speed: 246 deg on Aug 25 14:00 | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 | | | | | |
|--|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------------------------|-------|-------|-------|-----|---------------|
| Direction of Maximum Daily Speed Average: 265.9 deg on Aug 20 | | | | | | | | | | | | | | | | | | | | Hours of Data: 744 | | | | | |
| Direction of Minimum Speed: 247 deg on Aug 1 09:00 | | | | | | | | | | Direction of Minimum Daily Speed Average: 1.9 deg on Aug 22 | | | | | | | | | | Hours of Missing Data: 0 | | | | | |
| Monthly Average Direction: 232.6 deg | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 251 | 201 | 230 | 230 | 224 | 232 | 245 | 196 | 247 | 315 | 11 | 27 | 25 | 16 | 10 | 355 | 13 | 30 | 18 | 13 | 350 | 324 | 300 | 273 | 358.3 |
| 2-Aug | 227 | 260 | 222 | 214 | 199 | 189 | 204 | 174 | 172 | 188 | 186 | 180 | 264 | 275 | 276 | 240 | 238 | 204 | 240 | 221 | 222 | 227 | 221 | 235 | 218.0 |
| 3-Aug | 224 | 208 | 219 | 190 | 190 | 196 | 198 | 186 | 174 | 175 | 175 | 212 | 205 | 159 | 170 | 184 | 173 | 139 | 269 | 207 | 26 | 62 | 108 | 343 | 191.5 |
| 4-Aug | 352 | 308 | 305 | 115 | 115 | 78 | 346 | 292 | 117 | 97 | 317 | 43 | 78 | 107 | 76 | 94 | 101 | 139 | 125 | 132 | 309 | 106 | 35 | 50 | 77.8 |
| 5-Aug | 193 | 235 | 254 | 168 | 260 | 223 | 180 | 155 | 156 | 132 | 101 | 96 | 129 | 137 | 156 | 153 | 155 | 180 | 188 | 182 | 201 | 209 | 219 | 217 | 168.7 |
| 6-Aug | 218 | 217 | 215 | 221 | 198 | 236 | 278 | 332 | 34 | 8 | 356 | 359 | 358 | 1 | 1 | 353 | 350 | 334 | 328 | 348 | 352 | 347 | 347 | 337 | 346.9 |
| 7-Aug | 326 | 313 | 309 | 312 | 312 | 339 | 341 | 343 | 353 | 347 | 349 | 330 | 325 | 7 | 317 | 305 | 307 | 277 | 268 | 251 | 231 | 234 | 236 | 223 | 316.0 |
| 8-Aug | 201 | 201 | 206 | 188 | 195 | 181 | 189 | 188 | 190 | 201 | 178 | 206 | 265 | 207 | 253 | 241 | 271 | 176 | 186 | 188 | 197 | 219 | 218 | 218 | 204.7 |
| 9-Aug | 206 | 196 | 191 | 205 | 124 | 183 | 196 | 210 | 208 | 203 | 197 | 182 | 166 | 286 | 278 | 220 | 197 | 247 | 203 | 224 | 248 | 220 | 205 | 184 | 209.7 |
| 10-Aug | 191 | 207 | 115 | 191 | 204 | 212 | 210 | 209 | 203 | 213 | 178 | 163 | 230 | 233 | 65 | 83 | 135 | 159 | 219 | 227 | 218 | 197 | 193 | 217 | 188.1 |
| 11-Aug | 198 | 201 | 190 | 194 | 191 | 188 | 190 | 188 | 171 | 170 | 164 | 185 | 158 | 169 | 131 | 123 | 135 | 133 | 142 | 153 | 148 | 158 | 200 | 202 | 163.2 |
| 12-Aug | 198 | 167 | 163 | 200 | 220 | 186 | 130 | 126 | 143 | 152 | 190 | 171 | 170 | 182 | 172 | 177 | 171 | 186 | 183 | 174 | 166 | 169 | 157 | 130 | 172.0 |
| 13-Aug | 122 | 120 | 117 | 121 | 122 | 120 | 117 | 116 | 118 | 119 | 131 | 140 | 142 | 135 | 136 | 133 | 135 | 135 | 143 | 145 | 145 | 132 | 127 | 120 | 131.3 |
| 14-Aug | 120 | 120 | 119 | 124 | 126 | 123 | 132 | 140 | 157 | 203 | 190 | 230 | 217 | 212 | 242 | 234 | 239 | 198 | 176 | 136 | 133 | 130 | 147 | 141 | 168.3 |
| 15-Aug | 163 | 170 | 216 | 131 | 201 | 201 | 243 | 270 | 218 | 204 | 215 | 248 | 323 | 294 | 327 | 348 | 22 | 310 | 325 | 291 | 335 | 325 | 282 | 287 | 295.9 |
| 16-Aug | 275 | 280 | 278 | 260 | 109 | 158 | 197 | 205 | 200 | 159 | 168 | 242 | 253 | 295 | 291 | 239 | 265 | 264 | 239 | 263 | 235 | 234 | 236 | 231 | 244.0 |
| 17-Aug | 236 | 236 | 229 | 214 | 200 | 223 | 214 | 224 | 226 | 233 | 231 | 237 | 258 | 293 | 296 | 283 | 279 | 298 | 271 | 247 | 236 | 236 | 239 | 232 | 244.7 |
| 18-Aug | 230 | 234 | 221 | 225 | 226 | 222 | 218 | 211 | 203 | 208 | 228 | 237 | 238 | 260 | 255 | 227 | 194 | 219 | 218 | 210 | 216 | 233 | 231 | 229 | 227.6 |
| 19-Aug | 233 | 241 | 251 | 253 | 253 | 245 | 241 | 244 | 253 | 248 | 249 | 253 | 261 | 269 | 276 | 303 | 300 | 296 | 257 | 287 | 275 | 254 | 246 | 252 | 259.0 |
| 20-Aug | 237 | 240 | 243 | 239 | 243 | 246 | 250 | 259 | 263 | 263 | 277 | 278 | 286 | 299 | 285 | 287 | 267 | 263 | 270 | 263 | 259 | 269 | 267 | 271 | 265.9 |
| 21-Aug | 271 | 181 | 184 | 192 | 202 | 224 | 232 | 211 | 211 | 219 | 219 | 218 | 246 | 260 | 272 | 292 | 262 | 267 | 280 | 265 | 262 | 265 | 252 | 338 | 246.9 |
| 22-Aug | 323 | 297 | 281 | 313 | 299 | 229 | 351 | 336 | 3 | 34 | 25 | 291 | 288 | 36 | 9 | 315 | 84 | 80 | 81 | 99 | 324 | 280 | 113 | 214 | 2.5 |
| 23-Aug | 128 | 134 | 131 | 136 | 133 | 139 | 135 | 137 | 144 | 151 | 144 | 220 | 219 | 171 | 139 | 138 | 136 | 131 | 126 | 123 | 126 | 132 | 127 | 130 | 139.9 |
| 24-Aug | 130 | 130 | 125 | 192 | 194 | 91 | 118 | 110 | 93 | 97 | 105 | 115 | 115 | 102 | 109 | 99 | 110 | 114 | 122 | 172 | 214 | 235 | 253 | 217 | 132.5 |
| 25-Aug | 235 | 226 | 207 | 211 | 207 | 211 | 206 | 204 | 210 | 209 | 207 | 212 | 233 | 246 | 235 | 237 | 241 | 259 | 251 | 242 | 227 | 232 | 234 | 234 | 228.2 |
| 26-Aug | 242 | 239 | 230 | 233 | 233 | 232 | 236 | 239 | 234 | 221 | 207 | 228 | 248 | 252 | 230 | 238 | 241 | 241 | 242 | 239 | 222 | 227 | 221 | 223 | 234.6 |
| 27-Aug | 236 | 239 | 235 | 235 | 232 | 224 | 229 | 247 | 248 | 258 | 253 | 259 | 266 | 264 | 264 | 271 | 272 | 277 | 279 | 269 | 245 | 241 | 259 | 258 | 254.7 |
| 28-Aug | 268 | 292 | 255 | 250 | 210 | 230 | 182 | 193 | 198 | 192 | 312 | 301 | 291 | 279 | 293 | 292 | 300 | 317 | 319 | 302 | 293 | 297 | 302 | 184 | 282.6 |
| 29-Aug | 219 | 206 | 247 | 240 | 228 | 220 | 201 | 202 | 111 | 66 | 174 | 82 | 48 | 80 | 87 | 98 | 97 | 51 | 68 | 102 | 112 | 129 | 124 | 124 | 113.4 |
| 30-Aug | 120 | 122 | 121 | 122 | 123 | 126 | 125 | 123 | 117 | 118 | 122 | 125 | 131 | 142 | 148 | 145 | 146 | 143 | 177 | 180 | 174 | 177 | 162 | 168 | 137.4 |
| 31-Aug | 187 | 184 | 160 | 210 | 199 | 188 | 221 | 217 | 221 | 225 | 217 | 235 | 250 | 250 | 230 | 198 | 264 | 269 | 263 | 262 | 252 | 251 | 257 | 248 | 238.3 |
| 218.3 | 217.6 | 208.4 | 204.0 | 199.9 | 201.1 | 201.7 | 203.9 | 198.2 | 203.6 | 205.6 | 220.6 | 234.4 | 241.2 | 240.2 | 230.0 | 216.8 | 224.8 | 229.2 | 217.0 | 221.4 | 223.6 | 227.8 | 223.8 | | |
| Diurnal Average | | | | | | | | | | | | | | | | | | | | | | | | | |
| All monthly, daily, and diurnal averages have been calculated using vector methods | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Patricia McInnes - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 107 deg on Aug 6 07:00 Minimum Value: 3 deg on Aug 1 23:00 Percentiles: P ₁ = 7 P ₁₀ = 10 Q ₁ = 13 Median = 17 Q ₃ = 28 P ₉₀ = 50 P ₉₉ = 87 | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | |
|---|-------------------------------|----|----|----|----|----|-----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 47 | 35 | 23 | 22 | 13 | 10 | 12 | 29 | 94 | 75 | 29 | 32 | 34 | 28 | 32 | 36 | 25 | 16 | 20 | 19 | 10 | 14 | 3 | 22 | 94 |
| 2-Aug | 26 | 51 | 45 | 30 | 14 | 19 | 18 | 31 | 22 | 27 | 37 | 48 | 90 | 61 | 45 | 44 | 35 | 20 | 14 | 17 | 13 | 8 | 9 | 8 | 90 |
| 3-Aug | 11 | 15 | 10 | 25 | 14 | 16 | 16 | 17 | 19 | 25 | 28 | 73 | 34 | 40 | 43 | 44 | 28 | 47 | 38 | 85 | 29 | 26 | 57 | 13 | 85 |
| 4-Aug | 82 | 32 | 12 | 76 | 25 | 65 | 71 | 76 | 25 | 66 | 19 | 84 | 43 | 28 | 18 | 18 | 25 | 31 | 24 | 21 | 54 | 50 | 75 | 56 | 84 |
| 5-Aug | 54 | 25 | 78 | 62 | 27 | 50 | 40 | 24 | 37 | 50 | 49 | 63 | 62 | 29 | 23 | 23 | 16 | 15 | 13 | 21 | 12 | 12 | 10 | 14 | 78 |
| 6-Aug | 12 | 11 | 21 | 90 | 51 | 21 | 107 | 36 | 37 | 27 | 16 | 16 | 17 | 16 | 16 | 16 | 17 | 21 | 11 | 14 | 13 | 11 | 12 | 14 | 107 |
| 7-Aug | 8 | 7 | 5 | 8 | 10 | 13 | 11 | 11 | 16 | 15 | 18 | 19 | 40 | 55 | 55 | 44 | 32 | 28 | 17 | 23 | 8 | 11 | 11 | 20 | 55 |
| 8-Aug | 17 | 15 | 15 | 16 | 18 | 16 | 18 | 16 | 19 | 26 | 21 | 37 | 33 | 51 | 53 | 50 | 54 | 50 | 35 | 13 | 11 | 11 | 7 | 9 | 54 |
| 9-Aug | 15 | 18 | 25 | 38 | 57 | 12 | 18 | 16 | 23 | 25 | 36 | 33 | 83 | 39 | 53 | 88 | 83 | 44 | 25 | 18 | 9 | 12 | 12 | 19 | 88 |
| 10-Aug | 11 | 59 | 37 | 17 | 18 | 14 | 17 | 21 | 18 | 21 | 29 | 41 | 49 | 96 | 58 | 44 | 23 | 20 | 21 | 27 | 48 | 22 | 17 | 14 | 96 |
| 11-Aug | 31 | 19 | 16 | 15 | 15 | 15 | 15 | 23 | 21 | 25 | 36 | 39 | 53 | 29 | 34 | 22 | 24 | 17 | 16 | 14 | 10 | 9 | 14 | 14 | 53 |
| 12-Aug | 13 | 15 | 14 | 15 | 12 | 19 | 14 | 18 | 28 | 37 | 19 | 22 | 18 | 22 | 22 | 18 | 20 | 19 | 15 | 14 | 13 | 11 | 12 | 16 | 37 |
| 13-Aug | 10 | 12 | 13 | 12 | 12 | 13 | 13 | 12 | 14 | 14 | 18 | 17 | 17 | 17 | 18 | 17 | 17 | 15 | 15 | 13 | 12 | 10 | 11 | 12 | 18 |
| 14-Aug | 11 | 12 | 12 | 13 | 13 | 13 | 13 | 16 | 36 | 19 | 25 | 26 | 35 | 23 | 12 | 14 | 17 | 21 | 37 | 15 | 14 | 12 | 23 | 13 | 37 |
| 15-Aug | 28 | 39 | 52 | 26 | 41 | 39 | 36 | 15 | 31 | 47 | 29 | 27 | 86 | 67 | 27 | 21 | 23 | 29 | 13 | 11 | 49 | 31 | 13 | 8 | 86 |
| 16-Aug | 9 | 9 | 8 | 54 | 15 | 28 | 19 | 16 | 25 | 38 | 26 | 72 | 36 | 26 | 47 | 41 | 25 | 17 | 13 | 13 | 7 | 7 | 7 | 7 | 72 |
| 17-Aug | 8 | 9 | 29 | 20 | 17 | 13 | 19 | 14 | 12 | 18 | 22 | 40 | 40 | 64 | 31 | 26 | 21 | 20 | 18 | 23 | 7 | 7 | 9 | 9 | 64 |
| 18-Aug | 8 | 8 | 10 | 10 | 9 | 10 | 11 | 14 | 17 | 18 | 16 | 14 | 16 | 18 | 19 | 25 | 15 | 16 | 14 | 14 | 18 | 11 | 12 | 12 | 25 |
| 19-Aug | 12 | 11 | 10 | 10 | 9 | 9 | 11 | 12 | 14 | 14 | 13 | 14 | 14 | 15 | 14 | 14 | 17 | 27 | 19 | 13 | 11 | 29 | 12 | 11 | 29 |
| 20-Aug | 10 | 9 | 10 | 10 | 10 | 10 | 11 | 14 | 16 | 15 | 17 | 17 | 18 | 28 | 22 | 17 | 13 | 13 | 12 | 10 | 9 | 11 | 10 | 11 | 28 |
| 21-Aug | 46 | 53 | 17 | 14 | 16 | 11 | 16 | 13 | 17 | 16 | 16 | 16 | 21 | 22 | 24 | 23 | 17 | 19 | 12 | 8 | 14 | 20 | 36 | 60 | 60 |
| 22-Aug | 35 | 13 | 20 | 27 | 47 | 73 | 26 | 16 | 27 | 35 | 36 | 76 | 99 | 51 | 82 | 79 | 61 | 27 | 27 | 26 | 52 | 66 | 62 | 76 | 99 |
| 23-Aug | 49 | 20 | 22 | 15 | 13 | 13 | 15 | 15 | 33 | 21 | 24 | 17 | 16 | 25 | 20 | 15 | 14 | 15 | 14 | 13 | 11 | 13 | 14 | 14 | 49 |
| 24-Aug | 12 | 13 | 12 | 45 | 39 | 18 | 29 | 17 | 17 | 15 | 17 | 21 | 18 | 17 | 15 | 13 | 15 | 14 | 16 | 26 | 14 | 27 | 18 | 17 | 45 |
| 25-Aug | 14 | 13 | 18 | 17 | 16 | 15 | 18 | 15 | 16 | 16 | 17 | 15 | 25 | 14 | 14 | 14 | 16 | 13 | 14 | 12 | 12 | 12 | 11 | 10 | 25 |
| 26-Aug | 10 | 10 | 10 | 9 | 9 | 9 | 11 | 13 | 15 | 15 | 21 | 22 | 16 | 16 | 18 | 17 | 20 | 17 | 12 | 10 | 12 | 9 | 10 | 11 | 22 |
| 27-Aug | 10 | 9 | 10 | 10 | 10 | 11 | 14 | 12 | 14 | 14 | 16 | 15 | 17 | 15 | 16 | 16 | 20 | 16 | 13 | 14 | 5 | 8 | 22 | 11 | 22 |
| 28-Aug | 10 | 33 | 54 | 33 | 53 | 44 | 20 | 19 | 23 | 54 | 45 | 22 | 26 | 23 | 20 | 19 | 13 | 14 | 11 | 16 | 16 | 7 | 6 | 46 | 54 |
| 29-Aug | 15 | 10 | 40 | 41 | 45 | 44 | 26 | 34 | 55 | 37 | 86 | 84 | 63 | 53 | 61 | 55 | 31 | 26 | 27 | 9 | 11 | 9 | 11 | 13 | 86 |
| 30-Aug | 11 | 12 | 12 | 14 | 14 | 13 | 14 | 14 | 14 | 13 | 15 | 15 | 15 | 16 | 15 | 14 | 14 | 14 | 18 | 13 | 14 | 13 | 11 | 12 | 18 |
| 31-Aug | 12 | 11 | 37 | 33 | 14 | 57 | 50 | 24 | 26 | 18 | 19 | 15 | 17 | 14 | 18 | 17 | 24 | 15 | 11 | 10 | 8 | 8 | 8 | 9 | 57 |
| 82 59 78 90 57 73 107 76 94 75 86 84 99 96 82 88 83 50 38 85 54 66 75 76 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |





Wood Buffalo Environmental Association

SO₂ Calibration Report

Version-03-2017

Station Information

Station Name: Patricia McInnes
Station number: AMS 06
Calibration Date: August 1, 2017
Last Cal Date: July 5, 2017
Start time (MST): 7:45
End time (MST): 11:25
Reason: Routine

Calibration Standards

Cal Gas Concentration 50.8 ppm
Cal Gas Exp Date February 16, 2019
Calibrator Make/Model API T700 Serial Number 2449
ZAG Make/Model API T701 Serial Number 260

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 1008841397

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|----------------------|--------------|---------------|--------------|--------------|---------------|
| Analyzer Range | 0 | 1000 | PMT voltage | -679 | -678 |
| Calculated slope | 0.992639 | 0.996953 | Lamp voltage | 756 | 756 |
| Calculated intercept | 2.590154 | 2.155585 | Pressure | 708.2 | 700.6 |
| Analyzer Background | 6.2 | 6.2 | Flow | 0.452 | 0.449 |
| Analyzer Coefficient | 1.113 | 1.118 | Intensity | 91 | 91 |

SO₂ Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5537 | 0.0 | 0.0 | 0.1 | ---- |
| as found span | 5458 | 84.2 | 771.8 | 771.3 | 1.001 |
| calibrator zero | 5537 | 0.0 | 0.0 | 0.4 | ---- |
| high point | 5458 | 84.2 | 771.8 | 773.2 | 0.998 |
| second point | 5499 | 42.1 | 386.0 | 383.8 | 1.006 |
| third point | 5522 | 21.1 | 193.4 | 189.2 | 1.022 |
| as left zero | 5537 | 0.0 | 0.0 | 0.3 | ---- |
| as left span | 5458 | 84.2 | 771.8 | 771.3 | 1.001 |
| Average Correction Factor | | | | | 1.009 |

Corrected As found 771.20 Previous response 774.91 *% change 0.5%

** = > +/-5% change initiates investigation*

Notes:

Span adjusted.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

SO₂ Calibration Summary

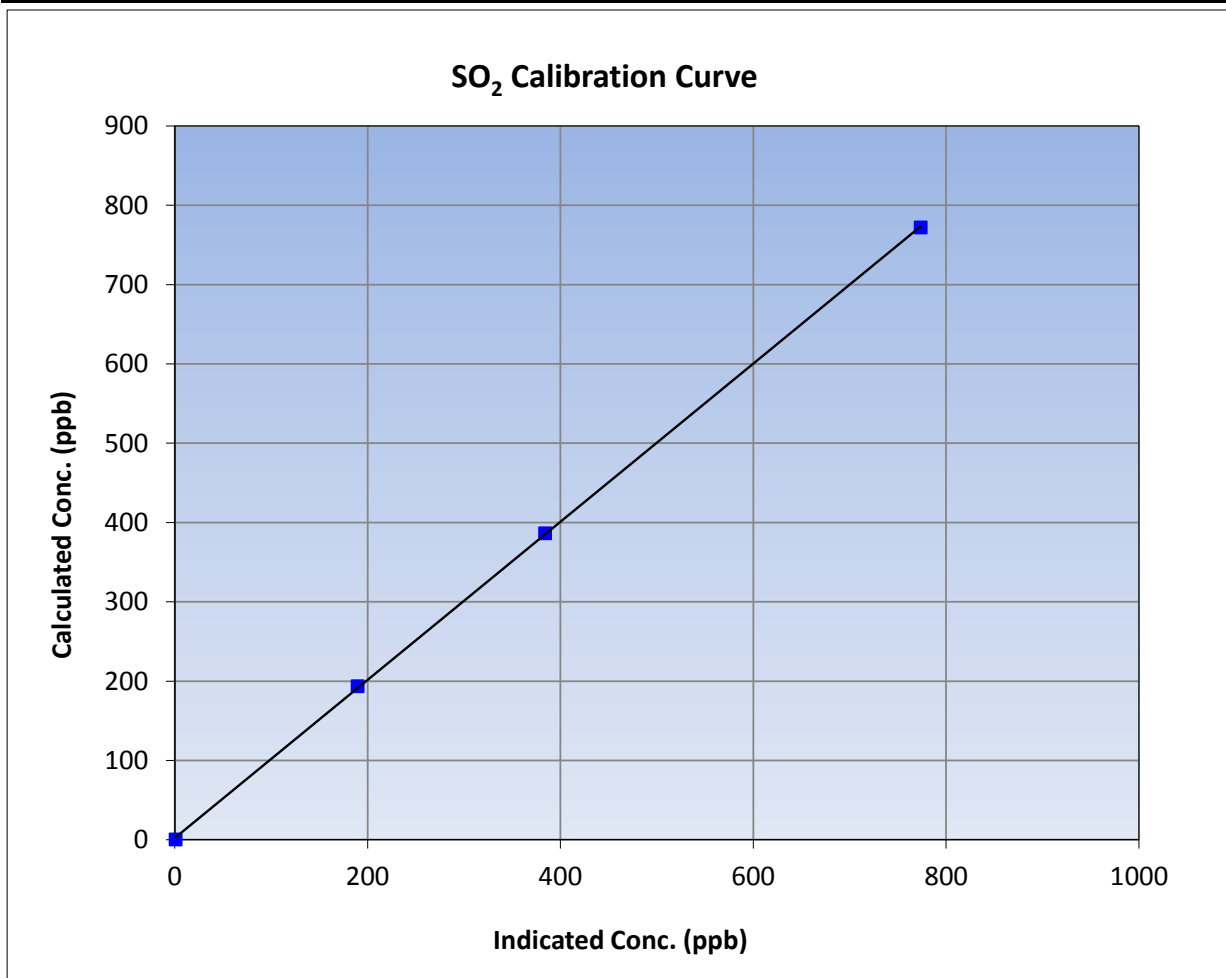
Version-03-2017

Station Information

| | | | |
|------------------|------------------|----------------------|--------------|
| Calibration Date | August 1, 2017 | Previous Calibration | July 5, 2017 |
| Station Name | Patricia McInnes | Station Number | AMS 06 |
| Start Time (MST) | 7:45 | End Time (MST) | 11:25 |
| Analyzer make | Thermo 43i | Analyzer serial # | 1008841397 |

Calibration Data

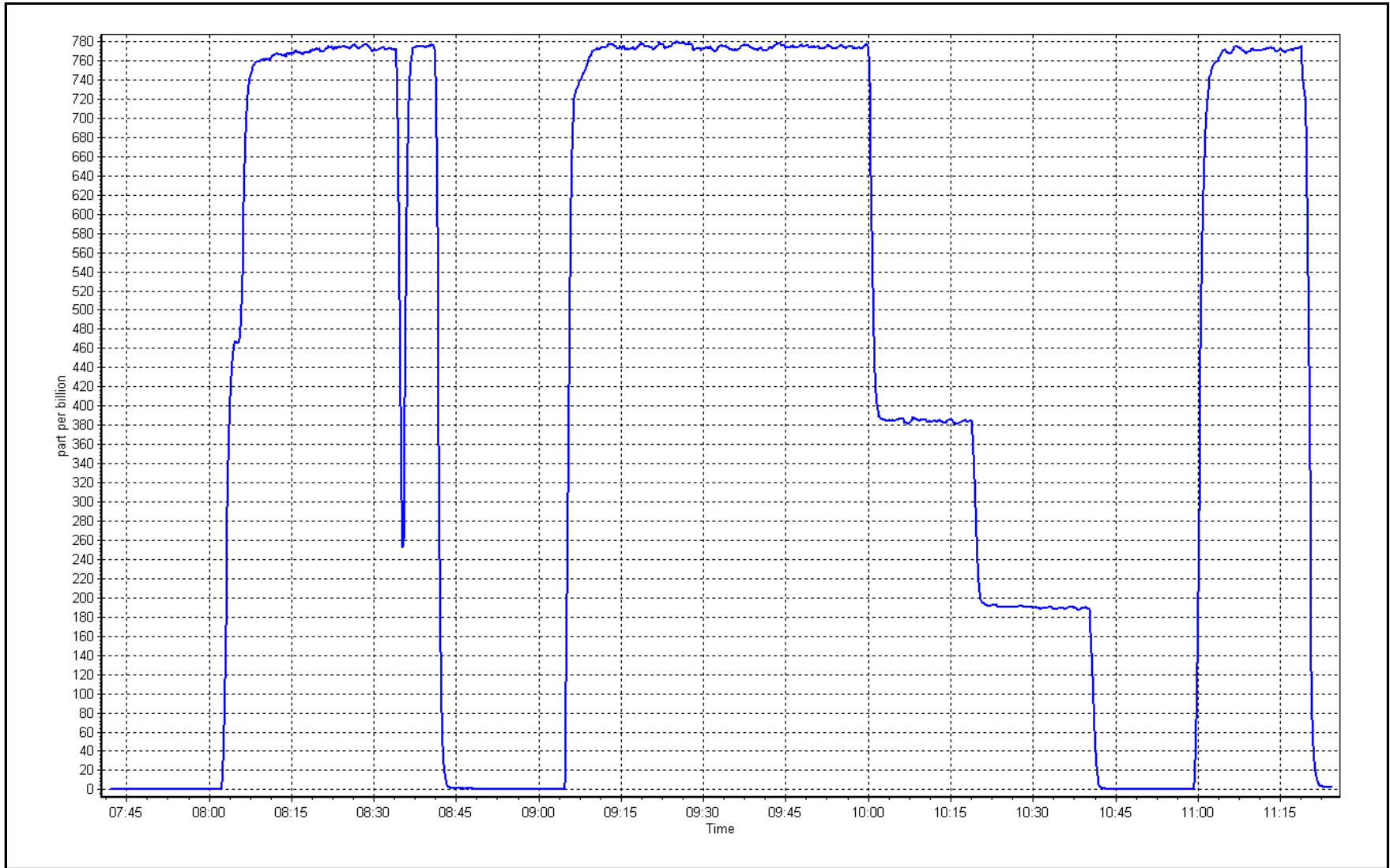
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Serial Number | Limits | |
|-------------------------------------|------------------------------------|---------------------------|---------------|----------|-------------|
| 0.0 | 0.4 | ---- | Serial Number | 0.999950 | ≥0.995 |
| 771.8 | 773.2 | 0.9982 | Slope | 0.996953 | 0.90 - 1.10 |
| 386.0 | 383.8 | 1.0056 | Intercept | 2.155585 | +/-30 |
| 193.4 | 189.2 | 1.0221 | | | |



SO2 Calibration Plot

Date: August 1, 2017

Location: Patricia McInnes





Wood Buffalo Environmental Association

TRS Calibration Report

Version-03-2017

Station Information

Station Name: Patricia McInnes
Calibration Date: August 2, 2017
Start time (MST): 8:50
Reason: Routine
Station number: AMS 06
Last Cal Date: July 11, 2017
End time (MST): 12:40

Calibration Standards

Cal Gas Concentration 5.28 ppm
Cal Gas Cylinder # SA5551
Calibrator Make/Model API T700
ZAG Make/Model API T701
Cal Gas Exp Date February 13, 2018
Serial Number 2449
Serial Number 260

Analyzer Information

Analyzer make: Thermo 43i-TLE
Analyzer serial #: 1218153358

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|----------------------|--------------|---------------|--------------|--------------|---------------|
| Analyzer Range | 0 - 100 ppb | | PMT voltage | -724 | 724 |
| Calculated slope | 1.001289 | 0.992315 | Lamp voltage | 989 | 986 |
| Calculated intercept | 0.274474 | 0.311180 | Pressure | 702.4 | 700.3 |
| Analyzer Background | 1.6 | 1.7 | Flow | 0.437 | 0.434 |
| Analyzer Coefficient | 1.141 | 1.195 | Intensity | 90 | 90 |

TRS Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5537 | 0.0 | 0.0 | -0.1 | ---- |
| as found span | 5458 | 83.5 | 79.6 | 76.2 | 1.044 |
| calibrator zero | 5537 | 0.0 | 0.0 | -0.1 | ---- |
| high point | 5458 | 83.5 | 79.6 | 80.0 | 0.994 |
| second point | 5502 | 41.8 | 39.8 | 39.6 | 1.005 |
| third point | 5523 | 20.9 | 19.9 | 19.6 | 1.016 |
| as left zero | 5537 | 0.0 | 0.0 | 0.0 | ---- |
| as left span | 5458 | 83.3 | 79.4 | 81.0 | 0.980 |
| SO2 Scrubber Check | 5522 | 22.1 | 199.3 | -0.1 | ---- |
| Average Correction Factor | | | | | 1.005 |

Corrected As found 76.30
Previous response 79.18
% change 3.8%

* = > +/-5% change initiates investigation

Notes:

Span adjusted. Scrubber check completed after as founds.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

TRS Calibration Summary

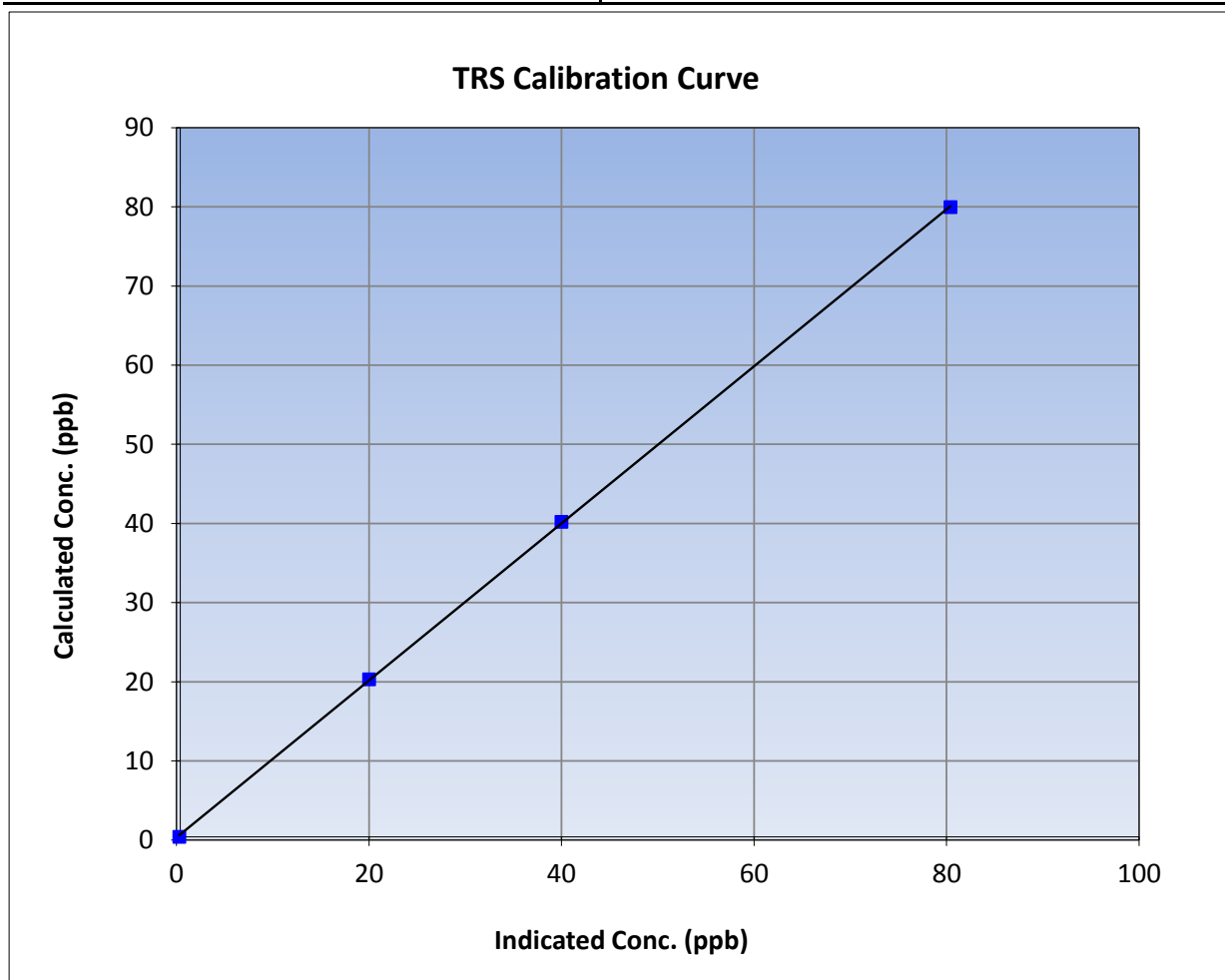
Version-03-2017

Station Information

| | | | |
|------------------|------------------|----------------------|---------------|
| Calibration Date | August 2, 2017 | Previous Calibration | July 11, 2017 |
| Station Name | Patricia McInnes | Station Number | AMS 06 |
| Start Time (MST) | 8:50 | End Time (MST) | 12:40 |
| Analyzer make | Thermo 43i-TLE | Analyzer serial # | 1218153358 |

Calibration Data

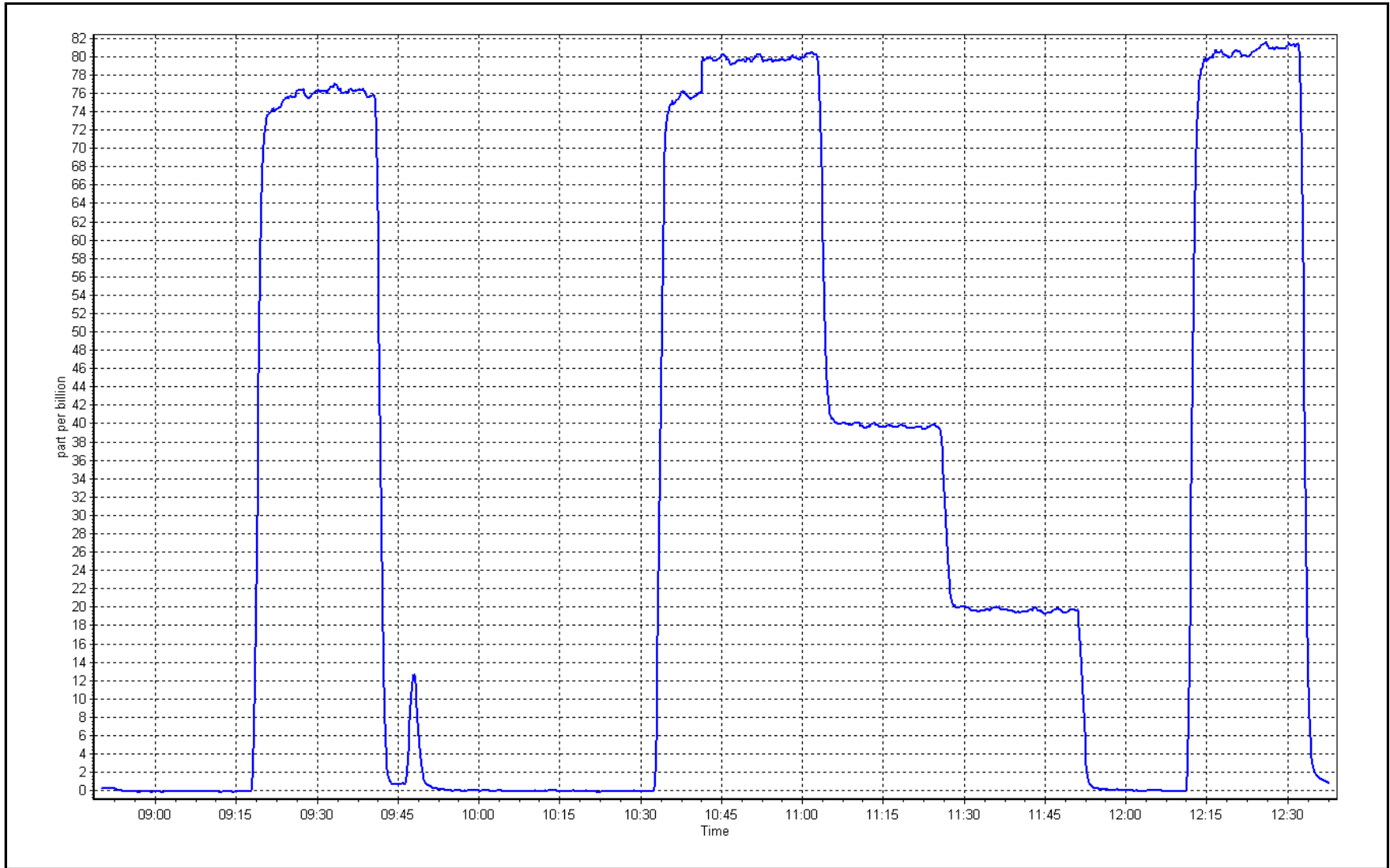
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|-------------|
| 0.0 | -0.1 | ---- | Correlation Coefficient | 0.999964 | ≥0.995 |
| 79.6 | 80.0 | 0.9945 | | | |
| 39.8 | 39.6 | 1.0053 | Slope | 0.992315 | 0.90 - 1.10 |
| 19.9 | 19.6 | 1.0156 | | | |
| | | | Intercept | 0.311180 | +/-3 |



TRS Calibration Plot

Date: August 2, 2017

Location: Patricia McInnes





Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|------------------|-----------------|--------------|
| Station Name: | Patricia McInnes | Station number: | AMS 06 |
| Calibration Date: | August 1, 2017 | Last Cal Date: | July 5, 2017 |
| Start time (MST): | 7:45 | End time (MST): | 11:25 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|--------------------|------------------|---------------------|-------------------|
| Gas Cert Reference | LL107926 | Cal Gas Expiry Date | February 16, 2019 |
| CH4 Cal Gas Conc. | <u>505.0</u> ppm | CH4 Equiv Conc. | 1068.8 ppm |
| C3H8 Cal Gas Conc. | <u>205.0</u> ppm | Station temp. | 21 Deg C |
| Calibrator Model | API T700 | Serial Number | 2449 |
| ZAG make/model | API T701 | Serial Number | 260 |

Analyzer Information

Analyzer make: Thermo 55i

Analyzer serial #: 1331259521

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|--------------------|--------------|---------------|------------------|--------------|---------------|
| THC Range (ppm) | 0 - 50 ppm | | Column Temp | 75.0 | 75.0 |
| NMHC Range (ppm) | 0 - 25 ppm | | Detector Temp | 175.1 | 175.0 |
| CH4 SP Ratio | 2.18E-04 | 2.11E-04 | Flame Temp | 405.0 | 405.0 |
| CH4 Retention time | 12.3 | 12.3 | Carrier Pressure | 35.8 | 35.8 |
| NMHC SP Ratio | 4.55E-05 | 4.74E-05 | Fuel Pressure | 42.3 | 42.3 |
| NMHC Peak Area | 188161 | 180610 | Air Pressure | 32.4 | 37.4 |

Calibration Statistics

| | <u>Start</u> | <u>Finish</u> |
|-----------------|--------------|---------------|
| THC Cal Slope | 0.998420 | 0.994829 |
| THC Cal Offset | 0.059489 | 0.033106 |
| CH4 Cal Slope | 0.997763 | 0.999004 |
| CH4 Cal Offset | 0.036545 | 0.035161 |
| NMHC Cal Slope | 0.998811 | 0.990593 |
| NMHC Cal Offset | 0.023175 | -0.000906 |

Notes: NMHC 5.1% low on as found. N2 cylinder changed after as founds. Flame optimized. Span adjusted. H2 generator filled with deionized water.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Version-02-2017

THC Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|--|
| as found zero | 5537 | 0.0 | 0.00 | 0.00 | ---- |
| as found span | 5458 | 84.2 | 16.24 | 15.84 | 1.025 |
| calibrator zero | 5537 | 0.0 | 0.00 | 0.00 | ---- |
| high point | 5458 | 84.2 | 16.24 | 16.31 | 0.996 |
| second point | 5499 | 42.1 | 8.12 | 8.10 | 1.003 |
| third point | 5522 | 21.1 | 4.07 | 4.03 | 1.008 |
| as left zero | 5537 | 0.0 | 0.00 | 0.00 | ---- |
| as left span | 5458 | 84.2 | 16.24 | 16.28 | 0.997 |
| Average Correction Factor | | | | | 1.002 |
| Corrected As found | 15.84 | Prev response | 16.20 | *% change | 2.3% |

NMHC Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|--|
| as found zero | 5537 | 0 | 0.00 | 0.00 | ---- |
| as found span | 5458 | 84.2 | 8.56 | 8.15 | 1.051 |
| calibrator zero | 5537 | 0 | 0.00 | 0.00 | ---- |
| high point | 5458 | 84.2 | 8.56 | 8.65 | 0.990 |
| second point | 5499 | 42.1 | 4.28 | 4.32 | 0.991 |
| third point | 5522 | 21.1 | 2.15 | 2.17 | 0.989 |
| as left zero | 5537 | 0 | 0.00 | 0.00 | ---- |
| as left span | 5458 | 84.2 | 8.56 | 8.61 | 0.994 |
| Average Correction Factor | | | | | 0.990 |
| Corrected As found | 8.15 | Prev response | 8.55 | *% change | 4.9% |

CH4 Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|--|
| as found zero | 5537 | 0.0 | 0.00 | 0.00 | ---- |
| as found span | 5458 | 84.2 | 7.67 | 7.69 | 0.998 |
| calibrator zero | 5537 | 0.0 | 0.00 | 0.00 | ---- |
| high point | 5458 | 84.2 | 7.67 | 7.67 | 1.001 |
| second point | 5499 | 42.1 | 3.84 | 3.77 | 1.017 |
| third point | 5522 | 21.1 | 1.92 | 1.87 | 1.031 |
| as left zero | 5537 | 0.0 | 0.00 | 0.00 | ---- |
| as left span | 5458 | 84.2 | 7.67 | 7.66 | 1.001 |
| Average Correction Factor | | | | | 1.016 |
| Corrected As found | 7.69 | Prev response | 7.65 | *% change | -0.5% |

* = > +/-5% change initiates investigation



Wood Buffalo Environmental Association

THC Calibration Summary

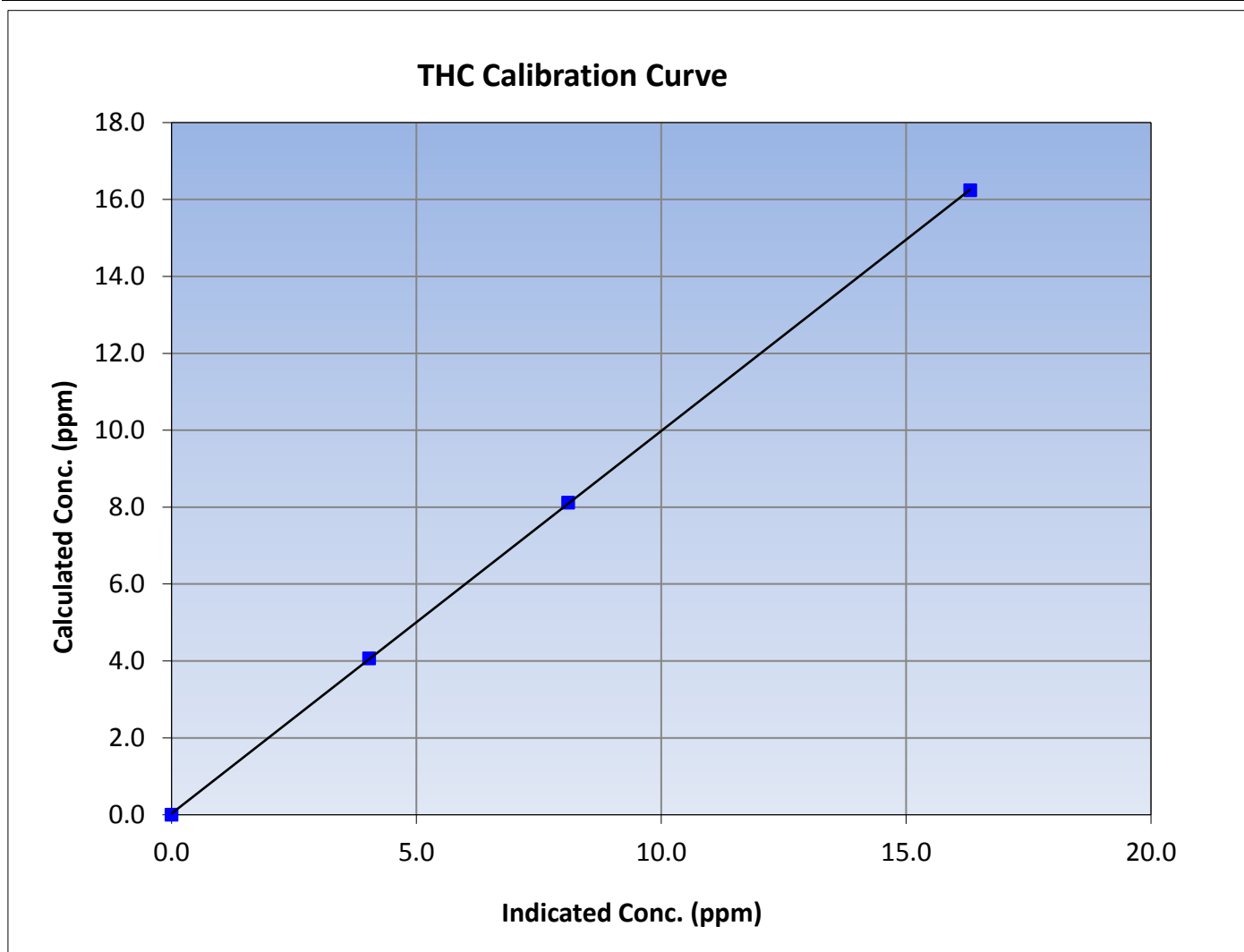
Version-02-2017

Station Information

| | | | |
|------------------|------------------|----------------------|--------------|
| Calibration Date | August 1, 2017 | Previous Calibration | July 5, 2017 |
| Station Name | Patricia McInnes | Station Number | AMS 06 |
| Start Time (MST) | 7:45 | End Time (MST) | 11:25 |
| Analyzer make | Thermo 55i | Analyzer serial # | 1331259521 |

Calibration Data

| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> | | | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|---------------|-------|----------|-------------|
| 0.00 | 0.00 | ---- | Correlation Coefficient | 0.999978 | ≥ 0.995 | | | |
| 16.24 | 16.31 | 0.9955 | | | | | | |
| 8.12 | 8.10 | 1.0030 | | | | Slope | 0.994829 | 0.90 - 1.10 |
| 4.07 | 4.03 | 1.0085 | | | | | | |
| | | | Intercept | 0.033106 | ± 0.5 | | | |





Wood Buffalo Environmental Association

CH₄ Calibration Summary

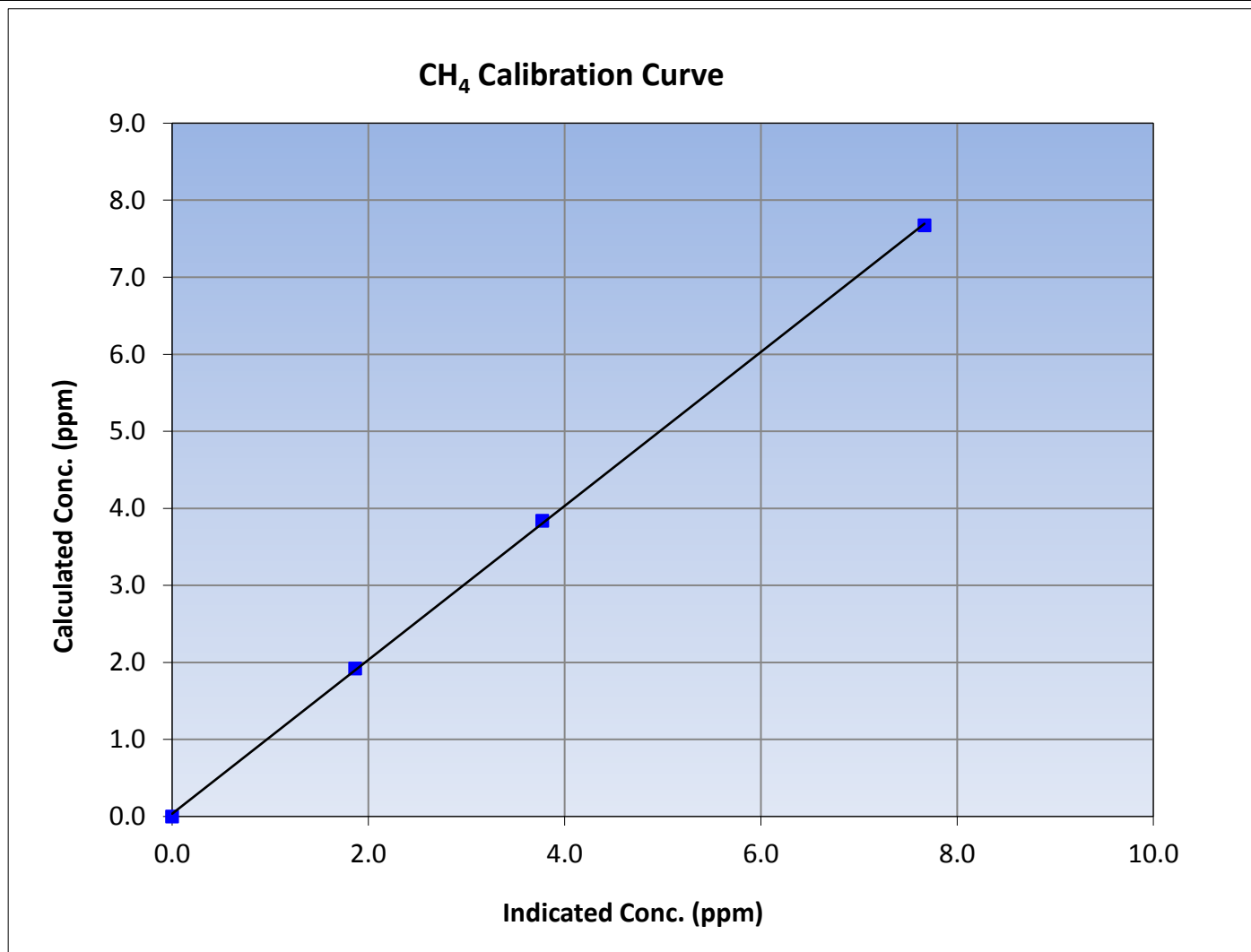
Version-02-2017

Station Information

| | | | |
|------------------|------------------|----------------------|--------------|
| Calibration Date | August 1, 2017 | Previous Calibration | July 5, 2017 |
| Station Name | Patricia McInnes | Station Number | AMS 06 |
| Start Time (MST) | 7:45 | End Time (MST) | 11:25 |
| Analyzer make | Thermo 55i | Analyzer serial # | 1331259521 |

Calibration Data

| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|---------------|
| 0.00 | 0.00 | ---- | Correlation Coefficient | 0.999893 | ≥ 0.995 |
| 7.67 | 7.67 | 1.0007 | | | |
| 3.84 | 3.77 | 1.0172 | | | |
| 1.92 | 1.87 | 1.0307 | | | |
| | | | Slope | 0.999004 | 0.90 - 1.10 |
| | | | Intercept | 0.035161 | +/-0.5 |





Wood Buffalo Environmental Association

NMHC Calibration Summary

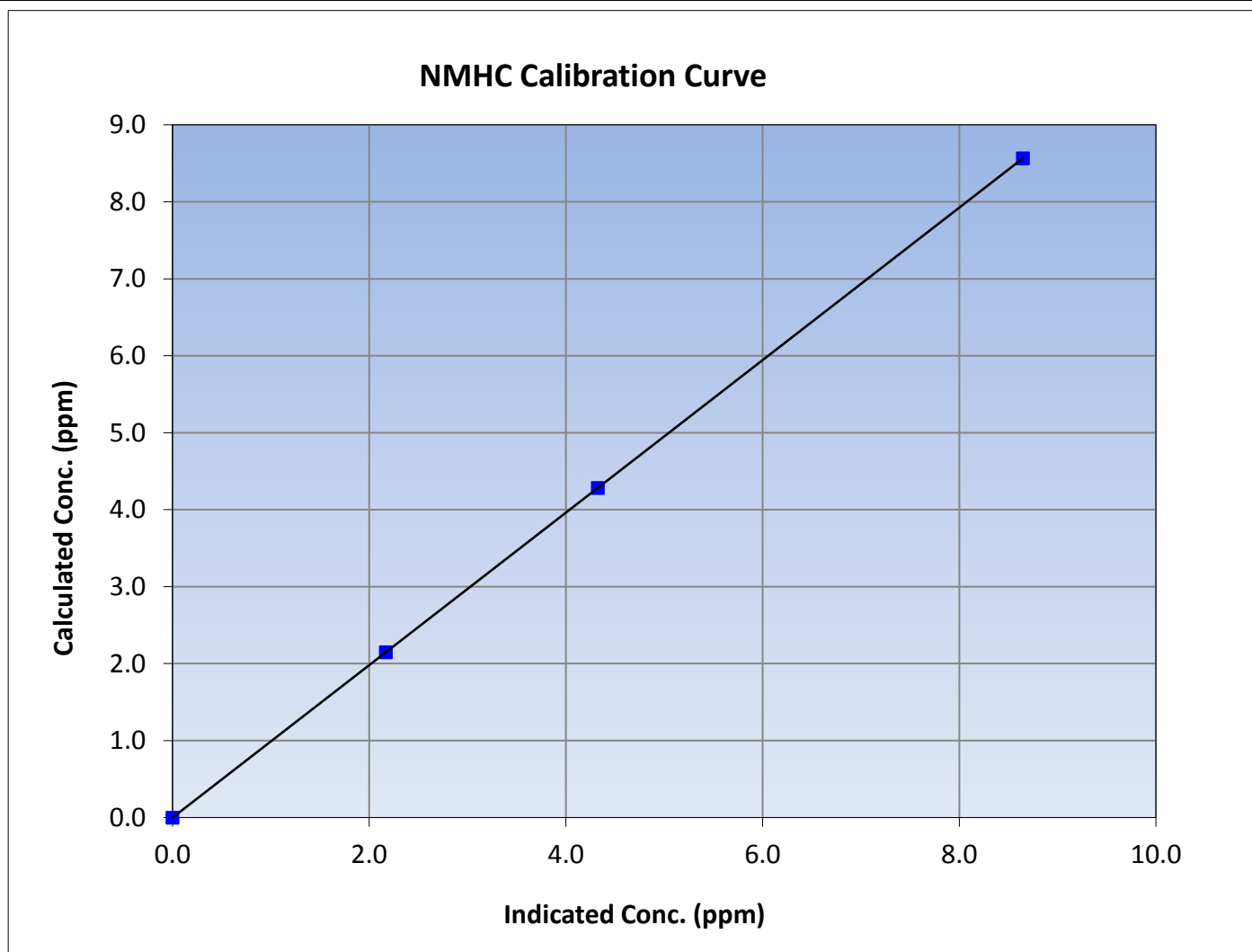
Version-02-2017

Station Information

| | | | |
|------------------|------------------|----------------------|--------------|
| Calibration Date | August 1, 2017 | Previous Calibration | July 5, 2017 |
| Station Name | Patricia McInnes | Station Number | AMS 06 |
| Start Time (MST) | 7:45 | End Time (MST) | 11:25 |
| Analyzer make | Thermo 55i | Analyzer serial # | 1331259521 |

Calibration Data

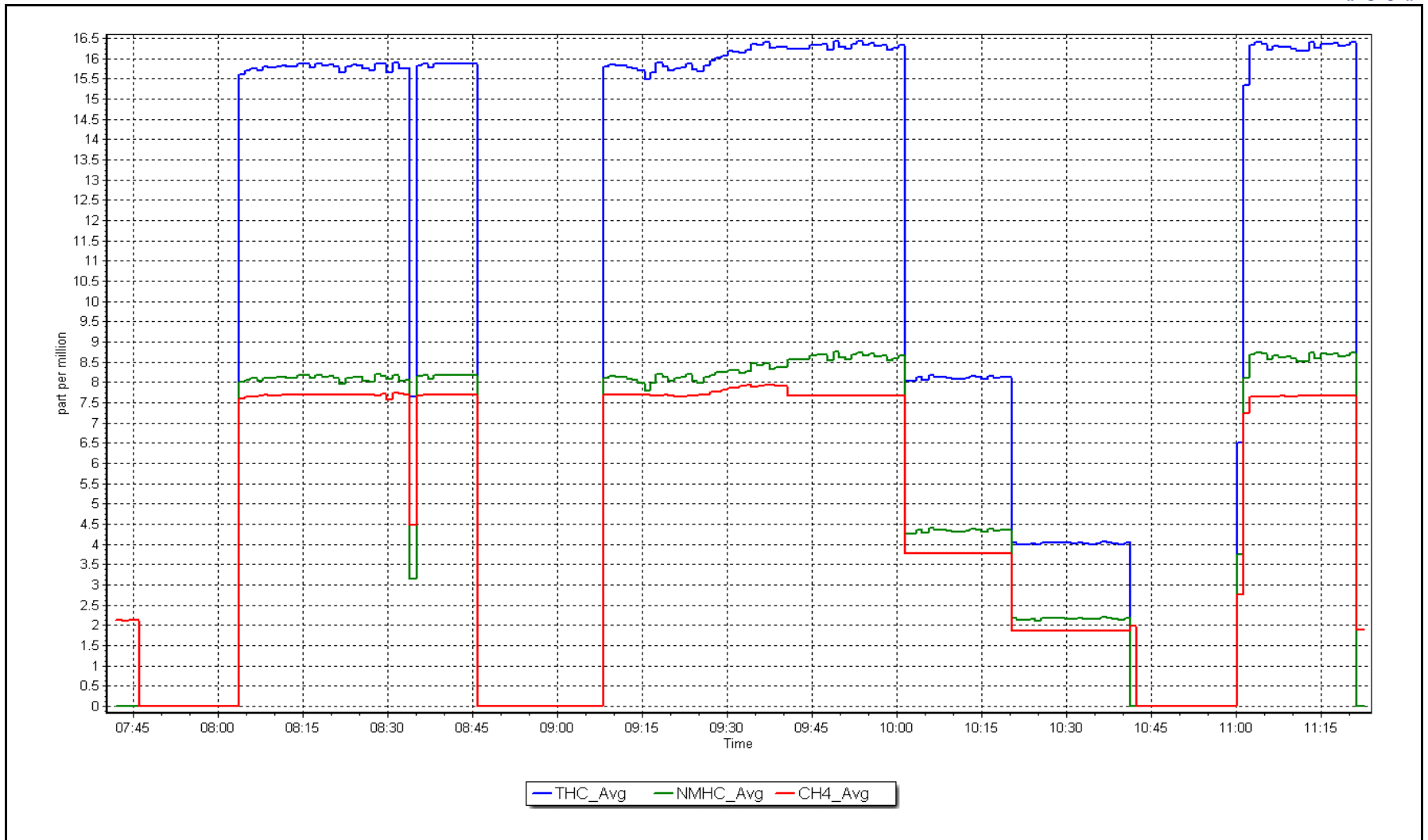
| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|---------------|
| 0.00 | 0.00 | ---- | Correlation Coefficient | 1.000000 | ≥ 0.995 |
| 8.56 | 8.65 | 0.9905 | | | |
| 4.28 | 4.32 | 0.9906 | | | |
| 2.15 | 2.17 | 0.9894 | | | |
| | | | Slope | 0.990593 | 0.90 - 1.10 |
| | | | Intercept | -0.000906 | +/-0.5 |



NMHC Calibration Plot

Date: August 1, 2017

Location: Patricia McInnes





Wood Buffalo Environmental Association

O₃ Calibration Summary

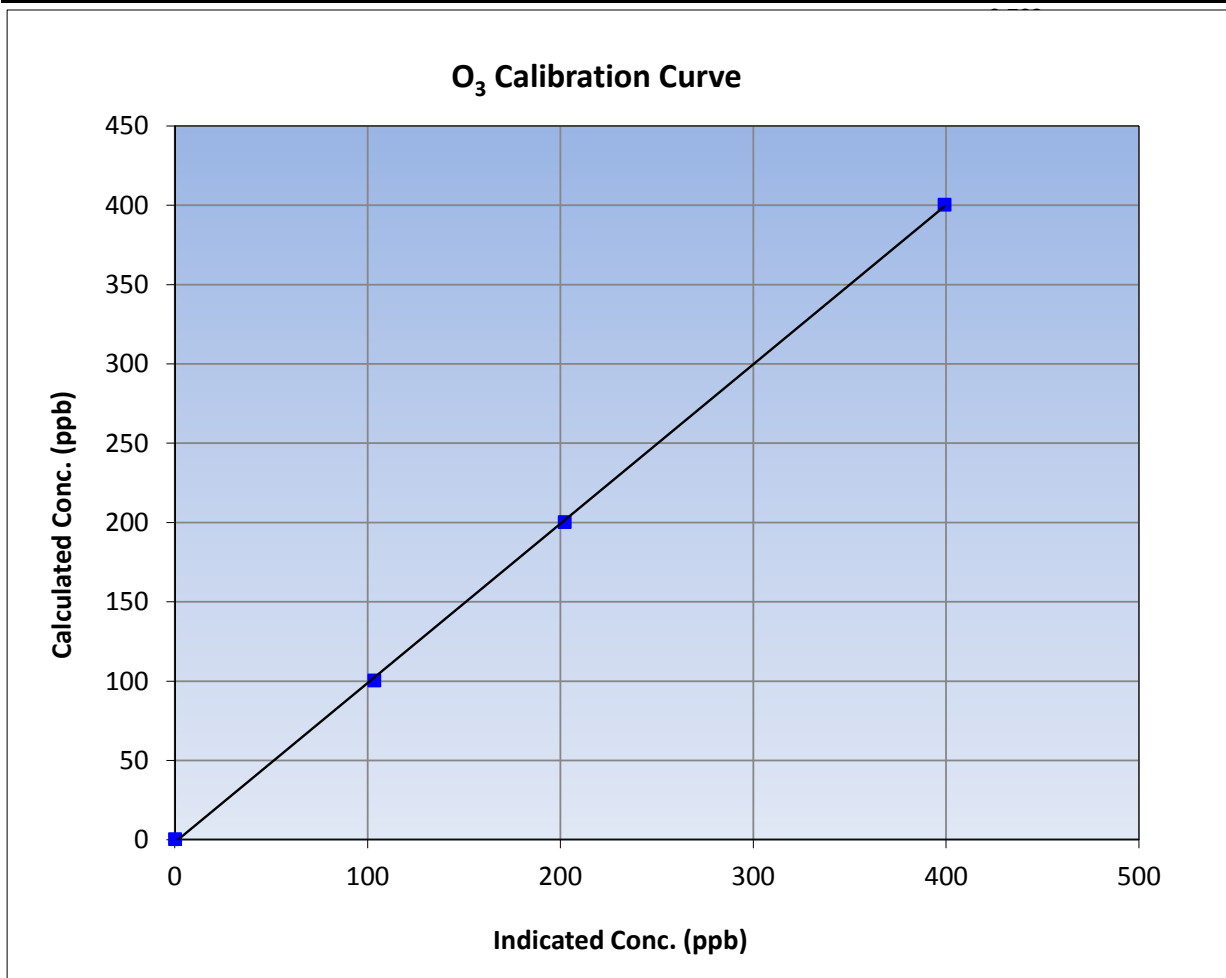
Version-03-2017

Station Information

| | | | |
|------------------|------------------|----------------------|--------------|
| Calibration Date | August 1, 2017 | Previous Calibration | July 5, 2017 |
| Station Name | Patricia McInnes | Station Number | AMS 06 |
| Start Time (MST) | 11:25 | End Time (MST) | 14:35 |
| Analyzer make | Thermo 49i | Analyzer serial # | 1300156234 |

Calibration Data

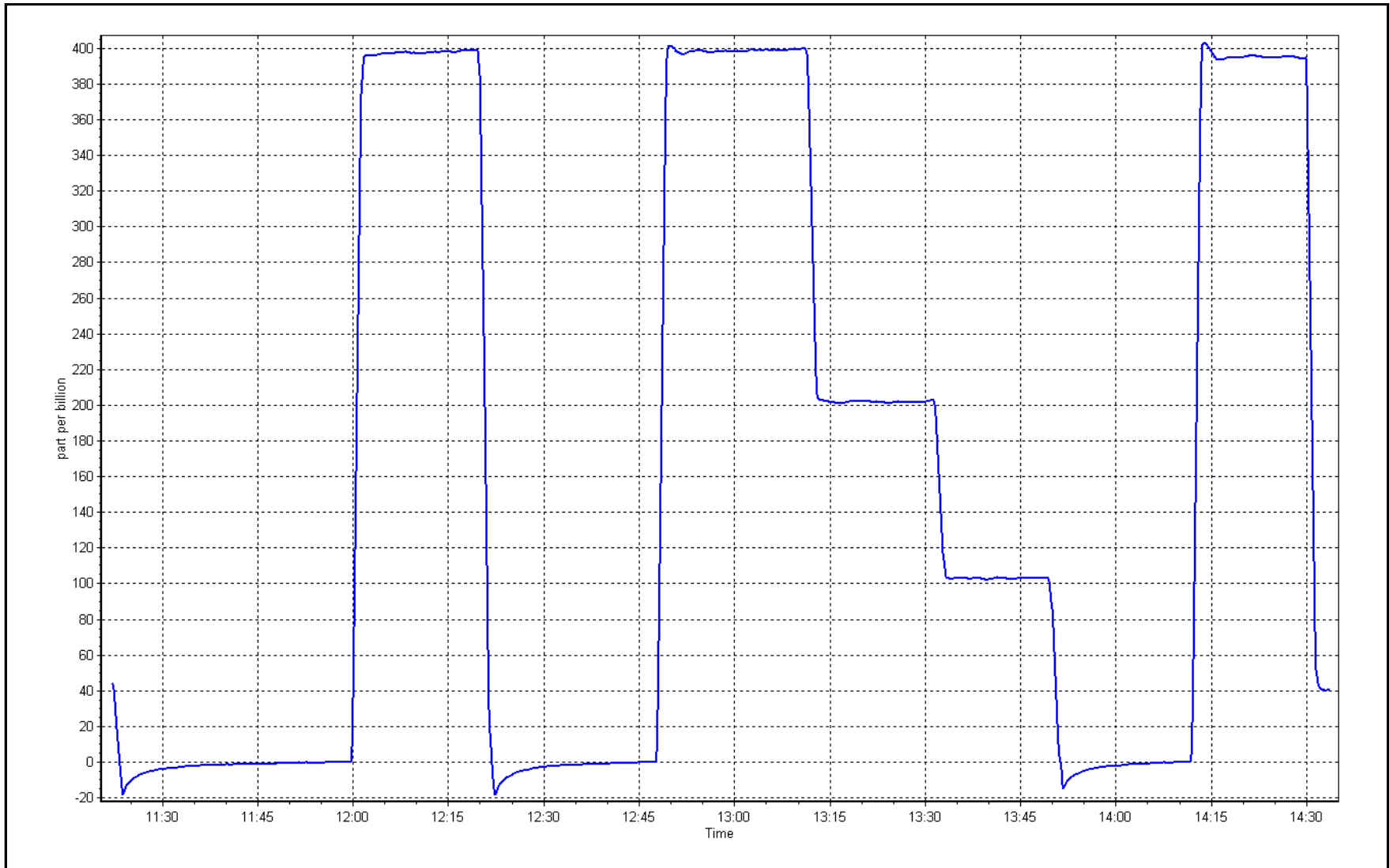
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | -0.3 | ---- | Correlation Coefficient | 0.999889 | ≥0.995 |
| 400.0 | 398.8 | 1.0030 | | | |
| 200.0 | 201.8 | 0.9911 | Slope | 1.004539 | 0.90 - 1.10 |
| 100.0 | 103.1 | 0.9699 | | | |
| | | | Intercept | -1.648126 | +/- 10 |



O₃ Calibration Plot

Date: August 1, 2017

Location: Patricia McInnes





Wood Buffalo Environmental Association

NO_x - NO - NO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|------------------|-----------------|--------------|
| Station Name: | Patricia McInnes | Station number: | AMS 06 |
| Calibration Date: | August 9, 2017 | Last Cal Date: | July 6, 2017 |
| Start time (MST): | 8:55 | End time (MST): | 14:40 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|-------------------|-----------------|---------------------|-------------------|
| NO Gas Cylinder # | LL107926 | Cal Gas Expiry Date | February 16, 2019 |
| NOX Cal Gas Conc. | <u>52.4</u> ppb | NO Cal Gas Conc. | <u>52.4</u> ppb |
| Calibrator Model | API T700 | Serial Number | 2449 |
| ZAG make/model | API T701 | Serial Number | 260 |

Analyzer Information

| | | | | | |
|-----------------------------|--------------|---------------|-------------------------------|--------------|---------------|
| Analyzer make: Thermo 42i | | | Analyzer serial #: 1218153460 | | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| NO coefficient | 1.015 | 1.020 | NOX Range (ppb) | 0 - 1000 ppb | |
| NOX coefficient | 1.001 | 1.001 | PMT Temperature | -2.8 | -2.6 |
| NO ₂ coefficient | 1.000 | 1.000 | Reaction cell Press | 183.9 | 186.2 |
| NO bkgrnd | 3.0 | 3.0 | Sample Flow | 0.751 | 0.763 |
| NOX bkgrnd | 3.2 | 3.3 | PMT Voltage | -773.3 | -772.6 |

Calibration Statistics

| | | |
|----------------------------|--------------|---------------|
| | <u>Start</u> | <u>Finish</u> |
| NO _x Cal Slope | 0.997978 | 1.000864 |
| NO _x Cal Offset | 2.656818 | 2.382983 |
| NO Cal Slope | 0.997648 | 1.000980 |
| NO Cal Offset | 2.596558 | 2.442702 |
| NO ₂ Cal Slope | 1.000413 | 0.983629 |
| NO ₂ Cal Offset | 1.449644 | -0.943619 |



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Version-03-2017

Dilution Calibration Data

| Set Point | Total flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|----------------------------------|------------------------|-----------------------------|---|--|---|--|---------------------------------------|--|---|--|
| as found zero | 5543 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | -0.2 | 0.0 | ---- | ---- |
| as found span | 5543 | 84.2 | 796.0 | 796.0 | 0.0 | 796.1 | 794.2 | 1.8 | 0.9998 | 1.0022 |
| calibrator zero | 5543 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | -0.2 | 0.1 | ---- | ---- |
| high point | 5543 | 84.2 | 796.0 | 796.0 | 0.0 | 794.1 | 793.8 | 0.3 | 1.0024 | 1.0027 |
| second point | 5543 | 42.1 | 398.0 | 398.0 | 0.0 | 393.9 | 394.2 | -0.3 | 1.0104 | 1.0096 |
| third point | 5543 | 21.1 | 199.5 | 199.5 | 0.0 | 194.8 | 194.5 | 0.3 | 1.0240 | 1.0255 |
| as left zero | 5543 | 0.0 | 0.0 | 0.0 | 0.0 | 0.6 | 0.1 | 0.5 | ---- | ---- |
| as left span | 5543 | 84.2 | 796.0 | 385.8 | 410.2 | 781.6 | 385.0 | 396.6 | 1.0184 | 1.0021 |
| Average Correction Factor | | | | | | | | | 1.0122 | 1.0126 |

| | | | | | |
|--|-----------------------------|----------------|--|-----------------|-------------------------|
| Corrected As found | NO _x = 796.2 ppb | NO = 794.4 ppb | | *Percent Change | NO _x = -0.2% |
| Previous Response | NO _x = 794.9 ppb | NO = 795.3 ppb | | *Percent Change | NO = 0.1% |
| <i>* = > +/-5% change initiates investigation</i> | | | | | |

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO drop conc (ppb) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | Converter Efficiency <i>Limit = 96-104%</i> |
|----------------------------------|------------------------------|---|--|---------------------------------------|--|---|--|---|--|
| 1st NO ref point | | 0.0 | 779.1 | 778.1 | 1.1 | 1.0217 | 1.0230 | ---- | ---- |
| 1st NO2 (400 ppb O3) | 385.8 | 392.3 | 785.0 | 385.8 | 399.1 | 1.0140 | ---- | 0.9830 | 101.7% |
| 2nd NO2 (200 ppb O3) | 584.0 | 194.1 | 783.5 | 584.0 | 199.5 | 1.0159 | ---- | 0.9729 | 102.8% |
| 3rd NO2 (100 ppb O3) | 681.8 | 96.3 | 791.0 | 681.8 | 99.2 | 1.0063 | ---- | 0.9708 | 103.0% |
| 2nd NO ref point | ---- | 0.0 | 787.1 | 785.5 | 1.5 | 1.0113 | 1.0133 | ---- | ---- |
| Average Correction Factor | | | | | | 1.0119 | 1.0182 | 0.9756 | 102.5% |

Notes: Span adjusted. Second high NO point used for GPT reference.

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

Version-03-2017

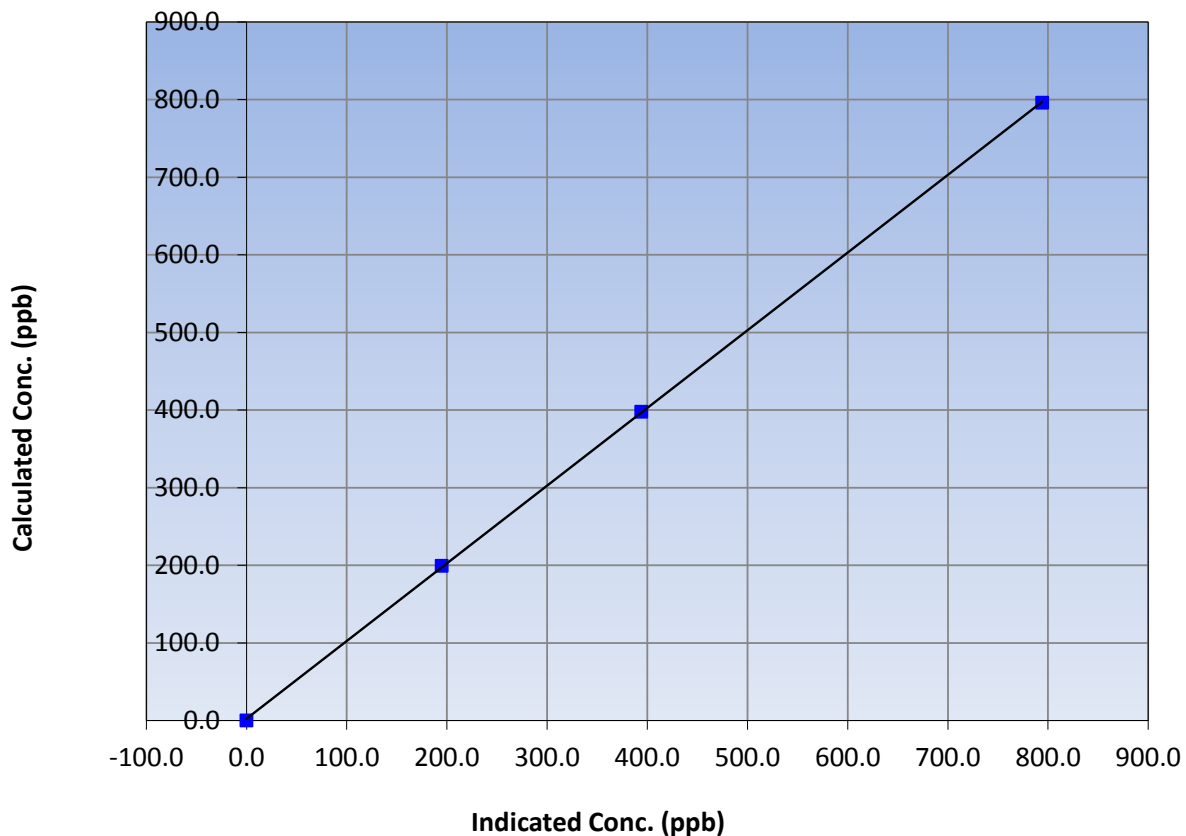
Station Information

| | | | |
|------------------|------------------|----------------------|--------------|
| Calibration Date | August 9, 2017 | Previous Calibration | July 6, 2017 |
| Station Name | Patricia McInnes | Station Number | AMS 06 |
| Start Time (MST) | 8:55 | End Time (MST) | 14:40 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1218153460 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | -0.1 | ---- | Correlation Coefficient | ≥0.995 | |
| 796.0 | 794.1 | 1.0024 | | | |
| 398.0 | 393.9 | 1.0104 | | | |
| 199.5 | 194.8 | 1.0240 | | | |
| | | | Slope | 1.000864 | 0.90 - 1.10 |
| | | | Intercept | 2.382983 | +/-20 |

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

Version-03-2017

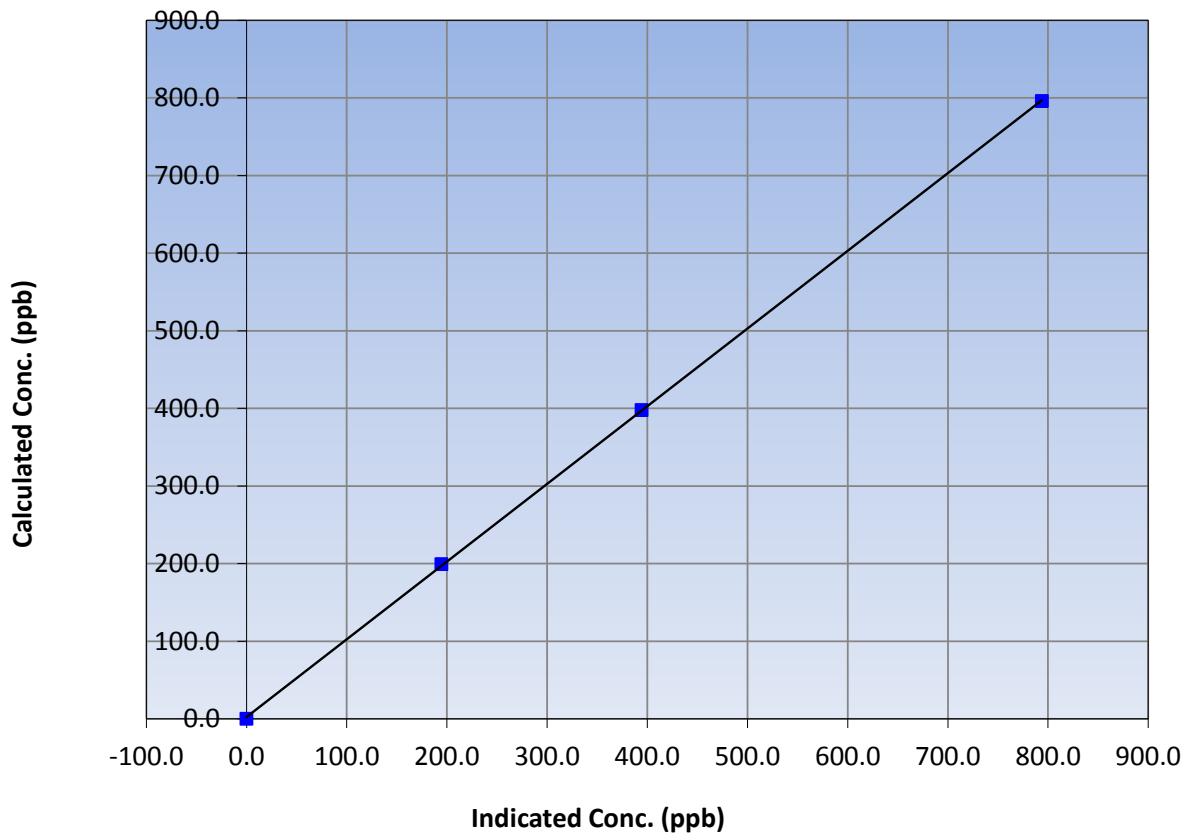
Station Information

| | | | |
|------------------|------------------|----------------------|--------------|
| Calibration Date | August 9, 2017 | Previous Calibration | July 6, 2017 |
| Station Name | Patricia McInnes | Station Number | AMS 06 |
| Start Time (MST) | 8:55 | End Time (MST) | 14:40 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1218153460 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | -0.2 | ---- | Correlation Coefficient | ≥0.995 | |
| 796.0 | 793.8 | 1.0027 | | | |
| 398.0 | 394.2 | 1.0096 | | | |
| 199.5 | 194.5 | 1.0255 | | | |
| | | | Slope | 1.000980 | 0.90 - 1.10 |
| | | | Intercept | 2.442702 | +/-20 |

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

Version-03-2017

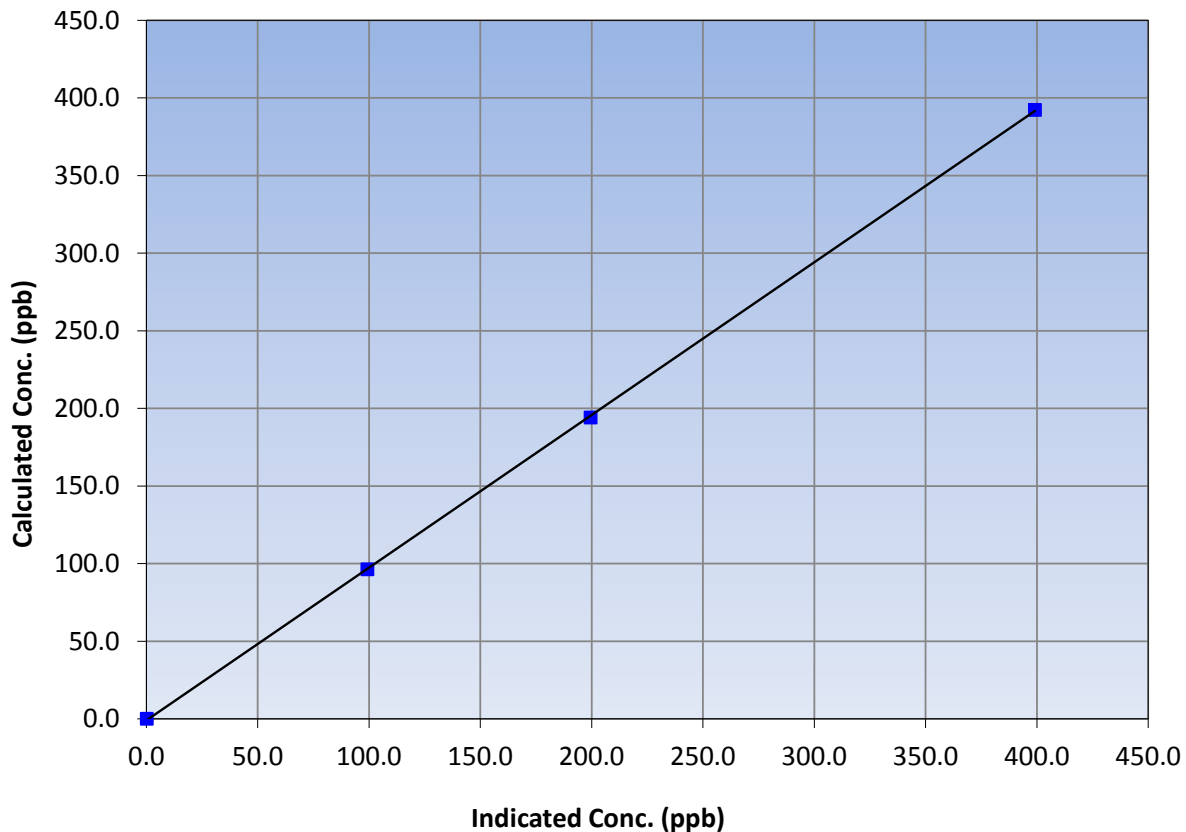
Station Information

| | | | |
|------------------|------------------|----------------------|--------------|
| Calibration Date | August 9, 2017 | Previous Calibration | July 6, 2017 |
| Station Name | Patricia McInnes | Station Number | AMS 06 |
| Start Time (MST) | 8:55 | End Time (MST) | 14:40 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1218153460 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> |
|-------------------------------------|------------------------------------|---------------------------|---|--------------------------------|
| 0.0 | 0.1 | ---- | Correlation Coefficient Slope Intercept | ≥0.995 0.90 - 1.10 +/-20 |
| 392.3 | 399.1 | 0.9830 | | |
| 194.1 | 199.5 | 0.9729 | | |
| 96.3 | 99.2 | 0.9708 | | |
| | | | | |

NO₂ Calibration Curve



NO_x Calibration Plot

Date: August 9, 2017

Location: Patricia McInnes





Wood Buffalo Environmental Association

TN - NO_x - NH₃ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|------------------|-----------------|--------------|
| Station Name: | Patricia McInnes | Station number: | AMS 06 |
| NOX Cal Date: | August 9, 2017 | Last Cal Date: | July 6, 2017 |
| Start time (MST): | 8:55 | End time (MST): | 14:40 |
| NH3 Cal Date: | August 10, 2017 | Last Cal Date: | July 7, 2017 |
| Start time (MST): | 7:40 | End time (MST): | 14:50 |
| Reason: | Routine | | |

Calibration Standards

| | | | | |
|-------------------|-------------|-----|--------------------|-------------------|
| NOX Cal Gas Conc. | <u>52.4</u> | ppb | NO Gas Cylinder # | LL107926 |
| NO Cal Gas Conc. | <u>52.4</u> | ppb | NO Cal Gas Expiry | February 16, 2019 |
| NH3 Cal Gas Conc. | <u>95.4</u> | ppm | NH3 Gas Cylinder # | SA25992 |
| | | | NH3 Cal Gas Expiry | May 24, 2017 |
| Calibrator Model | API T700 | | Serial Number | 2449 |
| ZAG make/model | API T701 | | Serial Number | 260 |

Analyzer Information

| | | | | |
|-----------------|--------------|---------------------|---------------------|------------------|
| Analyzer make: | API T201 | Analyzer serial #: | 215 | |
| Converter make: | API 501 | Converter serial #: | 217 | |
| | <u>Start</u> | <u>Finish</u> | <u>Start</u> | <u>Finish</u> |
| NO coefficient | 1.355 | 1.365 | NH3 Range (ppb) | 0 - 1000 ppb |
| NOX coefficient | 1.388 | 1.389 | NOX Range (ppb) | 0 - 1000 ppb |
| NO2 coefficient | 1.000 | 1.000 | PMT Temperature | 7.0 7.0 |
| NH3 coefficient | 1.037 | 1.042 | Reaction cell Press | 4.4 4.5 |
| TN coefficient | 1.403 | 1.404 | Sample Flow | 565 565 |
| NO bkgnd | -0.9 | 0.0 | PMT Voltage | 693 693 |
| NOX bkgnd | -0.7 | 0.0 | Moly Temperature | 314.6 315.5 |
| TN bkgnd | 0.2 | 1.2 | NH3 Conv Temp | 825 825 |

Calibration Statistics

| | | |
|----------------------------|--------------|---------------|
| | <u>Start</u> | <u>Finish</u> |
| NO _x Cal Slope | 0.999878 | 0.998577 |
| NO _x Cal Offset | 2.923630 | 3.098443 |
| NO Cal Slope | 1.001348 | 0.998157 |
| NO Cal Offset | 2.841507 | 4.391452 |
| NO ₂ Cal Slope | 0.997179 | 1.000720 |
| NO ₂ Cal Offset | -1.972342 | -1.726792 |
| NH3 Cal Slope | 0.999950 | 0.999896 |
| NH3 Cal Offset | -4.189648 | -7.795377 |
| TN Cal Slope | 0.978463 | 0.981940 |
| TN Cal Offset | -4.707110 | -8.815064 |



Wood Buffalo Environmental Association

TN - NOX - NH₃ Calibration Report

Version-03-2017

Dilution Calibration Data

| Set Point | Total flow rate (sccm) | Source gas flow rate (sccm) | Calculated TN concentration (ppb) (Cc) | Calculated NOX concentration (ppb) (Cc) | Calculated NH3 concentration (ppb) (Cc) | Indicated TN concentration (ppb) (Ic) | Indicated NOX concentration (ppb) (Ic) | Indicated NH3 concentration (ppb) (Ic) | TN Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NH3 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|----------------------------------|------------------------|-----------------------------|--|---|---|---------------------------------------|--|--|--|---|
| as found zero | 5543 | 0.0 | 0.0 | 0.0 | 0.0 | -1.0 | -1.0 | 0.0 | ---- | ---- |
| as found NO | 5543 | 84.2 | 796.0 | 796.0 | ---- | 788.2 | 784.2 | 3.9 | 1.010 | ---- |
| calibrator zero | 5543 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.3 | -0.1 | ---- | ---- |
| high NO point | 5543 | 84.2 | 796.0 | 796.0 | ---- | 795.3 | 796.3 | -1.1 | 1.001 | ---- |
| NO/O3 point | 5543 | 84.2 | 796.0 | 796.0 | ---- | 794.2 | 794.2 | 0.0 | 1.002 | ---- |
| as found NH3 | 4544 | 85.1 | 1786.7 | NA | 1786.7 | 1789.9 | ---- | 1797.6 | 0.998 | 0.994 |
| first NH3 | 4544 | 85.1 | 1786.7 | NA | 1786.7 | 1820.2 | ---- | 1787.8 | 0.982 | 0.999 |
| second NH3 | 4544 | 47.4 | 995.1 | NA | 995.1 | 1034.4 | ---- | 1012.4 | 0.962 | 0.983 |
| third NH3 | 4544 | 23.7 | 497.6 | NA | 497.6 | 520.9 | ---- | 510.8 | 0.955 | 0.974 |
| Average Correction Factor | | | | | | | | | 1.0015 | 0.9855 |

Corrected As found TN = 789.2 ppb NO_x = 785.2 ppb NH3 = 1797.6 ppb

Previous Response TN = 818.2 ppb NO_x = 793.1 ppb NH3 = 1790.9 ppb

NH3 Previous Converter Efficiency = 103.7 %

NH3 Current Converter Efficiency = 104.2 %

*Percent Change TN = 3.7%

*Percent Change NO_x = 1.0%

*Percent Change NH3 = -0.4%

* = > +/-5% change initiates investigation



Wood Buffalo Environmental Association

NO_x - NO - NO₂ Calibration Report

Version-03-2017

Dilution Calibration Data

| Set Point | Total flow rate (sccm) | Source gas flow rate (sccm) | Calculated NO _x concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated TN concentration (ppb) (Cc) | Indicated NO _x concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated TN concentration (ppb) (Ic) | NO _x Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|----------------------------------|------------------------|-----------------------------|---|--|--|--|---------------------------------------|---------------------------------------|---|--|
| as found zero | 5543 | 0.0 | 0.0 | 0.0 | 0.0 | -2.7 | -2.6 | -2.9 | ---- | ---- |
| as found span | 5543 | 84.2 | 796.0 | 796.0 | 796.0 | 796.5 | 790.8 | 784.5 | 0.9993 | 1.0065 |
| calibrator zero | 5543 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.1 | 0.1 | ---- | ---- |
| high point | 5543 | 84.2 | 796.0 | 796.0 | 796.0 | 796.3 | 795.6 | 795.3 | 0.9996 | 1.0005 |
| second point | 5543 | 42.1 | 398.0 | 398.0 | 398.0 | 391.8 | 390.9 | 3887.7 | 1.0158 | 1.0181 |
| third point | 5543 | 21.1 | 199.5 | 199.5 | 199.5 | 194.6 | 191.8 | 191.6 | 1.0250 | 1.0400 |
| Average Correction Factor | | | | | | | | | 1.0135 | 1.0195 |

Corrected As found TN = 787.4 ppb NO_x = 799.2 ppb NO = 793.4 ppb
 Previous Response TN = 818.2 ppb NO_x = 793.1 ppb NO = 792.1 ppb

*Percent Change TN = 3.9%
 *Percent Change NO_x = -0.8%
 *Percent Change NO = -0.2%
 * = > +/-5% change initiates investigation

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO drop conc (ppb) | Calculated NO ₂ concentration (ppb) (Cc) | Indicated NO _x concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO ₂ concentration (ppb) (Ic) | NO _x Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO ₂ Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | Converter Efficiency <i>Limit = 96-104%</i> |
|---|------------------------------|---|--|---------------------------------------|--|---|--|---|--|
| 1st NO ref point | ---- | 0.0 | 794.2 | 789.7 | 4.5 | 1.0022 | 1.0079 | ---- | ---- |
| 1st NO ₂ (400 ppb O ₃) | 387.6 | 402.1 | 790.5 | 387.6 | 402.9 | 1.0069 | ---- | 0.9980 | 100.2% |
| 2nd NO ₂ (200 ppb O ₃) | 588.5 | 201.2 | 791.6 | 588.5 | 203.1 | 1.0055 | ---- | 0.9906 | 100.9% |
| 3rd NO ₂ (100 ppb O ₃) | 694.6 | 95.1 | 793.3 | 694.6 | 98.7 | 1.0034 | ---- | 0.9635 | 103.8% |
| 2nd NO ref point | ---- | 0.0 | 798.8 | 798.1 | 0.7 | 0.9965 | 0.9973 | ---- | ---- |
| Average Correction Factor | | | | | | 1.0031 | 1.0026 | 0.9841 | 101.6% |

Notes: NO_x/NO/Nt zero adjusted. Second High NO point used for GPT reference. Converter core replaced after NH₃ as founds. NH₃ span adjusted.

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

TN Calibration Summary

Version-03-2017

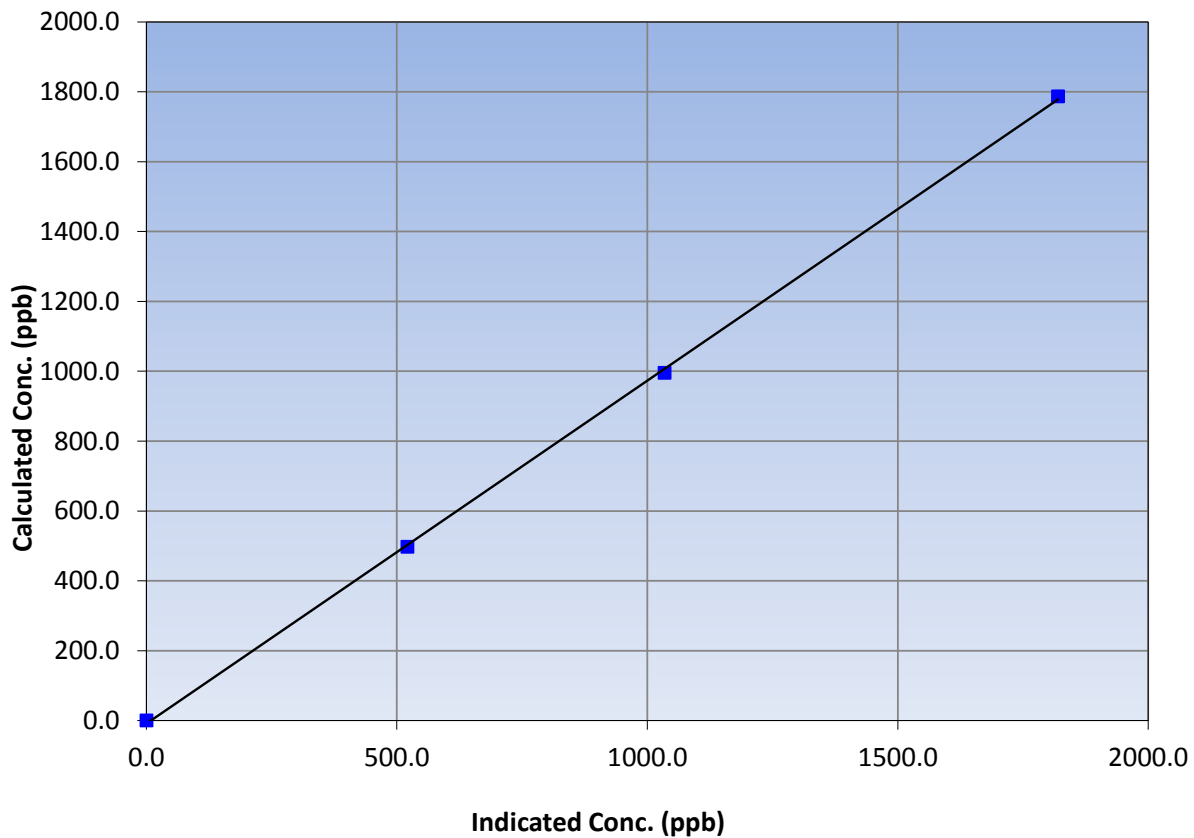
Station Information

| | | | |
|------------------|------------------|----------------------|--------------|
| Calibration Date | August 9, 2017 | Previous Calibration | July 6, 2017 |
| Station Name | Patricia McInnes | Station Number | AMS 06 |
| Start Time (MST) | 7:40 | End Time (MST) | 14:50 |
| Analyzer make | API T201 | Analyzer serial # | 215 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|-------------|
| 0.0 | 0.1 | ---- | Correlation Coefficient | ≥0.995 | |
| 1786.7 | 1820.2 | 0.9816 | | | |
| 995.1 | 1034.4 | 0.9621 | | | |
| 497.6 | 520.9 | 0.9552 | | | |
| | | | Slope | 0.981940 | 0.90 - 1.10 |
| | | | Intercept | -8.815064 | +/-20 |

TN Calibration Curve





Wood Buffalo Environmental Association

NH₃ Calibration Summary

Version-03-2017

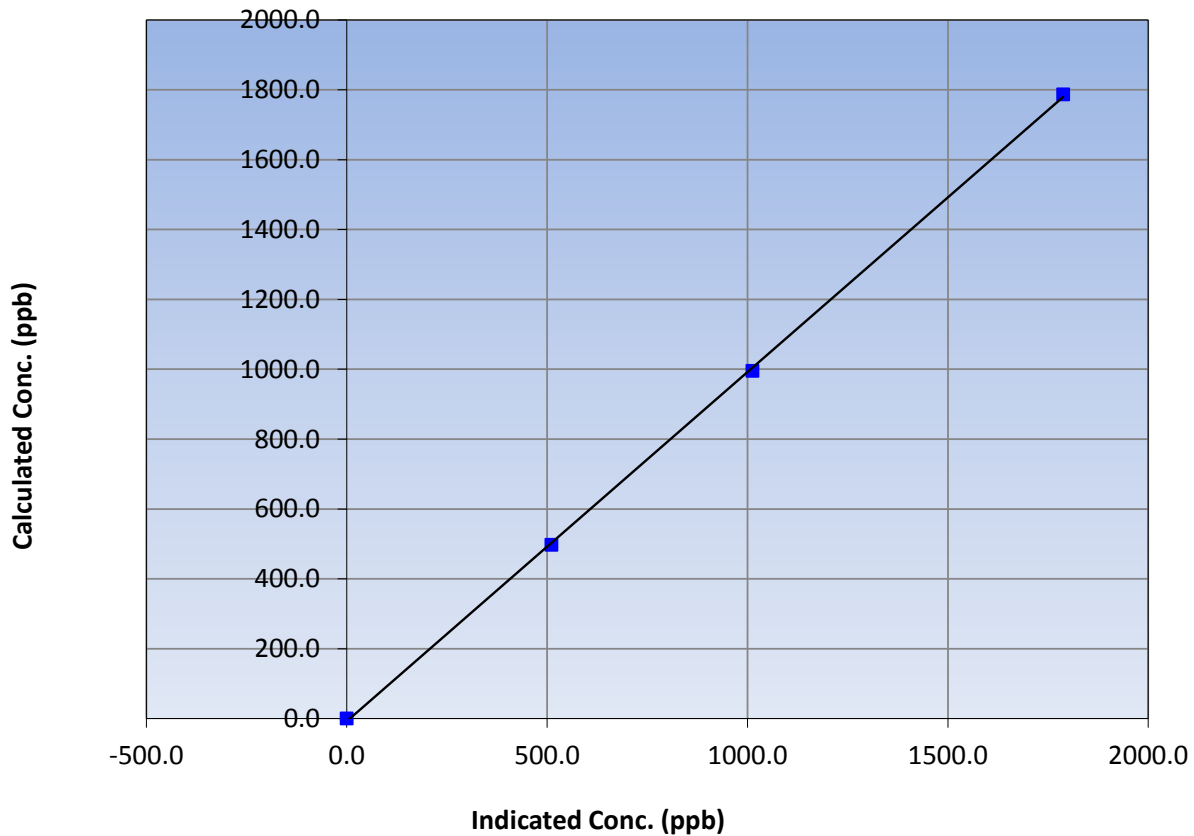
Station Information

| | | | |
|------------------|------------------|----------------------|--------------|
| Calibration Date | August 9, 2017 | Previous Calibration | July 6, 2017 |
| Station Name | Patricia McInnes | Station Number | AMS 06 |
| Start Time (MST) | 7:40 | End Time (MST) | 14:50 |
| Analyzer make | API T201 | Analyzer serial # | 215 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | -0.1 | ---- | Correlation Coefficient | ≥0.995 | |
| 1786.7 | 1787.8 | 0.9994 | | | |
| 995.1 | 1012.4 | 0.9830 | | | |
| 497.6 | 510.8 | 0.9741 | | | |
| | | | Slope | 0.999896 | 0.90 - 1.10 |
| | | | Intercept | -7.795377 | +/-20 |

NH₃ Calibration Curve





Wood Buffalo Environmental Association

NO_x Calibration Summary

Version-03-2017

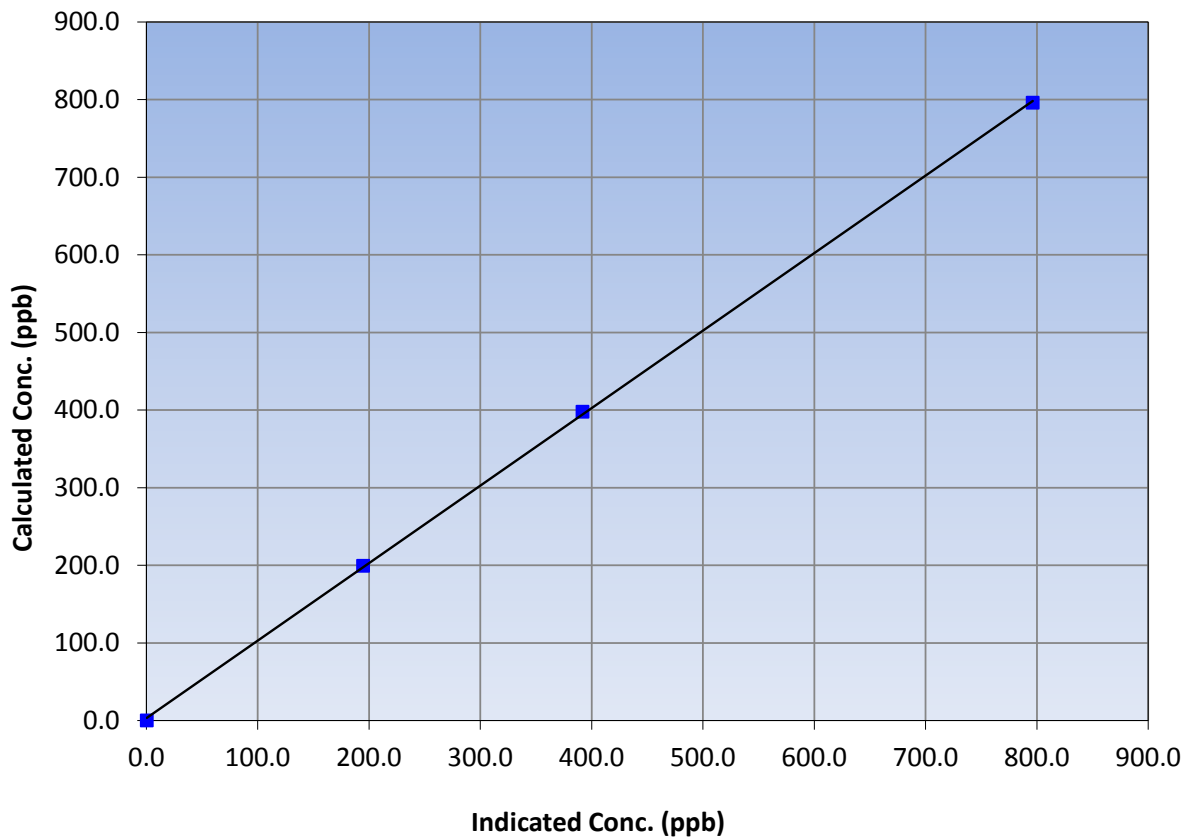
Station Information

| | | | |
|------------------|------------------|----------------------|--------------|
| Calibration Date | August 9, 2017 | Previous Calibration | July 6, 2017 |
| Station Name | Patricia McInnes | Station Number | AMS 06 |
| Start Time (MST) | 8:55 | End Time (MST) | 14:40 |
| Analyzer make | API T201 | Analyzer serial # | 215 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.3 | ---- | Correlation Coefficient | ≥0.995 | |
| 796.0 | 796.3 | 0.9996 | | | |
| 398.0 | 391.8 | 1.0158 | | | |
| 199.5 | 194.6 | 1.0250 | | | |
| | | | Slope | 0.998577 | 0.90 - 1.10 |
| | | | Intercept | 3.098443 | +/-20 |

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

Version-03-2017

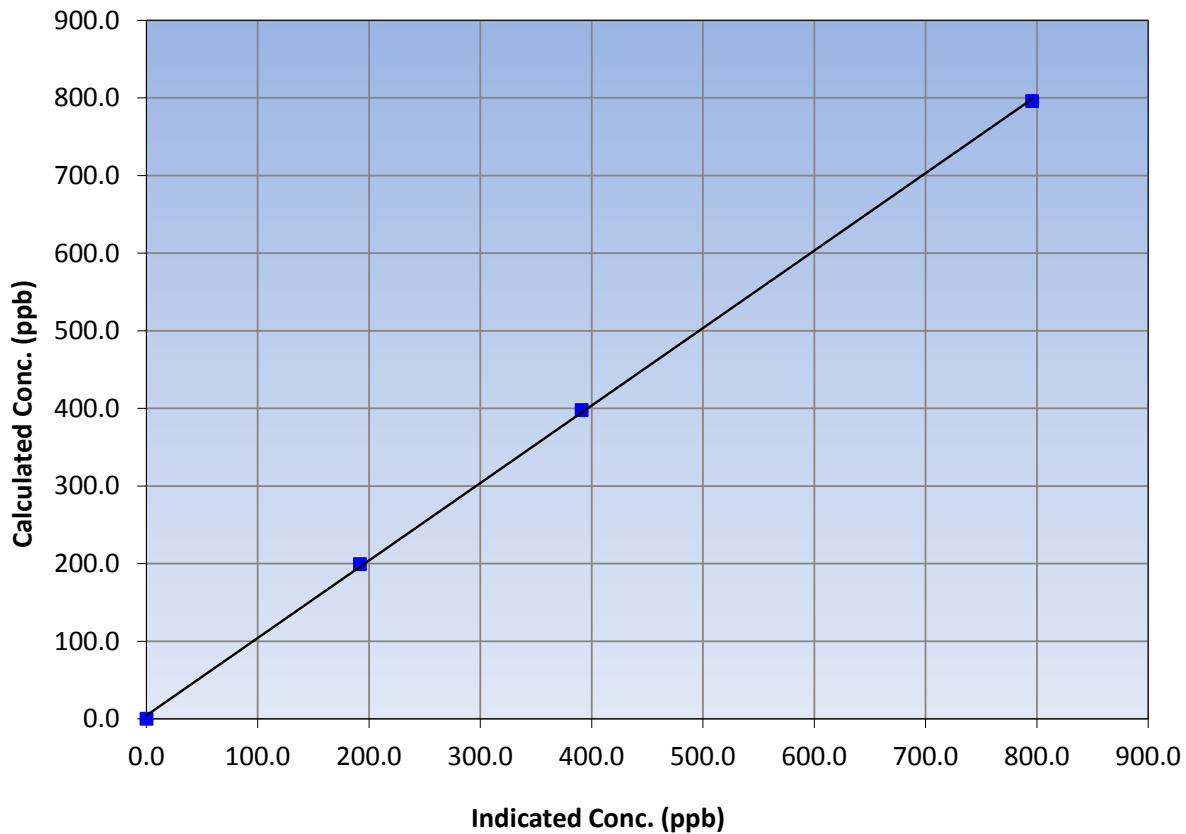
Station Information

| | | | |
|------------------|------------------|----------------------|--------------|
| Calibration Date | August 9, 2017 | Previous Calibration | July 6, 2017 |
| Station Name | Patricia McInnes | Station Number | AMS 06 |
| Start Time (MST) | 8:55 | End Time (MST) | 14:40 |
| Analyzer make | API T201 | Analyzer serial # | 215 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|
| 0.0 | 0.1 | ---- | Correlation Coefficient | ≥0.995 |
| 796.0 | 795.6 | 1.0005 | | |
| 398.0 | 390.9 | 1.0181 | Slope | 0.90 - 1.10 |
| 199.5 | 191.8 | 1.0400 | | |
| | | | Intercept | +/-20 |

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

Version-03-2017

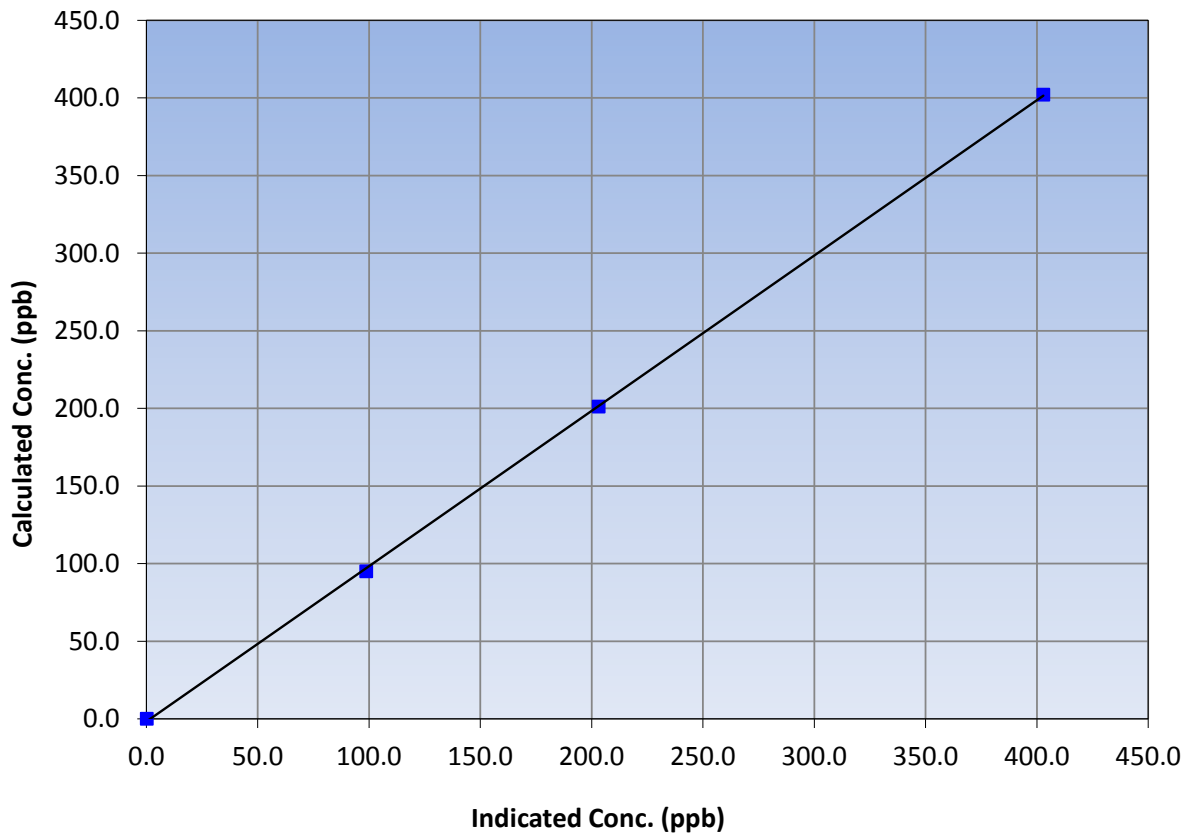
Station Information

| | | | |
|------------------|------------------|----------------------|--------------|
| Calibration Date | August 9, 2017 | Previous Calibration | July 6, 2017 |
| Station Name | Patricia McInnes | Station Number | AMS 06 |
| Start Time (MST) | 8:55 | End Time (MST) | 14:40 |
| Analyzer make | API T201 | Analyzer serial # | 215 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|-------------|
| 0.0 | 0.1 | ---- | Correlation Coefficient | ≥0.995 | |
| 402.1 | 402.9 | 0.9980 | | | |
| 201.2 | 203.1 | 0.9906 | | | |
| 95.1 | 98.7 | 0.9635 | | | |
| | | | Slope | 1.000720 | 0.90 - 1.10 |
| | | | Intercept | -1.726792 | +/-20 |

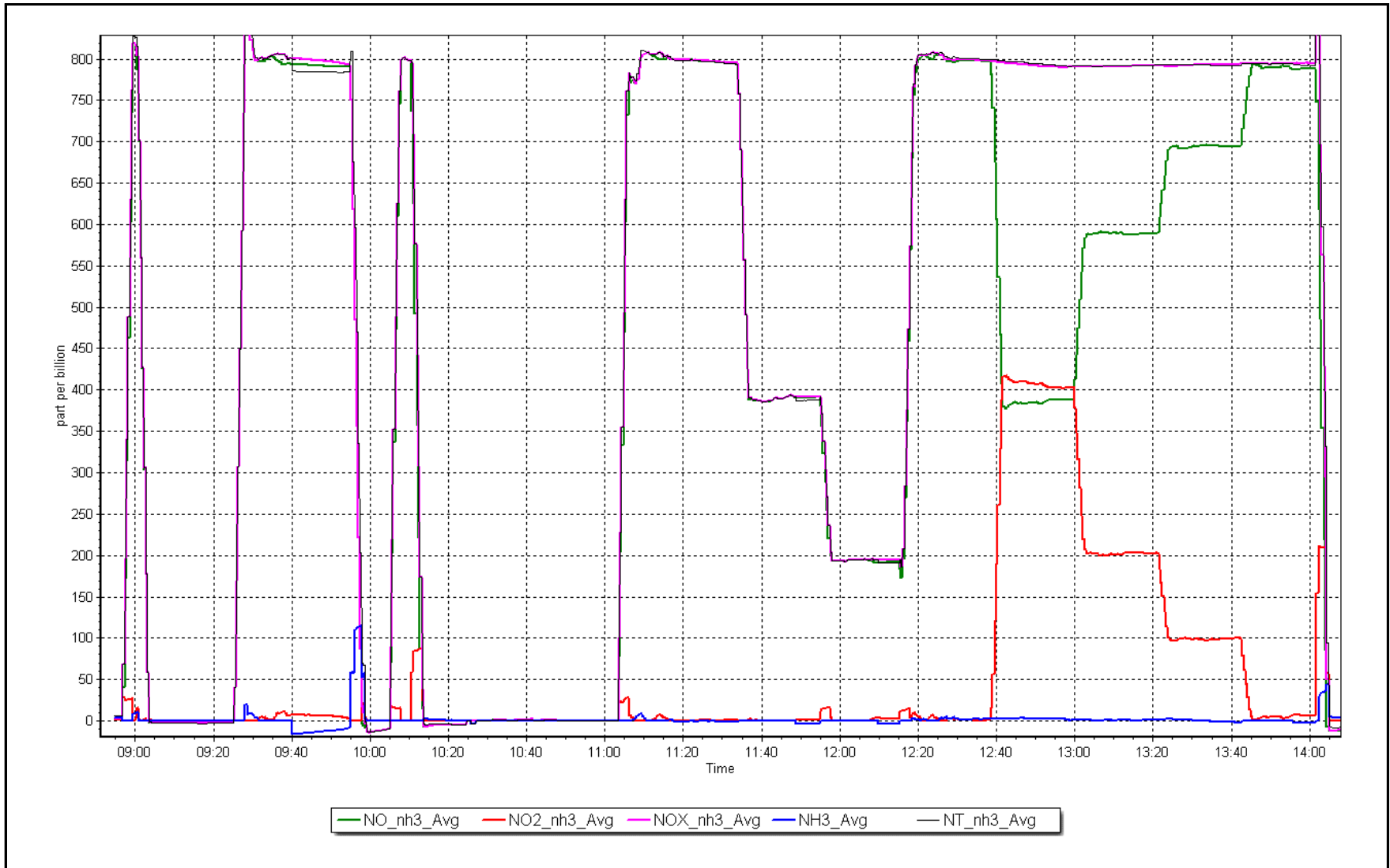
NO₂ Calibration Curve



NO_x Calibration Plot

Date: August 9, 2017

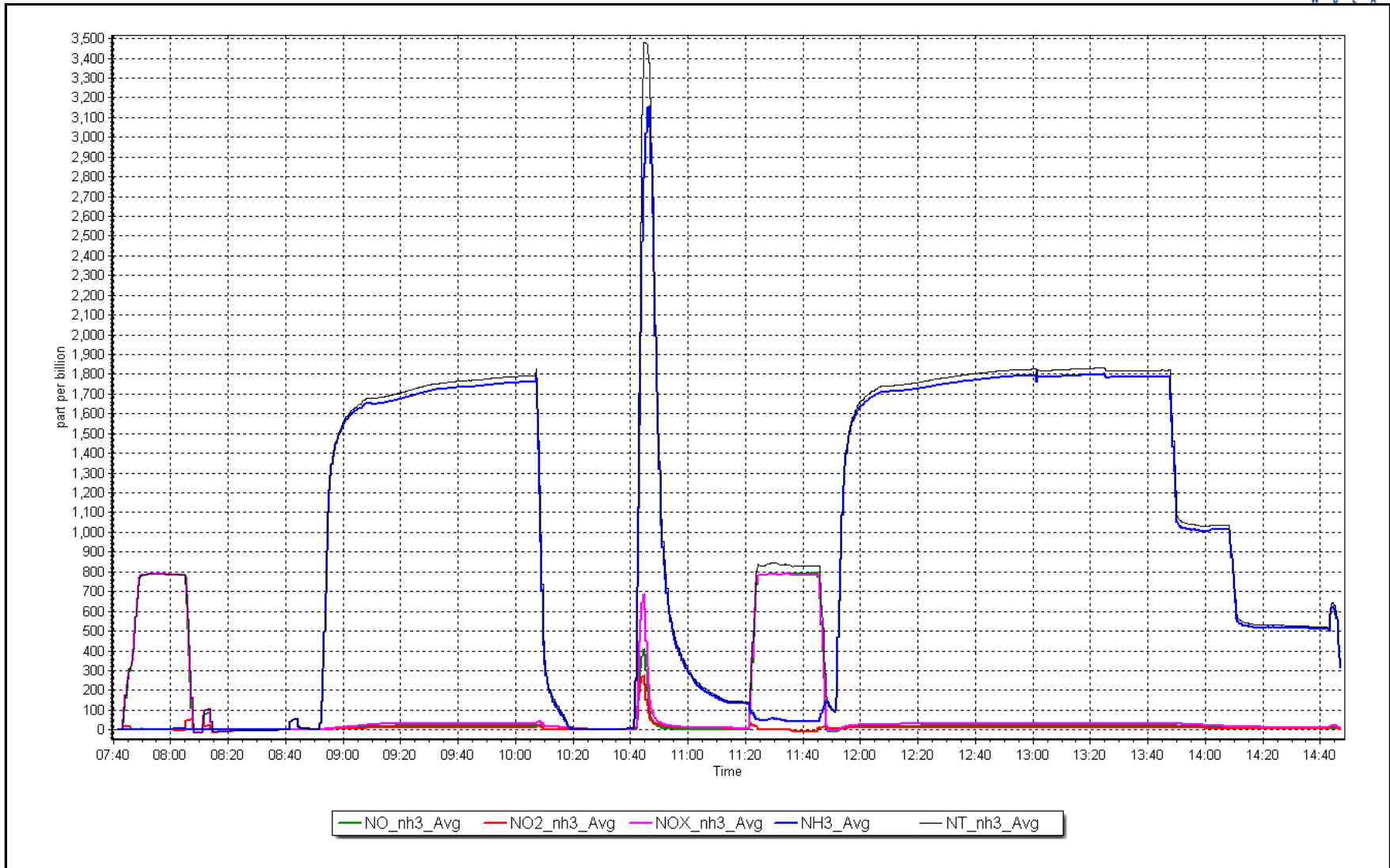
Location: Patricia McInnes



NH₃ Calibration Plot

Date: August 10, 2017

Location: Patricia McInnes





Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-02-2017

Station Information

| | | | |
|------------------------|-------------------|-----------------|---------------|
| Station Name: | Patricia McInnes | Station number: | AMS 06 |
| Calibration Date: | August 10, 2017 | Last Cal Date: | July 13, 2017 |
| Start time (MST): | 7:45 | End time (MST): | 10:05 |
| Sharp Model: | Thermo SHARP 5030 | S/N: | E-1475 |
| Particulate Fraction: | PM2.5 | C14 Source S/N: | 5680 |
| Flow Meter Make/Model: | Delta Cal | S/N: | 1451 |
| Temp/RH standard: | Delta Cal | S/N: | 1451 |

Monthly Calibration Test

| <u>Parameter</u> | <u>As found</u> | <u>Measured</u> | <u>As left</u> | <u>Adjusted</u> | <i>(Limits)</i> |
|-----------------------------|-----------------|-------------------------------------|----------------|-------------------------------------|-----------------------------|
| T1 (°C) | 18 | 18.8 | 18 | <input type="checkbox"/> | <i>+/- 2 °C</i> |
| P3 (hPa) | 975 | 971.9 | 975 | <input type="checkbox"/> | <i>+/- 13 hPa</i> |
| flow (LPH) | 1000 | 994.8 | 1000 | <input type="checkbox"/> | <i>+/- 50 LPH</i> |
| Nephelometer zero | 0.3 | ----- | 0.3 | <input type="checkbox"/> | <i>+/- 0.5 ug/m3</i> |
| Instrument Clock: | Verified | <input checked="" type="checkbox"/> | | | |
| Cyclone cleaning : | PM10 Cyclone | <input checked="" type="checkbox"/> | PM2.5 Cyclone | <input checked="" type="checkbox"/> | |
| Date Filter Tape Installed: | | | | | |

Quarterly Calibration Test

| | | |
|------------|---------------------------------------|------------------------------------|
| Leak Test: | Date of check: <u>August 10, 2017</u> | Last Cal Date: <u>June 7, 2017</u> |
| | Flow w/o adaptor: <u>16.58</u> | Flow w/ adaptor: <u>16.44</u> |

(Limit) 0.4 LPM

| <u>Adjusted</u> | <u>Current Test</u> | <u>Previous Test</u> | <u>% Change</u> |
|--|--|--|-----------------|
| <input type="checkbox"/> | Foil S/N: <u>2/09/07</u> | Foil S/N: <u>2597</u> | |
| Foil Calibration | Foil Mass: <u>1167</u> | Foil Mass: <u>1167</u> | |
| | Calibration Date: <u>August 10, 2017</u> | Calibration Date: <u>April 4, 2017</u> | |
| <i>(Limit) +/- 5% of previous</i> | Correction Factor: <u>6945</u> | Correction Factor: <u>6887</u> | 0.84% |

Annual Calibration Test

| <u>Parameter</u> | <u>As found</u> | <u>Measured</u> | <u>As left</u> | <u>Adjusted</u> | <i>(Limits)</i> |
|-----------------------------|-----------------|-----------------|----------------|--------------------------|------------------------|
| T2 (°C) | | | | <input type="checkbox"/> | <i>+/- 2 °C</i> |
| T3 (°C) | | | | <input type="checkbox"/> | <i>+/- 2 °C</i> |
| T4 (°C) | | | | <input type="checkbox"/> | <i>+/- 2 °C</i> |
| RH (%) | | | | <input type="checkbox"/> | <i>+/- 10%</i> |
| Date Sample Tube Cleaned: | | | | | |
| Date Pump Rebuilt/Replaced: | | | | | |

Notes: No adjustments made. Leak check and foil test completed. No issues.

Calibration by: Devin Russell



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 7
ATHABASCA VALLEY
AUGUST 2017

Operations, Data Collection,
QA/QC, Data Validation and Reporting by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

September 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
AUGUST 2017

MONTHLY SUMMARY for
AMD SECTION III.B.1(c)

| Parameter | Hours of Data | Hours of Calibration | Hours without Data | Operational Time | Maximum 1-Hour Value | 1-Hour Exceedances | Maximum 24-Hour Value | 24-Hour Exceedances |
|------------------------------------|---------------|----------------------|--------------------|------------------|----------------------|--------------------|-----------------------|---------------------|
| SO2 (ppb) Average | 708 | 35 | 36 | 99.87 | 14 | 0 | 2 | 0 |
| TRS (ppb) Average | 709 | 34 | 35 | 99.87 | 2 | 0 | 1 | 0 |
| THC (ppm) Average | 708 | 35 | 36 | 99.87 | 2.6 | - | 2.1 | - |
| NMHC (ppm) Average | 708 | 35 | 36 | 99.87 | 0.341 | - | 0.065 | - |
| CH4(ppm) Average | 708 | 35 | 36 | 99.87 | 2.5 | - | 2 | - |
| O3 (ppb) Average | 710 | 33 | 34 | 99.87 | 62 | 0 | 50 | - |
| NO2 (ppb) Average | 708 | 35 | 36 | 99.87 | 19 | 0 | 8 | - |
| NO (ppb) Average | 708 | 35 | 36 | 99.87 | 33 | - | 5 | - |
| NOX (ppb) Average | 708 | 35 | 36 | 99.87 | 52 | - | 13 | - |
| PM2.5 (ug/m3) Average | 741 | 2 | 3 | 99.87 | 87.4 | - | 24.2 | 0 |
| CO(ppm) Average | 709 | 35 | 35 | 100 | 0.8 | 0 | 0.3 | - |
| Temperature 2 m (C) Average | 744 | 0 | 0 | 100 | 31.1 | - | 24.3 | - |
| Barometric Pressure (inHg) Average | 744 | 0 | 0 | 100 | 29.4 | - | 29.4 | - |
| Relative Humidity (%) Average | 744 | 0 | 0 | 100 | 97 | - | 85 | - |
| Wind Speed 10 m (km/h) Average | 744 | 0 | 0 | 100 | 30 | - | 19 | - |
| Wind Direction 10 m (deg) Average | 744 | 0 | 0 | 100 | - | - | - | - |

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
AUGUST 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

| Parameter | Number | Mean | StnDev | Total | Percentile | | | | | | |
|------------------------------------|--------|-------|--------|-------|------------|------|------|--------|------|------|-------|
| | | | | | Min | P10 | Q1 | Median | Q3 | P90 | Max |
| SO2 (ppb) Average | 708 | 0.5 | 1 | - | 0 | 0 | 0 | 0 | 0 | 1 | 14 |
| TRS (ppb) Average | 709 | 0.3 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| THC (ppm) Average | 708 | 1.93 | 0.1 | - | 1.8 | 1.8 | 1.9 | 1.9 | 2 | 2 | 2.6 |
| NMHC (ppm) Average | 708 | 0.006 | 0.031 | - | 0 | 0 | 0 | 0 | 0 | 0 | 0.341 |
| CH4(ppm) Average | 708 | 1.93 | 0.1 | - | 1.8 | 1.8 | 1.9 | 1.9 | 2 | 2 | 2.5 |
| O3 (ppb) Average | 710 | 29.5 | 11 | - | 9 | 15 | 21 | 28 | 37 | 44 | 62 |
| NO2 (ppb) Average | 708 | 3.7 | 3 | - | 0 | 1 | 2 | 3 | 5 | 8 | 19 |
| NO (ppb) Average | 708 | 1.1 | 3 | - | 0 | 0 | 0 | 0 | 1 | 3 | 33 |
| NOX (ppb) Average | 708 | 4.9 | 5 | - | 0 | 1 | 2 | 3 | 6 | 10 | 52 |
| PM2.5 (ug/m3) Average | 741 | 8.37 | 7.4 | - | 0.3 | 2.8 | 4.5 | 6.9 | 9.5 | 15.5 | 87.4 |
| CO(ppm) Average | 709 | 0.14 | 0.1 | - | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.8 |
| Temperature 2 m (C) Average | 744 | 18.42 | 5 | - | 6.2 | 12.4 | 14.4 | 17.8 | 22.2 | 25.2 | 31.1 |
| Barometric Pressure (inHg) Average | 744 | 28.94 | 0.2 | - | 28.6 | 28.7 | 28.8 | 29 | 29.1 | 29.2 | 29.4 |
| Relative Humidity (%) Average | 744 | 61.7 | 19 | - | 24 | 33 | 46 | 64 | 78 | 87 | 97 |
| Wind Speed 10 m (km/h) Average | 744 | 9.2 | 6 | - | 0 | 3 | 5 | 8 | 12 | 18 | 30 |
| Wind Direction 10 m (deg) Average | 744 | - | - | - | - | - | - | - | - | - | - |

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
AUGUST 2017

OPERATIONAL NOTES

| Parameter | Period Start | Period End | Duration (Hours) | Notes |
|------------------------|-------------------|-------------------|------------------|---|
| NOX, O3, SO2, THC, TRS | 18 Aug 2017 09:00 | 18 Aug 2017 09:00 | 1 | Maintenance - sample manifold cleaned |
| PM2.5 | 24 Aug 2017 23:00 | 24 Aug 2017 23:00 | 1 | Unstable operation - excessive baseline drift |



Wood Buffalo Environmental Association

Summary of Hour Averages

**Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - August 2017**

| | | | | |
|---|--|----------|---------------------------|------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 14 ppb on Aug 29 12:00 | Maximum Daily Average: 2.0 ppb on Aug 22 | | Hours of Data: | 708 |
| Minimum Value: 0 ppb on Aug 6 23:00 | Minimum Daily Average: 0.1 ppb on Aug 25 | | Hours of Missing Data: | 36 |
| Maximum Diurnal Average: 0.9 ppb at hour 12 | Minimum Diurnal Average: 0.3 ppb at hour 6 | | Hours of Calibration: | 35 |
| Monthly Average: 0.5 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 6 | | Percent Operational Time: | 99.9 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 1 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 1 | 1 | 2 | 2 | 3 | 2 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 1.0 | 3 |
| 2-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 3-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | C | C | C | C | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 2 | 3 | 1 | 0.7 | 3 |
| 4-Aug | 2 | 1 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 2 |
| 5-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 6-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 7-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 2 | 6 | 6 | 5 | 4 | 1 | 1 | 0 | 0 | 1.5 | 6 |
| 8-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 9-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 10-Aug | 0 | 0 | 0 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 11-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 12-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 13-Aug | 0 | 0 | Z | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.5 | 1 |
| 14-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 15-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0.3 | 1 |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | Z | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.5 | 1 |
| 17-Aug | Z | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 18-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 19-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 20-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 21-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 22-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 7 | 10 | 7 | 2 | 2 | 2 | 2 | 2.0 | 10 |
| 23-Aug | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 24-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 25-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 26-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 27-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 29-Aug | Z | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 14 | 6 | 3 | 3 | 2 | 2 | 3 | 1 | 1 | 1 | 1 | 0 | 1 | 1.9 | 14 |
| 30-Aug | 1 | Z | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0.6 | 1 |
| 31-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 0 |

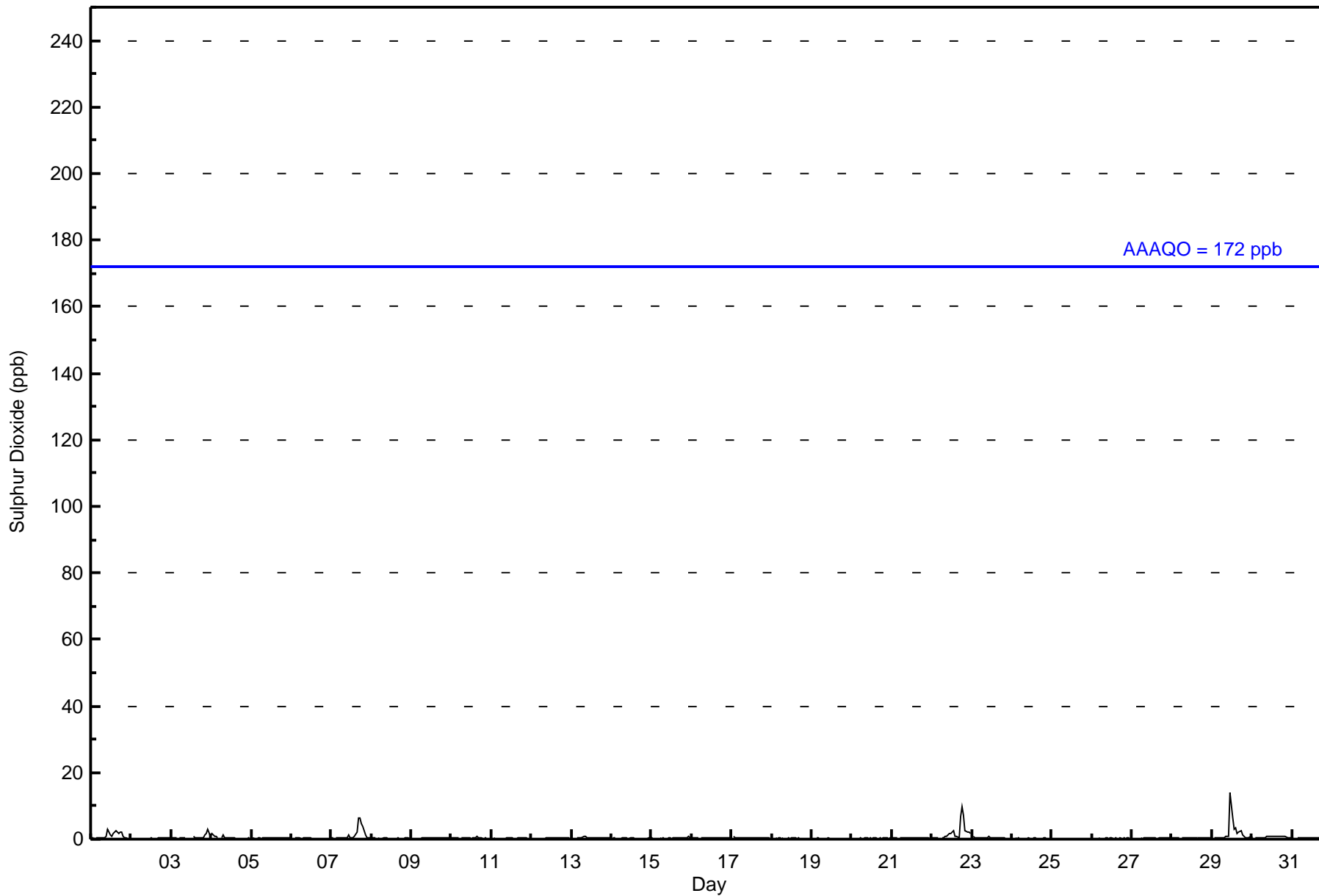
| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|
| 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 | 0.5 | 0.9 | 0.6 | 0.5 | 0.5 | 0.5 | 0.6 | 0.8 | 0.9 | 0.7 | 0.4 | 0.4 | 0.4 | 0.3 | Diurnal Average |
| 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 14 | 6 | 3 | 3 | 3 | 6 | 7 | 10 | 7 | 2 | 2 | 3 | 2 | Diurnal Maximum |

Z - zeronpan C - Calibration M - Maintenance
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 10 | 707 | 99.86 | 99.86 |
| 11 - 20 | 1 | 0.14 | 100.00 |
| 21 - 60 | 0 | 0.00 | 100.00 |
| 61 - 110 | 0 | 0.00 | 100.00 |
| 111 - 172 | 0 | 0.00 | 100.00 |
| > 172 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|------------|-----------|------------|-----------|------------|------------|------------|-----------|------------|------------|------------|-----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 10 | 9 | 6 | 7 | 10 | 38 | 53 | 164 | 43 | 33 | 43 | 103 | 64 | 43 | 29 | 28 | 34 | 707 |
| 11 - 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 21 - 60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 61 - 110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 111 - 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 9 | 6 | 7 | 10 | 38 | 53 | 164 | 43 | 33 | 43 | 103 | 64 | 43 | 29 | 29 | 34 | 708 |

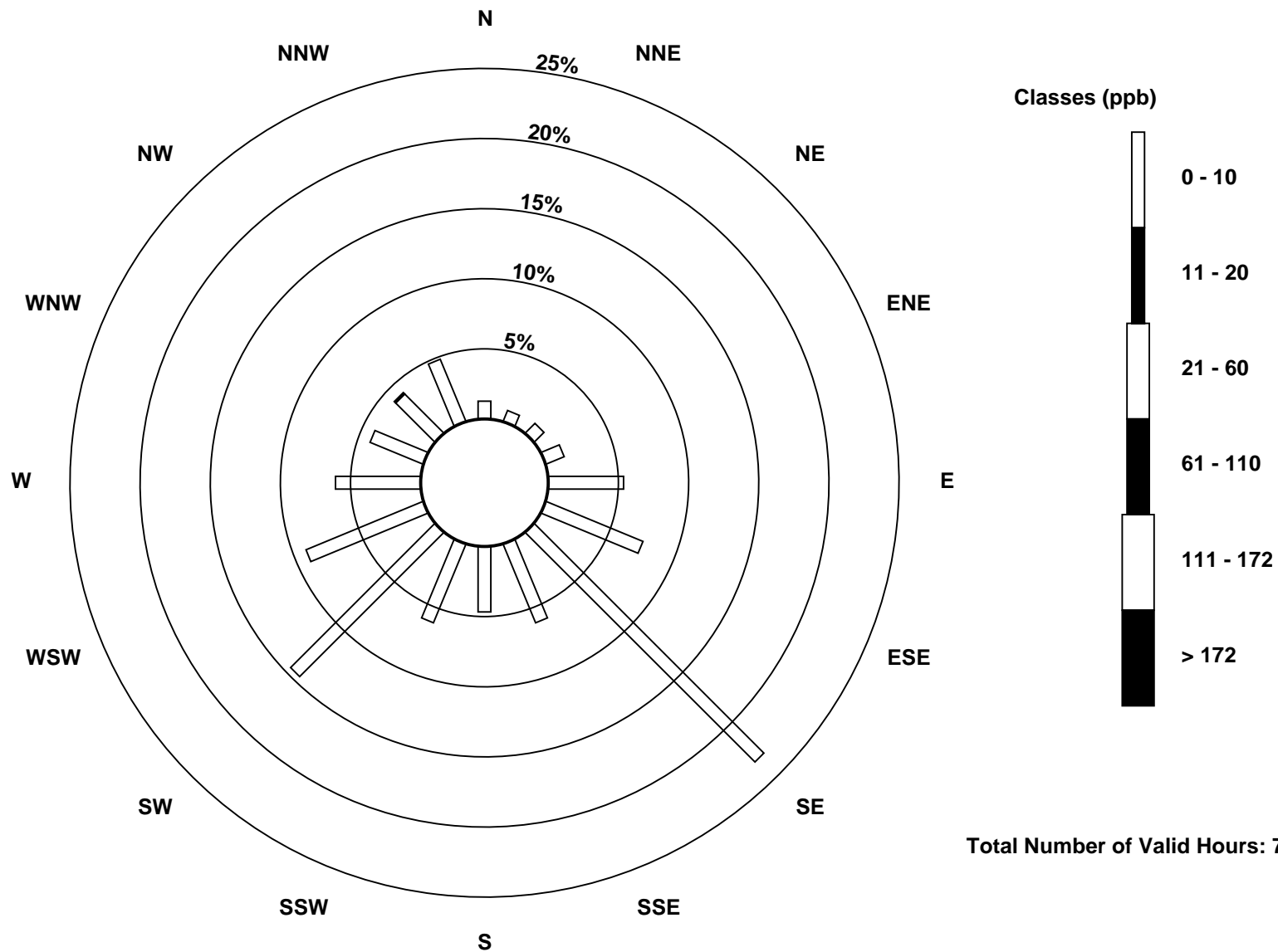
Total Number of Valid Hours: 708

Total Number of Hours: 744

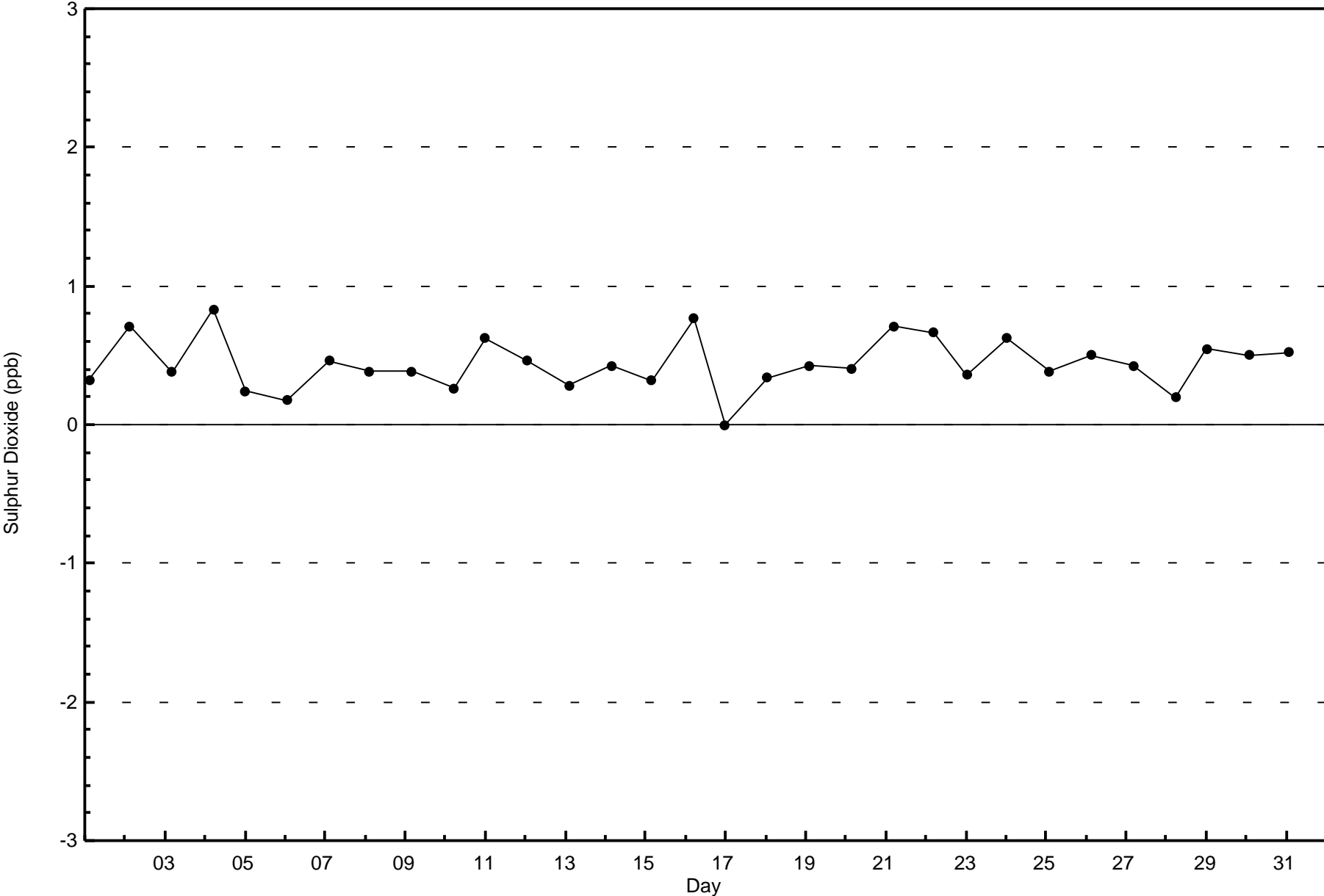


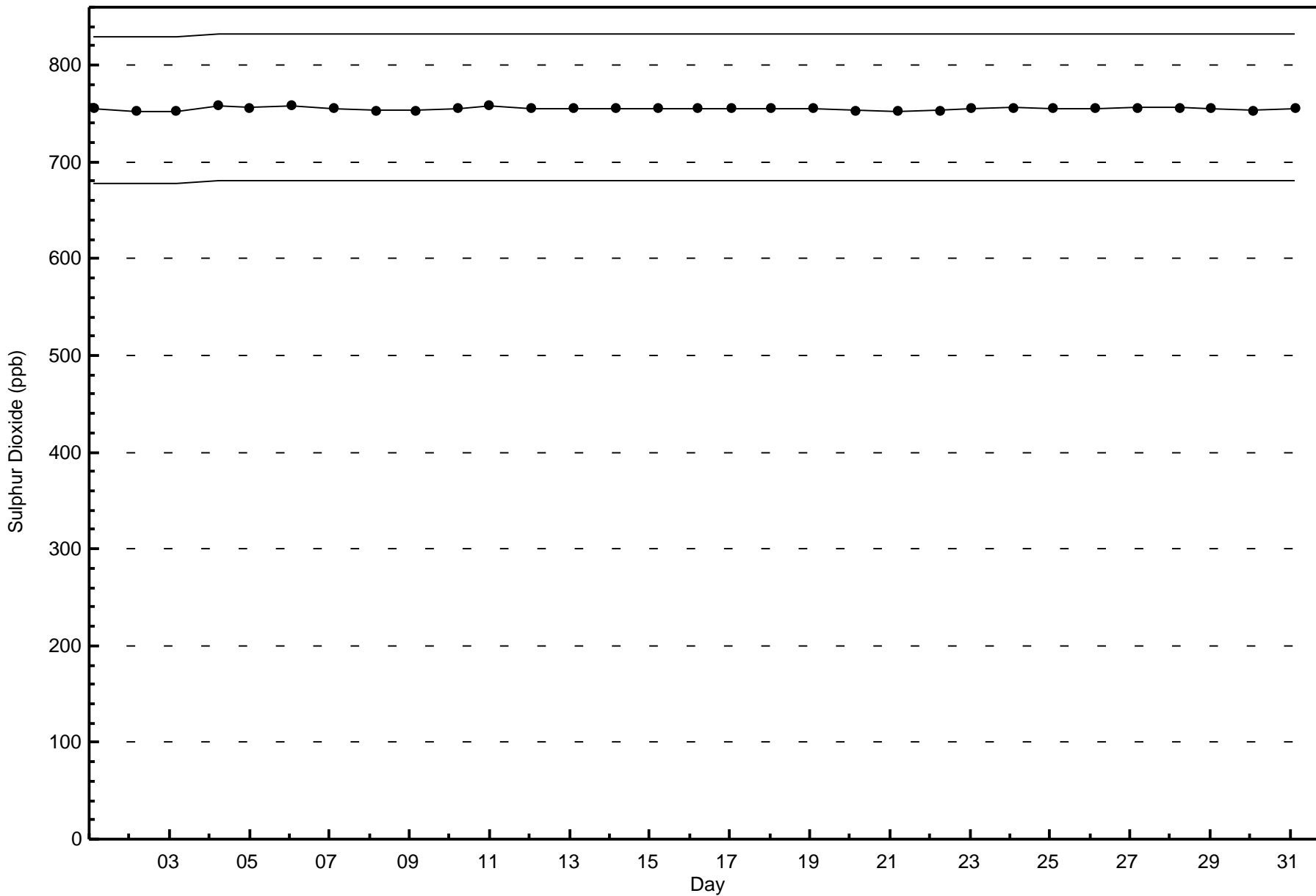
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley (AMS 7)



Total Number of Valid Hours: 708







Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

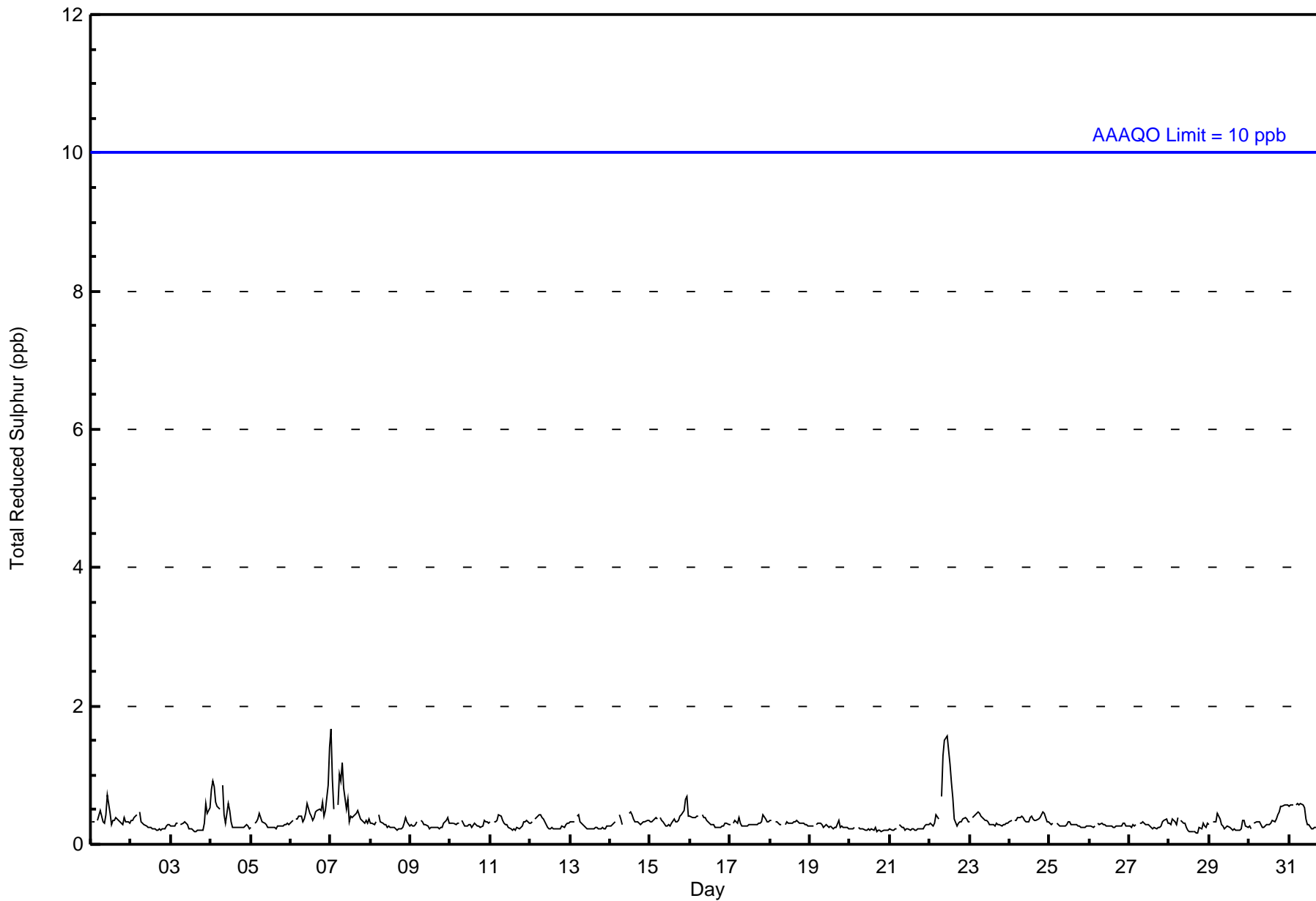
Athabasca Valley - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|---|---|---|---|---|---|---|---|--|----|----|----|----|----|----|----|----|----|--------------------------------|----|----|----|-----|---------------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|
| Maximum Value: 2 ppb on Aug 7 01:00 | | | | | | | | | | Maximum Daily Average: 0.6 ppb on Aug 22 | | | | | | | | | | Hours of Data: 709 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum Value: 0 ppb on Aug 28 18:00 | | | | | | | | | | Minimum Daily Average: 0.2 ppb on Aug 20 | | | | | | | | | | Hours of Missing Data: 35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 0.4 ppb at hour 6 | | | | | | | | | | Minimum Diurnal Average: 0.3 ppb at hour 17 | | | | | | | | | | Hours of Calibration: 34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 0.3 ppb | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 O ₃ = 0 P ₉₀ = 0 P ₉₉ = 1 | | | | | | | | | | Percent Operational Time: 99.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 1 | 1 | 1 | 1 | 1 | 1 | Z | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0.5 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 2 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 2 | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 2 | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.4 | 0.4 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | Diurnal Average |
| | | | | | | | | | | | | | | | | | | | | | | | | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | Diurnal Maximum |
| Z - zerospan C - Calibration M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2 | 709 | 100.00 | 100.00 |
| 3 - 4 | 0 | 0.00 | 100.00 |
| 5 - 7 | 0 | 0.00 | 100.00 |
| 8 - 11 | 0 | 0.00 | 100.00 |
| > 11 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2 | 9 | 6 | 8 | 11 | 36 | 55 | 161 | 43 | 33 | 44 | 104 | 63 | 43 | 31 | 29 | 33 | 709 |
| 3 - 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 - 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 - 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 9 | 6 | 8 | 11 | 36 | 55 | 161 | 43 | 33 | 44 | 104 | 63 | 43 | 31 | 29 | 33 | 709 |

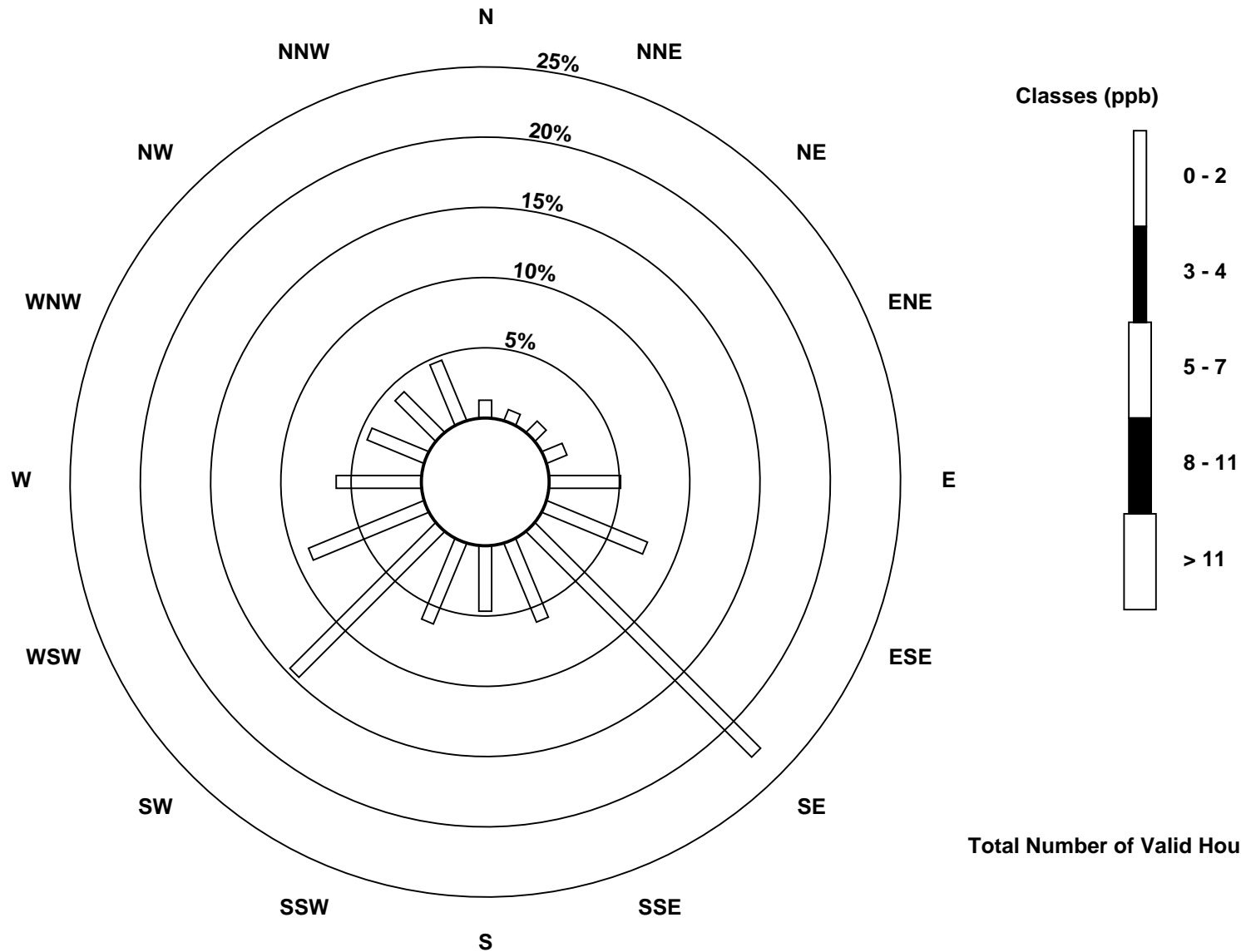
Total Number of Valid Hours: 709

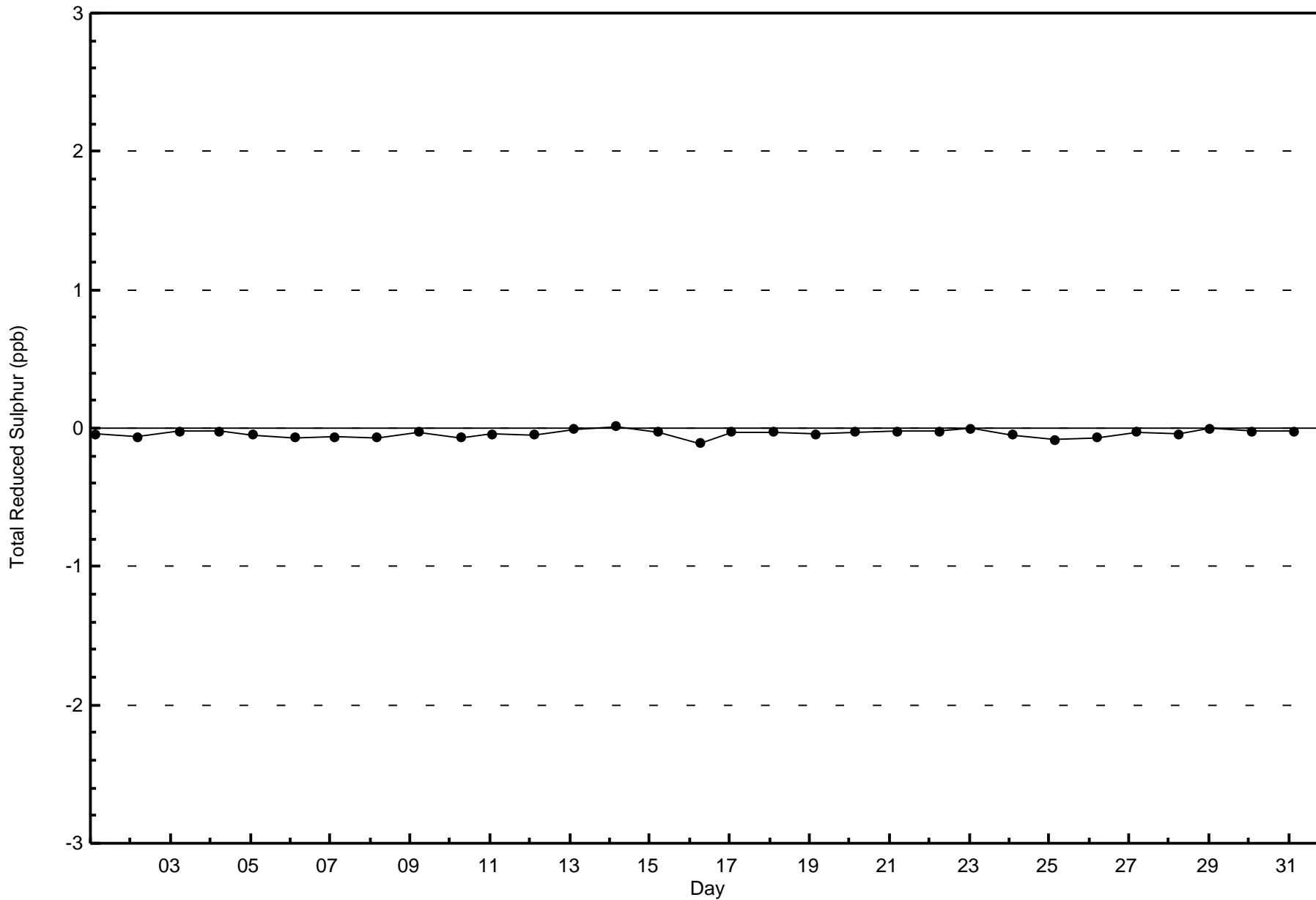
Total Number of Hours: 744

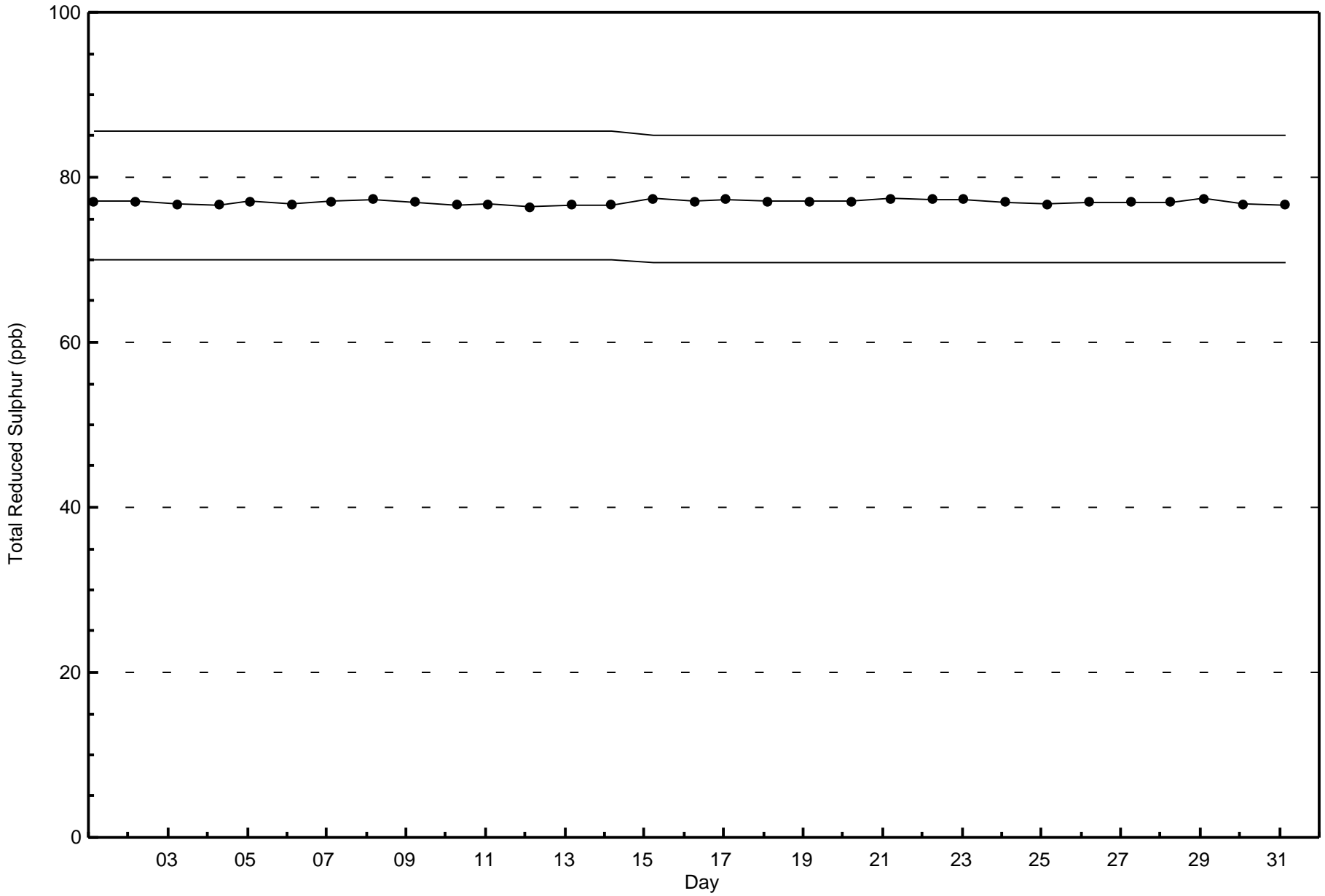


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Total Reduced Sulphur (TRS) - ppb
Athabasca Valley (AMS 7)









Wood Buffalo Environmental Association
Summary of Hour Averages

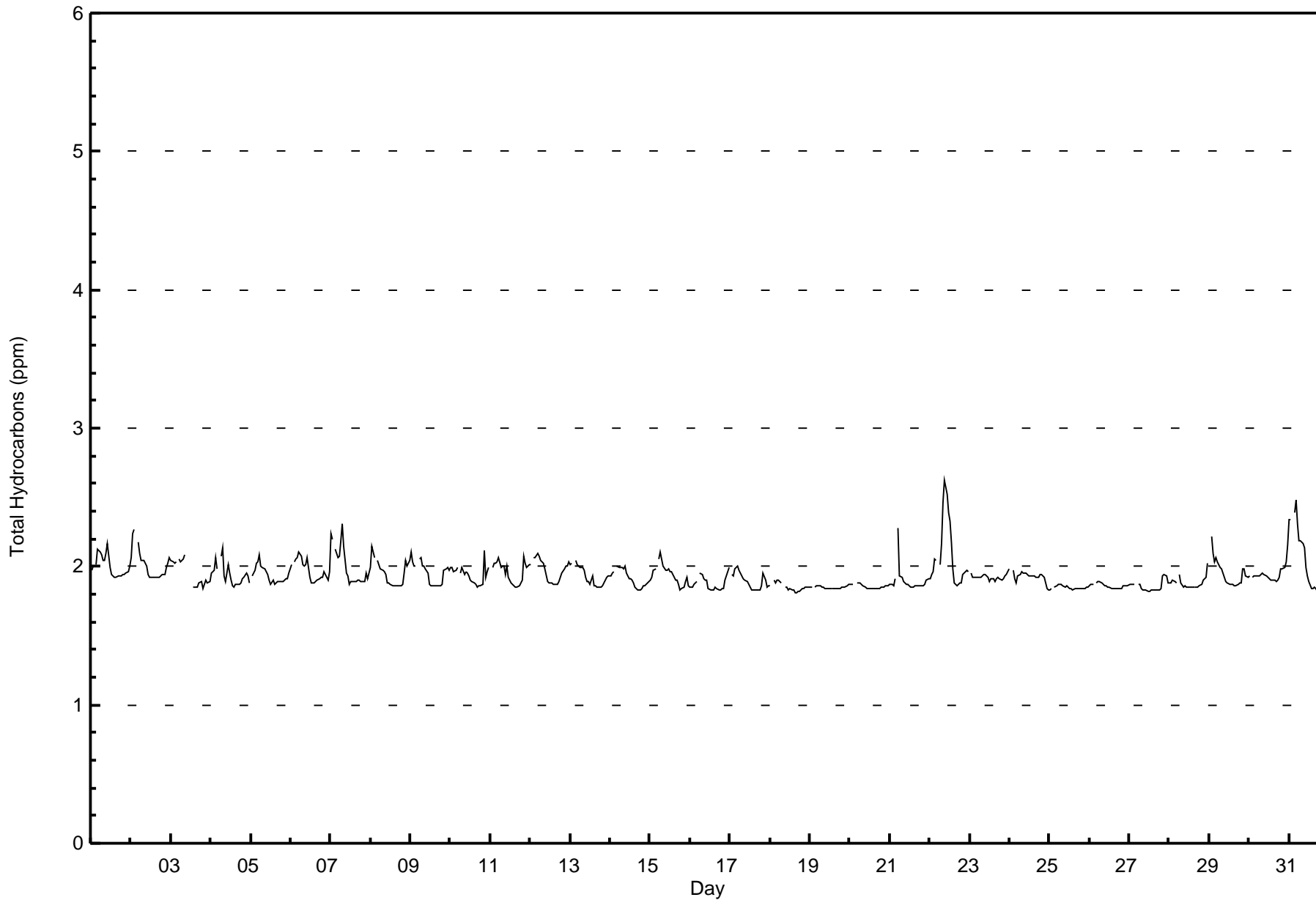
Total Hydrocarbons (THC) - ppm
Athabasca Valley - August 2017

| Maximum Value: 2.6 ppm on Aug 22 10:00 | | Maximum Daily Average: 2.1 ppm on Aug 22 | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|--|-----|--------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|---------------|---------------|-----|
| Minimum Value: 1.8 ppm on Aug 18 17:00 | | Minimum Daily Average: 1.8 ppm on Aug 25 | | Hours of Data: 708 | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 2.0 ppm at hour 6 | | Minimum Diurnal Average: 1.9 ppm at hour 16 | | Hours of Missing Data: 36 | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 1.93 ppm | | Percentiles: P ₁ = 1.8 P ₁₀ = 1.8 Q ₁ = 1.9 Median = 1.9 Q ₃ = 2.0 P ₉₀ = 2.0 P ₉₉ = 2.3 | | Hours of Calibration: 35 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Percent Operational Time: 99.9 | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 2.0 | 2.0 | Z | 2.0 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.1 | 2.2 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | |
| 2-Aug | 2.1 | 2.2 | 2.3 | Z | 2.2 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.1 | 2.0 | 2.3 | |
| 3-Aug | 2.0 | 2.0 | 2.0 | 2.0 | Z | 2.1 | 2.0 | 2.1 | 2.1 | C | C | C | C | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.1 | |
| 4-Aug | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | Z | 2.1 | 2.1 | 2.1 | 1.9 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 2.1 | |
| 5-Aug | Z | 1.9 | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 2.1 | |
| 6-Aug | 2.0 | Z | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.1 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 2.0 | 2.0 | 2.1 | |
| 7-Aug | 2.2 | 2.2 | Z | 2.1 | 2.1 | 2.1 | 2.2 | 2.3 | 2.1 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 2.0 | 2.0 | 2.3 | |
| 8-Aug | 2.0 | 2.1 | 2.1 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 1.9 | 2.1 | |
| 9-Aug | 2.1 | 2.0 | 2.0 | 2.0 | Z | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | |
| 10-Aug | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | Z | 2.0 | 2.0 | 1.9 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.1 | 1.9 | 2.0 | 2.0 | 1.9 | 2.1 | |
| 11-Aug | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | 2.0 | 2.0 | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | |
| 12-Aug | 2.0 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | |
| 13-Aug | 2.0 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | |
| 14-Aug | 1.9 | 2.0 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | |
| 15-Aug | 1.9 | 1.9 | 2.0 | 2.0 | Z | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 2.1 | |
| 16-Aug | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | Z | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 2.0 | 2.0 | |
| 17-Aug | Z | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 2.0 | 1.9 | 1.8 | 1.9 | 2.0 |
| 18-Aug | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | M | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| 19-Aug | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 |
| 20-Aug | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| 21-Aug | 1.9 | 1.9 | 1.9 | 1.9 | Z | 2.3 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.3 | |
| 22-Aug | 1.9 | 1.9 | 2.0 | 2.1 | 2.0 | Z | 2.0 | 2.2 | 2.5 | 2.6 | 2.5 | 2.4 | 2.3 | 2.2 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.6 | |
| 23-Aug | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 2.0 | |
| 24-Aug | 2.0 | Z | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.9 | 2.0 | |
| 25-Aug | 1.8 | 1.8 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | |
| 26-Aug | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | |
| 27-Aug | 1.9 | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | |
| 28-Aug | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 2.0 | |
| 29-Aug | Z | 2.2 | 2.1 | 2.0 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 1.9 | 1.9 | 2.0 | 2.2 | |
| 30-Aug | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.2 | 2.2 | |
| 31-Aug | 2.3 | 2.3 | Z | 2.4 | 2.5 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.0 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 2.5 | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | |
| Z - zerospan C - Calibration M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Athabasca Valley - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Athabasca Valley - August 2017**

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2.0 | 640 | 90.40 | 90.40 |
| 2.1 - 3.0 | 68 | 9.60 | 100.00 |
| 3.1 - 10.0 | 0 | 0.00 | 100.00 |
| > 10.0 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Athabasca Valley - August 2017**

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2.0 | 9 | 6 | 5 | 9 | 33 | 46 | 143 | 33 | 32 | 42 | 101 | 63 | 41 | 27 | 22 | 28 | 640 |
| 2.1 - 3.0 | 0 | 0 | 2 | 1 | 5 | 7 | 21 | 10 | 1 | 1 | 2 | 1 | 2 | 2 | 7 | 6 | 68 |
| 3.1 - 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 9 | 6 | 7 | 10 | 38 | 53 | 164 | 43 | 33 | 43 | 103 | 64 | 43 | 29 | 29 | 34 | 708 |

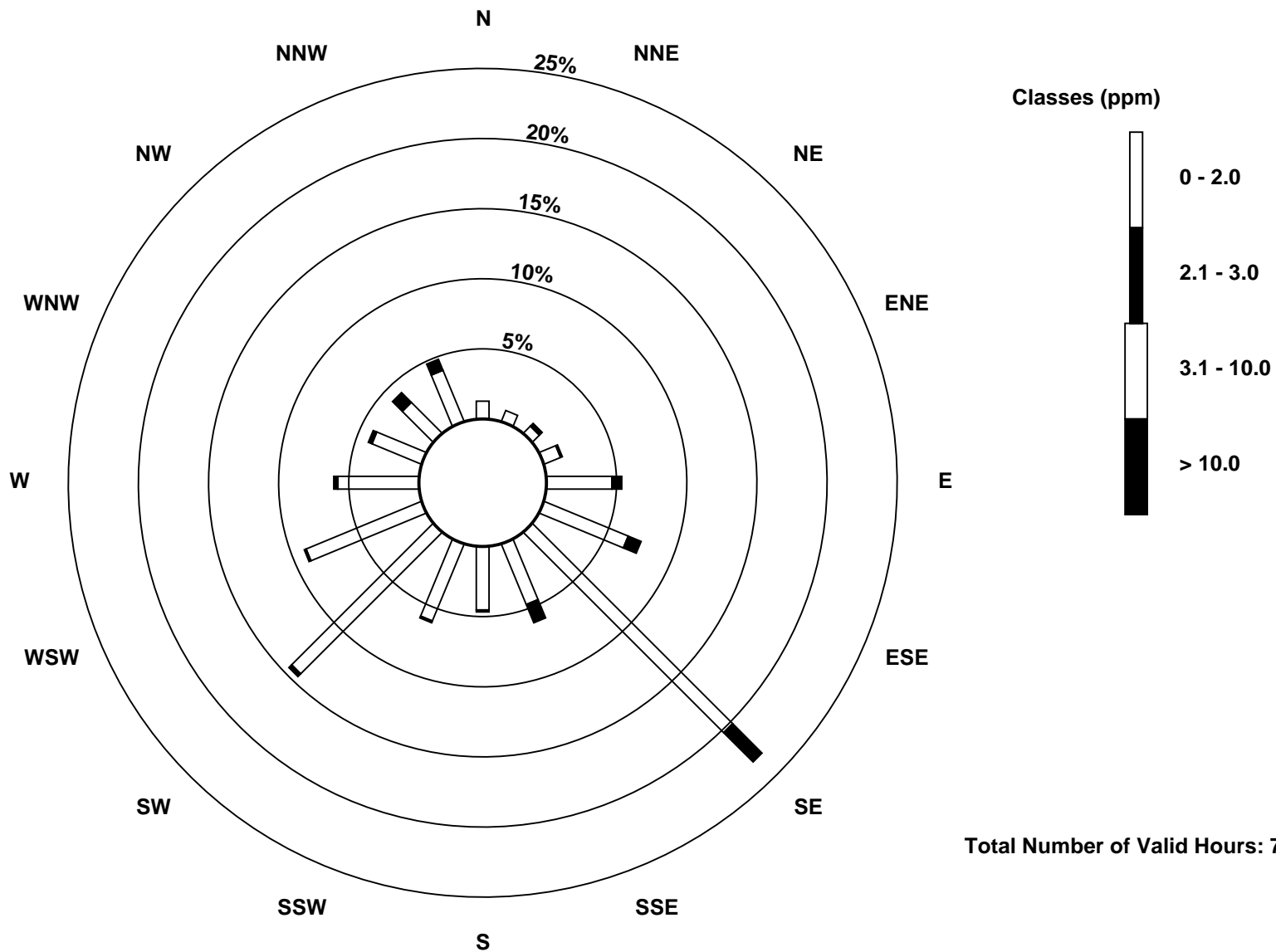
Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Total Hydrocarbons (THC) - ppm
Athabasca Valley (AMS 7)

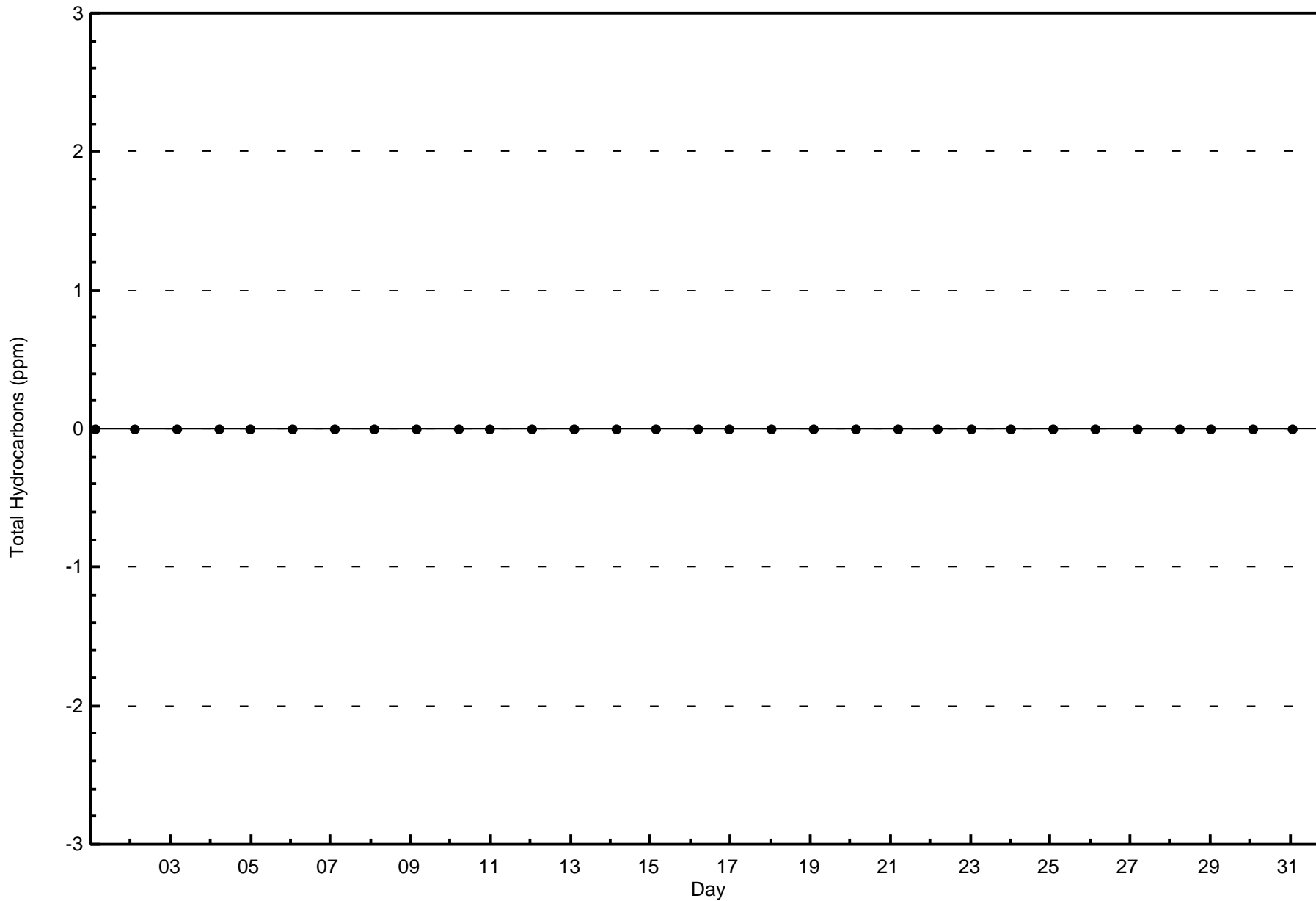


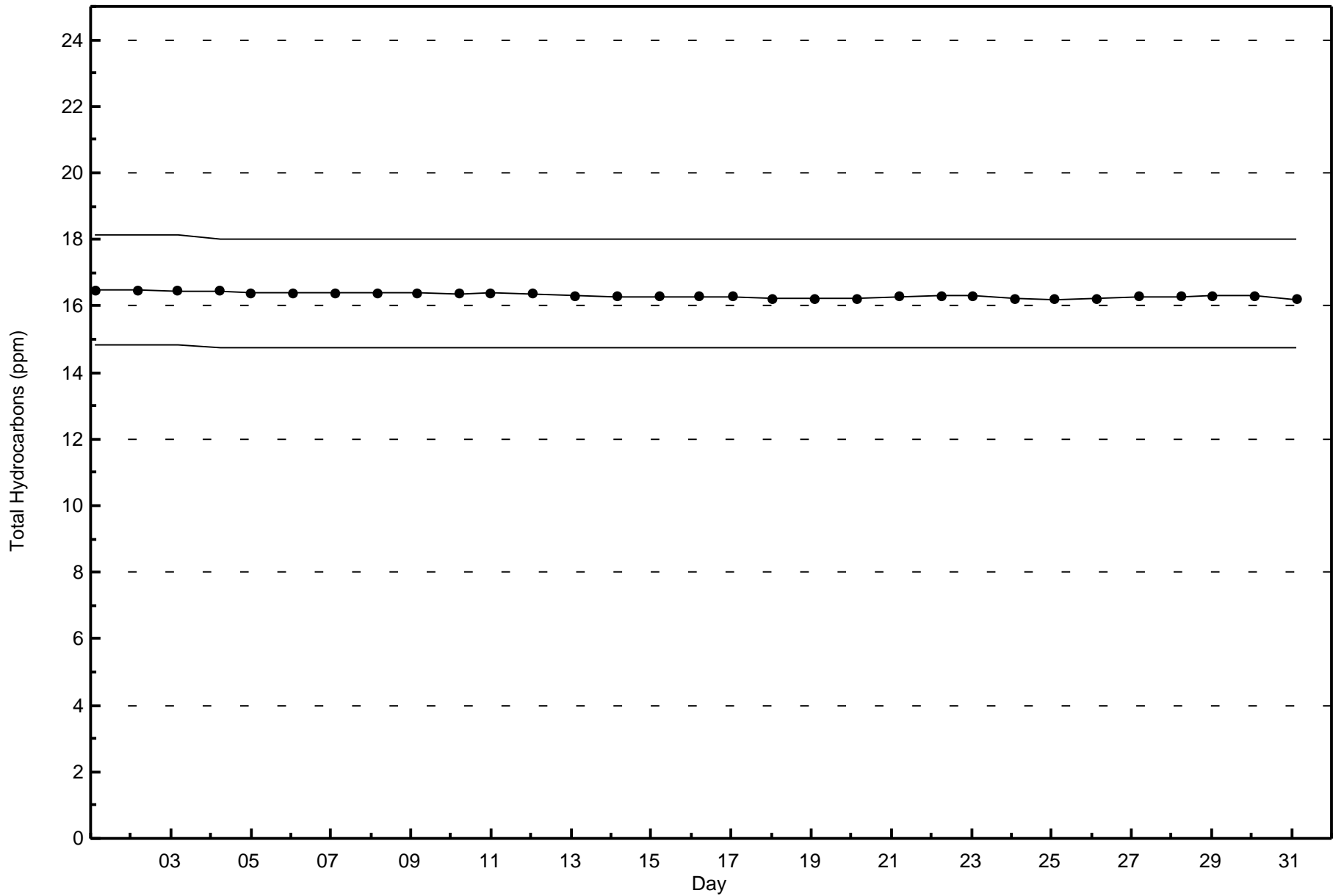
Total Number of Valid Hours: 708



Wood Buffalo Environmental Association
Zero Responses

Total Hydrocarbons (THC) - ppm
Athabasca Valley - August 2017







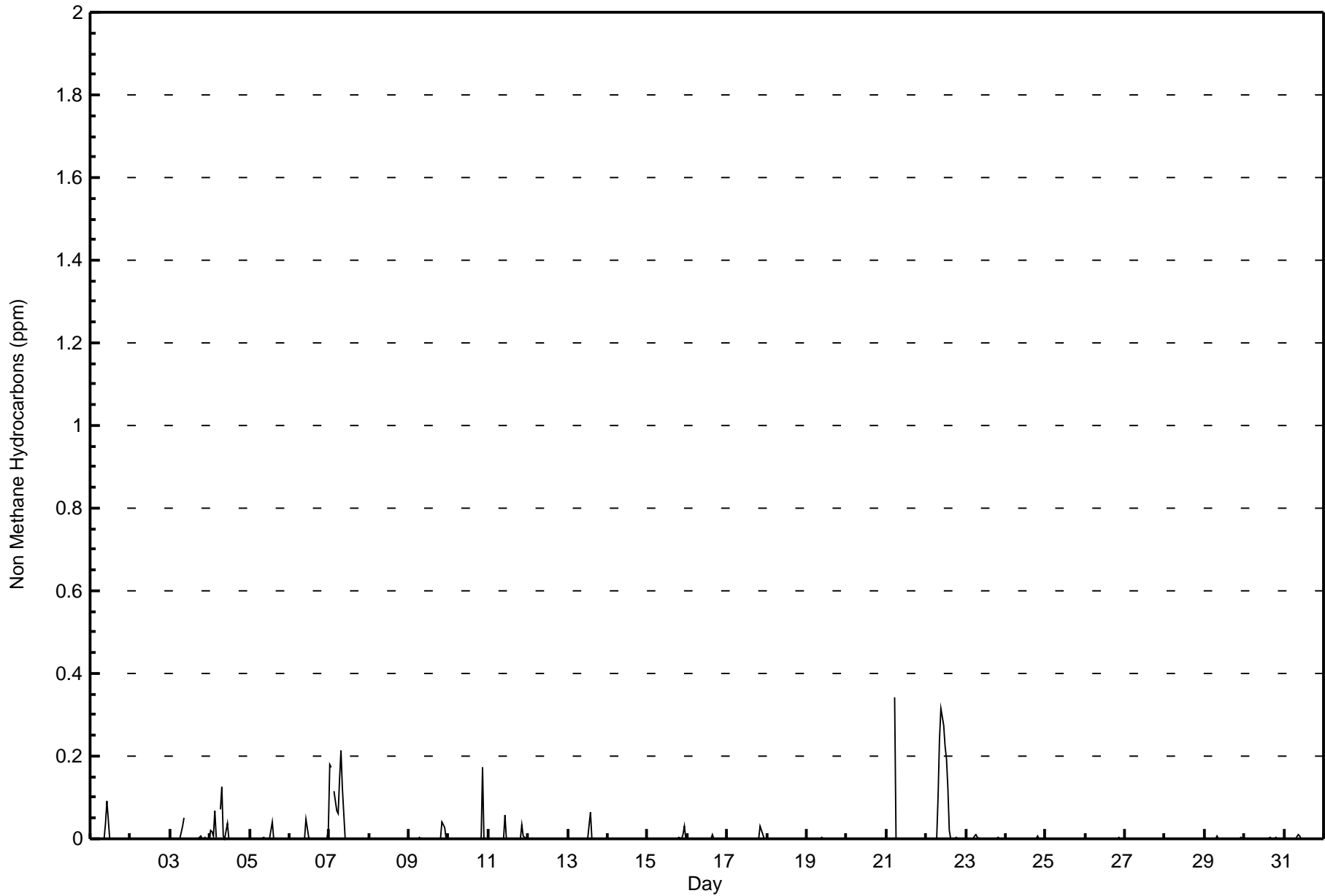
Wood Buffalo Environmental Association

Summary of Hour Averages

Non Methane Hydrocarbons (NMHC) - ppm

Athabasca Valley - August 2017

| Maximum Value: 0.341 ppm on Aug 21 06:00 Maximum Daily Average: 0.065 ppm on Aug 22 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: | 744 | | | |
|--|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------------------|-------|-------|---------------|---------------|
| Minimum Value: 0.000 ppm on Aug 1 01:00 Minimum Daily Average: 0.000 ppm on Aug 18 | | | | | | | | | | | | | | | | | | | | | | Hours of Data: | 708 | | | |
| Maximum Diurnal Average: 0.017 ppm at hour 11 Minimum Diurnal Average: 0.000 ppm at hour 17 | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: | 36 | | | |
| Monthly Average: 0.006 ppm Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.2 | | | | | | | | | | | | | | | | | | | | | | Hours of Calibration: | 35 | | | |
| | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: | 99.9 | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.036 | 0.093 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.006 | 0.093 |
| 2-Aug | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 | 0.000 | 0.002 |
| 3-Aug | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.030 | 0.049 | C | C | C | C | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.007 | 0.001 | 0.000 | 0.003 | 0.000 | 0.000 | 0.005 | 0.049 |
| 4-Aug | 0.021 | 0.016 | 0.008 | 0.067 | 0.004 | Z | 0.071 | 0.127 | 0.006 | 0.000 | 0.038 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.016 | 0.127 | |
| 5-Aug | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 | 0.000 | 0.000 | 0.041 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.041 | |
| 6-Aug | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.049 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.003 | 0.049 | |
| 7-Aug | 0.181 | 0.172 | Z | 0.116 | 0.066 | 0.062 | 0.146 | 0.214 | 0.122 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.047 | 0.214 | |
| 8-Aug | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | |
| 9-Aug | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.039 | 0.028 | 0.003 | 0.039 | |
| 10-Aug | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.174 | 0.000 | 0.008 | 0.174 | |
| 11-Aug | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.059 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.035 | 0.008 | 0.003 | 0.059 | |
| 12-Aug | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | |
| 13-Aug | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.064 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.003 | 0.064 | |
| 14-Aug | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.001 | |
| 15-Aug | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 | 0.009 | 0.029 | 0.002 | 0.029 | |
| 16-Aug | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.009 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.009 | |
| 17-Aug | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.029 | 0.009 | 0.000 | 0.002 | 0.029 | |
| 18-Aug | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | M | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | |
| 19-Aug | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.003 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.003 | |
| 20-Aug | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | |
| 21-Aug | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.341 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.015 | 0.341 | |
| 22-Aug | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.100 | 0.242 | 0.317 | 0.274 | 0.223 | 0.195 | 0.122 | 0.019 | 0.000 | 0.000 | 0.000 | 0.004 | 0.000 | 0.000 | 0.000 | 0.000 | 0.065 | 0.317 | |
| 23-Aug | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.008 | 0.010 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 | 0.000 | 0.000 | 0.001 | 0.010 | |
| 24-Aug | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.005 | 0.000 | 0.000 | 0.000 | 0.000 | 0.005 | |
| 25-Aug | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | |
| 26-Aug | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.005 | 0.000 | 0.000 | 0.000 | 0.005 | |
| 27-Aug | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | |
| 28-Aug | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 | 0.000 | 0.000 | 0.002 | |
| 29-Aug | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.007 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.004 | 0.001 | 0.007 | |
| 30-Aug | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.004 | 0.000 | 0.000 | 0.001 | 0.004 | 0.000 | 0.000 | 0.000 | 0.000 | 0.004 | |
| 31-Aug | 0.000 | 0.003 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.011 | 0.005 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.011 | |
| | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | |
| | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | |
| Z - zerospan C - Calibration M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | |





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - August 2017**

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 0.005 | 659 | 93.08 | 93.08 |
| 0.006 - 0.05 | 26 | 3.67 | 96.75 |
| 0.06 - 0.1 | 13 | 1.84 | 98.59 |
| > 0.1 | 10 | 1.41 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - August 2017**

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|------------|-----------|------------|-----------|------------|------------|------------|-----------|------------|------------|------------|-----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 0.005 | 8 | 6 | 5 | 10 | 36 | 50 | 157 | 40 | 30 | 42 | 102 | 63 | 40 | 25 | 19 | 26 | 659 |
| 0.006 - 0.05 | 1 | 0 | 0 | 0 | 0 | 3 | 5 | 3 | 2 | 1 | 1 | 0 | 2 | 2 | 3 | 3 | 26 |
| 0.06 - 0.1 | 0 | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 4 | 13 |
| > 0.1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 5 | 1 | 10 |
| Totals | 9 | 6 | 7 | 10 | 38 | 53 | 164 | 43 | 33 | 43 | 103 | 64 | 43 | 29 | 29 | 34 | 708 |

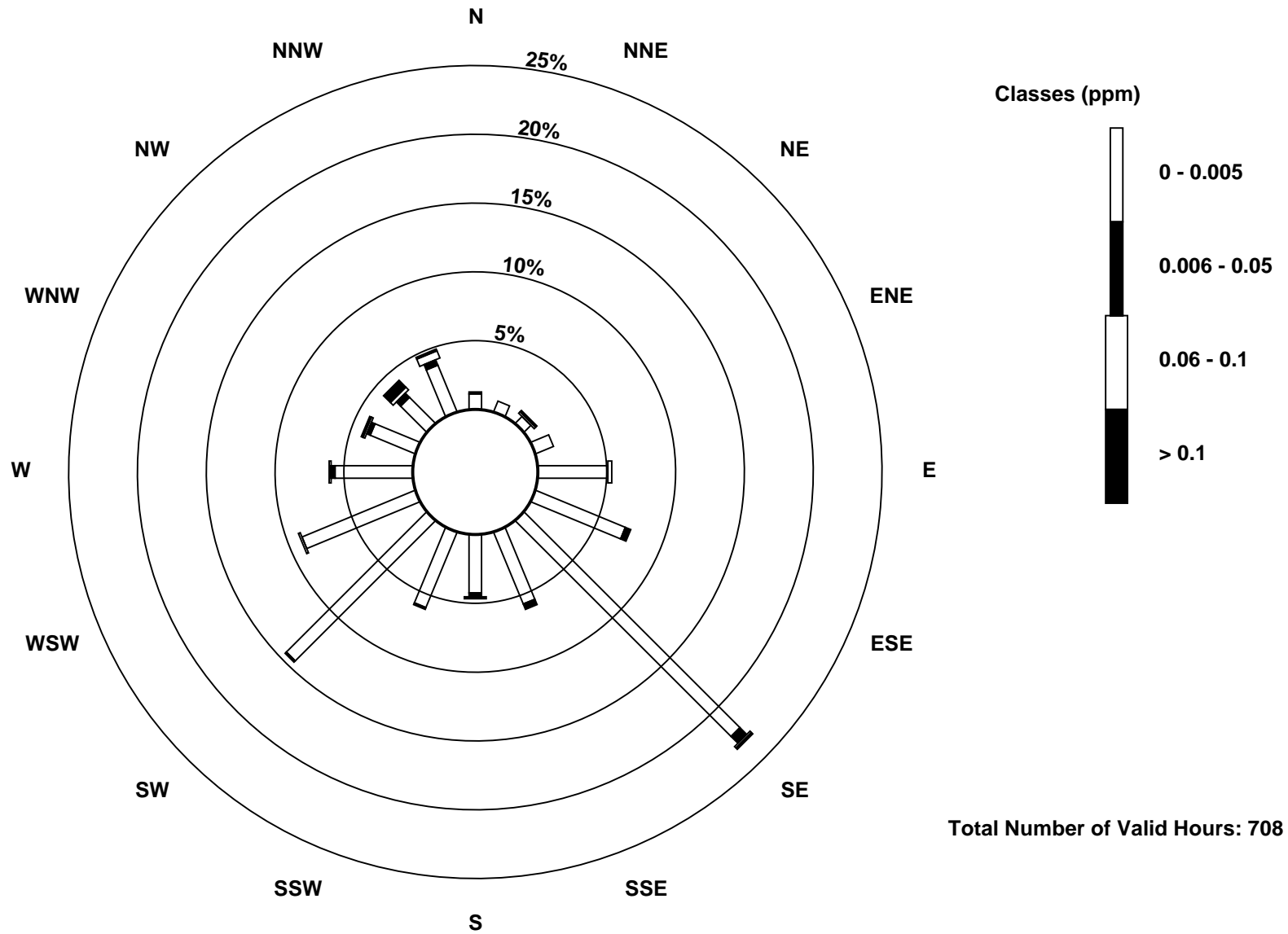
Total Number of Valid Hours: 708

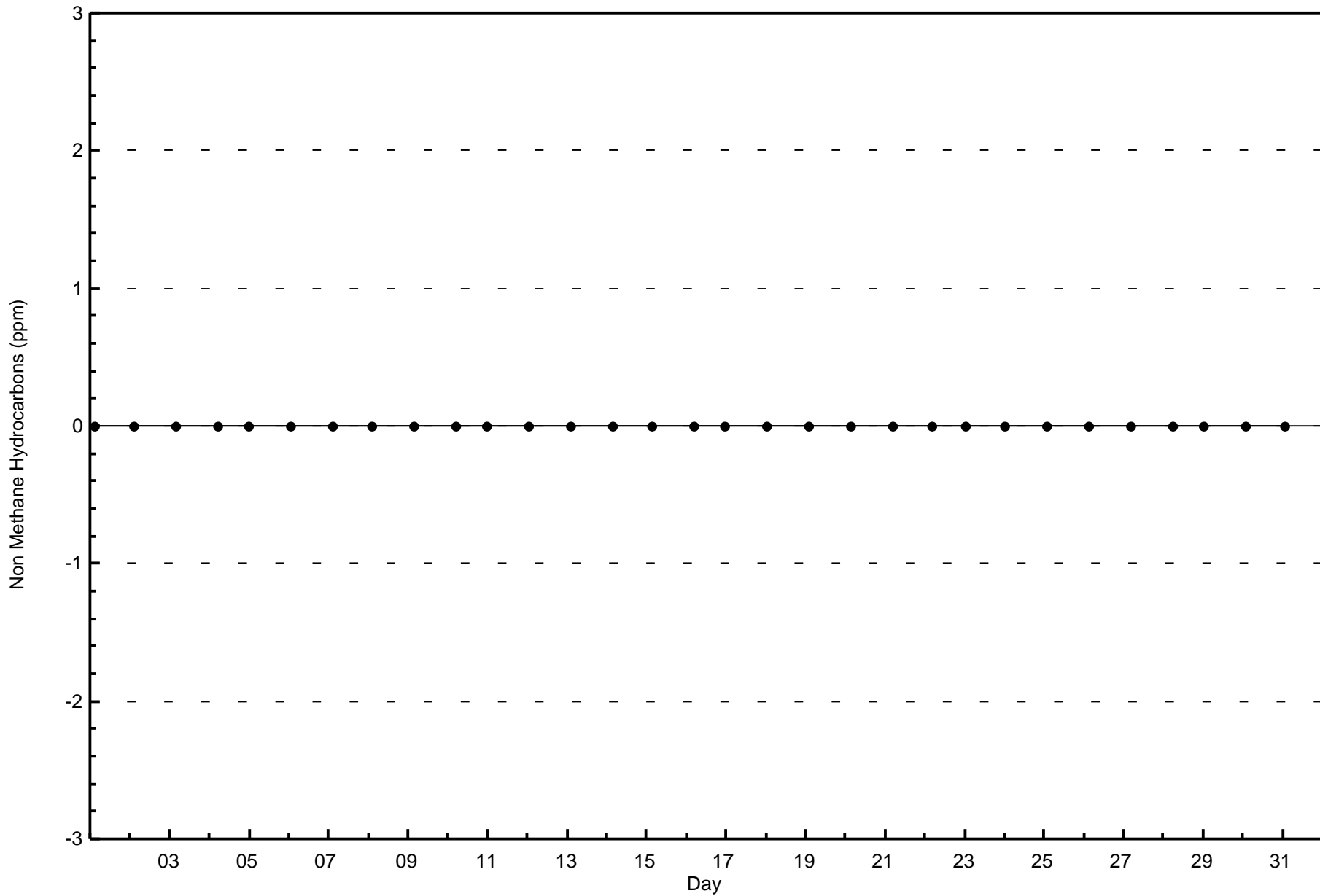
Total Number of Hours: 744

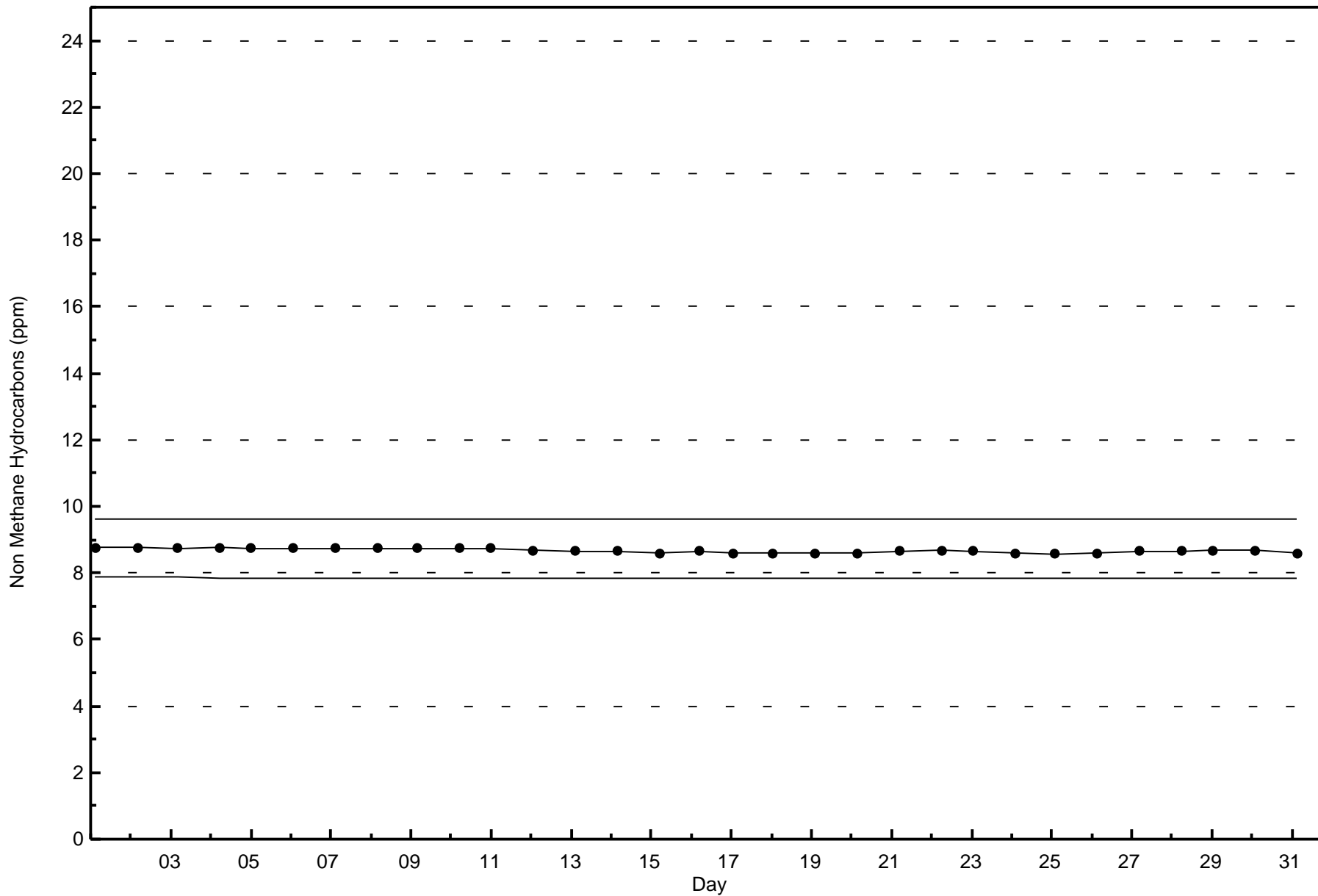


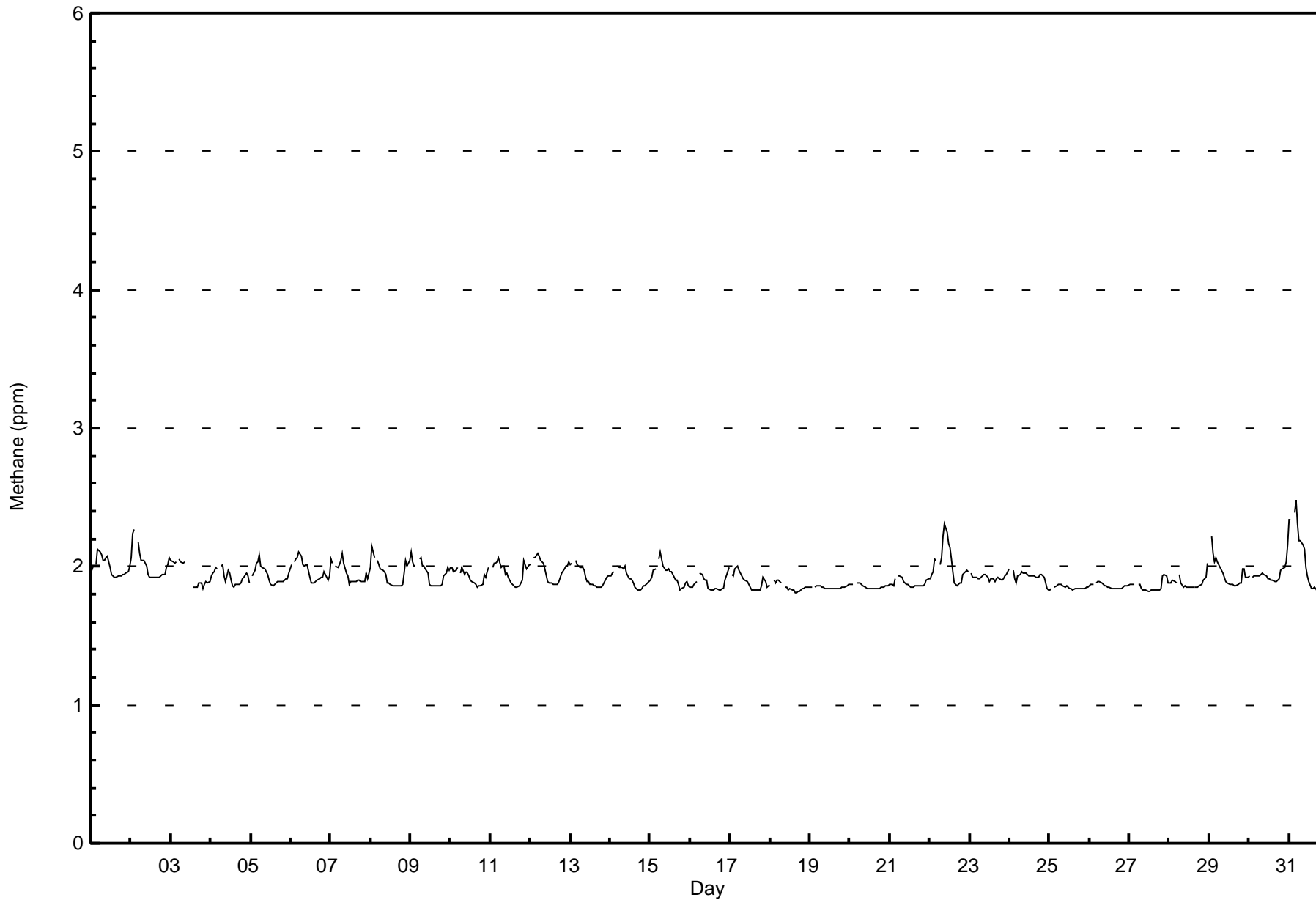
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley (AMS 7)











**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Methane (CH₄) - ppm
Athabasca Valley - August 2017**

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2.0 | 655 | 92.51 | 92.51 |
| 2.1 - 3.0 | 53 | 7.49 | 100.00 |
| 3.1 - 10.0 | 0 | 0.00 | 100.00 |
| > 10.0 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Methane (CH₄) - ppm
Athabasca Valley - August 2017**

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|----|-----|-----|-----|----|-----|-----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2.0 | 9 | 6 | 6 | 9 | 33 | 47 | 145 | 34 | 33 | 42 | 101 | 64 | 42 | 27 | 25 | 32 | 655 |
| 2.1 - 3.0 | 0 | 0 | 1 | 1 | 5 | 6 | 19 | 9 | 0 | 1 | 2 | 0 | 1 | 2 | 4 | 2 | 53 |
| 3.1 - 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 9 | 6 | 7 | 10 | 38 | 53 | 164 | 43 | 33 | 43 | 103 | 64 | 43 | 29 | 29 | 34 | 708 |

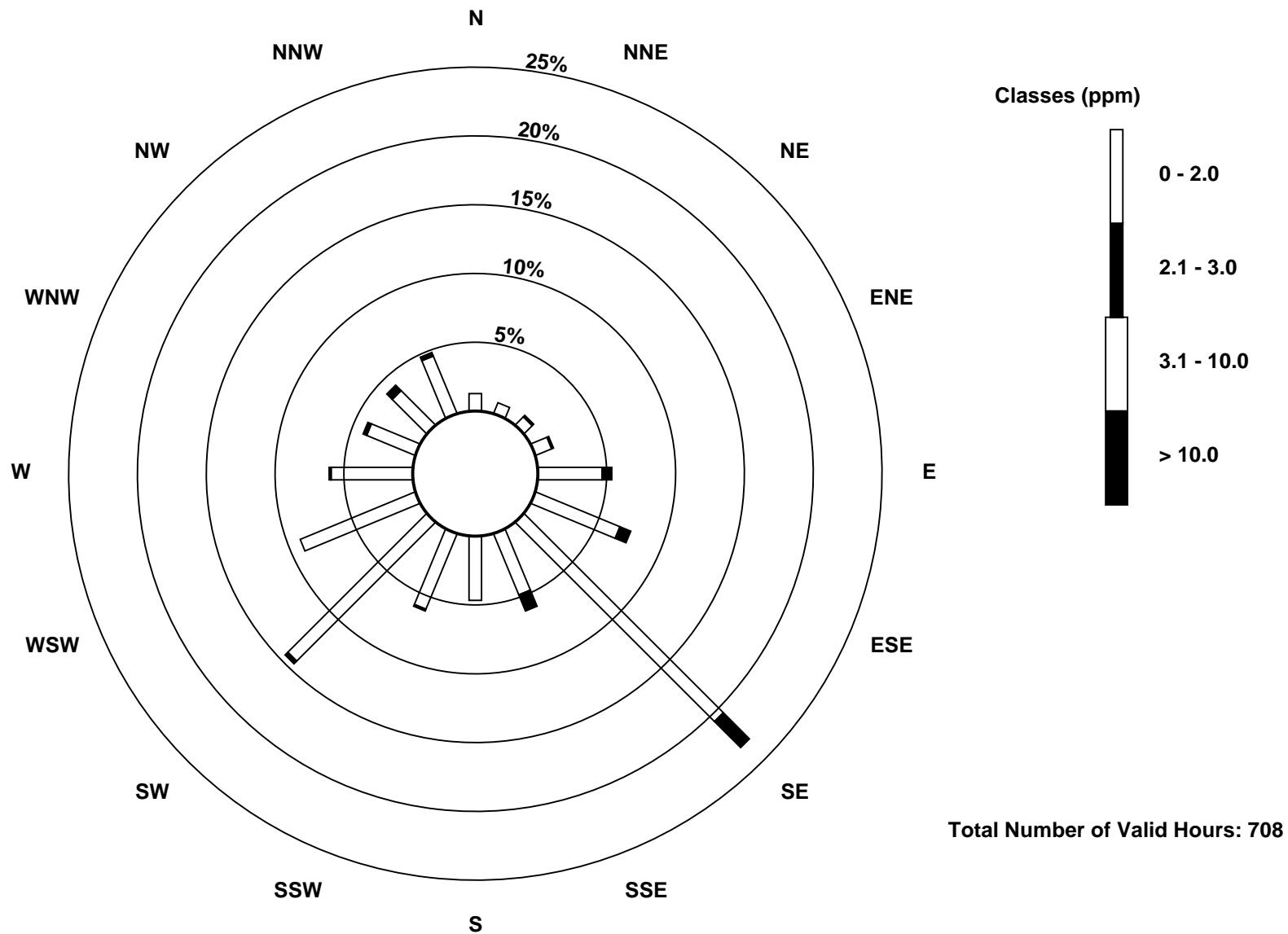
Total Number of Valid Hours: 708

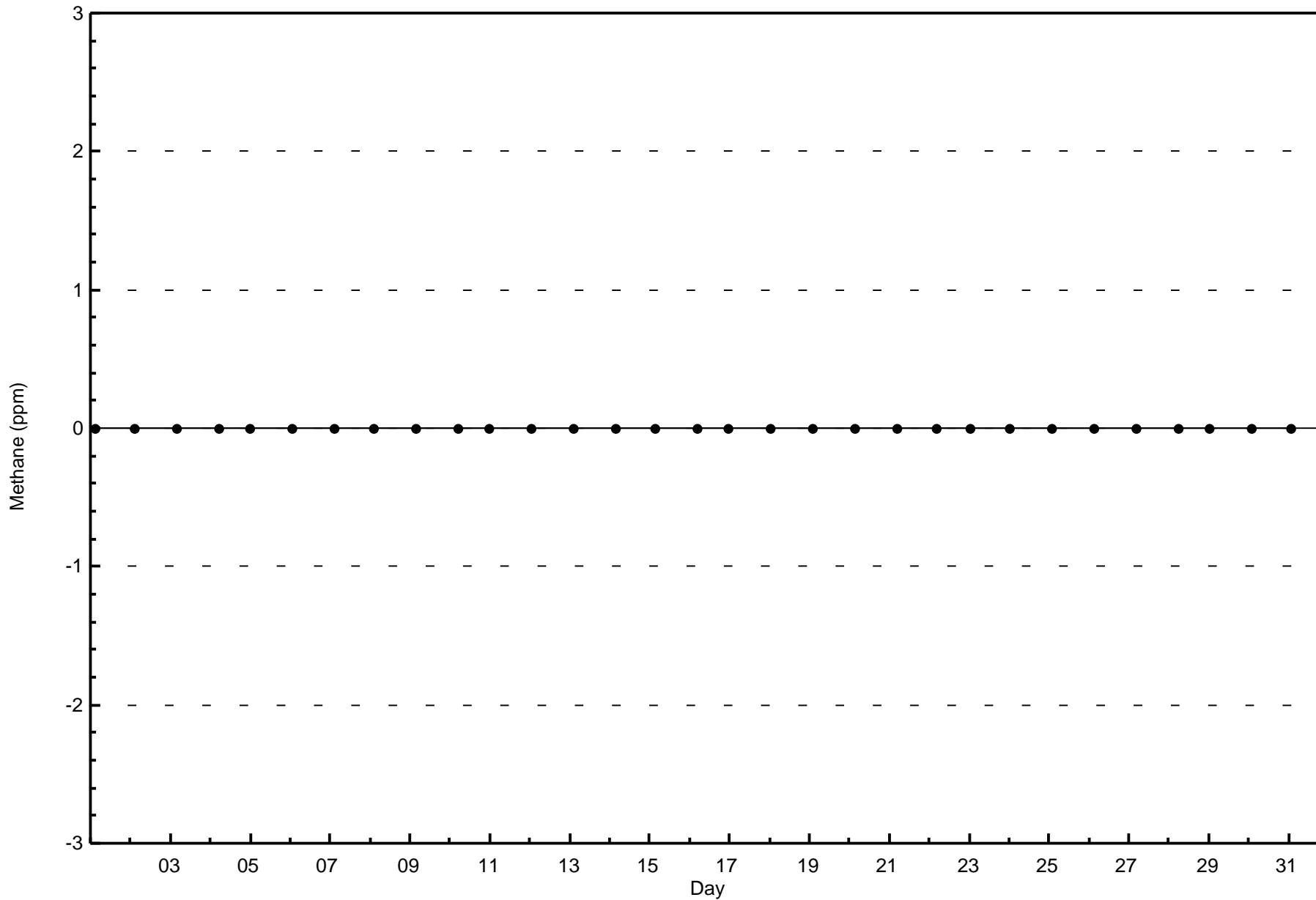
Total Number of Hours: 744

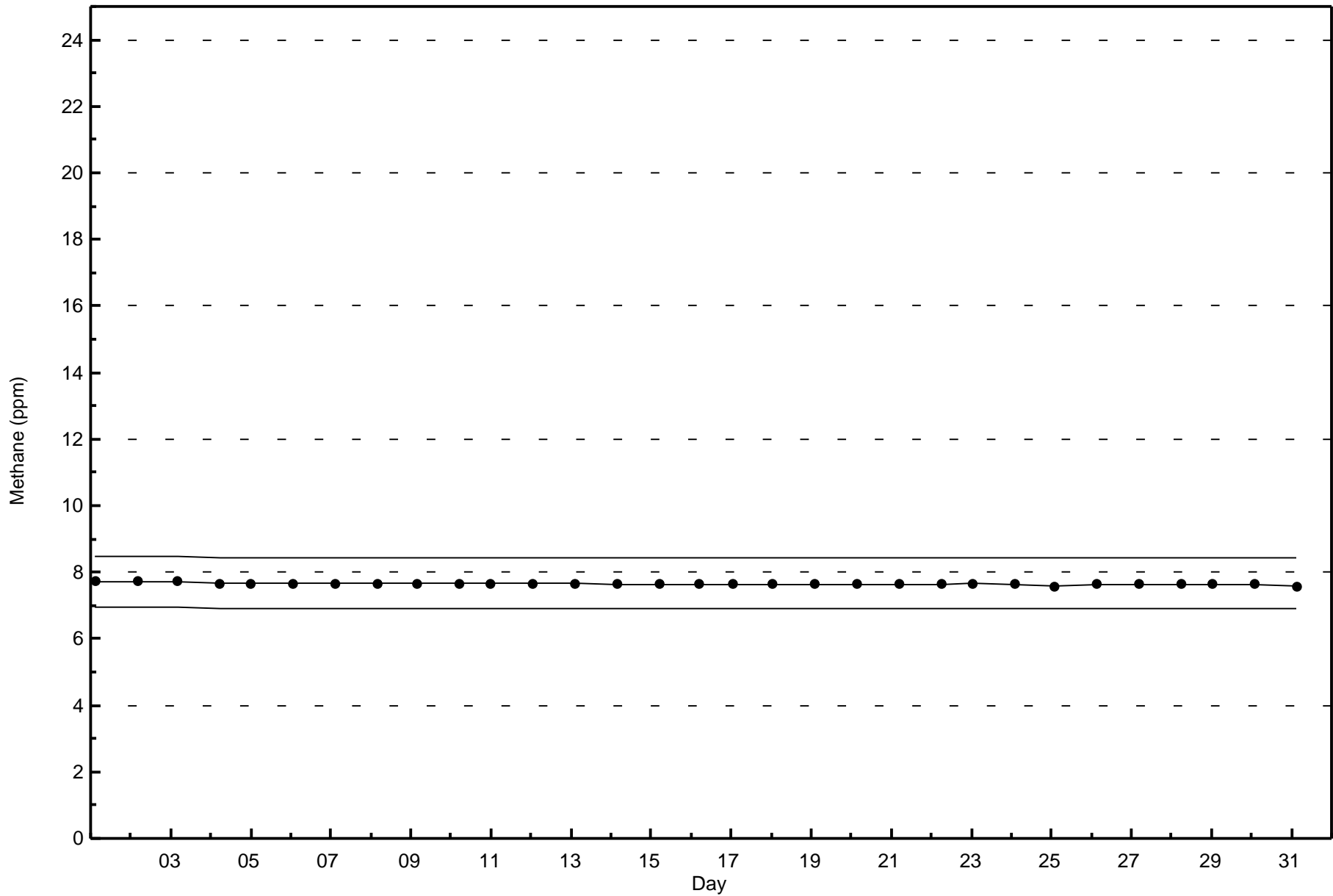


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Methane (CH₄) - ppm
Athabasca Valley (AMS 7)









Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

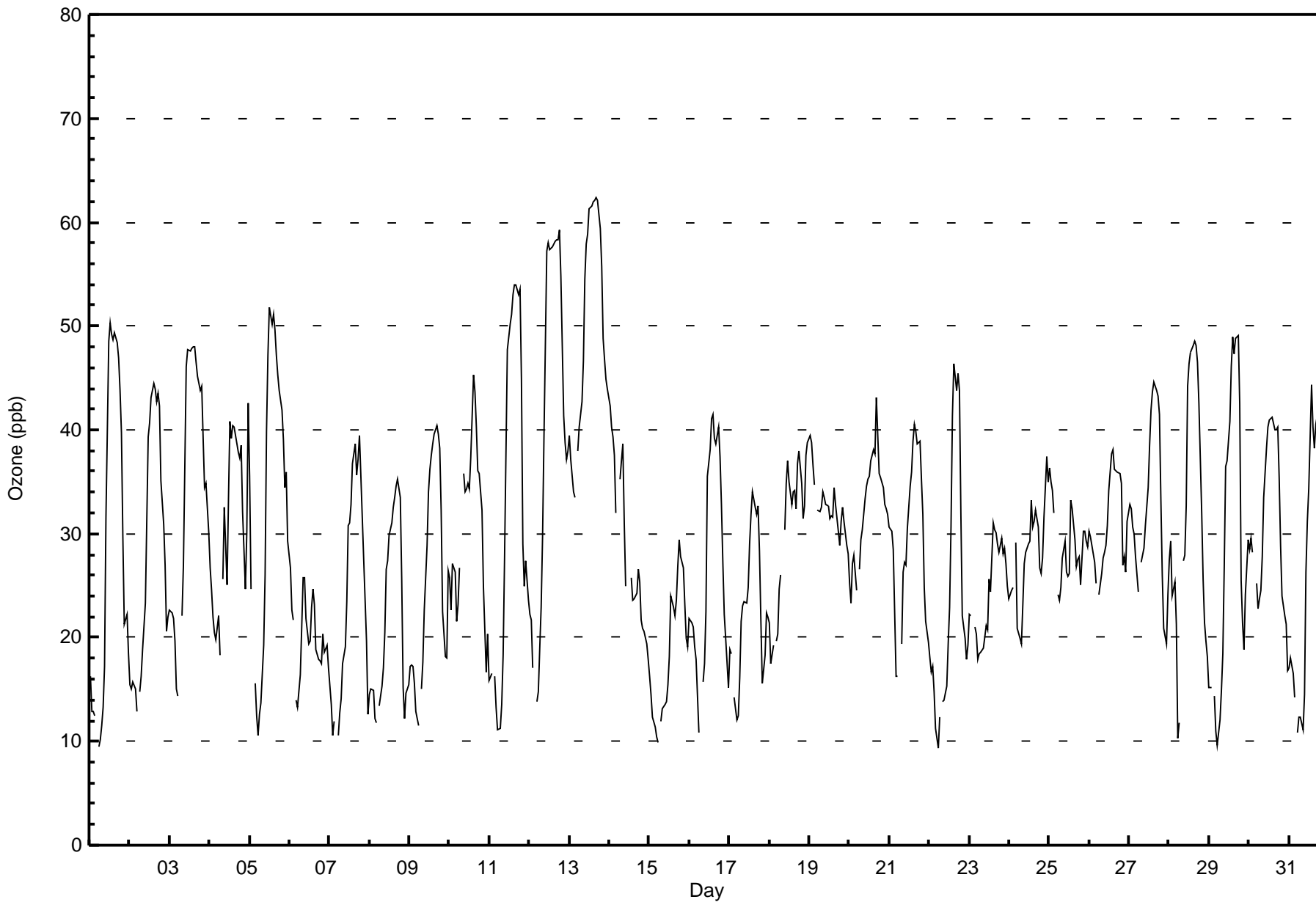
Athabasca Valley - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|----|----|--------------------------------|----|----|----|------|---------------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|-----------------|--|
| Maximum Value: 62 ppb on Aug 13 17:00 | | | | | | | | | | Maximum Daily Average: 50.2 ppb on Aug 13 | | | | | | | | | | Hours of Data: 710 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum Value: 9 ppb on Aug 22 06:00 | | | | | | | | | | Minimum Daily Average: 18.5 ppb on Aug 15 | | | | | | | | | | Hours of Missing Data: 34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 40.1 ppb at hour 15 | | | | | | | | | | Minimum Diurnal Average: 16.7 ppb at hour 6 | | | | | | | | | | Hours of Calibration: 33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 29.5 ppb | | | | | | | | | | Percentiles: P ₁ = 11 P ₁₀ = 15 Q ₁ = 21 Median = 28 Q ₃ = 37 P ₉₀ = 44 P ₉₉ = 58 | | | | | | | | | | Percent Operational Time: 99.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 16 | 13 | 13 | 12 | Z | 10 | 10 | 11 | 13 | 17 | 32 | 49 | 50 | 49 | 49 | 49 | 48 | 47 | 44 | 40 | 30 | 21 | 22 | 18 | 28.9 | 50 | | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 15 | 15 | 16 | 15 | 13 | Z | 15 | 16 | 19 | 23 | 31 | 39 | 41 | 43 | 44 | 44 | 43 | 43 | 42 | 35 | 31 | 27 | 21 | 22 | 28.5 | 44 | | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 23 | 22 | 22 | 20 | 15 | 14 | Z | 22 | 27 | 37 | 46 | 48 | 48 | 48 | 48 | 48 | 47 | 45 | 44 | 44 | 39 | 34 | 35 | 30 | 35.0 | 48 | | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 27 | 25 | 22 | 20 | 20 | 22 | 18 | Z | 26 | 33 | 25 | 33 | 41 | 39 | 40 | 40 | 39 | 38 | 37 | 39 | 32 | 25 | 30 | 43 | 31.0 | 43 | | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 36 | 25 | Z | 16 | 12 | 11 | 13 | 14 | 19 | 26 | 40 | 47 | 52 | 50 | 51 | 50 | 47 | 45 | 44 | 42 | 39 | 34 | 36 | 29 | 33.8 | 52 | | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 27 | 23 | 22 | Z | 14 | 13 | 16 | 21 | 26 | 26 | 22 | 19 | 20 | 23 | 25 | 23 | 19 | 18 | 18 | 17 | 20 | 19 | 19 | 17 | 20.3 | 27 | | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 15 | 14 | 11 | 12 | Z | 11 | 13 | 14 | 17 | 19 | 23 | 31 | 31 | 33 | 37 | 39 | 36 | 37 | 40 | 36 | 28 | 24 | 20 | 13 | 23.9 | 40 | | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 14 | 15 | 15 | 12 | 12 | Z | 13 | 15 | 17 | 21 | 27 | 27 | 30 | 31 | 33 | 33 | 35 | 35 | 34 | 26 | 15 | 12 | 15 | 15 | 21.8 | 35 | | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 17 | 17 | 17 | 16 | 13 | 12 | Z | 15 | 18 | 23 | 29 | 34 | 36 | 38 | 39 | 40 | 40 | 40 | 38 | 32 | 23 | 18 | 18 | 26 | 26.0 | 40 | | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 26 | 23 | 27 | 26 | 22 | 23 | 27 | Z | 36 | 34 | 34 | 35 | 34 | 37 | 45 | 44 | 40 | 36 | 36 | 32 | 25 | 21 | 17 | 20 | 30.4 | 45 | | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 16 | 17 | Z | 16 | 13 | 11 | 11 | 14 | 18 | 27 | 38 | 48 | 50 | 51 | 53 | 54 | 54 | 53 | 53 | 45 | 29 | 25 | 27 | 24 | 32.5 | 54 | | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 22 | 22 | 17 | Z | 14 | 15 | 19 | 23 | 30 | 39 | 57 | 58 | 57 | 58 | 58 | 58 | 58 | 58 | 59 | 55 | 41 | 39 | 37 | 38 | 40.5 | 59 | | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 39 | 37 | 34 | 33 | Z | 38 | 40 | 43 | 47 | 55 | 58 | 59 | 61 | 62 | 62 | 62 | 62 | 62 | 59 | 56 | 49 | 47 | 45 | 44 | 50.2 | 62 | | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 42 | 40 | 39 | 38 | 32 | Z | 35 | 37 | 39 | 31 | 25 | C | C | 26 | 24 | 24 | 24 | 27 | 25 | 22 | 21 | 21 | 19 | 18 | 29.0 | 42 | | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 16 | 15 | 12 | 11 | 10 | 10 | Z | 12 | 13 | 14 | 14 | 15 | 18 | 24 | 23 | 22 | 24 | 27 | 29 | 28 | 27 | 23 | 20 | 19 | 18.5 | 29 | | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 22 | 21 | 21 | 19 | 18 | 14 | 11 | Z | 16 | 18 | 23 | 36 | 38 | 41 | 41 | 39 | 39 | 40 | 37 | 33 | 27 | 22 | 20 | 15 | 26.6 | 41 | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 19 | 18 | Z | 14 | 12 | 12 | 16 | 21 | 23 | 23 | 23 | 25 | 29 | 32 | 34 | 33 | 32 | 33 | 28 | 22 | 16 | 18 | 22 | 22 | 23.0 | 34 | | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 21 | 18 | 19 | Z | 20 | 20 | 25 | 26 | M | 30 | 35 | 37 | 35 | 33 | 34 | 34 | 32 | 37 | 38 | 35 | 31 | 33 | 38 | 39 | 30.4 | 39 | | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 39 | 39 | 37 | 35 | Z | 32 | 32 | 32 | 34 | 33 | 33 | 33 | 31 | 32 | 32 | 34 | 33 | 30 | 29 | 31 | 33 | 31 | 29 | 28 | 32.7 | 39 | | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 25 | 23 | 27 | 28 | 25 | Z | 27 | 29 | 30 | 33 | 35 | 35 | 35 | 37 | 38 | 38 | 43 | 39 | 36 | 35 | 34 | 33 | 32 | 32 | 32.7 | 43 | | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 31 | 30 | 28 | 22 | 16 | 16 | Z | 19 | 26 | 27 | 27 | 30 | 35 | 36 | 39 | 41 | 40 | 39 | 39 | 35 | 32 | 25 | 22 | 20 | 29.4 | 41 | | | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 18 | 17 | 17 | 15 | 11 | 9 | 12 | Z | 14 | 14 | 15 | 19 | 23 | 31 | 41 | 46 | 44 | 45 | 44 | 32 | 22 | 20 | 18 | 19 | 23.8 | 46 | | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 22 | 22 | Z | 21 | 20 | 18 | 19 | 19 | 20 | 21 | 21 | 26 | 24 | 31 | 30 | 30 | 29 | 28 | 30 | 28 | 29 | 27 | 25 | 25 | 24.3 | 31 | | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 24 | 25 | 25 | Z | 29 | 21 | 20 | 19 | 23 | 27 | 28 | 29 | 29 | 33 | 31 | 31 | 32 | 31 | 27 | 26 | 28 | 32 | 37 | 35 | 27.9 | 37 | | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 36 | 35 | 34 | 32 | Z | 24 | 24 | 25 | 28 | 29 | 26 | 26 | 26 | 33 | 32 | 29 | 27 | 28 | 28 | 25 | 30 | 30 | 29 | 29 | 29.0 | 36 | | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 30 | 30 | 28 | 27 | 25 | Z | 24 | 26 | 28 | 28 | 29 | 31 | 34 | 38 | 38 | 36 | 36 | 36 | 36 | 35 | 27 | 28 | 26 | 31 | 30.8 | 38 | | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 33 | 32 | 31 | 30 | 28 | 24 | Z | 27 | 28 | 29 | 31 | 34 | 39 | 42 | 44 | 45 | 44 | 43 | 41 | 33 | 26 | 21 | 19 | 24 | 32.5 | 45 | | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 28 | 29 | 24 | 25 | 21 | 10 | 12 | Z | 27 | 28 | 33 | 44 | 46 | 48 | 48 | 49 | 48 | 47 | 43 | 32 | 26 | 21 | 20 | 18 | 31.6 | 49 | | | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 15 | 15 | Z | 14 | 11 | 10 | 12 | 15 | 18 | 27 | 37 | 37 | 41 | 46 | 49 | 47 | 49 | 49 | 42 | 25 | 21 | 19 | 24 | 29 | 28.4 | 49 | | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 28 | 30 | 28 | Z | 25 | 23 | 24 | 24 | 28 | 33 | 38 | 40 | 41 | 41 | 41 | 40 | 40 | 40 | 35 | 29 | 24 | 22 | 21 | 17 | 31.1 | 41 | | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 17 | 18 | 17 | 14 | Z | 11 | 12 | 12 | 11 | 15 | 26 | 31 | 34 | 44 | 40 | 38 | 41 | 41 | 40 | 39 | 40 | 40 | 40 | 40 | 28.8 | 44 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 24.6 | 23.3 | 23.2 | 21.0 | 18.1 | 16.7 | 19.2 | 21.3 | 23.9 | 27.1 | 31.0 | 35.0 | 37.1 | 38.8 | 40.1 | 40.0 | 39.5 | 39.3 | 37.9 | 33.7 | 28.8 | 26.2 | 26.0 | 25.8 | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 42 | 40 | 39 | 38 | 32 | 38 | 40 | 43 | 47 | 55 | 58 | 59 | 61 | 62 | 62 | 62 | 62 | 62 | 62 | 59 | 56 | 49 | 47 | 45 | 44 | Diurnal Maximum | |
| Z - zerospan C - Calibration M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Ozone (O₃) - ppb
Athabasca Valley - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ozone (O₃) - ppb
Athabasca Valley - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 176 | 24.79 | 24.79 |
| 21 - 50 | 505 | 71.13 | 95.92 |
| 51 - 82 | 29 | 4.08 | 100.00 |
| > 83 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Athabasca Valley - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|----|-----|-----|-----|----|-----|-----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 1 | 1 | 1 | 2 | 17 | 21 | 68 | 21 | 3 | 5 | 12 | 2 | 1 | 1 | 10 | 10 | 176 |
| 21 - 50 | 8 | 5 | 6 | 10 | 20 | 28 | 79 | 20 | 24 | 39 | 91 | 61 | 41 | 30 | 19 | 24 | 505 |
| 51 - 82 | 0 | 0 | 0 | 0 | 0 | 2 | 15 | 4 | 6 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 29 |
| > 83 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 9 | 6 | 7 | 12 | 37 | 51 | 162 | 45 | 33 | 46 | 103 | 63 | 42 | 31 | 29 | 34 | 710 |

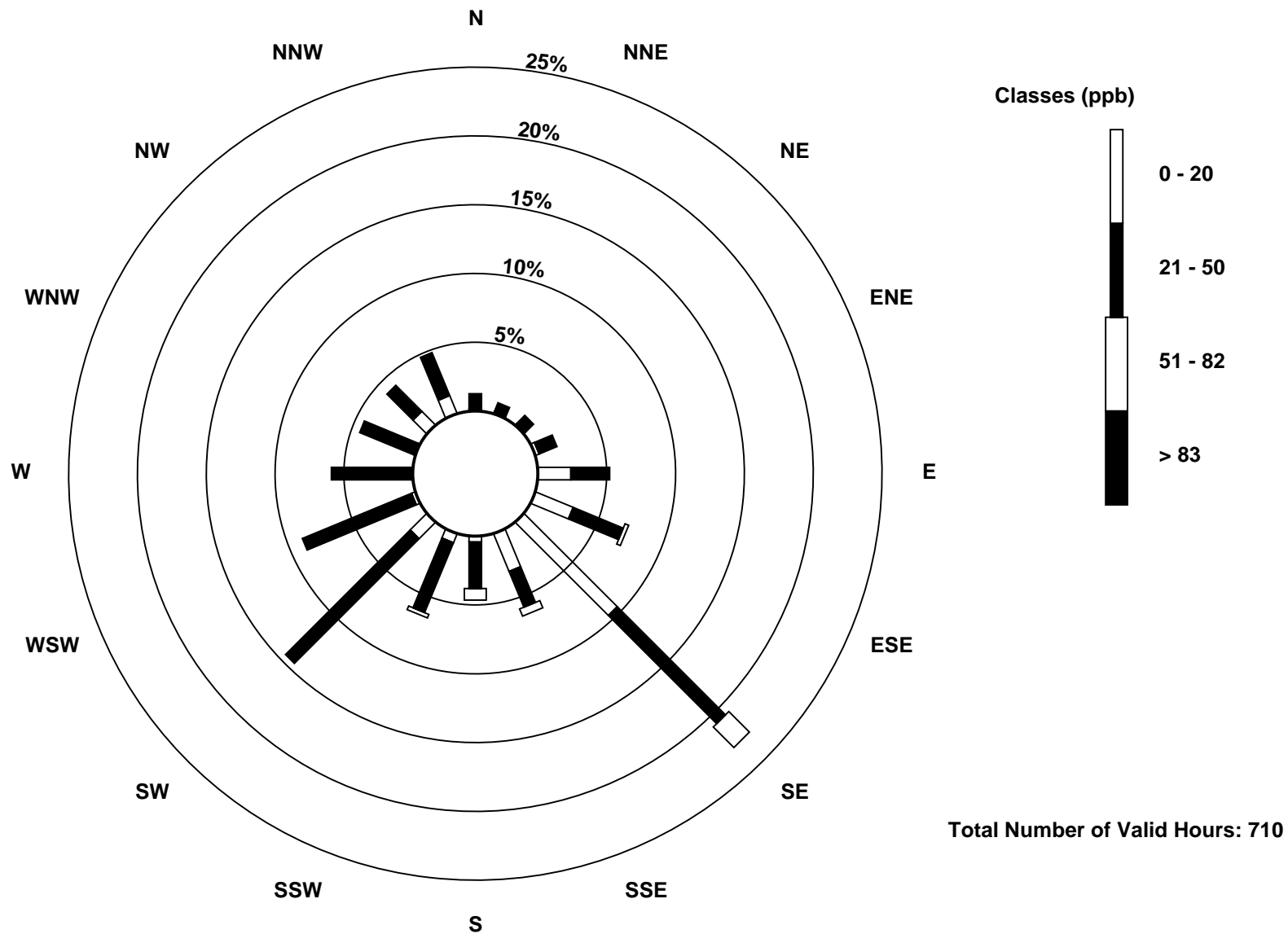
Total Number of Valid Hours: 710

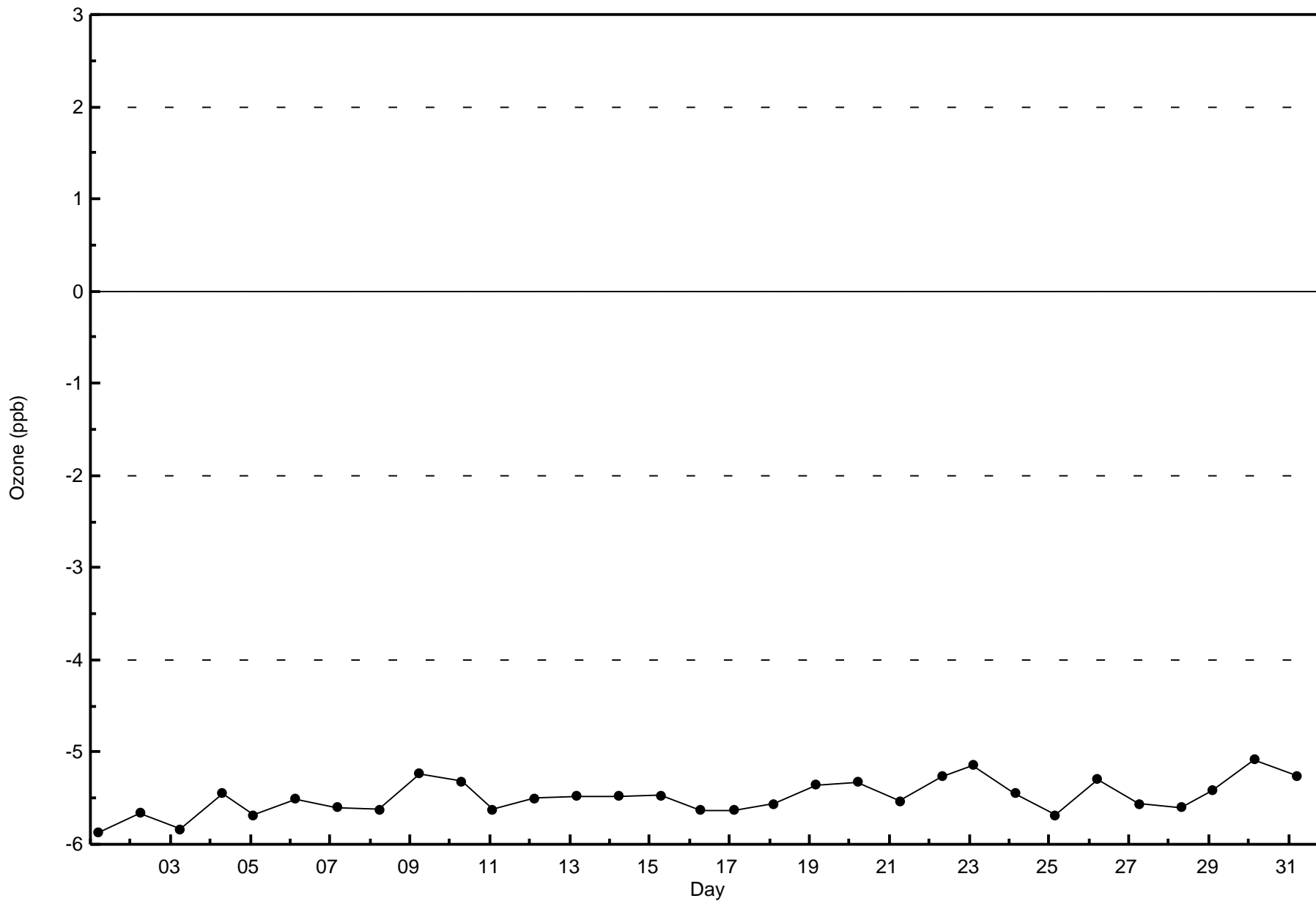
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Ozone (O₃) - ppb
Athabasca Valley (AMS 7)

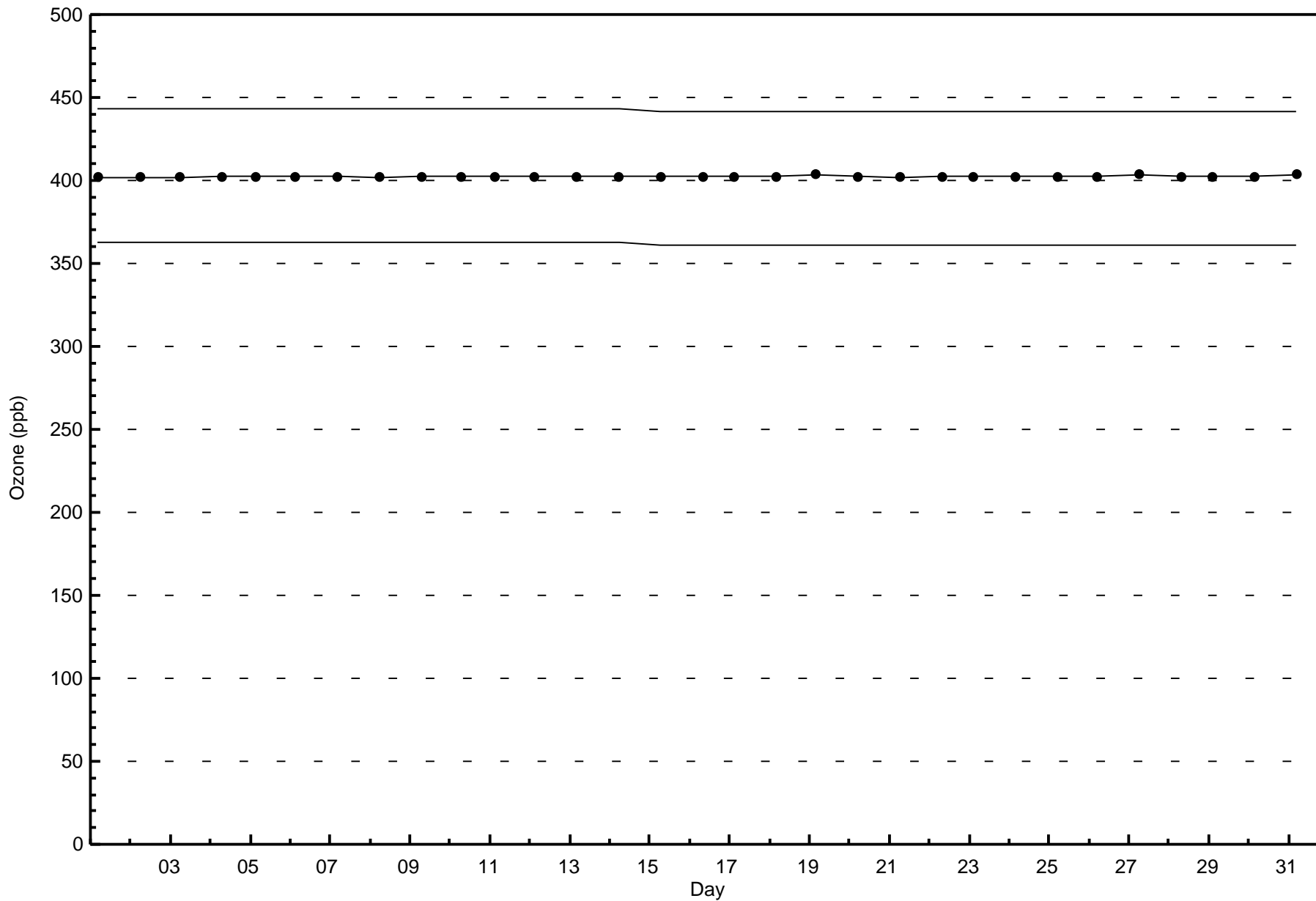






Wood Buffalo Environmental Association
Span Responses

Ozone (O₃) - ppb
Athabasca Valley - August 2017



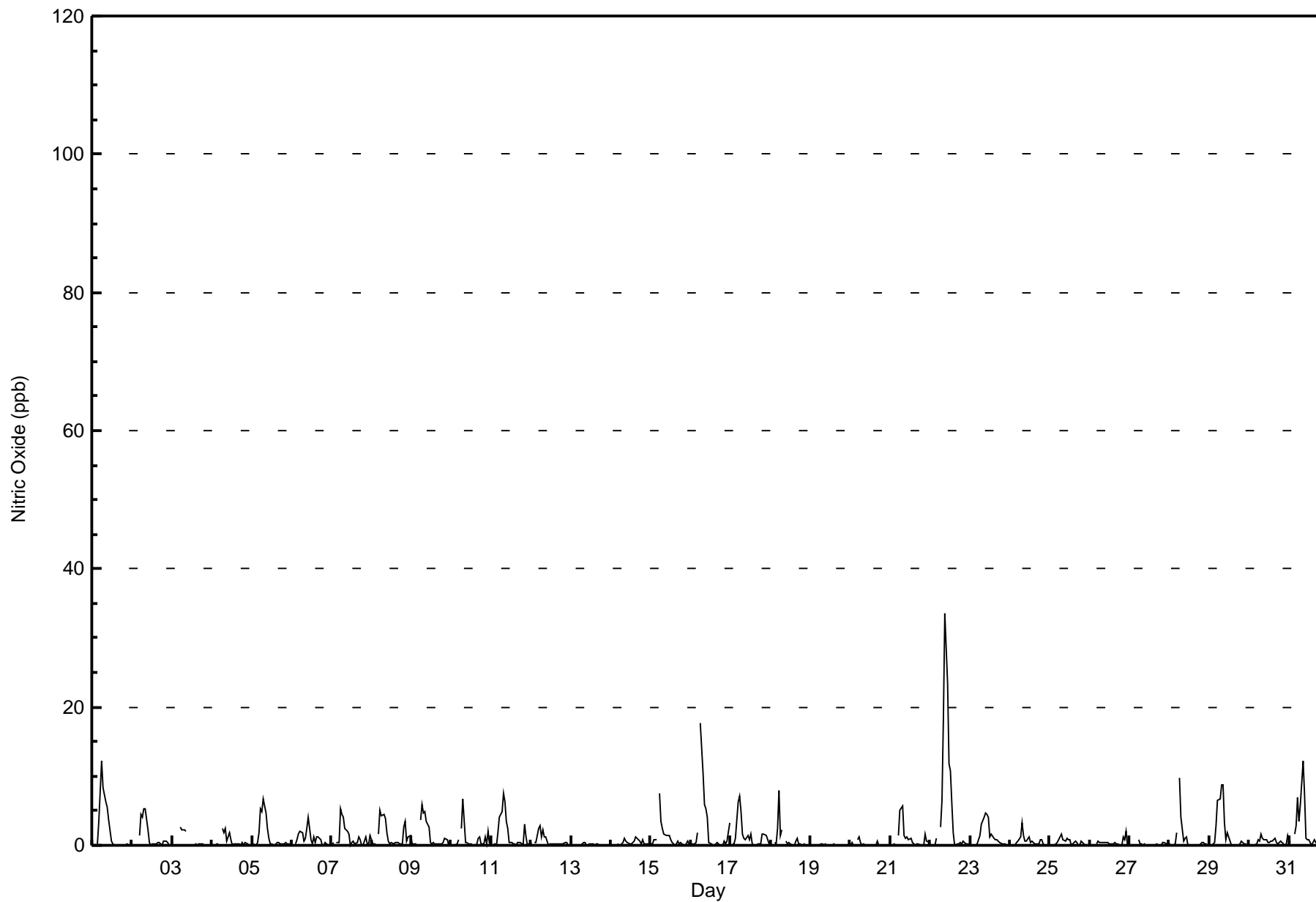


| Maximum Value: 33 ppb on Aug 22 10:00 | | | | | | | | | | | | | | | | | | Maximum Daily Average: 5.1 ppb on Aug 22 | | | | | | | | | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|---|-----------------|---|---|-----------------|----|----|----|----|----|----|----|----|----|----|----|---|----|-----------------|----|-------|----|-------|---------------|---------------|--|--------|--|--------|--|--------|--|--------|--|--------------------------------|--|--------|--|--------|--|-------|--|-------|--|-------|--|-------|--|-------|--|-------|--|-------|--|-------|--|-------|--|-------|--|-------|--|
| Minimum Value: 0 ppb on Aug 6 19:00 | | | | | | | | | | | | | | | | | | Minimum Daily Average: 0.0 ppb on Aug 19 | | | | | | | | | | | | | | | | | | Hours of Data: 708 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 3.6 ppb at hour 8 | | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 0.1 ppb at hour 2 | | | | | | | | | | | | | | | | | | Hours of Missing Data: 36 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 1.1 ppb | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 12 | | | | | | | | | | | | | | | | | | Hours of Calibration: 35 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 99.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 0 | 0 | Z | 0 | 4 | 12 | 8 | 7 | 6 | 5 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.1 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 0 | 0 | 0 | Z | 1 | 4 | 4 | 5 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1.2 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 0 | 0 | 0 | 0 | Z | 3 | 2 | 2 | 2 | C | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 0 | 0 | 0 | 0 | 0 | Z | 2 | 2 | 2 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | Z | 0 | 0 | 0 | 2 | 5 | 5 | 7 | 5 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.3 | 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 0 | Z | 0 | 1 | 2 | 2 | 2 | 1 | 1 | 2 | 4 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0.9 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 0 | 0 | Z | 0 | 0 | 5 | 5 | 4 | 2 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1.2 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 1 | 0 | 0 | Z | 2 | 5 | 4 | 4 | 4 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 4 | 1 | 1 | 1.5 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 0 | 0 | 0 | 0 | Z | 4 | 6 | 5 | 5 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1.3 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 0 | 0 | 0 | 0 | 1 | Z | 2 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 2 | 0.8 | 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | Z | 0 | 0 | 0 | 2 | 4 | 5 | 8 | 6 | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 1.7 | 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 0 | Z | 0 | 0 | 3 | 3 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 0 | 0 | 1 | 1 | Z | 7 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1.1 | 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 0 | 0 | 0 | 0 | 2 | Z | 18 | 10 | 6 | 5 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2.3 | 18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | Z | 0 | 0 | 1 | 6 | 7 | 5 | 2 | 1 | 1 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 1 | 1 | 1.4 | 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 0 | Z | 0 | 0 | 2 | 8 | 1 | 2 | M | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.9 | 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 0 | 0 | 0 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 0 | 0 | 0 | 0 | Z | 1 | 5 | 6 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0.9 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 0 | 0 | 0 | 0 | 1 | Z | 3 | 6 | 18 | 33 | 23 | 12 | 11 | 6 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 5.1 | 33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | Z | 0 | 0 | 0 | 0 | 1 | 1 | 3 | 4 | 5 | 4 | 4 | 1 | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1.3 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 0 | Z | 0 | 0 | 0 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0.6 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 0 | 0 | Z | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0.4 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 0 | 0 | 0 | Z | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 0.4 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 0 | 0 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 0 | 0 | 0 | 0 | 2 | Z | 10 | 4 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.9 | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | Z | 0 | 0 | 0 | 3 | 7 | 7 | 9 | 9 | 3 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1.8 | 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 0 | Z | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0.6 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 1 | 0 | Z | 2 | 3 | 7 | 3 | 6 | 12 | 7 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.0 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | Diurnal Average | | Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.1 1 | | | | | | | | | | | | | | | | | | 0.1 0 | | 0.1 1 | | 0.3 2 | | 1.4 6 | | 3.5 12 | | 3.5 18 | | 3.6 10 | | 3.3 18 | | 2.9 33 | | 2.0 23 | | 1.0 12 | | 0.7 11 | | 0.5 6 | | 0.3 2 | | 0.3 1 | | 0.4 1 | | 0.2 1 | | 0.2 1 | | 0.4 3 | | 0.6 4 | | 0.3 2 | | 0.3 2 | | 0.3 3 | |
| Z - zerspan | | | C - Calibration | | | M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Athabasca Valley - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Athabasca Valley - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 706 | 99.72 | 99.72 |
| 21 - 40 | 2 | 0.28 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Athabasca Valley - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 9 | 6 | 7 | 10 | 38 | 53 | 164 | 43 | 33 | 43 | 103 | 64 | 43 | 29 | 27 | 34 | 706 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 9 | 6 | 7 | 10 | 38 | 53 | 164 | 43 | 33 | 43 | 103 | 64 | 43 | 29 | 29 | 34 | 708 |

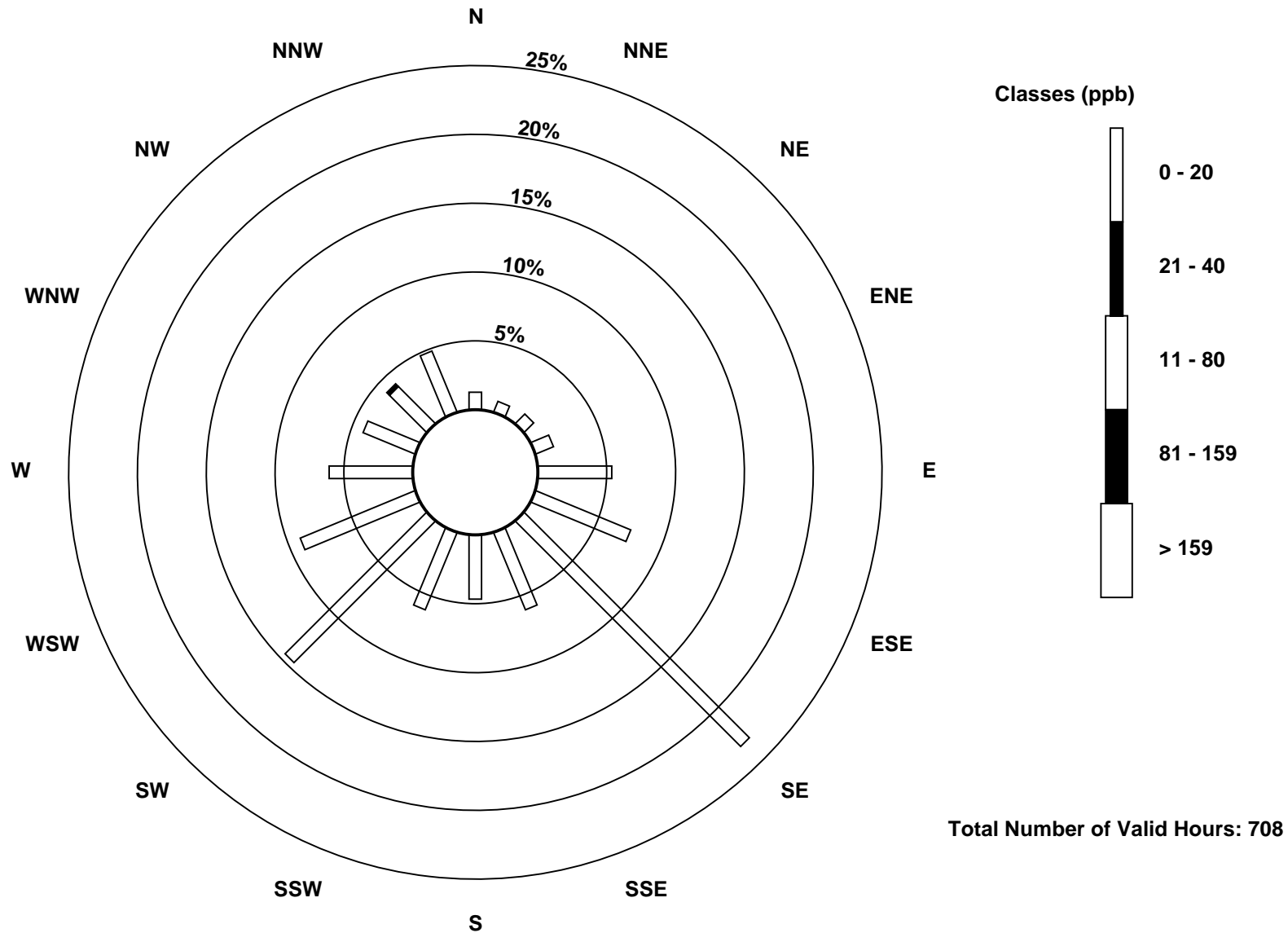
Total Number of Valid Hours: 708

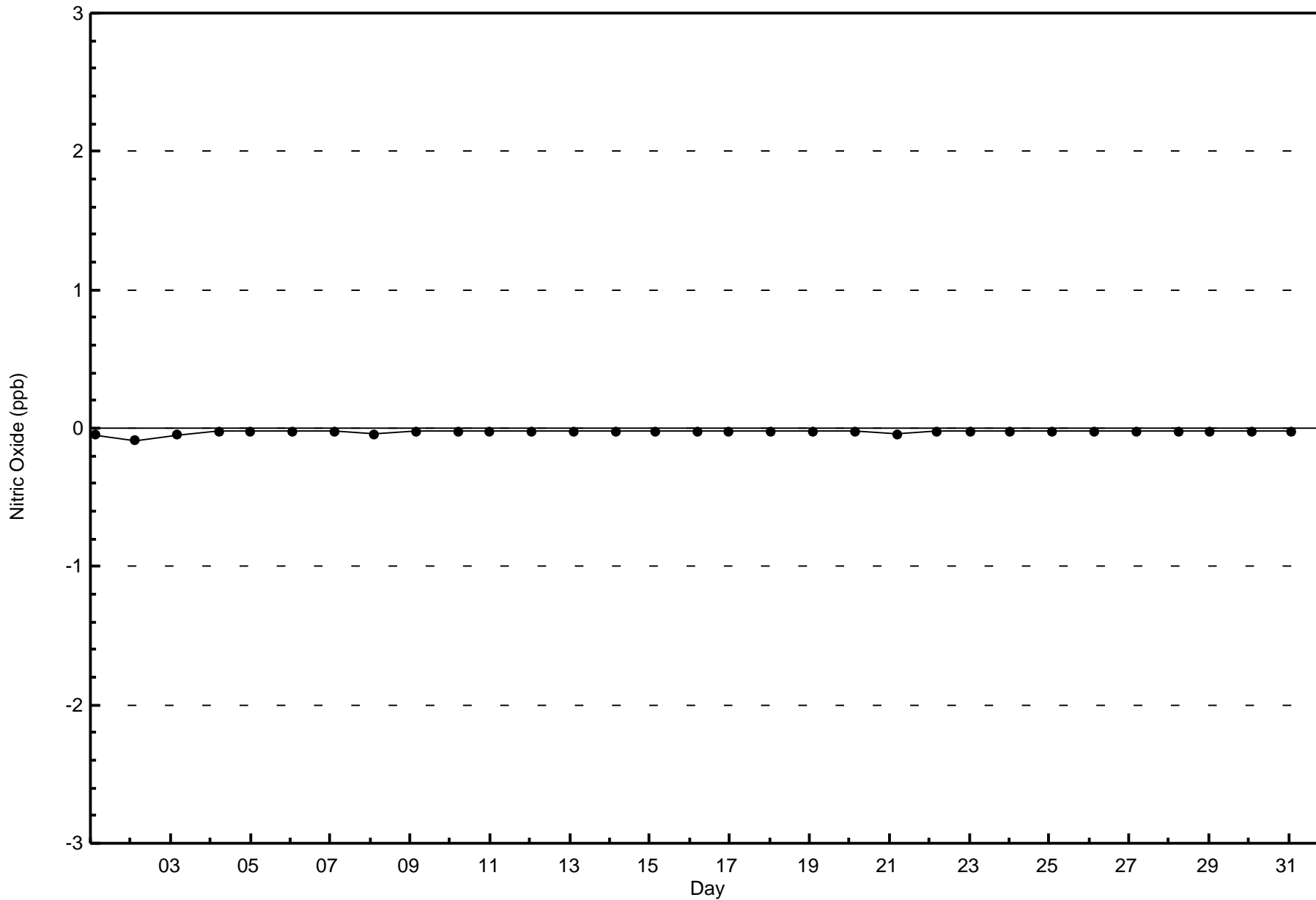
Total Number of Hours: 744

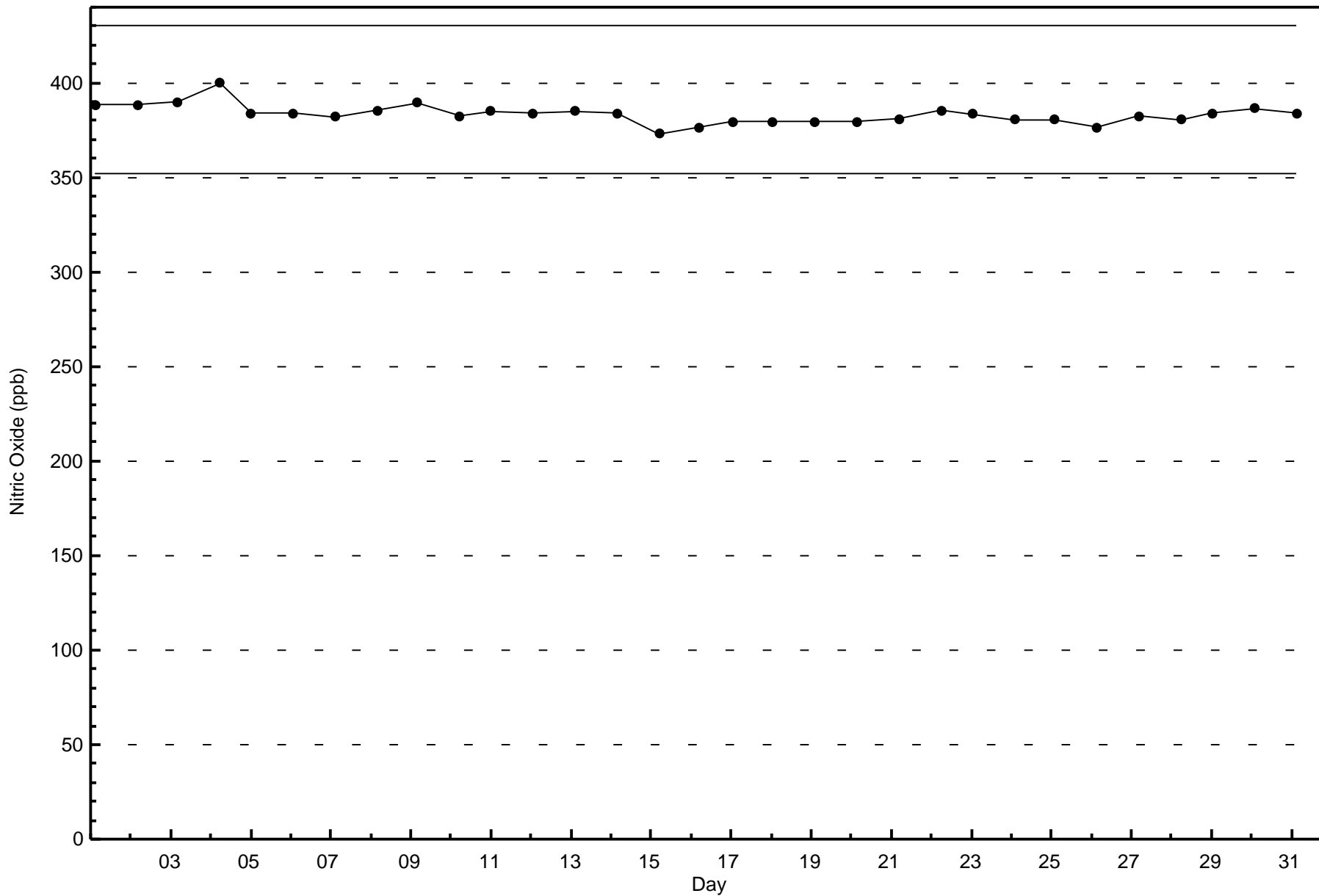


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitric Oxide (NO) - ppb
Athabasca Valley (AMS 7)









Wood Buffalo Environmental Association
Summary of Hour Averages

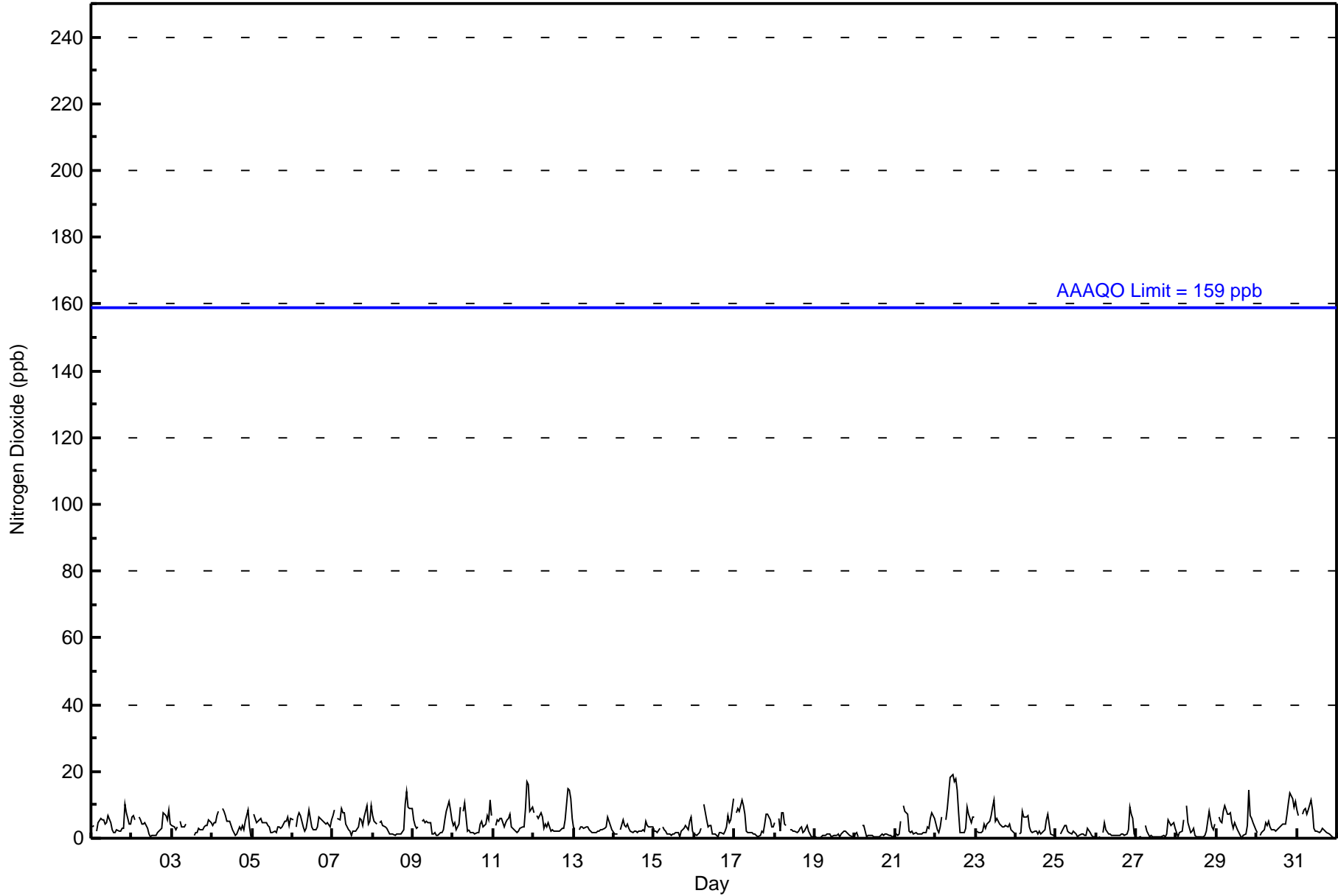
Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | |
|---|-------------------------------|---|---|---|----|----|----|----|----|---|----|----|----|----|----|----|----|----|----|--------------------------------|----|----|----|-----------------|---------------|---------------|---|
| Maximum Value: 19 ppb on Aug 22 11:00 | | | | | | | | | | Maximum Daily Average: 7.9 ppb on Aug 22 | | | | | | | | | | Hours of Data: 708 | | | | | | | |
| Minimum Value: 0 ppb on Aug 26 01:00 | | | | | | | | | | Minimum Daily Average: 0.9 ppb on Aug 19 | | | | | | | | | | Hours of Missing Data: 36 | | | | | | | |
| Maximum Diurnal Average: 6.4 ppb at hour 21 | | | | | | | | | | Minimum Diurnal Average: 1.7 ppb at hour 15 | | | | | | | | | | Hours of Calibration: 35 | | | | | | | |
| Monthly Average: 3.7 ppb | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 5 P ₉₀ = 8 P ₉₉ = 14 | | | | | | | | | | Percent Operational Time: 99.9 | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 4 | 4 | Z | 2 | 5 | 6 | 5 | 5 | 4 | 5 | 7 | 5 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 10 | 8 | 4 | 4 | 4.2 | 10 | |
| 2-Aug | 6 | 7 | 6 | Z | 6 | 6 | 4 | 4 | 5 | 3 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 8 | 7 | 6 | 9 | 4 | 4.1 | 9 | |
| 3-Aug | 4 | 3 | 3 | 3 | Z | 5 | 4 | 4 | 4 | C | C | C | C | 1 | 2 | 2 | 3 | 3 | 2 | 3 | 4 | 4 | 5 | 5 | 3.3 | 5 | |
| 4-Aug | 4 | 5 | 5 | 7 | 8 | Z | 9 | 8 | 7 | 5 | 5 | 4 | 3 | 2 | 1 | 1 | 3 | 3 | 4 | 2 | 5 | 8 | 4 | 1 | 4.4 | 9 | |
| 5-Aug | Z | 7 | 5 | 5 | 6 | 6 | 5 | 5 | 5 | 4 | 3 | 2 | 2 | 2 | 2 | 3 | 4 | 3 | 3 | 5 | 5 | 6 | 4 | 6 | 4.2 | 7 | |
| 6-Aug | 5 | Z | 3 | 6 | 8 | 7 | 4 | 2 | 3 | 5 | 8 | 3 | 3 | 3 | 3 | 3 | 7 | 6 | 5 | 5 | 4 | 5 | 4 | 6 | 4.6 | 8 | |
| 7-Aug | 7 | 8 | Z | 6 | 5 | 9 | 8 | 8 | 4 | 3 | 2 | 1 | 2 | 2 | 2 | 3 | 6 | 5 | 4 | 6 | 10 | 4 | 5 | 10 | 5.2 | 10 | |
| 8-Aug | 7 | 5 | 4 | Z | 5 | 5 | 4 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 10 | 14 | 9 | 9 | 9 | 4.4 | 14 | |
| 9-Aug | 5 | 4 | 3 | 3 | Z | 5 | 5 | 5 | 5 | 5 | 5 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 6 | 8 | 11 | 8 | 6 | 4.1 | 11 | |
| 10-Aug | 4 | 5 | 3 | 4 | 9 | Z | 8 | 11 | 2 | 3 | 2 | 2 | 2 | 1 | 2 | 2 | 4 | 5 | 3 | 4 | 7 | 6 | 11 | 7 | 4.6 | 11 | |
| 11-Aug | Z | 4 | 6 | 5 | 6 | 6 | 3 | 5 | 6 | 6 | 7 | 4 | 3 | 2 | 2 | 2 | 3 | 4 | 4 | 9 | 17 | 16 | 8 | 9 | 5.8 | 17 | |
| 12-Aug | 8 | Z | 7 | 6 | 8 | 6 | 3 | 4 | 3 | 5 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 6 | 15 | 15 | 12 | 6 | 5.4 | 15 | |
| 13-Aug | 3 | 3 | Z | 3 | 3 | 4 | 3 | 4 | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 4 | 6 | 5 | 4 | 3 | 3.0 | 6 | |
| 14-Aug | 1 | 1 | 1 | Z | 3 | 5 | 4 | 3 | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 5 | 4 | 3 | 4 | 3 | 2.8 | 5 | |
| 15-Aug | 2 | 2 | 2 | 3 | Z | 4 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 2 | 2 | 3 | 4 | 3 | 5 | 6 | 2 | 2.4 | 6 |
| 16-Aug | 1 | 1 | 1 | 2 | 3 | Z | 10 | 6 | 4 | 4 | 4 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 2 | 3 | 7 | 5 | 5 | 12 | 3.4 | 12 | |
| 17-Aug | Z | 8 | 9 | 8 | 11 | 10 | 7 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 0 | 1 | 2 | 2 | 4 | 7 | 7 | 5 | 3 | 3 | 4.3 | 11 | |
| 18-Aug | 5 | Z | 6 | 2 | 8 | 8 | 4 | 4 | M | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 4 | 2 | 2 | 4 | 2 | 1 | 0 | 1 | 3.1 | 8 | |
| 19-Aug | 0 | 0 | Z | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 0.9 | 2 |
| 20-Aug | 1 | 2 | 0 | Z | 4 | 4 | 2 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1.1 | 4 | |
| 21-Aug | 2 | 1 | 1 | 5 | Z | 10 | 8 | 7 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 4 | 3 | 6 | 8 | 6 | 3.3 | 10 | |
| 22-Aug | 4 | 3 | 2 | 3 | 6 | Z | 6 | 9 | 14 | 18 | 19 | 17 | 18 | 14 | 8 | 2 | 2 | 2 | 3 | 9 | 7 | 5 | 7 | 6 | 7.9 | 19 | |
| 23-Aug | Z | 2 | 2 | 2 | 2 | 4 | 3 | 4 | 5 | 7 | 9 | 12 | 5 | 6 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 2 | 2 | 4.2 | 12 | |
| 24-Aug | 1 | Z | 1 | 2 | 8 | 6 | 6 | 7 | 4 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 2 | 3 | 6 | 7 | 4 | 1 | 1 | 1 | 3.1 | 8 | |
| 25-Aug | 0 | 0 | Z | 1 | 3 | 4 | 4 | 2 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 2 | 1 | 1 | 0 | 1.5 | 4 | |
| 26-Aug | 0 | 0 | 0 | Z | 2 | 5 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 9 | 7 | 6 | 1 | 2.1 | 9 | |
| 27-Aug | 0 | 0 | 1 | 1 | Z | 4 | 2 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 5 | 5 | 4 | 5 | 3 | 1.6 | 5 | |
| 28-Aug | 2 | 0 | 2 | 2 | 6 | Z | 10 | 5 | 2 | 2 | 3 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 2 | 8 | 6 | 3 | 3 | 4 | 2.7 | 10 | |
| 29-Aug | Z | 6 | 5 | 5 | 8 | 10 | 7 | 7 | 8 | 5 | 3 | 5 | 2 | 2 | 1 | 0 | 1 | 1 | 4 | 14 | 7 | 6 | 5 | 2 | 5.0 | 14 | |
| 30-Aug | 2 | Z | 1 | 2 | 3 | 5 | 4 | 5 | 4 | 3 | 3 | 2 | 2 | 3 | 3 | 4 | 4 | 4 | 7 | 11 | 14 | 12 | 10 | 11 | 5.1 | 14 | |
| 31-Aug | 8 | 7 | Z | 7 | 8 | 9 | 7 | 9 | 12 | 9 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 0 | 0 | 4.3 | 12 | |
| 3.3 3.4 3.1 3.7 5.5 5.8 5.0 4.6 4.0 3.7 3.5 2.7 2.3 2.0 1.7 1.8 2.4 2.4 2.9 5.3 6.4 5.5 4.9 4.3 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | |
| 8 8 9 8 11 10 10 11 14 18 19 17 18 14 8 4 7 6 7 14 17 16 12 12 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | |
| Z - zerospan C - Calibration M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 708 | 100.00 | 100.00 |
| 21 - 40 | 0 | 0.00 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 9 | 6 | 7 | 10 | 38 | 53 | 164 | 43 | 33 | 43 | 103 | 64 | 43 | 29 | 29 | 34 | 708 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 9 | 6 | 7 | 10 | 38 | 53 | 164 | 43 | 33 | 43 | 103 | 64 | 43 | 29 | 29 | 34 | 708 |

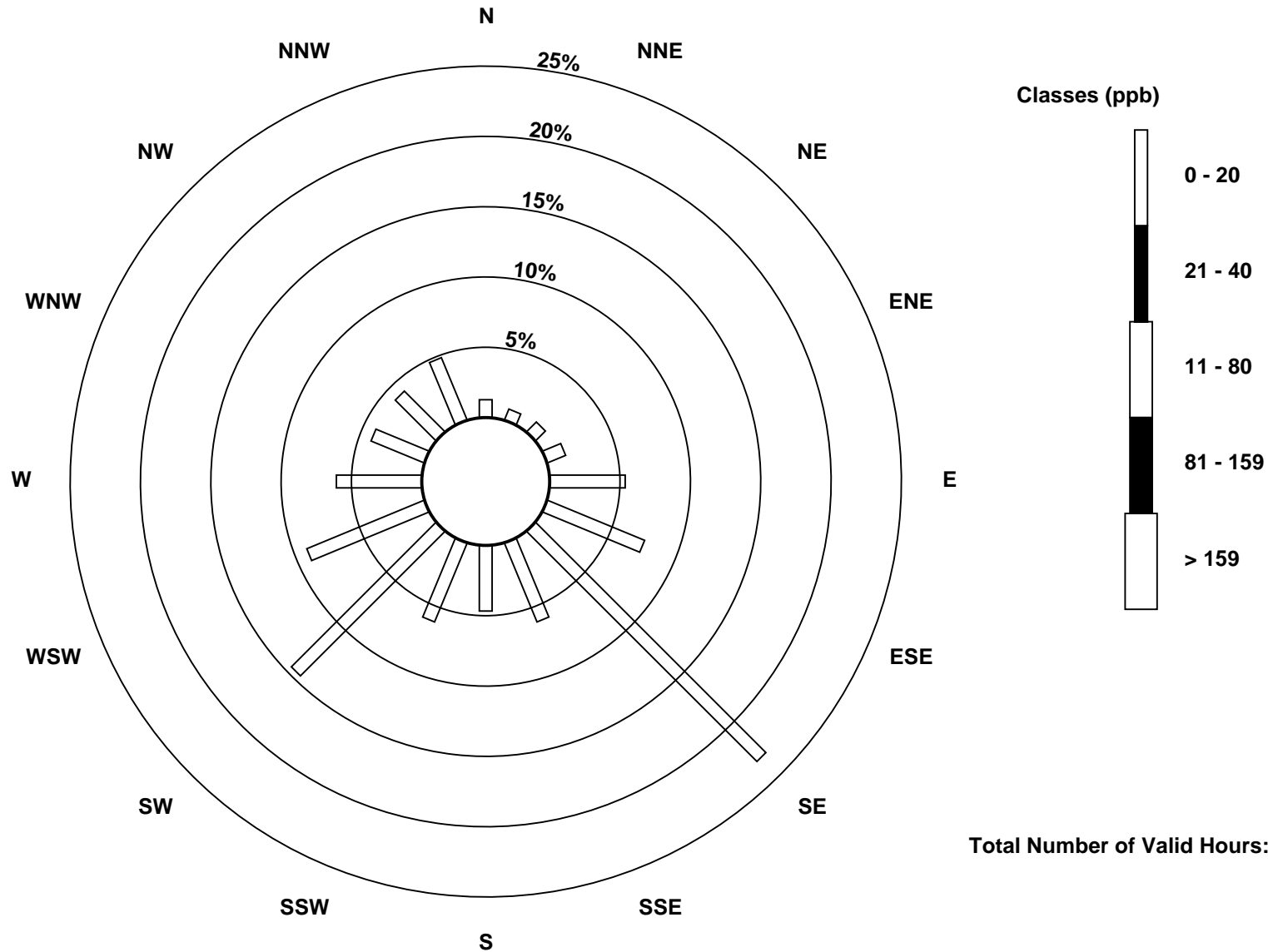
Total Number of Valid Hours: 708

Total Number of Hours: 744

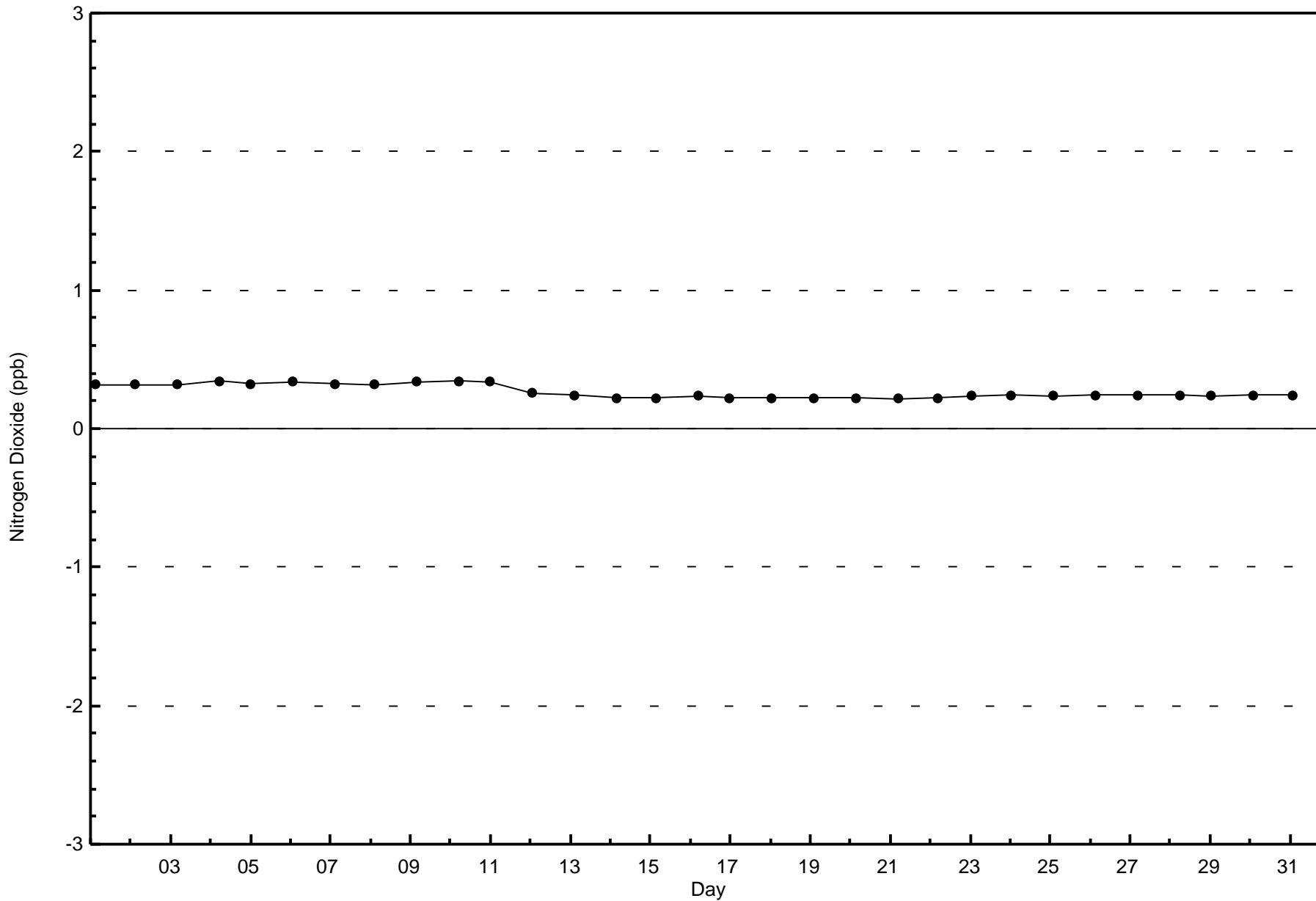


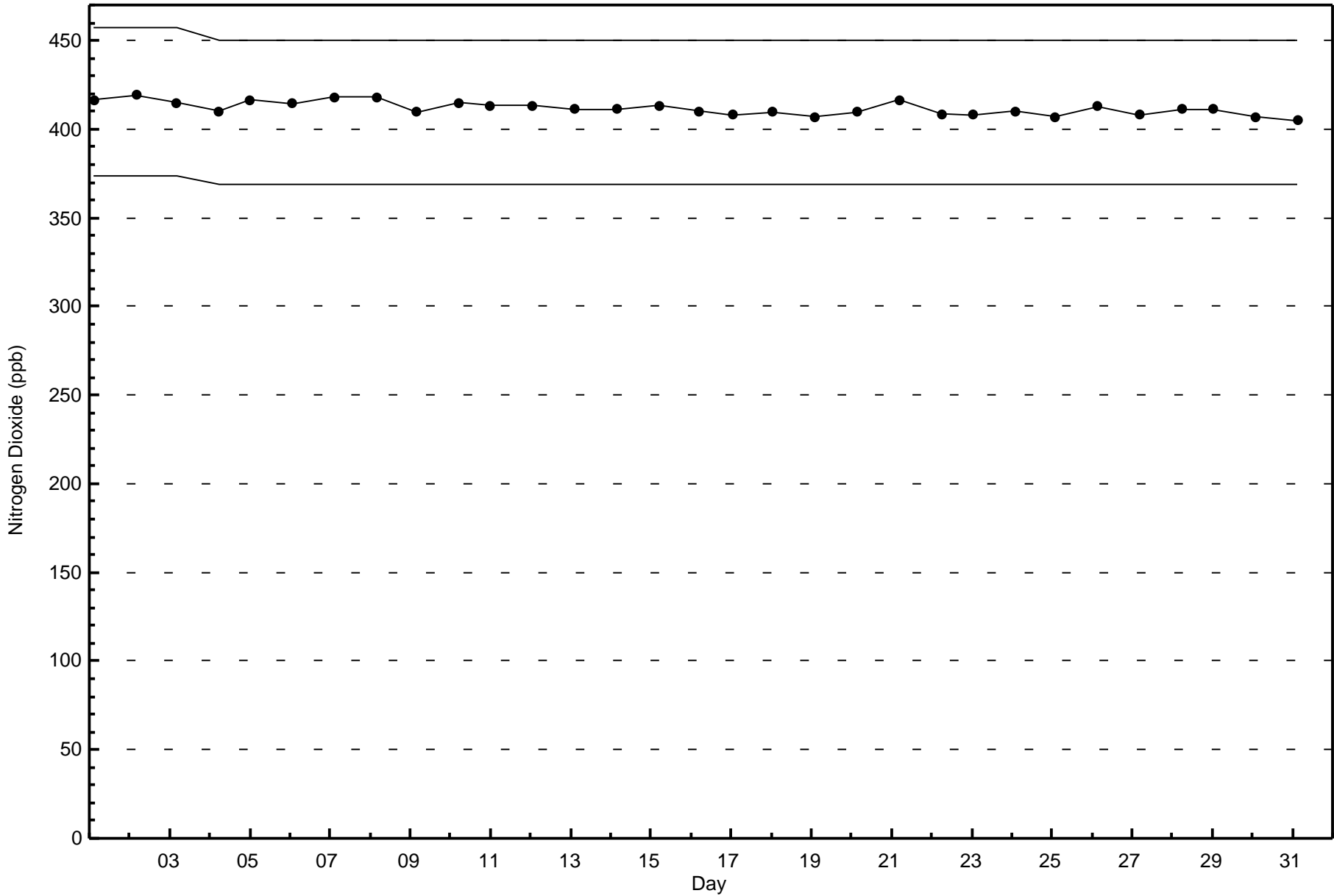
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley (AMS 7)



Total Number of Valid Hours: 708







Wood Buffalo Environmental Association
Summary of Hour Averages

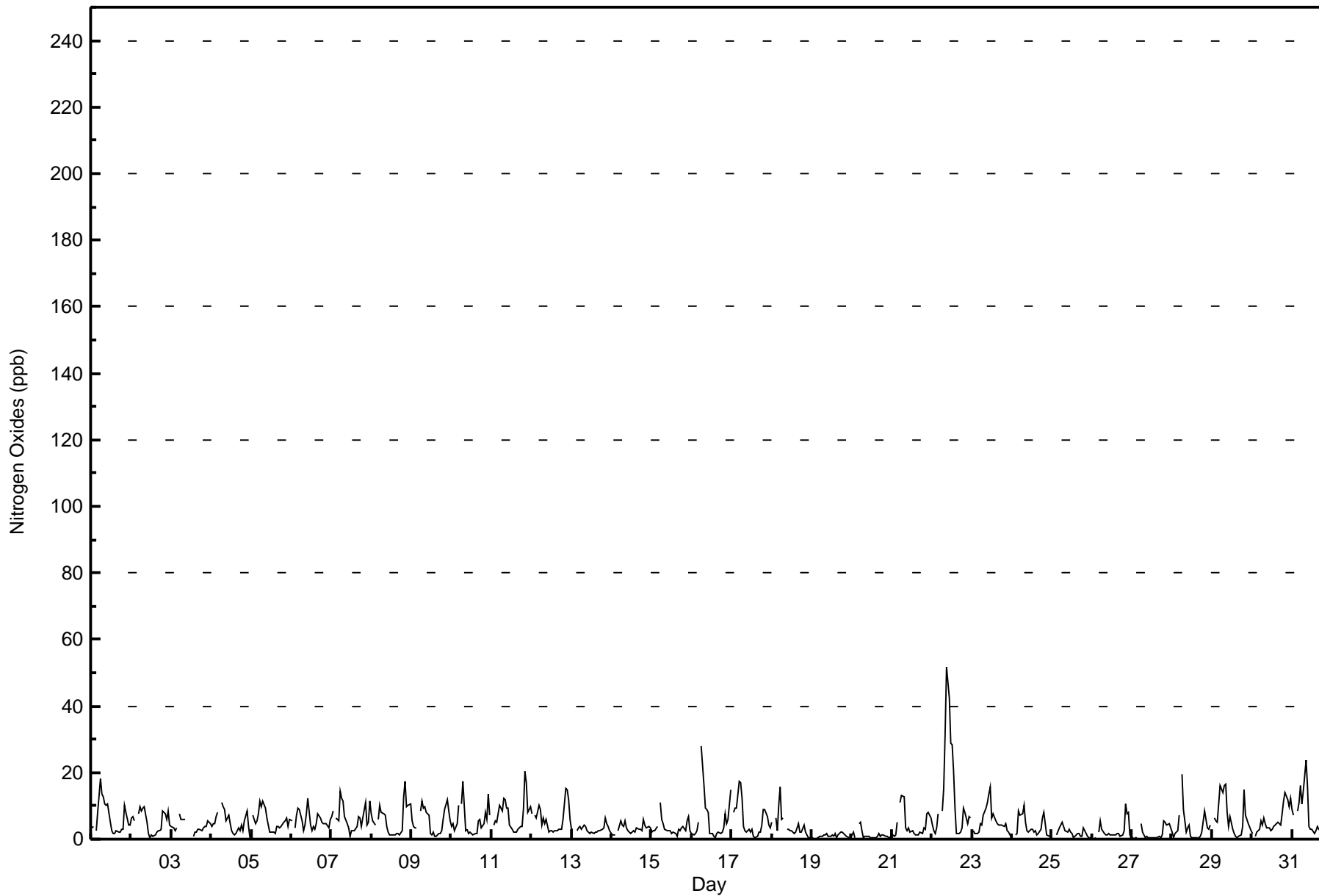
Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - August 2017

| Maximum Value: 52 ppb on Aug 22 10:00 | | Maximum Daily Average: 13.1 ppb on Aug 22 | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|--|---|--------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----------------|---------------|---------------|----|
| Minimum Value: 0 ppb on Aug 26 01:00 | | Minimum Daily Average: 1.0 ppb on Aug 19 | | Hours of Data: 708 | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 9.3 ppb at hour 6 | | Minimum Diurnal Average: 2.0 ppb at hour 15 | | Hours of Missing Data: 36 | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 4.9 ppb | | Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 6 P ₉₀ = 10 P ₉₉ = 22 | | Hours of Calibration: 35 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Percent Operational Time: 99.9 | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 4 | 4 | Z | 2 | 8 | 18 | 14 | 13 | 10 | 10 | 11 | 5 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 10 | 8 | 4 | 4 | 6.3 | 18 | |
| 2-Aug | 6 | 7 | 6 | Z | 8 | 10 | 8 | 9 | 10 | 5 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 8 | 8 | 6 | 9 | 4 | 5.2 | 10 | |
| 3-Aug | 4 | 3 | 3 | 4 | Z | 8 | 6 | 6 | 6 | C | C | C | C | 1 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 4 | 5 | 4 | 3.8 | 8 | |
| 4-Aug | 4 | 5 | 5 | 7 | 8 | Z | 11 | 10 | 10 | 9 | 5 | 7 | 5 | 3 | 2 | 1 | 2 | 4 | 3 | 4 | 3 | 5 | 8 | 4 | 1 | 4.9 | 11 |
| 5-Aug | Z | 7 | 5 | 5 | 8 | 11 | 10 | 11 | 9 | 6 | 4 | 2 | 2 | 2 | 2 | 4 | 4 | 3 | 4 | 5 | 5 | 6 | 4 | 6 | 5.5 | 11 | |
| 6-Aug | 5 | Z | 3 | 7 | 9 | 9 | 5 | 3 | 4 | 8 | 12 | 4 | 3 | 4 | 3 | 5 | 8 | 6 | 5 | 5 | 5 | 5 | 3 | 6 | 5.5 | 12 | |
| 7-Aug | 7 | 9 | Z | 6 | 6 | 14 | 12 | 12 | 7 | 5 | 3 | 1 | 2 | 3 | 2 | 4 | 7 | 6 | 4 | 6 | 11 | 4 | 5 | 11 | 6.4 | 14 | |
| 8-Aug | 8 | 5 | 4 | Z | 6 | 10 | 8 | 8 | 7 | 4 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 3 | 13 | 17 | 10 | 10 | 10 | 5.9 | 17 | |
| 9-Aug | 6 | 4 | 3 | 3 | Z | 8 | 11 | 9 | 10 | 8 | 7 | 2 | 1 | 2 | 1 | 1 | 2 | 2 | 3 | 6 | 9 | 12 | 8 | 6 | 5.4 | 12 | |
| 10-Aug | 4 | 4 | 2 | 5 | 10 | Z | 11 | 17 | 3 | 3 | 2 | 2 | 2 | 1 | 2 | 2 | 5 | 6 | 4 | 5 | 8 | 6 | 13 | 7 | 5.4 | 17 | |
| 11-Aug | Z | 4 | 6 | 5 | 8 | 10 | 8 | 12 | 12 | 9 | 10 | 4 | 3 | 2 | 2 | 2 | 3 | 4 | 4 | 9 | 20 | 17 | 8 | 10 | 7.5 | 20 | |
| 12-Aug | 8 | Z | 7 | 6 | 10 | 9 | 4 | 6 | 5 | 6 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 6 | 15 | 15 | 12 | 6 | 6.0 | 15 | |
| 13-Aug | 3 | 3 | Z | 3 | 3 | 4 | 3 | 4 | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 3 | 7 | 5 | 4 | 2 | 3.1 | 7 | |
| 14-Aug | 1 | 1 | 1 | Z | 3 | 5 | 4 | 4 | 5 | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 6 | 4 | 3 | 4 | 3 | 3.2 | 6 | |
| 15-Aug | 2 | 2 | 3 | 4 | Z | 11 | 6 | 5 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 1 | 3 | 2 | 3 | 4 | 2 | 5 | 7 | 2 | 3.4 | 11 |
| 16-Aug | 2 | 1 | 2 | 2 | 5 | Z | 28 | 16 | 9 | 9 | 8 | 2 | 2 | 1 | 1 | 2 | 2 | 1 | 2 | 4 | 7 | 5 | 6 | 15 | 5.7 | 28 | |
| 17-Aug | Z | 8 | 9 | 9 | 18 | 17 | 12 | 4 | 3 | 2 | 3 | 2 | 3 | 1 | 0 | 1 | 2 | 2 | 4 | 9 | 9 | 7 | 4 | 4 | 5.8 | 18 | |
| 18-Aug | 5 | Z | 6 | 2 | 10 | 16 | 6 | 6 | M | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 5 | 2 | 2 | 4 | 2 | 1 | 0 | 0 | 3.9 | 16 | |
| 19-Aug | 0 | 0 | Z | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 1.0 | 2 | |
| 20-Aug | 1 | 2 | 0 | Z | 5 | 5 | 2 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1.3 | 5 | |
| 21-Aug | 2 | 1 | 1 | 5 | Z | 11 | 13 | 13 | 4 | 3 | 3 | 2 | 3 | 2 | 1 | 1 | 1 | 2 | 2 | 4 | 3 | 8 | 8 | 6 | 4.3 | 13 | |
| 22-Aug | 4 | 3 | 2 | 3 | 7 | Z | 8 | 15 | 32 | 52 | 42 | 29 | 28 | 20 | 9 | 2 | 2 | 2 | 3 | 10 | 8 | 5 | 7 | 7 | 13.1 | 52 | |
| 23-Aug | Z | 2 | 2 | 2 | 2 | 5 | 4 | 7 | 9 | 11 | 14 | 16 | 6 | 7 | 5 | 5 | 4 | 4 | 4 | 4 | 5 | 3 | 2 | 1 | 5.4 | 16 | |
| 24-Aug | 1 | Z | 1 | 2 | 9 | 7 | 8 | 10 | 5 | 3 | 2 | 3 | 3 | 2 | 2 | 1 | 2 | 3 | 6 | 8 | 5 | 1 | 1 | 1 | 3.7 | 10 | |
| 25-Aug | 0 | 0 | Z | 1 | 3 | 4 | 5 | 4 | 3 | 2 | 3 | 2 | 2 | 1 | 1 | 2 | 2 | 1 | 1 | 4 | 2 | 1 | 1 | 0 | 1.9 | 5 | |
| 26-Aug | 0 | 0 | 0 | Z | 2 | 5 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 3 | 11 | 8 | 8 | 1 | 2.5 | 11 | |
| 27-Aug | 0 | 0 | 1 | 0 | Z | 5 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 5 | 5 | 4 | 5 | 3 | 1.7 | 5 | |
| 28-Aug | 2 | 0 | 2 | 2 | 7 | Z | 20 | 9 | 2 | 3 | 4 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 2 | 8 | 6 | 4 | 3 | 4 | 3.6 | 20 | |
| 29-Aug | Z | 6 | 5 | 5 | 11 | 16 | 14 | 16 | 16 | 8 | 4 | 7 | 3 | 2 | 1 | 0 | 1 | 1 | 4 | 15 | 7 | 6 | 5 | 2 | 6.8 | 16 | |
| 30-Aug | 2 | Z | 1 | 2 | 3 | 5 | 4 | 6 | 5 | 3 | 3 | 3 | 3 | 4 | 4 | 5 | 5 | 4 | 8 | 11 | 14 | 12 | 10 | 12 | 5.6 | 14 | |
| 31-Aug | 9 | 7 | Z | 9 | 11 | 16 | 11 | 14 | 24 | 16 | 4 | 3 | 3 | 2 | 3 | 4 | 3 | 2 | 2 | 1 | 1 | 1 | 0 | 0 | 6.3 | 24 | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | |
| Z - zerospan C - Calibration M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 701 | 99.01 | 99.01 |
| 21 - 40 | 5 | 0.71 | 99.72 |
| 41 - 80 | 2 | 0.28 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 9 | 6 | 6 | 10 | 38 | 53 | 163 | 42 | 33 | 43 | 103 | 64 | 43 | 28 | 26 | 34 | 701 |
| 21 - 40 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 5 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 9 | 6 | 7 | 10 | 38 | 53 | 164 | 43 | 33 | 43 | 103 | 64 | 43 | 29 | 29 | 34 | 708 |

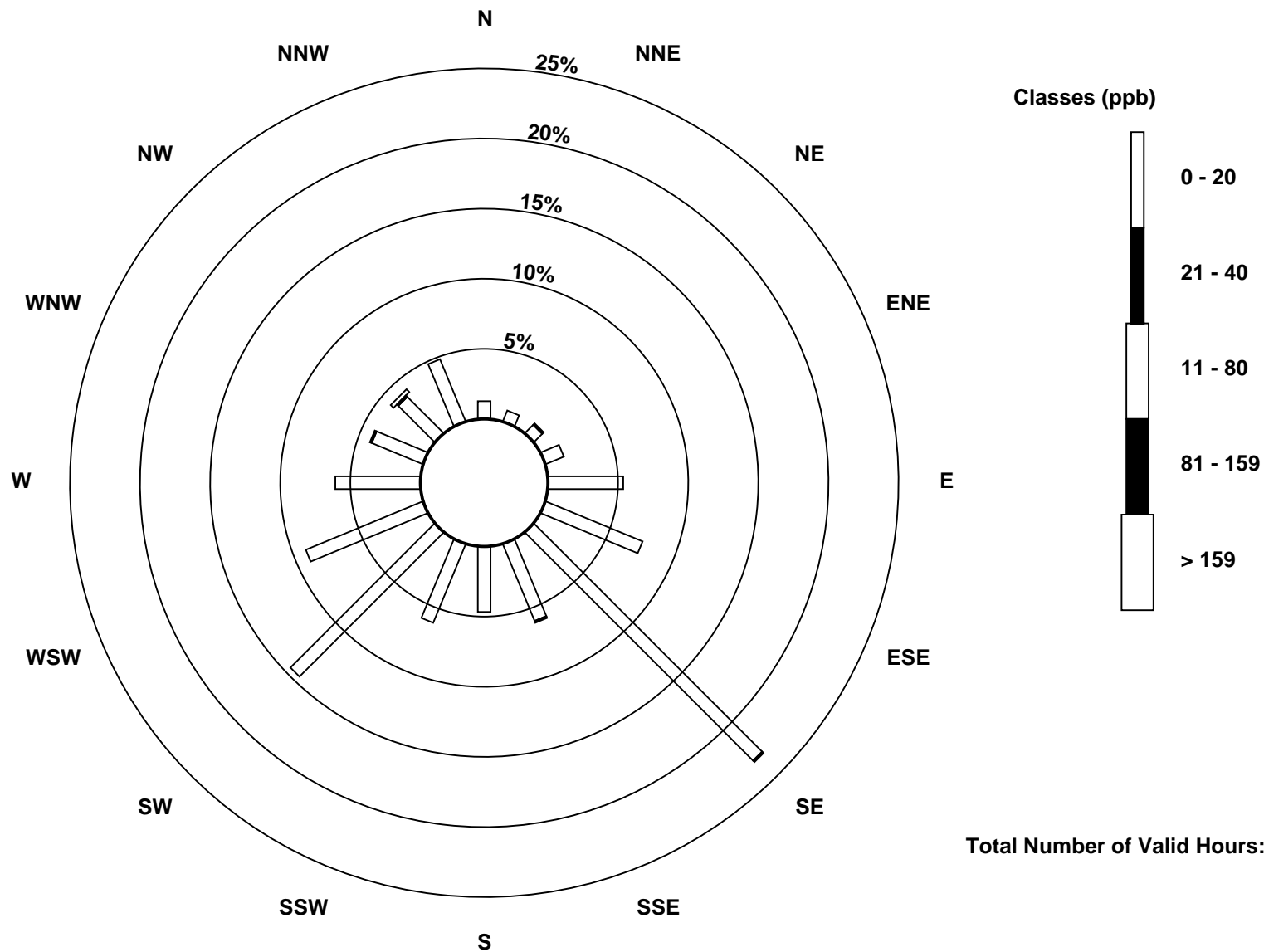
Total Number of Valid Hours: 708

Total Number of Hours: 744

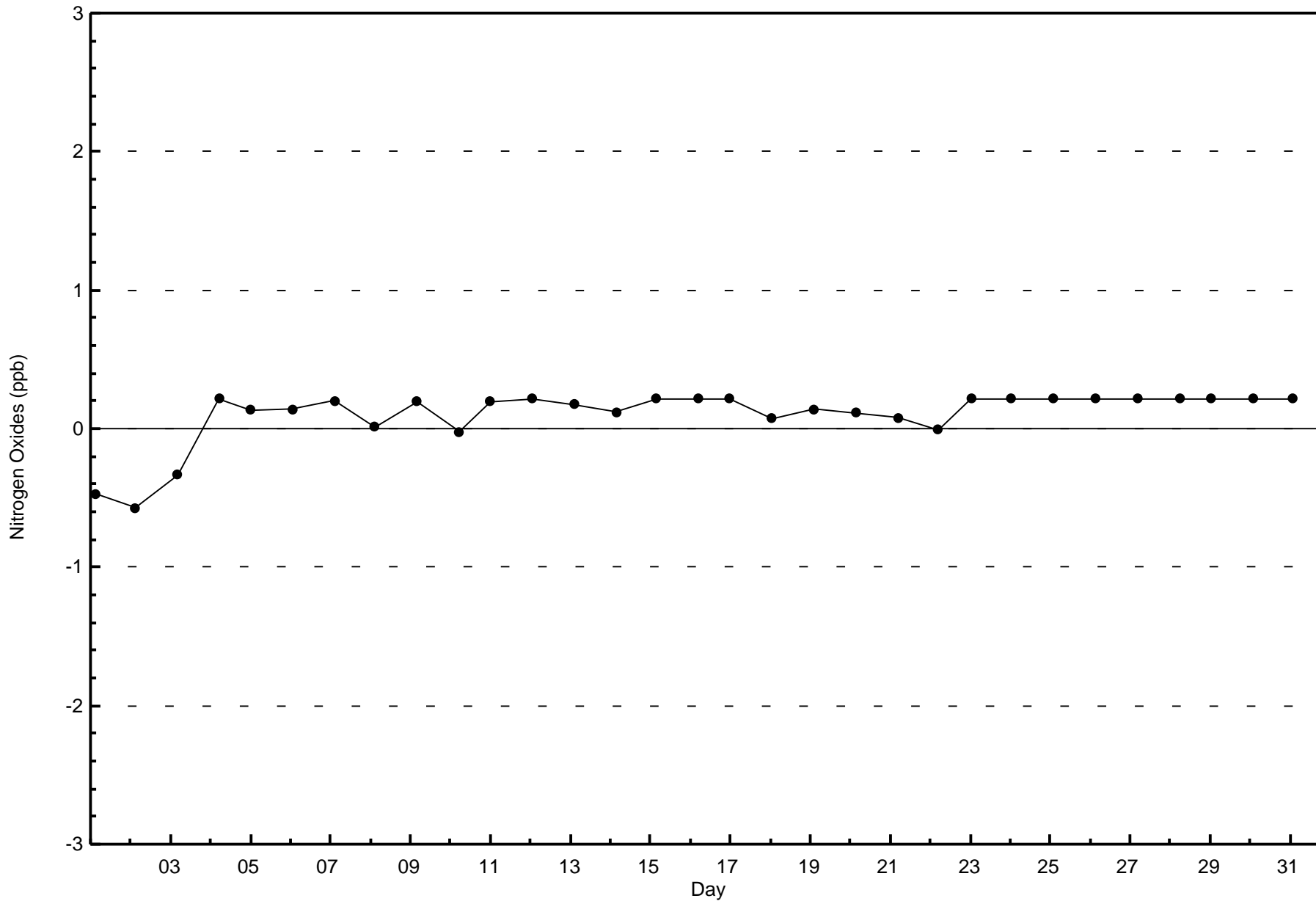


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley (AMS 7)



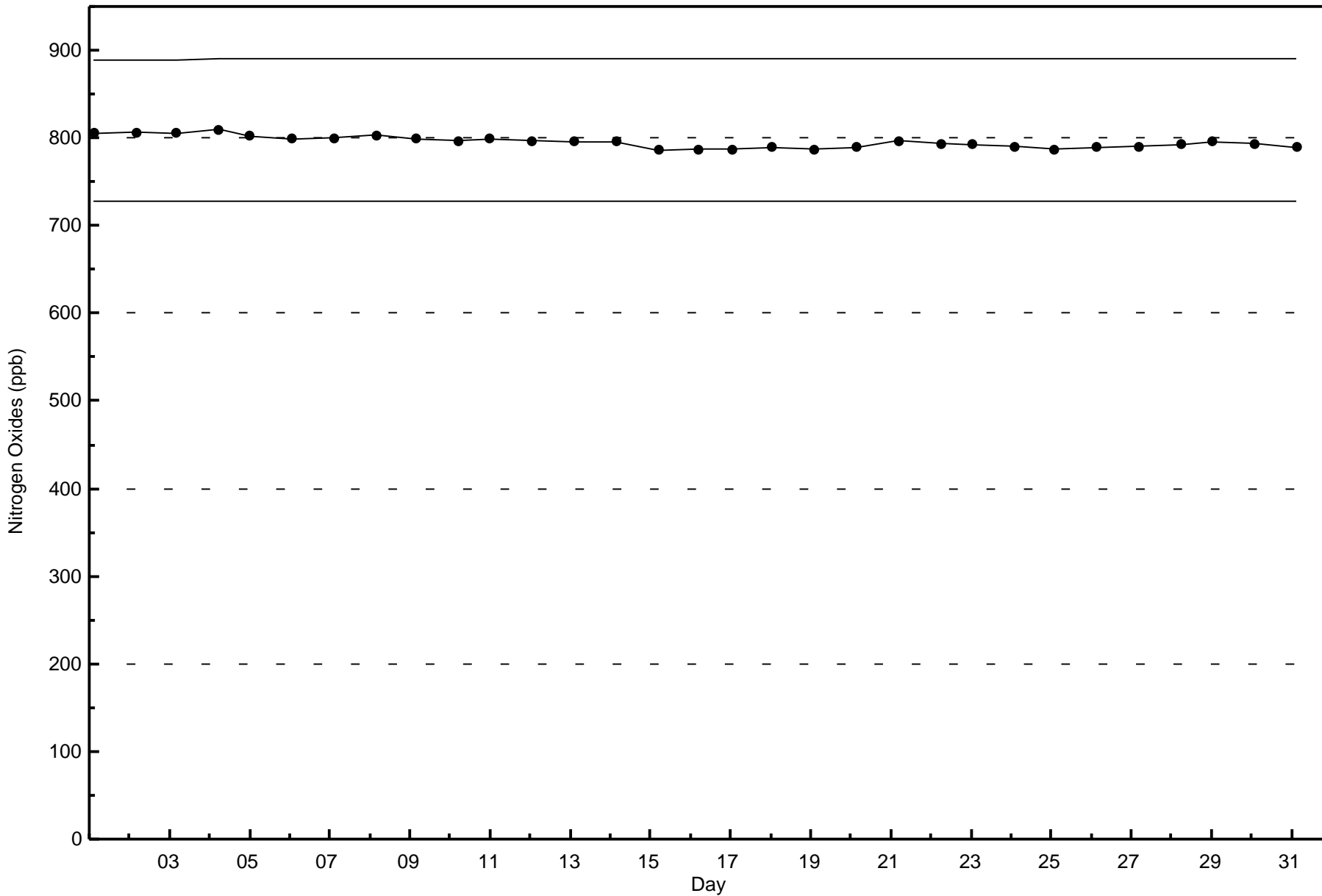
Total Number of Valid Hours: 708





Wood Buffalo Environmental Association
Span Responses

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - August 2017



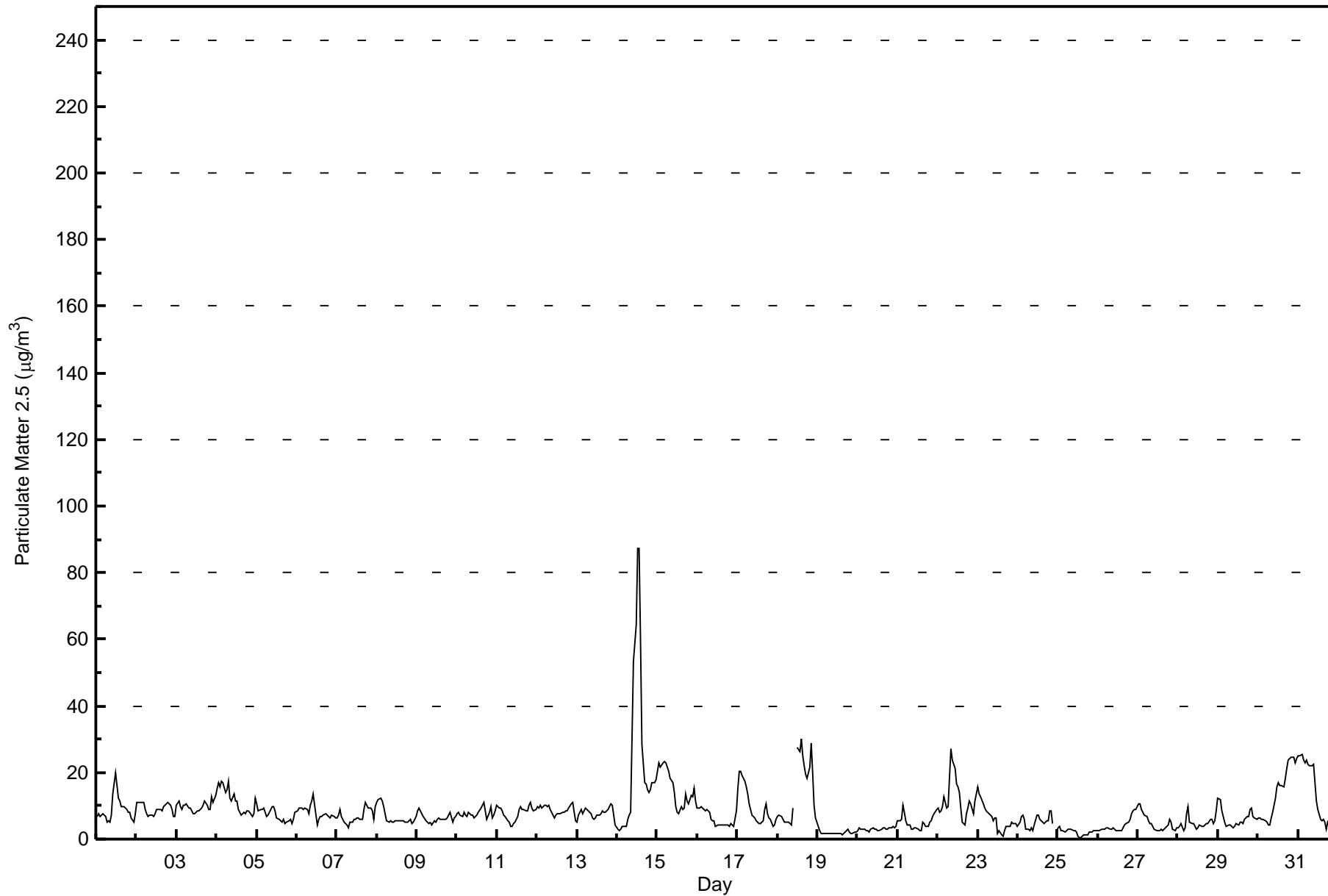


| Number of Exceedences (AAAQO): 24-hr: 0 | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|--|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------------------------|---------------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|
| Maximum Value: 87.4 µg/m ³ on Aug 14 13:00 | | Maximum Daily Average: 24.2 µg/m ³ on Aug 14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum Value: 0.3 µg/m ³ on Aug 25 14:00 | | Hours of Data: 741 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 9.9 µg/m ³ at hour 13 | | Hours of Missing Data: 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 8.37 µg/m ³ | | Hours of Calibration: 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum Daily Average: 1.9 µg/m ³ on Aug 19 | | Percent Operational Time: 99.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum Diurnal Average: 7.4 µg/m ³ at hour 16 | | Percentiles: P ₁ = 1.3 P ₁₀ = 2.8 Q ₁ = 4.5 Median = 6.9 Q ₃ = 9.5 P ₉₀ = 15.5 P ₉₉ = 30.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 6.7 | 7.5 | 6.9 | 7.0 | 7.5 | 6.9 | 5.2 | 5.3 | 5.0 | 7.1 | 13.4 | 20.0 | 16.0 | 12.4 | 11.3 | 9.7 | 9.7 | 9.3 | 8.7 | 8.0 | 8.2 | 6.5 | 5.2 | 7.4 | 8.8 | 20.0 | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 11.0 | 11.0 | 11.1 | 11.2 | 10.9 | 8.9 | 7.8 | 6.9 | 7.3 | 7.0 | 6.7 | 7.6 | 8.8 | 8.9 | 8.9 | 8.5 | 9.6 | 10.4 | 10.7 | 11.1 | 10.3 | 8.9 | 6.6 | 6.8 | 9.0 | 11.2 | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 10.2 | 11.3 | 9.8 | 8.9 | 10.0 | 10.1 | 10.6 | 9.3 | 9.2 | 8.3 | 7.7 | 7.8 | 8.3 | 8.6 | 8.9 | 9.3 | 10.3 | 11.3 | 10.3 | 9.0 | 8.8 | 12.5 | 10.9 | 13.2 | 9.8 | 13.2 | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 15.2 | 17.1 | 15.6 | 17.5 | 16.8 | 13.9 | 15.0 | 17.2 | 12.3 | 11.3 | 13.4 | 11.4 | 11.5 | 9.1 | 8.2 | 7.2 | 7.9 | 7.6 | 8.3 | 8.6 | 8.0 | 6.7 | 7.6 | 12.2 | 11.6 | 17.5 | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 10.6 | 8.3 | 9.1 | 9.0 | 9.1 | 8.2 | 6.7 | 7.1 | 8.7 | 9.8 | 9.8 | 8.4 | 6.4 | 6.1 | 5.4 | 4.9 | 5.8 | 4.8 | 5.0 | 5.7 | 5.9 | 4.7 | 6.0 | 7.9 | 7.2 | 10.6 | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 8.6 | 9.4 | 9.4 | 9.3 | 8.9 | 9.4 | 8.9 | 7.6 | 10.3 | 11.5 | 13.7 | 7.3 | 4.4 | 5.8 | 6.9 | 6.9 | 7.2 | 7.7 | 7.1 | 6.8 | 6.4 | 7.0 | 6.7 | 6.2 | 8.1 | 13.7 | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 6.4 | 7.1 | 9.0 | 6.8 | 4.9 | 4.7 | 4.3 | 3.4 | 5.0 | 5.2 | 5.8 | 6.0 | 6.6 | 6.5 | 6.0 | 6.1 | 9.1 | 10.9 | 10.0 | 9.5 | 9.4 | 8.6 | 5.8 | 9.9 | 7.0 | 10.9 | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 10.9 | 11.9 | 12.1 | 11.3 | 9.8 | 7.8 | 5.6 | 5.2 | 5.3 | 5.2 | 5.2 | 5.7 | 5.7 | 5.7 | 5.5 | 5.6 | 5.4 | 4.9 | 4.9 | 5.3 | 6.0 | 4.6 | 5.0 | 6.9 | 6.7 | 12.1 | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 8.5 | 9.1 | 8.3 | 7.6 | 6.7 | 5.4 | 5.2 | 4.6 | 5.2 | 4.4 | 5.3 | 5.3 | 5.9 | 6.3 | 6.1 | 6.0 | 5.7 | 6.0 | 6.3 | 7.2 | 7.9 | 5.1 | 6.4 | 6.8 | 6.3 | 9.1 | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 7.5 | 8.0 | 7.0 | 6.9 | 8.2 | 7.4 | 6.8 | 7.9 | 7.1 | 7.3 | 6.4 | 6.9 | 7.4 | 7.9 | 9.4 | 10.1 | 10.9 | 8.4 | 5.7 | 7.9 | 9.8 | 6.4 | 7.1 | 8.6 | 7.8 | 10.9 | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 10.2 | 9.4 | 9.4 | 8.6 | 7.1 | 6.7 | 5.6 | 5.0 | 4.0 | 3.7 | 4.5 | 5.1 | 6.7 | 8.8 | 9.9 | 9.0 | 8.8 | 8.3 | 8.7 | 10.3 | 11.1 | 9.2 | 8.3 | 8.8 | 7.8 | 11.1 | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 9.7 | 9.4 | 10.1 | 9.4 | 10.3 | 10.3 | 9.9 | 10.1 | 8.9 | 7.9 | 6.4 | 7.2 | 7.6 | 7.7 | 7.6 | 7.9 | 8.0 | 8.4 | 8.6 | 9.3 | 10.8 | 11.0 | 8.1 | 5.5 | 8.8 | 11.0 | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 5.2 | 7.2 | 8.9 | 7.8 | 8.5 | 9.2 | 9.0 | 8.3 | 7.6 | 6.2 | 6.1 | 6.3 | 7.0 | 7.4 | 7.8 | 8.3 | 8.0 | 8.2 | 8.7 | 9.6 | 10.6 | 10.2 | 7.2 | 4.4 | 7.8 | 10.6 | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 3.1 | 2.7 | 3.0 | 3.8 | 3.6 | 3.8 | 5.8 | 7.1 | 7.9 | 30.5 | 53.5 | 64.3 | 87.4 | 87.1 | 60.2 | 28.2 | 17.1 | 16.4 | 14.8 | 13.9 | 15.0 | 16.8 | 16.9 | 17.9 | 24.2 | 87.4 | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 20.1 | 23.0 | 21.7 | 22.7 | 23.2 | 23.1 | 21.7 | 20.3 | 18.4 | 16.9 | 14.1 | 9.6 | 8.1 | 7.5 | 9.5 | 9.0 | 9.5 | 13.4 | 11.3 | 10.5 | 13.1 | 12.9 | 15.3 | 11.4 | 15.3 | 23.2 | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 9.5 | 9.4 | 9.7 | 9.3 | 9.0 | 8.6 | 8.7 | 7.9 | 5.9 | 5.7 | 5.6 | 3.8 | 4.2 | 4.3 | 4.2 | 4.1 | 4.4 | 4.2 | 4.2 | 4.0 | 4.9 | 4.2 | 4.0 | 8.6 | 6.2 | 9.7 | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 15.5 | 20.1 | 20.3 | 19.2 | 17.2 | 15.7 | 13.6 | 10.6 | 8.7 | 7.4 | 6.3 | 5.7 | 4.9 | 4.8 | 4.8 | 5.3 | 8.7 | 10.8 | 7.5 | 6.2 | 6.0 | 3.9 | 4.1 | 5.7 | 9.7 | 20.3 | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 7.0 | 7.1 | 6.8 | 5.8 | 5.0 | 5.3 | 5.1 | 5.1 | 4.3 | 9.4 | C | C | 27.7 | 26.3 | 30.2 | 24.9 | 22.0 | 19.7 | 18.4 | 21.6 | 28.9 | 20.0 | 10.3 | 6.4 | 14.4 | 30.2 | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 4.0 | 2.7 | 1.8 | 1.6 | 1.7 | 1.7 | 1.6 | 1.8 | 1.6 | 1.7 | 1.7 | 1.6 | 1.7 | 1.7 | 1.1 | 1.5 | 2.5 | 2.9 | 2.0 | 1.7 | 1.8 | 2.0 | 1.9 | 1.9 | 4.0 | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 2.6 | 3.2 | 3.1 | 2.8 | 2.8 | 2.6 | 2.5 | 2.0 | 2.9 | 3.2 | 3.0 | 2.8 | 2.6 | 2.7 | 3.1 | 3.2 | 3.6 | 2.9 | 3.0 | 3.5 | 3.6 | 3.8 | 3.6 | 3.8 | 3.0 | 3.8 | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 5.5 | 5.7 | 6.1 | 10.3 | 7.8 | 5.3 | 4.2 | 4.0 | 2.8 | 2.8 | 3.3 | 3.4 | 2.8 | 2.6 | 2.8 | 4.9 | 4.5 | 3.8 | 3.9 | 5.1 | 5.4 | 6.9 | 7.7 | 8.7 | 5.0 | 10.3 | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 9.3 | 7.9 | 8.3 | 9.7 | 12.7 | 9.4 | 9.9 | 18.6 | 27.0 | 23.8 | 21.4 | 16.7 | 15.6 | 14.2 | 9.4 | 5.0 | 4.1 | 7.6 | 9.3 | 11.5 | 10.5 | 7.5 | 11.5 | 13.7 | 12.3 | 27.0 | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 15.8 | 13.7 | 12.7 | 10.6 | 9.3 | 8.7 | 7.9 | 7.4 | 6.8 | 5.4 | 6.5 | 6.2 | 1.9 | 2.4 | 1.3 | 0.9 | 2.5 | 3.9 | 3.9 | 4.0 | 5.3 | 4.6 | 4.5 | 4.5 | 6.3 | 15.8 | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 4.0 | 5.1 | 6.6 | 7.4 | 5.9 | 3.0 | 2.8 | 2.4 | 3.6 | 2.5 | 4.1 | 7.0 | 7.4 | 6.0 | 5.7 | 4.9 | 4.8 | 5.7 | 5.5 | 8.3 | 8.3 | 4.6 | UO | 2.5 | 5.1 | 8.3 | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 3.4 | 3.7 | 2.7 | 2.7 | 2.3 | 2.5 | 3.0 | 2.9 | 2.8 | 2.7 | 2.7 | 2.0 | 1.0 | 0.3 | 0.5 | 1.2 | 1.3 | 1.2 | 1.4 | 2.2 | 2.3 | 2.6 | 2.7 | 2.7 | 2.2 | 3.7 | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 2.7 | 2.7 | 2.8 | 2.9 | 3.0 | 3.3 | 3.3 | 3.0 | 3.1 | 3.4 | 3.1 | 2.7 | 2.7 | 2.5 | 2.6 | 3.3 | 4.0 | 4.6 | 5.1 | 5.7 | 7.4 | 8.3 | 9.1 | 9.0 | 4.2 | 9.1 | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 10.7 | 10.5 | 8.8 | 8.2 | 7.4 | 6.9 | 5.4 | 4.5 | 4.8 | 4.0 | 3.1 | 2.6 | 2.5 | 2.5 | 3.0 | 2.4 | 3.4 | 3.8 | 4.1 | 5.7 | 5.3 | 2.9 | 2.6 | 3.4 | 4.9 | 10.7 | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 3.3 | 3.6 | 4.7 | 2.7 | 3.2 | 7.8 | 9.9 | 5.1 | 4.8 | 4.8 | 3.6 | 2.9 | 3.6 | 4.0 | 4.0 | 3.7 | 4.2 | 4.5 | 4.8 | 6.0 | 5.8 | 4.7 | 5.7 | 8.7 | 4.8 | 9.9 | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 12.2 | 11.8 | 8.6 | 7.0 | 5.1 | 3.8 | 4.2 | 4.2 | 4.0 | 3.2 | 3.7 | 4.8 | 4.3 | 4.9 | 5.0 | 4.8 | 5.9 | 7.0 | 6.6 | 9.0 | 9.5 | 6.8 | 6.3 | 5.9 | 6.2 | 12.2 | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 6.3 | 6.2 | 6.0 | 5.7 | 5.5 | 5.2 | 4.4 | 4.3 | 6.3 | 7.9 | 12.2 | 15.8 | 17.1 | 16.1 | 16.3 | 15.8 | 18.0 | 21.4 | 23.8 | 23.9 | 24.4 | 24.6 | 22.9 | 24.1 | 13.9 | 24.6 | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 25.0 | 25.0 | 25.4 | 23.7 | 23.1 | 23.8 | 22.4 | 22.1 | 22.1 | 22.6 | 17.0 | 11.6 | 9.1 | 6.1 | 5.7 | 6.0 | 5.1 | 3.1 | 4.9 | 3.5 | 3.5 | 3.3 | 2.7 | 2.7 | 13.3 | 25.4 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 9.1 | 9.4 | 9.2 | 9.0 | 8.6 | 8.1 | 7.6 | 7.5 | 7.5 | 8.2 | 9.0 | 9.0 | 9.9 | 9.6 | 8.8 | 7.4 | 7.5 | 7.8 | 7.7 | 8.2 | 8.8 | 7.8 | 7.4 | 7.9 | Diurnal Average |
| | | | | | | | | | | | | | | | | | | | | | | | | 25.0 | 25.0 | 25.4 | 23.7 | 23.2 | 23.8 | 22.4 | 22.1 | 27.0 | 30.5 | 53.5 | 64.3 | 87.4 | 87.1 | 60.2 | 28.2 | 22.0 | 21.4 | 23.8 | 23.9 | 28.9 | 24.6 | 22.9 | 24.1 | Diurnal Maximum |
| C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | UO - Unstable Operation | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley - August 2017**

| Concentration Ranges ($\mu\text{g}/\text{m}^3$) | Number of Hours | % | Cumulative % |
|---|------------------------|----------|---------------------|
| 1 - 5 | 260 | 35.09 | 35.09 |
| 6 - 15 | 403 | 54.39 | 89.47 |
| 16 - 25 | 63 | 8.50 | 97.98 |
| 26 - 80 | 10 | 1.35 | 99.33 |
| > 81.0 | 2 | 0.27 | 99.60 |

Total Number of Valid Hours: 741

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley - August 2017

| Concentration Ranges ($\mu\text{g}/\text{m}^3$) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|--|----------------|-----|----|-----|----|-----|-----|-----|----|-----|-----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 1 - 5 | 1 | 1 | 2 | 4 | 13 | 16 | 37 | 4 | 13 | 22 | 39 | 42 | 30 | 18 | 11 | 7 | 260 |
| 6 - 15 | 8 | 5 | 4 | 8 | 25 | 41 | 112 | 33 | 20 | 22 | 51 | 14 | 11 | 12 | 12 | 25 | 403 |
| 16 - 25 | 0 | 0 | 1 | 0 | 1 | 0 | 26 | 9 | 3 | 2 | 11 | 1 | 0 | 1 | 6 | 2 | 63 |
| 26 - 80 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 2 | 2 | 0 | 0 | 0 | 10 |
| > 81.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 2 |
| Totals | 9 | 6 | 8 | 12 | 39 | 57 | 175 | 46 | 36 | 47 | 106 | 60 | 43 | 31 | 29 | 34 | 738 |

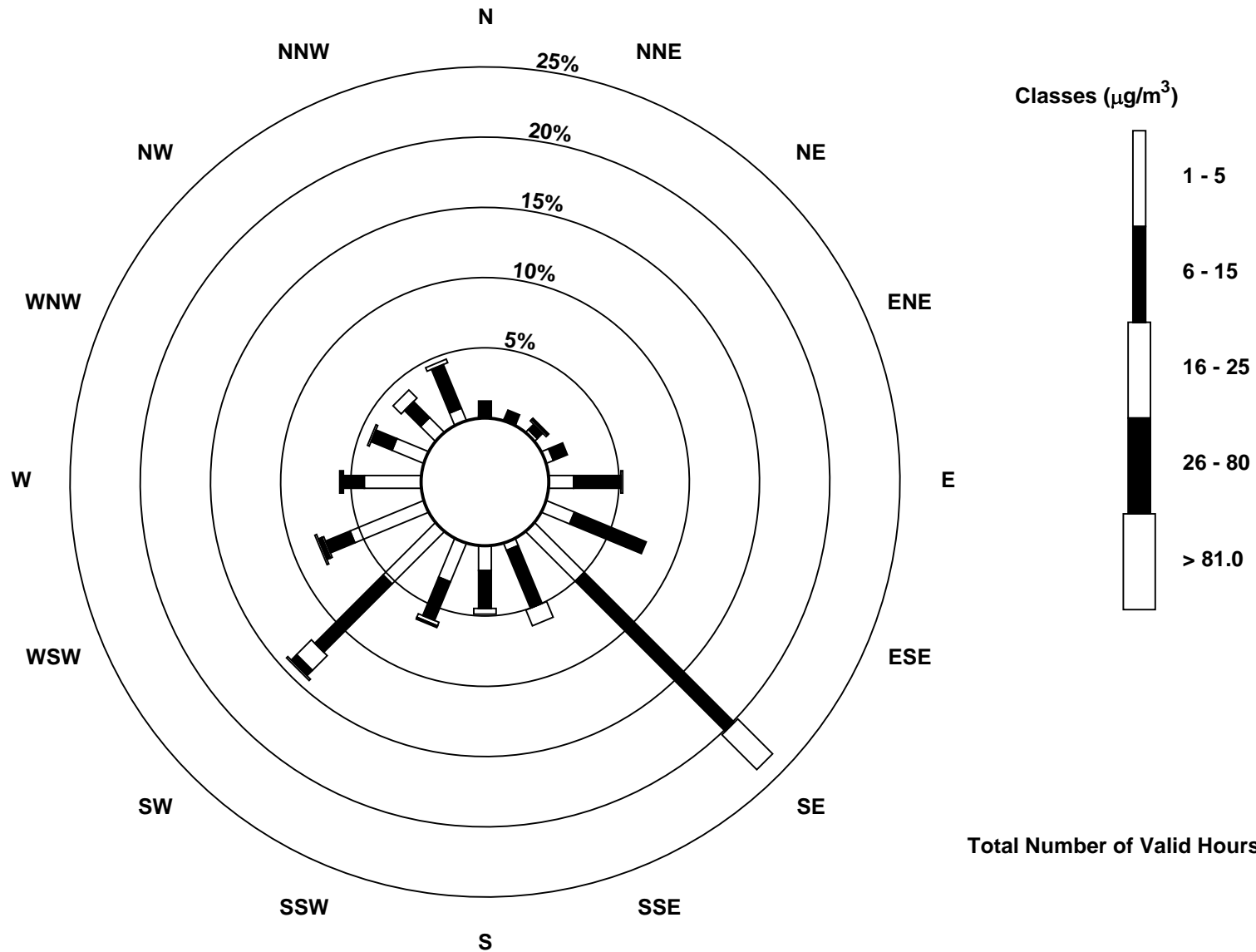
Total Number of Valid Hours: 741

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley (AMS 7)



Total Number of Valid Hours: 741



Wood Buffalo Environmental Association

Summary of Hour Averages

Carbon Monoxide (CO) - ppm

Athabasca Valley - August 2017

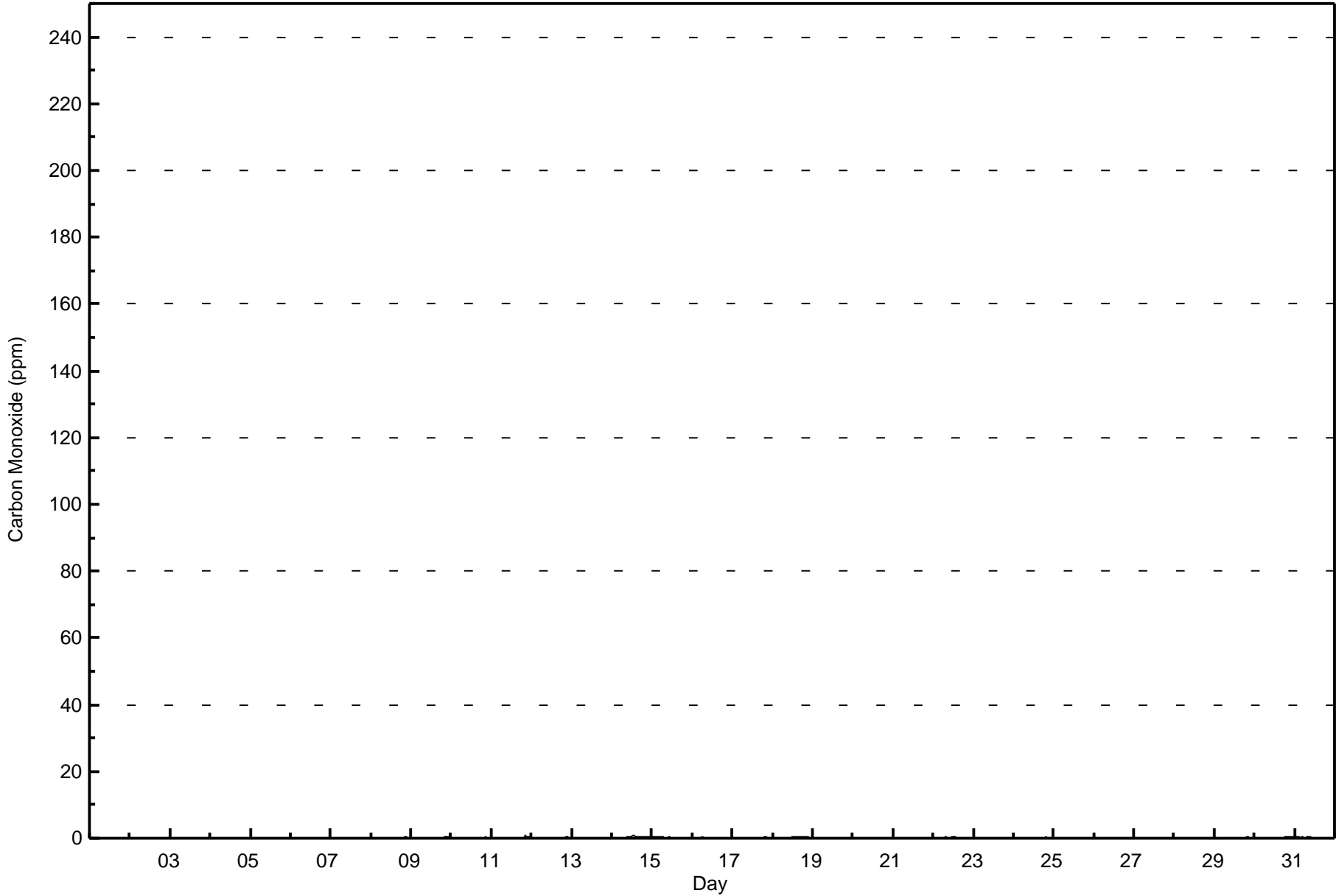
| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 0.8 ppm on Aug 14 13:00 Maximum Daily Average: 0.3 ppm on Aug 14 | | Hours in Service: 744 Hours of Data: 709 Hours of Missing Data: 35 Hours of Calibration: 35 Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|---------------|---------------|-----|
| Minimum Value: 0.1 ppm on Aug 21 02:00 Maximum Diurnal Average: 0.2 ppm at hour 21 Monthly Average: 0.14 ppm | | Minimum Daily Average: 0.1 ppm on Aug 20 Minimum Diurnal Average: 0.1 ppm at hour 16 Percentiles: $P_1 = 0.1$ $P_{10} = 0.1$ $Q_1 = 0.1$ Median = 0.1 $Q_3 = 0.2$ $P_{90} = 0.2$ $P_{99} = 0.5$ | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | Z | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 |
| 2-Aug | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | Z | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.2 |
| 3-Aug | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | Z | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| 4-Aug | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | Z | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 |
| 5-Aug | 0.1 | 0.2 | 0.1 | 0.1 | Z | 0.1 | 0.1 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 |
| 6-Aug | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | Z | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| 7-Aug | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | Z | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.2 | 0.1 | 0.2 |
| 8-Aug | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | Z | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.5 | 0.4 | 0.2 | 0.1 | 0.1 | 0.5 |
| 9-Aug | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | Z | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.3 | 0.3 | 0.2 | 0.1 | 0.1 | 0.3 |
| 10-Aug | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | Z | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.4 | 0.2 | 0.2 | 0.1 | 0.1 | 0.4 |
| 11-Aug | 0.1 | 0.1 | 0.1 | 0.1 | Z | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.7 | 0.3 | 0.2 | 0.2 | 0.2 | 0.7 |
| 12-Aug | 0.2 | 0.2 | 0.1 | 0.1 | 0.2 | Z | 0.1 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.2 |
| 13-Aug | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | Z | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| 14-Aug | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | Z | 0.1 | 0.1 | 0.3 | 0.5 | 0.6 | 0.8 | 0.8 | 0.5 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 0.8 |
| 15-Aug | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | Z | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.2 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.3 |
| 16-Aug | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | Z | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.2 |
| 17-Aug | 0.2 | 0.2 | 0.2 | 0.2 | Z | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.3 | 0.2 | 0.1 | 0.1 | 0.3 |
| 18-Aug | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | Z | 0.1 | C | C | C | C | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.3 | 0.3 | 0.3 | 0.2 | 0.1 | 0.3 | |
| 19-Aug | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | Z | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| 20-Aug | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | Z | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| 21-Aug | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | Z | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.2 |
| 22-Aug | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.3 | 0.4 | Z | 0.2 | 0.3 | 0.3 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.4 |
| 23-Aug | 0.1 | 0.1 | 0.1 | 0.1 | Z | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 |
| 24-Aug | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | Z | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 |
| 25-Aug | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | Z | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| 26-Aug | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | Z | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.2 |
| 27-Aug | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | Z | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| 28-Aug | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.1 | 0.1 | Z | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 |
| 29-Aug | 0.1 | 0.1 | 0.1 | 0.1 | Z | 0.1 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.3 | 0.3 | 0.2 | 0.1 | 0.1 | 0.1 | 0.3 |
| 30-Aug | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | Z | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.3 |
| 31-Aug | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | Z | 0.2 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.3 |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.1 | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.3 | | | |

Z - zerospan C - Calibration
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 13 ppm



Wood Buffalo Environmental Association
Hourly Averages

Carbon Monoxide (CO) - ppm
Athabasca Valley - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Carbon Monoxide (CO) - ppm
Athabasca Valley - August 2017**

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 0.3 | 699 | 98.59 | 98.59 |
| 0.4 - 0.5 | 6 | 0.85 | 99.44 |
| 0.6 - 0.7 | 2 | 0.28 | 99.72 |
| 0.8 - 1.4 | 2 | 0.28 | 100.00 |
| 1.5 - 10 | 0 | 0.00 | 100.00 |
| > 10 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Carbon Monoxide (CO) - ppm
Athabasca Valley - August 2017**

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 0.3 | 9 | 6 | 7 | 12 | 36 | 52 | 166 | 41 | 34 | 45 | 96 | 60 | 43 | 31 | 27 | 34 | 699 |
| 0.4 - 0.5 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 6 |
| 0.6 - 0.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| 0.8 - 1.4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 2 |
| 1.5 - 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 9 | 6 | 8 | 12 | 37 | 52 | 166 | 43 | 35 | 45 | 99 | 62 | 43 | 31 | 27 | 34 | 709 |

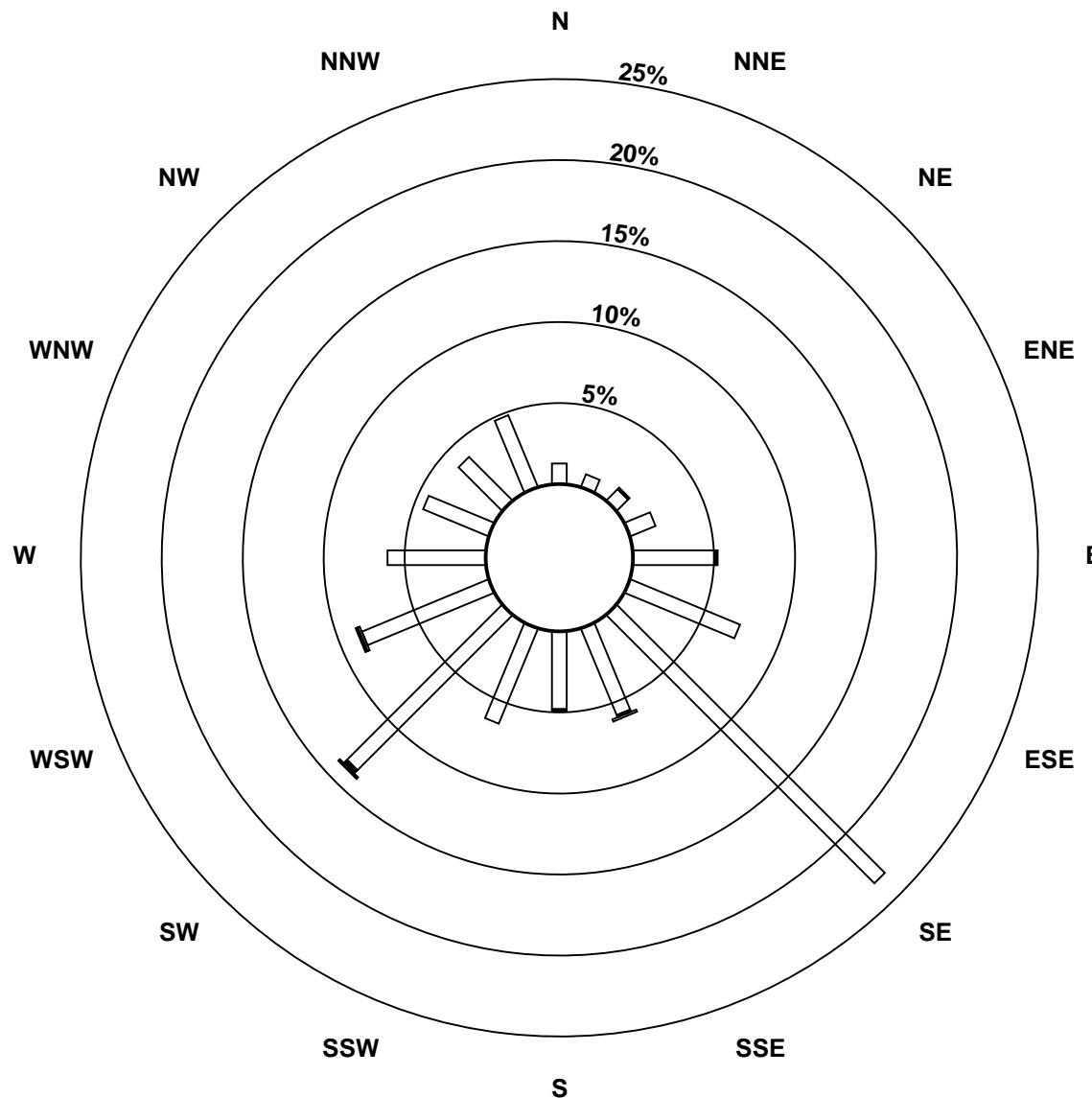
Total Number of Valid Hours: 709

Total Number of Hours: 744

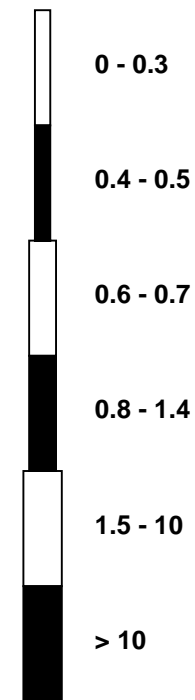


Wood Buffalo Environmental Association
Wind Rose Aug 2017

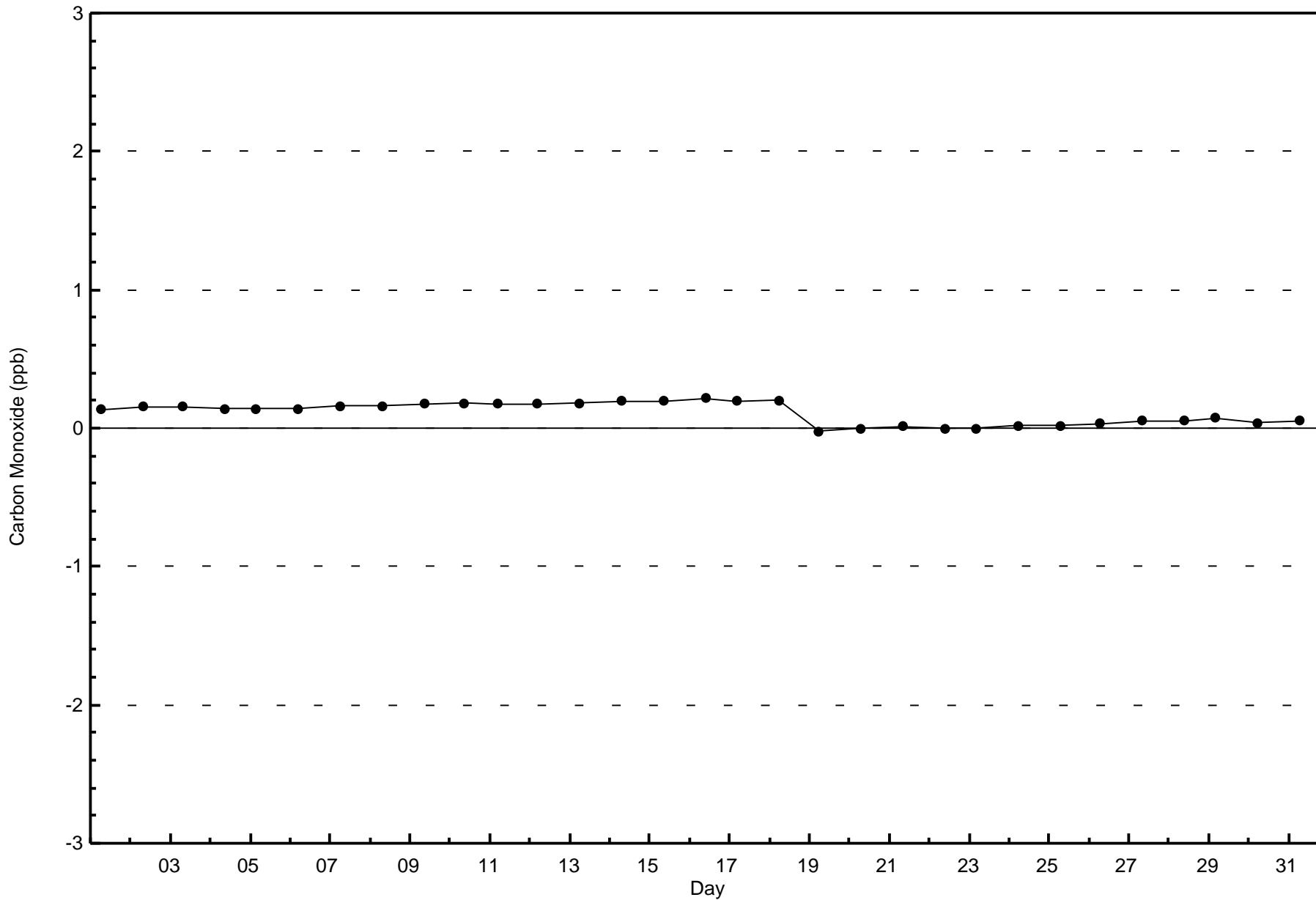
Carbon Monoxide (CO) - ppm
Athabasca Valley (AMS 7)



Classes (ppm)



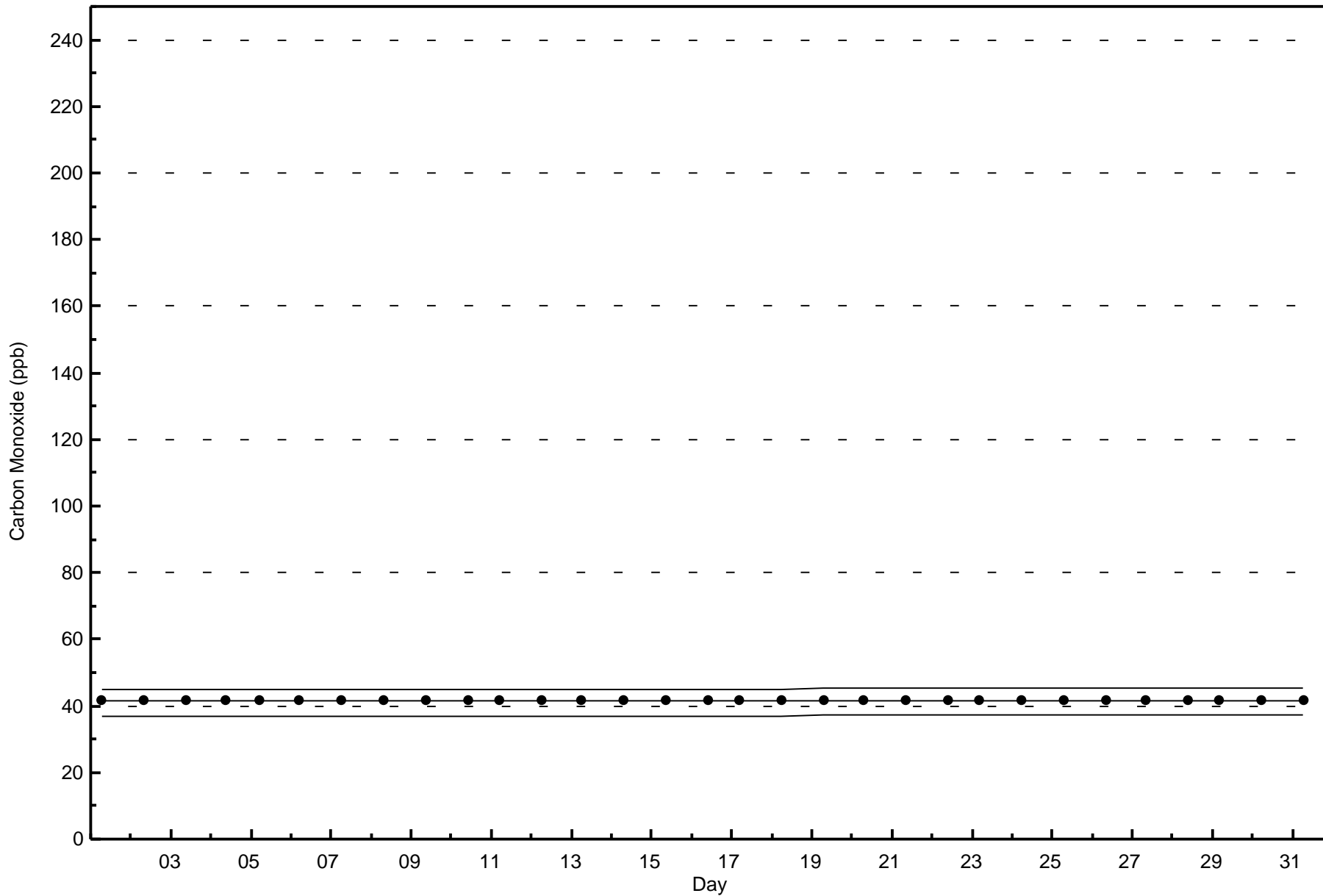
Total Number of Valid Hours: 709





Wood Buffalo Environmental Association
Span Responses

Carbon Monoxide (CO) - ppb
Athabasca Valley - August 2017

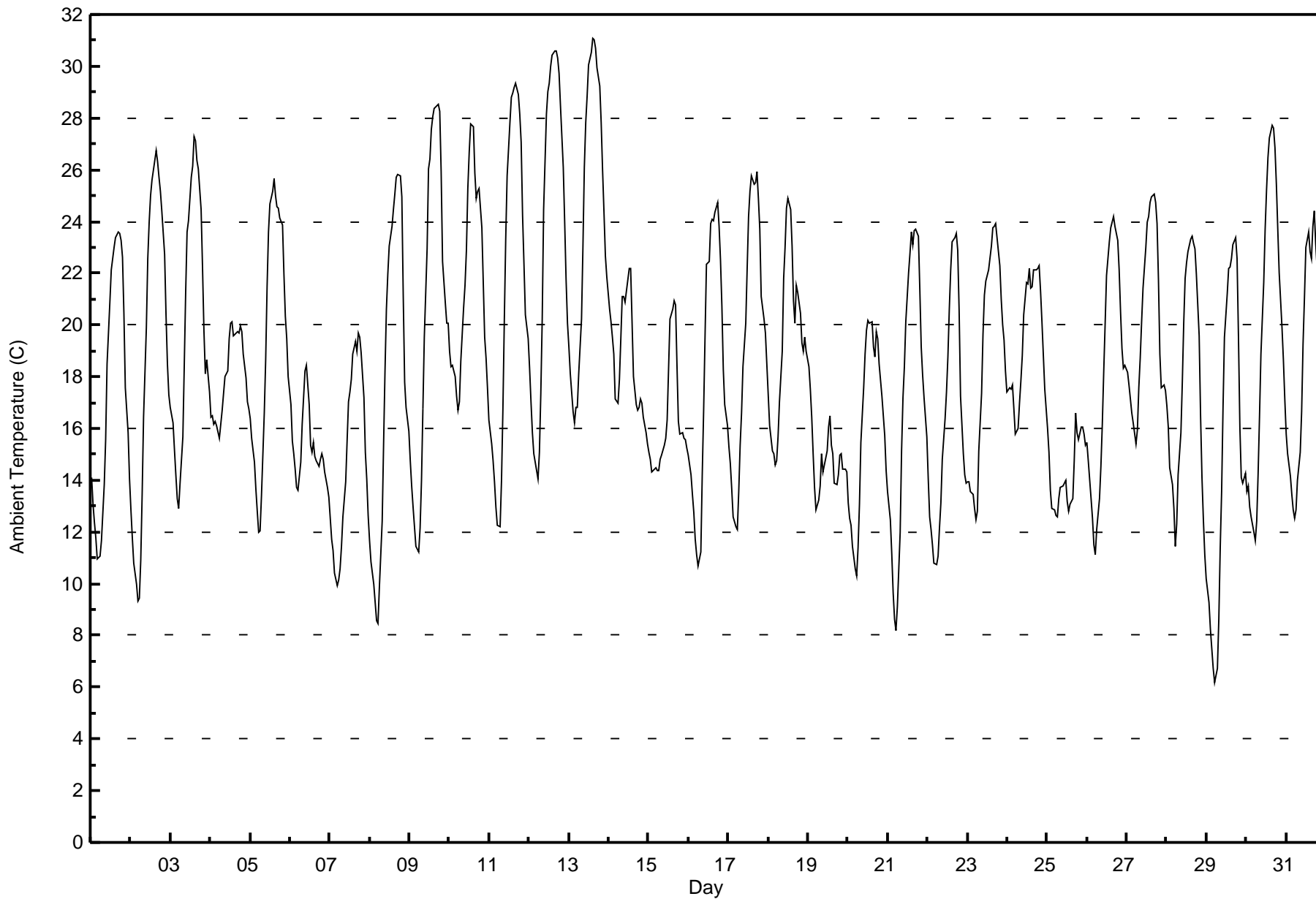




Wood Buffalo Environmental Association
Summary of Hour Averages

Ambient Temperature (AT) - C
Athabasca Valley - August 2017

| Maximum Value: 31.1 C on Aug 13 15:00 Maximum Daily Average: 24.3 C on Aug 13 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 | | | | |
|--|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|------|------|---------------|---------------|
| Minimum Value: 6.2 C on Aug 29 06:00 Minimum Daily Average: 14.3 C on Aug 25 Maximum Diurnal Average: 23.3 C at hour 15 Minimum Diurnal Average: 12.4 C at hour 6 Monthly Average: 18.42 C Percentiles: P ₁ = 8.5 P ₁₀ = 12.4 Q ₁ = 14.4 Median = 17.8 Q ₃ = 22.2 P ₉₀ = 25.2 P ₉₉ = 30.3 | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 14.1 | 13.1 | 12.3 | 11.8 | 10.9 | 11.1 | 11.7 | 12.8 | 13.8 | 15.6 | 18.5 | 20.9 | 22.1 | 22.6 | 23.0 | 23.4 | 23.6 | 23.6 | 23.3 | 22.6 | 20.5 | 17.6 | 15.9 | 14.1 | 17.4 | 23.6 |
| 2-Aug | 12.9 | 11.8 | 10.8 | 10.0 | 9.3 | 9.4 | 10.9 | 13.5 | 16.4 | 19.9 | 22.5 | 24.0 | 25.0 | 25.6 | 26.3 | 26.7 | 26.3 | 25.7 | 25.2 | 24.4 | 22.8 | 20.4 | 18.5 | 17.3 | 19.0 | 26.7 |
| 3-Aug | 16.8 | 16.2 | 15.2 | 14.2 | 13.3 | 12.9 | 13.9 | 15.7 | 18.5 | 21.3 | 23.6 | 24.0 | 25.7 | 26.1 | 27.3 | 27.1 | 26.4 | 26.0 | 24.5 | 22.2 | 19.8 | 18.1 | 18.7 | 17.4 | 20.2 | 27.3 |
| 4-Aug | 16.4 | 16.5 | 16.2 | 16.3 | 16.1 | 15.6 | 16.2 | 16.7 | 17.3 | 18.0 | 18.2 | 19.5 | 20.1 | 20.1 | 19.6 | 19.6 | 19.8 | 19.7 | 20.0 | 19.7 | 18.9 | 18.0 | 17.0 | 16.8 | 18.0 | 20.1 |
| 5-Aug | 16.4 | 15.6 | 14.7 | 13.6 | 12.8 | 12.0 | 12.1 | 13.4 | 16.6 | 18.7 | 21.5 | 23.6 | 24.7 | 25.2 | 25.6 | 25.0 | 24.6 | 24.5 | 24.2 | 23.9 | 22.0 | 20.4 | 19.5 | 18.0 | 19.5 | 25.6 |
| 6-Aug | 16.9 | 15.5 | 15.0 | 14.4 | 13.7 | 13.6 | 14.7 | 16.2 | 17.2 | 18.2 | 18.5 | 16.9 | 15.4 | 15.1 | 15.5 | 14.9 | 14.7 | 14.6 | 14.8 | 15.0 | 14.8 | 14.3 | 13.7 | 13.3 | 15.3 | 18.5 |
| 7-Aug | 12.5 | 11.7 | 11.3 | 10.4 | 9.9 | 10.2 | 10.6 | 11.4 | 12.6 | 13.9 | 15.5 | 17.1 | 17.4 | 17.9 | 18.9 | 19.4 | 19.0 | 19.7 | 19.5 | 18.9 | 17.2 | 15.1 | 14.0 | 12.6 | 14.9 | 19.7 |
| 8-Aug | 11.7 | 10.8 | 10.0 | 9.3 | 8.5 | 8.5 | 9.9 | 12.4 | 15.4 | 18.2 | 20.6 | 22.0 | 23.0 | 23.8 | 24.4 | 25.1 | 25.7 | 25.8 | 25.8 | 24.9 | 21.1 | 17.8 | 16.8 | 15.9 | 17.8 | 25.8 |
| 9-Aug | 14.8 | 13.8 | 13.0 | 12.2 | 11.5 | 11.2 | 12.1 | 14.0 | 16.7 | 19.5 | 23.0 | 26.0 | 26.4 | 27.5 | 28.0 | 28.3 | 28.5 | 28.5 | 28.2 | 25.9 | 22.5 | 20.8 | 20.1 | 20.1 | 20.5 | 28.5 |
| 10-Aug | 19.0 | 18.4 | 18.4 | 18.0 | 17.3 | 16.7 | 17.0 | 18.6 | 20.6 | 21.5 | 22.9 | 25.3 | 26.7 | 27.7 | 27.6 | 25.9 | 24.9 | 25.2 | 25.3 | 23.8 | 21.6 | 19.5 | 18.7 | 17.6 | 21.6 | 27.7 |
| 11-Aug | 16.3 | 15.4 | 14.8 | 13.9 | 13.0 | 12.2 | 12.2 | 14.0 | 16.8 | 20.2 | 23.3 | 25.8 | 27.8 | 28.8 | 29.0 | 29.2 | 29.3 | 28.9 | 28.1 | 27.1 | 24.2 | 22.3 | 20.4 | 19.5 | 21.4 | 29.3 |
| 12-Aug | 18.3 | 17.0 | 15.8 | 15.0 | 14.4 | 14.0 | 15.1 | 17.3 | 20.2 | 24.5 | 28.2 | 29.0 | 29.4 | 30.0 | 30.4 | 30.6 | 30.6 | 30.3 | 29.7 | 28.5 | 26.1 | 24.0 | 21.8 | 20.1 | 23.3 | 30.6 |
| 13-Aug | 19.2 | 18.1 | 16.7 | 16.2 | 16.8 | 16.8 | 18.1 | 20.3 | 23.0 | 26.1 | 27.8 | 28.8 | 30.0 | 30.6 | 31.1 | 31.0 | 30.7 | 30.0 | 29.2 | 27.8 | 26.0 | 24.4 | 22.7 | 21.9 | 24.3 | 31.1 |
| 14-Aug | 20.6 | 20.1 | 19.5 | 18.9 | 17.2 | 17.0 | 17.9 | 19.5 | 21.1 | 21.1 | 20.9 | 21.8 | 22.2 | 22.2 | 20.1 | 18.0 | 16.9 | 16.7 | 16.8 | 17.1 | 17.0 | 16.4 | 15.8 | 15.4 | 18.8 | 22.2 |
| 15-Aug | 15.1 | 14.8 | 14.3 | 14.4 | 14.5 | 14.4 | 14.4 | 14.8 | 15.0 | 15.3 | 15.6 | 16.3 | 18.3 | 20.2 | 20.6 | 20.9 | 20.8 | 18.5 | 16.3 | 15.8 | 15.8 | 15.6 | 15.6 | 15.3 | 16.4 | 20.9 |
| 16-Aug | 15.0 | 14.2 | 13.4 | 12.7 | 11.7 | 11.1 | 10.7 | 11.3 | 14.2 | 16.7 | 19.6 | 22.3 | 22.5 | 23.9 | 24.1 | 24.1 | 24.4 | 24.7 | 23.8 | 22.5 | 20.7 | 18.3 | 16.9 | 16.1 | 18.1 | 24.7 |
| 17-Aug | 15.3 | 14.6 | 13.7 | 12.6 | 12.2 | 12.1 | 13.6 | 15.4 | 16.6 | 18.4 | 20.1 | 22.2 | 24.2 | 25.2 | 25.8 | 25.4 | 25.5 | 26.0 | 24.9 | 23.7 | 21.1 | 20.2 | 19.7 | 18.5 | 19.4 | 26.0 |
| 18-Aug | 17.3 | 16.1 | 15.1 | 15.0 | 14.6 | 14.7 | 15.7 | 17.1 | 19.0 | 21.8 | 23.0 | 24.5 | 24.9 | 24.5 | 23.1 | 21.0 | 20.1 | 21.5 | 21.3 | 20.5 | 19.3 | 19.0 | 19.5 | 19.0 | 19.5 | 24.9 |
| 19-Aug | 18.4 | 17.5 | 16.5 | 15.0 | 13.7 | 12.9 | 13.2 | 13.8 | 15.0 | 14.3 | 14.6 | 15.1 | 16.1 | 16.5 | 15.3 | 15.0 | 13.9 | 13.9 | 14.2 | 15.0 | 15.0 | 14.4 | 14.4 | 14.3 | 14.9 | 18.4 |
| 20-Aug | 13.1 | 12.5 | 12.2 | 11.5 | 10.6 | 10.3 | 11.4 | 13.1 | 15.5 | 17.6 | 18.9 | 19.8 | 20.2 | 20.1 | 20.1 | 19.2 | 18.8 | 19.8 | 19.5 | 18.5 | 17.3 | 16.5 | 15.7 | 14.4 | 16.1 | 20.2 |
| 21-Aug | 13.5 | 12.5 | 11.2 | 9.7 | 8.6 | 8.2 | 9.1 | 12.0 | 15.1 | 17.2 | 18.4 | 20.1 | 22.0 | 22.8 | 23.6 | 23.1 | 23.7 | 23.7 | 23.4 | 21.4 | 19.2 | 18.1 | 17.2 | 15.7 | 17.1 | 23.7 |
| 22-Aug | 14.1 | 12.6 | 12.1 | 11.5 | 10.8 | 10.7 | 11.1 | 12.1 | 13.1 | 14.8 | 16.4 | 17.4 | 18.8 | 20.6 | 22.1 | 23.2 | 23.4 | 23.5 | 22.9 | 20.5 | 17.2 | 15.0 | 14.2 | 13.9 | 16.3 | 23.5 |
| 23-Aug | 13.9 | 13.9 | 13.6 | 13.4 | 12.9 | 12.5 | 12.8 | 15.1 | 17.4 | 19.6 | 21.2 | 21.7 | 21.9 | 22.1 | 23.0 | 23.8 | 23.8 | 23.9 | 23.4 | 22.3 | 21.0 | 20.0 | 19.4 | 18.2 | 18.8 | 23.9 |
| 24-Aug | 17.4 | 17.6 | 17.5 | 17.7 | 16.7 | 15.8 | 16.0 | 17.0 | 17.8 | 18.8 | 20.4 | 21.7 | 21.6 | 22.2 | 21.4 | 21.5 | 22.2 | 22.1 | 22.2 | 22.3 | 21.3 | 20.1 | 17.5 | 16.8 | 19.4 | 22.3 |
| 25-Aug | 16.0 | 15.1 | 13.6 | 12.9 | 12.9 | 12.7 | 12.6 | 13.3 | 13.7 | 13.8 | 13.9 | 14.0 | 13.2 | 12.8 | 13.1 | 13.3 | 14.8 | 16.6 | 15.8 | 15.6 | 16.0 | 16.0 | 15.8 | 15.4 | 14.3 | 16.6 |
| 26-Aug | 15.5 | 14.7 | 13.3 | 12.5 | 11.5 | 11.1 | 12.1 | 13.3 | 14.5 | 16.1 | 18.1 | 20.0 | 21.9 | 23.2 | 23.8 | 24.0 | 24.2 | 23.8 | 23.3 | 22.1 | 20.5 | 19.1 | 18.3 | 18.4 | 18.1 | 24.2 |
| 27-Aug | 18.2 | 17.7 | 17.2 | 16.6 | 16.2 | 15.4 | 16.0 | 17.6 | 18.7 | 20.1 | 21.4 | 23.0 | 24.0 | 24.2 | 24.7 | 24.9 | 25.1 | 24.7 | 23.9 | 21.8 | 18.9 | 17.6 | 17.7 | 17.5 | 20.1 | 25.1 |
| 28-Aug | 16.9 | 16.0 | 14.5 | 13.8 | 12.9 | 11.4 | 12.3 | 14.2 | 15.8 | 17.8 | 20.1 | 21.8 | 22.4 | 22.8 | 23.3 | 23.5 | 23.2 | 22.9 | 22.0 | 19.6 | 16.5 | 14.1 | 12.5 | 11.1 | 17.6 | 23.5 |
| 29-Aug | 10.2 | 9.3 | 8.3 | 7.5 | 6.7 | 6.2 | 6.7 | 8.6 | 11.4 | 13.5 | 16.8 | 19.5 | 21.2 | 22.2 | 22.2 | 22.6 | 23.1 | 23.4 | 22.6 | 19.5 | 16.0 | 14.1 | 13.9 | 14.2 | 15.0 | 23.4 |
| 30-Aug | 13.5 | 13.8 | 13.0 | 12.6 | 12.0 | 11.7 | 12.4 | 14.3 | 16.5 | 18.9 | 21.7 | 23.7 | 25.2 | 26.5 | 27.2 | 27.7 | 27.6 | 26.8 | 25.5 | 23.7 | 22.0 | 19.9 | 18.7 | 17.1 | 19.7 | 27.7 |
| 31-Aug | 15.8 | 15.0 | 14.2 | 13.5 | 12.8 | 12.5 | 12.9 | 14.0 | 15.1 | 16.6 | 19.3 | 21.1 | 23.0 | 23.6 | 22.8 | 22.6 | 23.8 | 24.4 | 23.1 | 21.2 | 20.1 | 19.0 | 17.8 | 16.9 | 18.4 | 24.4 |
| | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | |
| | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | |





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Athabasca Valley - August 2017**

| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 18 | 2.42 | 2.42 |
| 10 - 20 | 447 | 60.08 | 62.50 |
| > 20 | 279 | 37.50 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Barometric Pressure (BP) - inHg

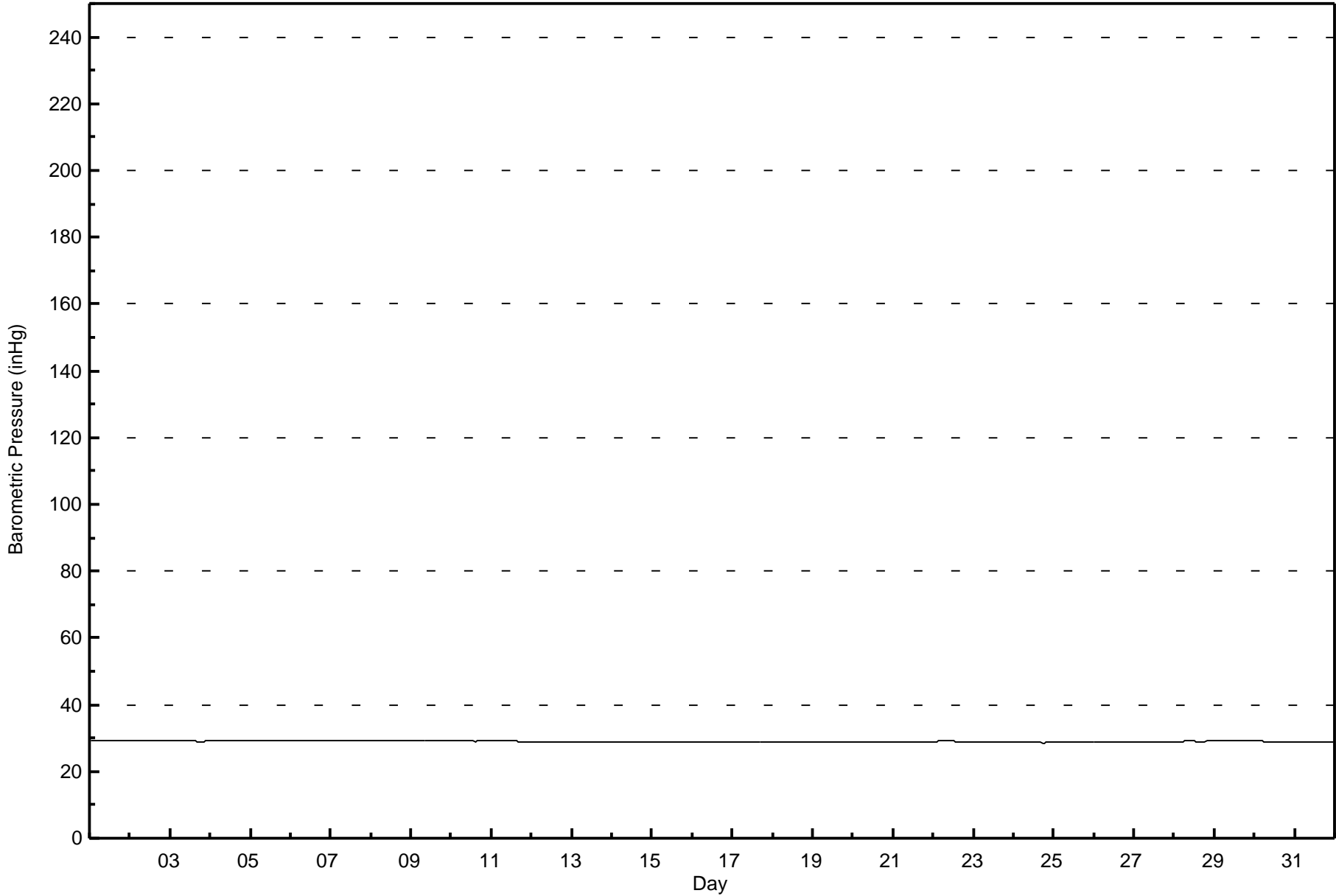
Athabasca Valley - August 2017

| Maximum Value: 29.4 inHg on Aug 2 04:00 Maximum Daily Average: 29.4 inHg on Aug 1 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: | 744 | | | | |
|--|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------------------|-------|------|---------------|---------------|------|
| Minimum Value: 28.6 inHg on Aug 24 19:00 Minimum Daily Average: 28.7 inHg on Aug 15 | | | | | | | | | | | | | | | | | | | | | | Hours of Data: | 744 | | | | |
| Maximum Diurnal Average: 29.0 inHg at hour 8 Minimum Diurnal Average: 28.9 inHg at hour 18 | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: | 0 | | | | |
| Monthly Average: 28.94 inHg Percentiles: P ₁ = 28.6 P ₁₀ = 28.7 Q ₁ = 28.8 Median = 29.0 Q ₃ = 29.1 P ₉₀ = 29.2 P ₉₉ = 29.4 | | | | | | | | | | | | | | | | | | | | | | Hours of Calibration: | 0 | | | | |
| | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: | 100.0 | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 29.3 | 29.3 | 29.3 | 29.3 | 29.4 | 29.4 | 29.4 | 29.4 | 29.4 | 29.4 | 29.4 | 29.4 | 29.3 | 29.3 | 29.3 | 29.3 | 29.3 | 29.3 | 29.3 | 29.3 | 29.3 | 29.3 | 29.4 | 29.4 | 29.4 | 29.4 | |
| 2-Aug | 29.4 | 29.4 | 29.4 | 29.4 | 29.4 | 29.4 | 29.4 | 29.4 | 29.4 | 29.4 | 29.3 | 29.3 | 29.3 | 29.3 | 29.3 | 29.3 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.3 | 29.4 |
| 3-Aug | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.1 | 29.1 | 29.1 | 29.1 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.1 | 29.2 |
| 4-Aug | 29.0 | 29.0 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 |
| 5-Aug | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.1 | 29.1 |
| 6-Aug | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.1 | 29.2 |
| 7-Aug | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 |
| 8-Aug | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.2 | 29.2 |
| 9-Aug | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.0 | 29.0 | 29.0 | 29.0 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 |
| 10-Aug | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 |
| 11-Aug | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.1 | 29.1 |
| 12-Aug | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.9 | 29.0 |
| 13-Aug | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.6 | 28.6 | 28.6 | 28.6 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.8 |
| 14-Aug | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 |
| 15-Aug | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.6 | 28.6 | 28.6 | 28.6 | 28.6 | 28.6 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 |
| 16-Aug | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.8 | 28.8 |
| 17-Aug | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 |
| 18-Aug | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.6 | 28.6 | 28.6 | 28.6 | 28.7 | 28.7 | 28.6 | 28.7 | 28.8 | |
| 19-Aug | 28.6 | 28.6 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.7 | 28.8 |
| 20-Aug | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.8 | 28.9 | 28.9 |
| 21-Aug | 28.9 | 28.9 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 |
| 22-Aug | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.1 | 29.1 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.1 |
| 23-Aug | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 29.0 |
| 24-Aug | 28.9 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.7 | 28.7 | 28.7 | 28.6 | 28.6 | 28.6 | 28.6 | 28.6 | 28.6 | 28.6 | 28.6 | 28.6 | 28.6 | 28.6 | 28.7 | 28.9 |
| 25-Aug | 28.6 | 28.6 | 28.7 | 28.7 | 28.6 | 28.6 | 28.6 | 28.6 | 28.6 | 28.6 | 28.6 | 28.6 | 28.6 | 28.6 | 28.7 | 28.7 | 28.7 | 28.7 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.8 | 28.7 | 28.8 |
| 26-Aug | 28.8 | 28.8 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 29.0 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 29.0 |
| 27-Aug | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 |
| 28-Aug | 28.9 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.1 | 29.1 | 29.1 | 29.1 | 29.0 | 29.1 |
| 29-Aug | 29.1 | 29.1 | 29.1 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.2 | 29.2 |
| 30-Aug | 29.1 | 29.1 | 29.1 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 28.9 | 28.9 | 28.9 | 28.9 | 28.8 | 28.8 | 28.8 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.9 | 29.1 |
| 31-Aug | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.8 | 28.8 | 28.8 | 28.7 | 28.8 | 28.8 |
| | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Barometric Pressure (BP) - inHg
Athabasca Valley - August 2017



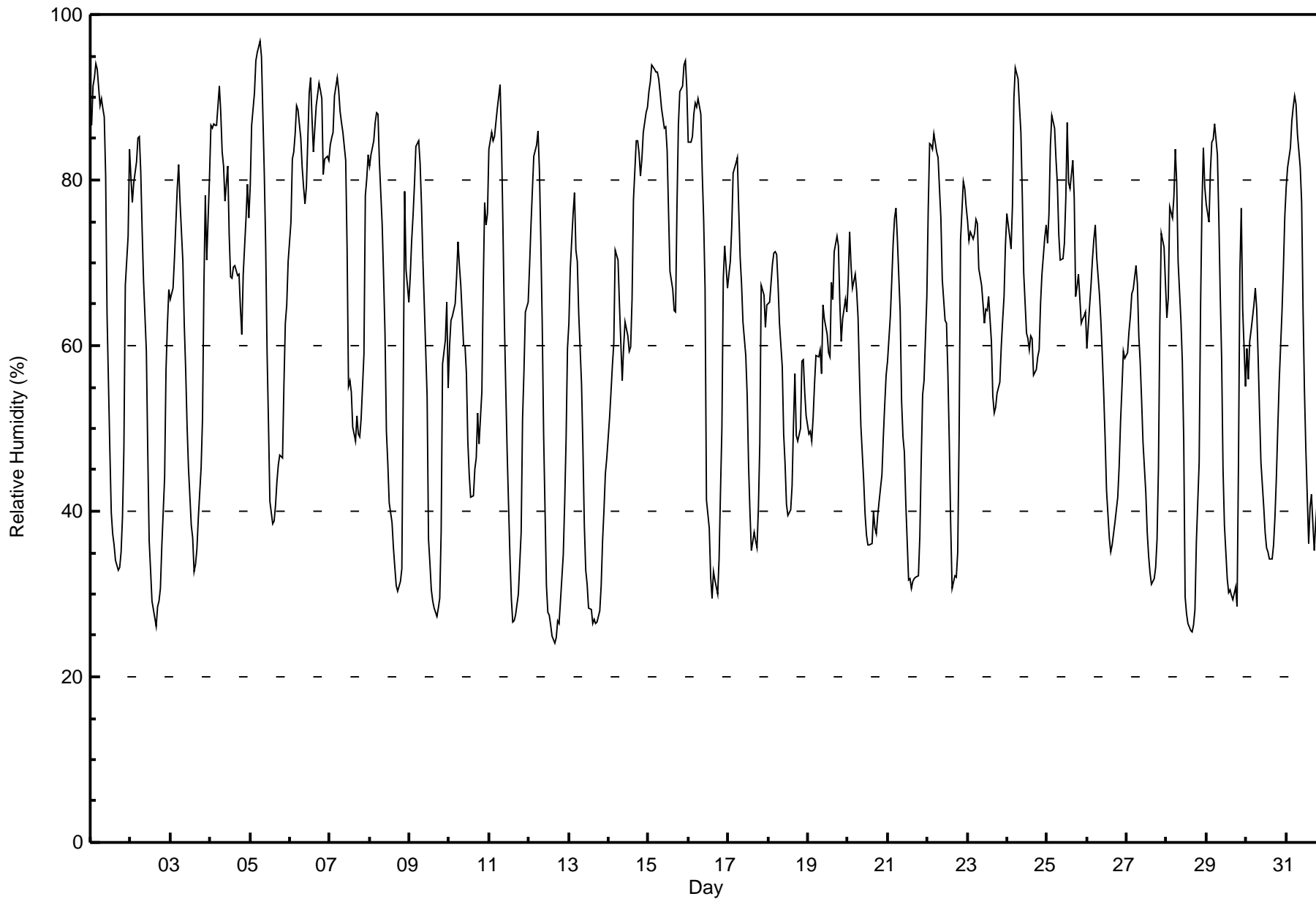


Wood Buffalo Environmental Association

Summary of Hour Averages

**Relative Humidity (RH) - %
Athabasca Valley - August 2017**

| Maximum Value: 97 % on Aug 5 07:00 | | | | | | | | | | | | | | | | | Maximum Daily Average: 85.3 % on Aug 15 | | | | | | | | | | | | | | | | | Hours in Service: 744 | | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|------|------|------|------|------|------|------|---------------|---------------|------|------|------|------|------|------|------|---------------------------------|------|------|------|------|------|------|-----------------|-----------------|--|
| Minimum Value: 24 % on Aug 12 16:00 | | | | | | | | | | | | | | | | | Minimum Daily Average: 45.3 % on Aug 13 | | | | | | | | | | | | | | | | | Hours of Data: 744 | | | | | | | | | |
| Maximum Diurnal Average: 81.5 % at hour 6 | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 43.0 % at hour 15 | | | | | | | | | | | | | | | | | Hours of Missing Data: 0 | | | | | | | | | |
| Monthly Average: 61.7 % | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 26 P ₁₀ = 33 Q ₁ = 46 Median = 64 Q ₃ = 78 P ₉₀ = 87 P ₉₉ = 94 | | | | | | | | | | | | | | | | | Hours of Calibration: 0 | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 87 | 91 | 92 | 94 | 93 | 89 | 90 | 89 | 88 | 80 | 64 | 47 | 40 | 37 | 36 | 34 | 33 | 33 | 35 | 39 | 48 | 67 | 73 | 84 | 65.2 | 94 | | | | | | | | | | | | | | | | | |
| 2-Aug | 80 | 77 | 80 | 82 | 85 | 85 | 81 | 74 | 68 | 59 | 47 | 36 | 33 | 29 | 27 | 26 | 29 | 29 | 31 | 36 | 44 | 57 | 63 | 67 | 55.2 | 85 | | | | | | | | | | | | | | | | | |
| 3-Aug | 66 | 67 | 71 | 75 | 79 | 82 | 77 | 70 | 63 | 57 | 50 | 45 | 38 | 37 | 33 | 33 | 35 | 39 | 45 | 51 | 67 | 78 | 70 | 81 | 58.7 | 82 | | | | | | | | | | | | | | | | | |
| 4-Aug | 87 | 86 | 87 | 87 | 87 | 91 | 88 | 83 | 82 | 77 | 82 | 73 | 68 | 68 | 69 | 70 | 69 | 69 | 64 | 61 | 69 | 75 | 80 | 76 | 77.0 | 91 | | | | | | | | | | | | | | | | | |
| 5-Aug | 79 | 87 | 90 | 94 | 95 | 96 | 97 | 95 | 81 | 72 | 59 | 51 | 41 | 39 | 39 | 41 | 44 | 46 | 47 | 47 | 55 | 63 | 65 | 70 | 66.3 | 97 | | | | | | | | | | | | | | | | | |
| 6-Aug | 75 | 83 | 83 | 86 | 89 | 88 | 85 | 82 | 79 | 77 | 79 | 90 | 92 | 87 | 83 | 86 | 89 | 92 | 91 | 90 | 81 | 83 | 83 | 82 | 84.8 | 92 | | | | | | | | | | | | | | | | | |
| 7-Aug | 84 | 85 | 86 | 90 | 92 | 91 | 88 | 87 | 86 | 82 | 72 | 55 | 56 | 54 | 50 | 48 | 52 | 49 | 49 | 51 | 59 | 78 | 80 | 83 | 71.2 | 92 | | | | | | | | | | | | | | | | | |
| 8-Aug | 82 | 83 | 85 | 87 | 88 | 88 | 82 | 75 | 68 | 62 | 50 | 46 | 41 | 39 | 36 | 33 | 31 | 30 | 32 | 33 | 55 | 79 | 69 | 65 | 59.9 | 88 | | | | | | | | | | | | | | | | | |
| 9-Aug | 69 | 73 | 76 | 79 | 84 | 85 | 82 | 77 | 70 | 65 | 54 | 37 | 34 | 30 | 29 | 28 | 27 | 28 | 29 | 37 | 58 | 61 | 65 | 55 | 55.5 | 85 | | | | | | | | | | | | | | | | | |
| 10-Aug | 60 | 63 | 64 | 65 | 68 | 72 | 70 | 67 | 60 | 60 | 57 | 49 | 44 | 42 | 42 | 45 | 46 | 52 | 48 | 54 | 67 | 77 | 75 | 76 | 59.3 | 77 | | | | | | | | | | | | | | | | | |
| 11-Aug | 84 | 86 | 85 | 85 | 87 | 89 | 92 | 85 | 75 | 63 | 55 | 47 | 35 | 30 | 27 | 27 | 28 | 30 | 34 | 37 | 51 | 57 | 64 | 65 | 59.0 | 92 | | | | | | | | | | | | | | | | | |
| 12-Aug | 70 | 75 | 79 | 83 | 84 | 86 | 81 | 73 | 63 | 49 | 31 | 28 | 27 | 26 | 25 | 24 | 25 | 27 | 26 | 29 | 35 | 41 | 49 | 60 | 49.8 | 86 | | | | | | | | | | | | | | | | | |
| 13-Aug | 63 | 69 | 76 | 79 | 72 | 70 | 64 | 56 | 48 | 38 | 33 | 31 | 28 | 28 | 26 | 27 | 26 | 27 | 28 | 31 | 36 | 40 | 45 | 46 | 45.3 | 79 | | | | | | | | | | | | | | | | | |
| 14-Aug | 51 | 54 | 58 | 60 | 71 | 70 | 65 | 60 | 56 | 60 | 63 | 61 | 59 | 60 | 66 | 78 | 85 | 85 | 83 | 80 | 83 | 86 | 88 | 89 | 69.6 | 89 | | | | | | | | | | | | | | | | | |
| 15-Aug | 91 | 92 | 94 | 93 | 93 | 93 | 92 | 91 | 89 | 86 | 86 | 84 | 76 | 69 | 67 | 64 | 64 | 77 | 87 | 91 | 91 | 94 | 94 | 91 | 85.3 | 94 | | | | | | | | | | | | | | | | | |
| 16-Aug | 85 | 85 | 85 | 88 | 89 | 89 | 90 | 88 | 81 | 75 | 67 | 41 | 38 | 32 | 30 | 33 | 32 | 30 | 34 | 42 | 50 | 68 | 72 | 67 | 62.1 | 90 | | | | | | | | | | | | | | | | | |
| 17-Aug | 69 | 70 | 74 | 81 | 82 | 83 | 77 | 71 | 67 | 63 | 59 | 54 | 46 | 40 | 35 | 37 | 36 | 36 | 40 | 48 | 67 | 66 | 62 | 65 | 59.5 | 83 | | | | | | | | | | | | | | | | | |
| 18-Aug | 65 | 65 | 70 | 71 | 71 | 71 | 68 | 63 | 57 | 49 | 46 | 41 | 40 | 40 | 43 | 50 | 57 | 49 | 49 | 50 | 58 | 58 | 54 | 51 | 55.7 | 71 | | | | | | | | | | | | | | | | | |
| 19-Aug | 49 | 50 | 48 | 51 | 55 | 59 | 59 | 59 | 57 | 65 | 63 | 61 | 59 | 59 | 68 | 66 | 71 | 73 | 72 | 65 | 61 | 63 | 66 | 64 | 61.0 | 73 | | | | | | | | | | | | | | | | | |
| 20-Aug | 68 | 74 | 70 | 67 | 69 | 67 | 63 | 56 | 50 | 44 | 40 | 37 | 36 | 36 | 36 | 40 | 38 | 37 | 40 | 41 | 44 | 49 | 53 | 56 | 50.5 | 74 | | | | | | | | | | | | | | | | | |
| 21-Aug | 58 | 64 | 68 | 72 | 75 | 77 | 73 | 64 | 53 | 49 | 47 | 41 | 32 | 32 | 31 | 32 | 32 | 32 | 32 | 37 | 46 | 54 | 56 | 66 | 50.9 | 77 | | | | | | | | | | | | | | | | | |
| 22-Aug | 77 | 84 | 84 | 84 | 86 | 83 | 83 | 79 | 76 | 68 | 63 | 63 | 57 | 48 | 38 | 31 | 32 | 32 | 35 | 49 | 73 | 80 | 79 | 77 | 65.0 | 86 | | | | | | | | | | | | | | | | | |
| 23-Aug | 75 | 73 | 74 | 73 | 74 | 75 | 75 | 69 | 67 | 65 | 63 | 64 | 64 | 66 | 61 | 54 | 52 | 53 | 54 | 56 | 60 | 63 | 66 | 72 | 65.3 | 75 | | | | | | | | | | | | | | | | | |
| 24-Aug | 76 | 73 | 72 | 77 | 90 | 94 | 92 | 89 | 86 | 78 | 69 | 61 | 61 | 60 | 61 | 61 | 56 | 57 | 59 | 59 | 65 | 69 | 73 | 75 | 71.3 | 94 | | | | | | | | | | | | | | | | | |
| 25-Aug | 72 | 76 | 84 | 88 | 86 | 83 | 79 | 73 | 70 | 71 | 72 | 78 | 87 | 80 | 79 | 82 | 78 | 66 | 67 | 69 | 63 | 63 | 64 | 64 | 74.7 | 88 | | | | | | | | | | | | | | | | | |
| 26-Aug | 60 | 62 | 67 | 70 | 73 | 75 | 71 | 66 | 63 | 59 | 54 | 49 | 43 | 37 | 35 | 36 | 37 | 39 | 42 | 45 | 51 | 55 | 59 | 58 | 54.4 | 75 | | | | | | | | | | | | | | | | | |
| 27-Aug | 59 | 62 | 64 | 66 | 67 | 70 | 68 | 61 | 58 | 53 | 48 | 42 | 37 | 35 | 32 | 31 | 32 | 33 | 37 | 45 | 63 | 74 | 72 | 67 | 53.2 | 74 | | | | | | | | | | | | | | | | | |
| 28-Aug | 63 | 66 | 77 | 75 | 78 | 84 | 80 | 70 | 63 | 58 | 49 | 30 | 28 | 26 | 26 | 25 | 26 | 28 | 36 | 46 | 65 | 77 | 84 | 79 | 55.8 | 84 | | | | | | | | | | | | | | | | | |
| 29-Aug | 77 | 75 | 81 | 85 | 85 | 87 | 83 | 75 | 66 | 59 | 45 | 38 | 32 | 30 | 31 | 30 | 29 | 31 | 28 | 46 | 69 | 77 | 64 | 55 | 57.4 | 87 | | | | | | | | | | | | | | | | | |
| 30-Aug | 60 | 56 | 60 | 62 | 65 | 67 | 64 | 59 | 52 | 46 | 40 | 38 | 36 | 35 | 34 | 34 | 36 | 39 | 44 | 50 | 56 | 64 | 69 | 76 | 51.8 | 76 | | | | | | | | | | | | | | | | | |
| 31-Aug | 79 | 81 | 84 | 87 | 89 | 90 | 89 | 86 | 82 | 77 | 64 | 55 | 47 | 36 | 41 | 42 | 38 | 35 | 39 | 43 | 44 | 46 | 48 | 49 | 61.3 | 90 | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | 71.5 | 73.7 | 76.3 | 78.6 | 80.7 | 81.5 | 78.9 | 73.9 | 68.5 | 63.5 | 57.1 | 50.8 | 46.9 | 44.1 | 43.0 | 43.5 | 44.0 | 44.6 | 46.4 | 50.4 | 59.1 | 66.5 | 67.9 | 68.8 | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | 91 | 92 | 94 | 94 | 95 | 96 | 97 | 95 | 89 | 86 | 86 | 86 | 90 | 92 | 87 | 83 | 86 | 89 | 92 | 91 | 91 | 91 | 94 | 94 | 91 | Diurnal Maximum | |





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Speed (WS) - km/h
Athabasca Valley - August 2017

| | | |
|--|---|---------------------------------|
| Maximum Speed: 30 km/h on Aug 27 14:00 | Maximum Daily Speed Average: 17.6 km/h on Aug 19 | Hours in Service: 744 |
| Minimum Speed Value: 0 km/h on Aug 22 01:00 | Minimum Daily Speed Average: 0.9 km/h on Aug 22 | Hours of Data: 744 |
| Maximum Diurnal Speed Average: 7.2 km/h at hour 14 | Minimum Diurnal Speed Average: 3.1 km/h at hour 21 | Hours of Missing Data: 0 |
| Monthly Average Velocity: 3.8 km/h 207.8 deg | Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 8 Q ₃ = 12 P ₉₀ = 18 P ₉₉ = 27 | Percent Operational Time: 100.0 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | SW2 | ESE2 | SSW2 | SSW2 | E3 | SE6 | E5 | ESE2 | SSE2 | W3 | NNW7 | NNW11 | NNW12 | NNW15 | NNW15 | NNW14 | NNW13 | NNW12 | NNW9 | N6 | NW4 | WSW5 | WSW3 | E2 | NNW4.2 | NNW15 |
| 2-Aug | E3 | ESE3 | ESE4 | SE4 | SE5 | SE8 | SE8 | SE6 | E6 | SSE2 | SW7 | SW6 | SW8 | SW8 | SW8 | SW11 | SW10 | WSW9 | WSW7 | SW4 | SSW5 | S4 | SE4 | E6 | S3.6 | SW11 |
| 3-Aug | ESE5 | SE8 | SE6 | SE8 | SE7 | SE9 | SE9 | SE9 | ESE7 | ENE5 | NE3 | WNW3 | SSW5 | WNW3 | S7 | WSW9 | SW6 | ESE5 | WNW9 | SW3 | N10 | NNE3 | SE6 | N9 | SE2.2 | N10 |
| 4-Aug | NNW6 | NW5 | NW5 | NW1 | SE7 | E4 | NNW6 | NE1 | SE7 | SW3 | N8 | NE3 | W3 | ESE9 | NE6 | E6 | E2 | NNE1 | ESE6 | ESE6 | NNE2 | SE3 | E4 | NE4 | ENE1.8 | ESE9 |
| 5-Aug | S3 | SE3 | SSE2 | SE4 | SE5 | SE5 | SE6 | ESE5 | ESE4 | ENE4 | ENE6 | E4 | ESE14 | ESE14 | SSE13 | S11 | S11 | S10 | S8 | S6 | SSW4 | S5 | S7 | SSE7 | SSE5.4 | ESE14 |
| 6-Aug | SE6 | ESE7 | SE7 | SE3 | SSE4 | ESE4 | ESE4 | W1 | NW4 | NNW8 | NNW14 | NNW19 | NNW20 | NNW16 | NNW17 | NNW18 | NNW13 | NW8 | NW9 | NNW7 | NNE7 | N5 | NNW6 | NW5 | NNW5.9 | NNW20 |
| 7-Aug | NW7 | NW5 | WNW6 | WSW5 | W4 | NNW7 | NW10 | NNW11 | NNW13 | NNW14 | NNW15 | NNW11 | NNW10 | WNW8 | NNW6 | W4 | WNW9 | W8 | WNW9 | WSW6 | SSW5 | SE2 | SSE3 | SE3 | NW5.8 | NNW15 |
| 8-Aug | SE6 | SSE7 | SSE7 | SE7 | SE8 | SE10 | SE8 | SE7 | E5 | ESE2 | SW13 | SW9 | SSW10 | SW11 | SW11 | SW10 | SW9 | SW7 | SW5 | S5 | SSE1 | E2 | SE3 | SSE4 | S5.2 | SW13 |
| 9-Aug | SE5 | SE8 | SE9 | SE10 | SE10 | SE9 | SE8 | SE8 | ESE6 | E8 | E3 | SW8 | SSW7 | SW11 | SW7 | WSW3 | SW8 | SW7 | SW5 | SW6 | S1 | SSE3 | ESE3 | SE7 | SSE4.5 | SW11 |
| 10-Aug | SE8 | SE8 | SE6 | SE5 | SE6 | SSE5 | SSE7 | ESE3 | SSW6 | SW8 | SW7 | SW7 | SW9 | WSW4 | NNW11 | ENE11 | SE15 | ESE5 | SW6 | SSW5 | S2 | SSE1 | SE4 | SE3 | SSE3.4 | SE15 |
| 11-Aug | SE6 | SE8 | SE7 | SE8 | SE10 | SE10 | SE9 | SE9 | SE7 | ESE7 | E6 | NE5 | SSE6 | SE10 | ESE13 | SE12 | SE12 | SE15 | SE16 | SSE10 | SSE7 | SSE4 | ESE2 | SSE8 | SE8.2 | SE16 |
| 12-Aug | SSE8 | SE7 | SSE4 | SE6 | SSE5 | SSE4 | SE8 | SE8 | SE10 | SE11 | SSW16 | S17 | S18 | S17 | S18 | S18 | S17 | S15 | SSE15 | SSE11 | SSE7 | SE7 | SSE6 | SE6 | SSE10.1 | S18 |
| 13-Aug | SE7 | ESE7 | ENE5 | ENE5 | ESE8 | ESE9 | SE12 | SE14 | SE16 | SE18 | SE23 | SE26 | SSE25 | SE23 | SE22 | SE23 | SE23 | SE24 | SE19 | SE14 | SE9 | SE10 | SE10 | SE9 | SE14.6 | SE26 |
| 14-Aug | SE8 | SE7 | SE9 | SE9 | E5 | ESE7 | SE11 | SE10 | SE8 | SSW11 | SW9 | WSW9 | SW9WSW15 | SW18 | SW13 | SW13 | SW9 | SW7 | S5 | SSE6 | SE8 | SE9 | SE8 | SE8 | S6.1 | SW18 |
| 15-Aug | SSE5 | S5 | SW6 | SE7 | S4 | SSW5 | SW7 | SW7 | SW8 | SW8 | SW7 | SW7 | WSW3 | N4 | N5 | N8 | NNE7 | NW16 | NW9 | W1 | NNW3 | NNW6 | SW5 | SW6 | WSW2.7 | NW16 |
| 16-Aug | SW5 | SW6 | SW7 | SW7 | SW7 | SSW5 | SSE4 | SE5 | E6 | E7 | E5 | SW9 | WNW5 | W11 | NNW6 | W5 | WSW7 | WSW11 | WSW10 | WSW8 | SW6 | S2 | E3 | SSE5 | SW3.7 | WSW11 |
| 17-Aug | SSE5 | SE6 | SE6 | SE4 | SSE5 | SE5 | SSE3 | SSW8 | SSW9 | SW10 | SW13 | SW9 | SSW8 | SW5 | NW7 | WNW13 | W13 | W9 | W5 | SSW5 | S1 | SW6 | SSW8 | S1 | SW4.5 | WNW13 |
| 18-Aug | SE2 | SSE4 | SE3 | ESE3 | SE3 | SE2 | SSW7 | SW11 | SW8 | SW6 | WSW10 | WSW15 | WSW19 | W27 | W22 | WSW19 | S11 | SW16 | SW16 | SSW8 | SW13 | SW14 | WSW18 | SW14 | SW9.9 | W27 |
| 19-Aug | WSW15 | WSW17 | WSW22 | WSW20 | WSW19 | WSW21 | WSW21 | WSW16 | WSW18 | W21 | WSW23 | WSW26 | W22 | W30 | W29 | NW22 | NW11 | NW8 | W7 | W15 | W17 | WSW12 | WSW17 | WSW14 | W17.6 | W30 |
| 20-Aug | SSW7 | SW10 | SW13 | SW11 | S6 | SSW9 | SSW5 | WSW14 | WSW14 | W23 | W27 | W28 | WNW24 | WNW22 | WNW22 | WNW20 | W26 | W26 | W22 | W18 | WSW16 | W20 | W18 | WSW12 | W15.6 | W28 |
| 21-Aug | SSW5 | SW10 | SSW8 | SE6 | SE7 | SE8 | SE8 | SE5 | SSW8 | SW11 | SW13 | SW17 | SW18 | WSW16 | W18 | WNW18 | WNW16 | W16 | WNW16 | W11 | WSW7 | S4 | SE5 | SE2 | SW7.2 | WNW18 |
| 22-Aug | SW0 | ENE2 | ESE1 | ENE3 | E3 | ESE4 | E4 | E3 | NE1 | NW4 | NW3 | NW4 | WNW3 | WNW3 | WNW4 | NW5 | N4 | E5 | E6 | WNW1 | NW1 | E3 | ESE2 | ESE4 | NE0.9 | E6 |
| 23-Aug | SE6 | SE7 | ESE6 | SE7 | SE10 | SE9 | SE10 | SE9 | SE5 | E2 | E4 | WSW4 | SSW3 | ENE3 | ESE9 | SE14 | SE15 | SE13 | SE12 | SE12 | SE11 | SE12 | SE12 | ESE8 | SE7.9 | SE15 |
| 24-Aug | ESE6 | SE9 | SE14 | S7 | SE7 | SE7 | SE4 | ENE2 | ENE4 | E8 | ESE10 | ESE10 | E11 | ESE12 | E16 | ESE15 | ESE12 | SE8 | SSE9 | SSW4 | SW14 | WSW13 | SSW11 | SSW11 | SE6.5 | E16 |
| 25-Aug | WSW14 | SW11 | S9 | S7 | S8 | S9 | S8 | SSW10 | SSW14 | SSW17 | SSW13 | SSW15 | SW19 | WSW27 | WSW21 | SW17 | SW14 | W23 | WSW17 | SW7 | SW14 | SW13 | SW14 | WSW12 | SW12.7 | WSW27 |
| 26-Aug | WSW17 | WSW16 | SW10 | SSW7 | E5 | ESE5 | SE4 | SSW9 | SW14 | SW14 | SW13 | SW14 | SW17 | SW19 | SW20 | SW20 | WSW14 | WSW17 | WSW13 | WSW8 | SSW5 | SSW6 | SSW9 | SW9 | SW10.8 | SW20 |
| 27-Aug | SW11 | WSW10 | SW11 | SW12 | SW11 | S5 | SE3 | SW7 | SW10 | SW12 | WSW20 | W22 | W25 | W30 | W28 | WNW27 | W23 | WNW23 | WNW15 | W8 | ESE1 | ESE2 | SE2 | SSW4 | W11.8 | W30 |
| 28-Aug | SSW6 | SW5 | SSW2 | SW5 | SSW4 | ESE5 | ESE4 | S4 | SSW6 | ESE3 | ENE4 | WNW6 | WNW15 | WNW21 | WNW20 | WNW22 | WNW20 | NW17 | NNW9 | WNW4 | W2 | SSE1 | E2 | E4 | WNW4.9 | WNW22 |
| 29-Aug | ESE4 | ESE5 | SE4 | SE3 | ESE4 | ESE4 | SE7 | ESE5 | E5 | NW4 | W3 | NW4 | NE3 | NNE2 | NW6 | NW6 | NW5 | NW4 | E5 | SE1 | E3 | E3 | ESE4 | ESE5 | E1.5 | SE7 |
| 30-Aug | ESE5 | SE10 | SE13 | SE11 | SE10 | SE11 | SE12 | SE12 | SE12 | SE16 | SE18 | SE21 | SE23 | SE20 | SE18 | SSE21 | SSE20 | SE19 | SSE13 | SSE10 | SE9 | SE6 | SE7 | SE4 | SE13.3 | SE23 |
| 31-Aug | SSE4 | SE4 | SE4 | SE2 | SE5 | SE7 | SSE6 | SSE5 | SE5 | SE6 | SW10 | SW11 | SW13 | W22 | SW18 | SW14 | WSW14 | W25 | W23 | WSW14 | WSW16 | WSW18 | WSW21 | WSW23 | SW9.4 | W25 |

| | |
|---|-----------------|
| S3.5 S4.2 S4.3 SSE4.3 SSE4.9 SSE5.1 SSE4.8 SSE4.2 S3.8 SSW3.2 SW4.2 SW6.2 SW6.5 WSW7.2 WSW6.4 WSW5.3 SW5.2 WSW5.8 WSW4.8 SW4.2 SW3.1 SSW3.5 SSW4.2 S3.4 | Diurnal Average |
| WSW17 WSW17 WSW22 WSW20 WSW19 WSW21 WSW21 WSW16 WSW18 W23 W27 W28 W25 W30 W29 WNW27 W26 W26 W23 W18 W17 W20 WSW21 WSW23 | Diurnal Maximum |

All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

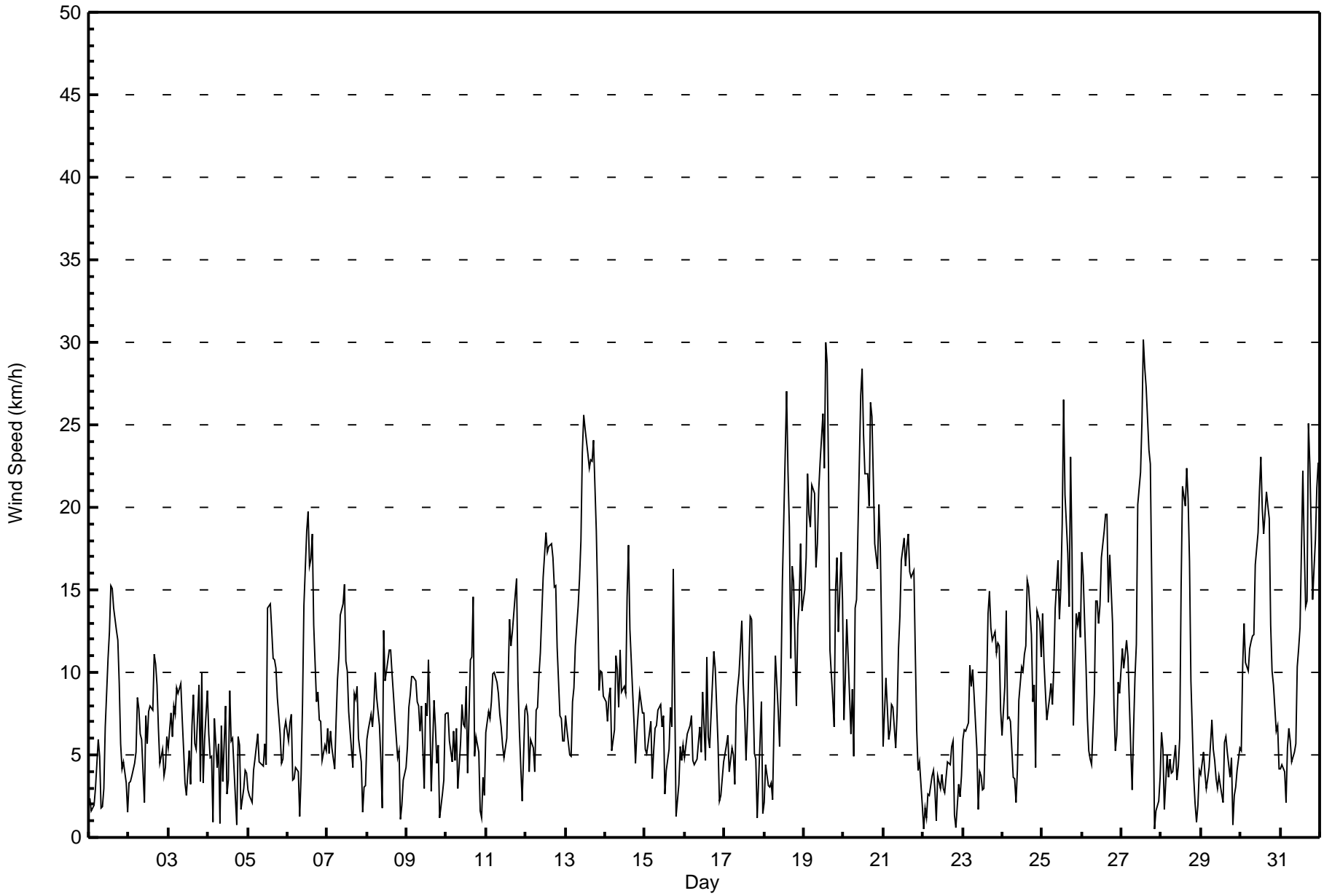
Wind Speed (WS) - km/h
Athabasca Valley - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Aug 20 15:00 Minimum Value: 1 km/h on Aug 29 11:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 8 | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | |
|--|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 3 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 4 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 3 | 1 | 4 |
| 2-Aug | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 2 | 1 | 2 | 3 |
| 3-Aug | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | 2 | 9 | 6 | 6 | 2 | 2 | 3 | 9 |
| 4-Aug | 3 | 3 | 3 | 2 | 4 | 3 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 3 | 1 | 2 | 2 | 2 | 2 | 3 | 1 | 2 | 3 | 4 | 4 |
| 5-Aug | 4 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 5 | 4 | 4 | 4 | 3 | 3 | 3 | 2 | 2 | 1 | 2 | 2 | 2 | 5 |
| 6-Aug | 1 | 2 | 1 | 2 | 2 | 1 | 2 | 1 | 1 | 3 | 3 | 4 | 5 | 4 | 3 | 3 | 3 | 2 | 1 | 2 | 2 | 2 | 2 | 1 | 5 |
| 7-Aug | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 4 |
| 8-Aug | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 3 | 2 | 3 | 3 | 3 | 4 | 3 | 2 | 1 | 1 | 2 | 2 | 3 | 2 | 4 |
| 9-Aug | 1 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 2 | 2 | 3 | 3 | 4 | 3 | 2 | 3 | 2 | 3 | 1 | 2 | 2 | 2 | 4 |
| 10-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 9 | 5 | 3 | 3 | 3 | 2 | 1 | 1 | 2 | 9 |
| 11-Aug | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 4 | 4 | 4 | 3 | 3 | 4 | 4 | 3 | 3 | 1 | 2 | 1 | 4 |
| 12-Aug | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 4 | 5 | 5 | 6 | 5 | 5 | 5 | 4 | 4 | 3 | 3 | 2 | 1 | 1 | 1 | 6 |
| 13-Aug | 2 | 3 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 5 | 7 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 5 | 4 | 2 | 2 | 2 | 2 | 7 |
| 14-Aug | 2 | 2 | 2 | 2 | 1 | 2 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 5 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 5 |
| 15-Aug | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 2 | 2 | 2 | 10 | 4 | 2 | 3 | 2 | 2 | 2 | 10 |
| 16-Aug | 2 | 2 | 1 | 2 | 2 | 3 | 1 | 1 | 3 | 2 | 2 | 4 | 3 | 5 | 3 | 2 | 4 | 5 | 4 | 2 | 2 | 2 | 1 | 1 | 5 |
| 17-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 4 | 4 | 3 | 3 | 2 | 1 | 2 | 2 | 3 | 3 | 2 | 4 |
| 18-Aug | 2 | 1 | 1 | 2 | 1 | 2 | 3 | 3 | 2 | 2 | 3 | 5 | 5 | 7 | 7 | 7 | 4 | 5 | 4 | 3 | 5 | 3 | 4 | 3 | 7 |
| 19-Aug | 3 | 4 | 4 | 4 | 3 | 4 | 4 | 4 | 6 | 7 | 6 | 7 | 6 | 8 | 8 | 6 | 3 | 3 | 2 | 4 | 2 | 3 | 4 | 3 | 8 |
| 20-Aug | 4 | 3 | 3 | 4 | 3 | 5 | 4 | 4 | 3 | 6 | 6 | 7 | 6 | 7 | 10 | 9 | 7 | 7 | 5 | 3 | 2 | 3 | 3 | 5 | 10 |
| 21-Aug | 3 | 3 | 3 | 1 | 2 | 2 | 2 | 1 | 3 | 2 | 3 | 3 | 4 | 5 | 5 | 4 | 6 | 4 | 4 | 2 | 4 | 2 | 2 | 2 | 6 |
| 22-Aug | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 2 |
| 23-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 4 |
| 24-Aug | 2 | 3 | 3 | 5 | 2 | 3 | 2 | 2 | 1 | 2 | 2 | 3 | 3 | 3 | 4 | 4 | 5 | 4 | 3 | 3 | 2 | 7 | 3 | 5 | 7 |
| 25-Aug | 4 | 3 | 3 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 5 | 9 | 7 | 6 | 5 | 4 | 6 | 5 | 2 | 4 | 3 | 3 | 3 | 9 |
| 26-Aug | 3 | 4 | 4 | 4 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 2 | 2 | 2 | 3 | 4 |
| 27-Aug | 3 | 2 | 3 | 3 | 2 | 3 | 2 | 3 | 4 | 4 | 6 | 6 | 7 | 7 | 6 | 7 | 6 | 5 | 4 | 1 | 2 | 1 | 1 | 2 | 7 |
| 28-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 4 | 5 | 6 | 6 | 5 | 5 | 4 | 3 | 2 | 1 | 1 | 1 | 2 | 6 |
| 29-Aug | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 2 |
| 30-Aug | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 5 | 5 | 6 | 5 | 5 | 5 | 5 | 5 | 4 | 2 | 1 | 2 | 2 | 2 | 6 |
| 31-Aug | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 3 | 3 | 3 | 2 | 2 | 3 | 5 | 5 | 4 | 7 | 6 | 5 | 3 | 3 | 3 | 3 | 3 | 7 |
| | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Athabasca Valley - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Athabasca Valley - August 2017**

| Wind Speed Ranges (km/h) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 5 | 239 | 32.12 | 32.12 |
| 6 - 11 | 304 | 40.86 | 72.98 |
| 12 - 19 | 141 | 18.95 | 91.94 |
| 20 - 28 | 57 | 7.66 | 99.60 |
| 29 - 38 | 3 | 0.40 | 100.00 |
| > 38 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Athabasca Valley - August 2017**

| Wind Speed Ranges (km/h) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-----------------------------|----------------|-----|----|-----|----|-----|-----|-----|----|-----|-----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 5 | 4 | 4 | 7 | 10 | 28 | 34 | 41 | 24 | 15 | 18 | 12 | 7 | 9 | 9 | 16 | 1 | 239 |
| 6 - 11 | 5 | 2 | 1 | 2 | 10 | 17 | 98 | 16 | 15 | 23 | 63 | 13 | 6 | 6 | 10 | 17 | 304 |
| 12 - 19 | 0 | 0 | 0 | 0 | 1 | 6 | 27 | 3 | 6 | 6 | 29 | 34 | 6 | 6 | 2 | 15 | 141 |
| 20 - 28 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 3 | 0 | 0 | 2 | 11 | 19 | 10 | 1 | 1 | 57 |
| 29 - 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 3 |
| > 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 9 | 6 | 8 | 12 | 39 | 57 | 176 | 46 | 36 | 47 | 106 | 65 | 43 | 31 | 29 | 34 | 744 |

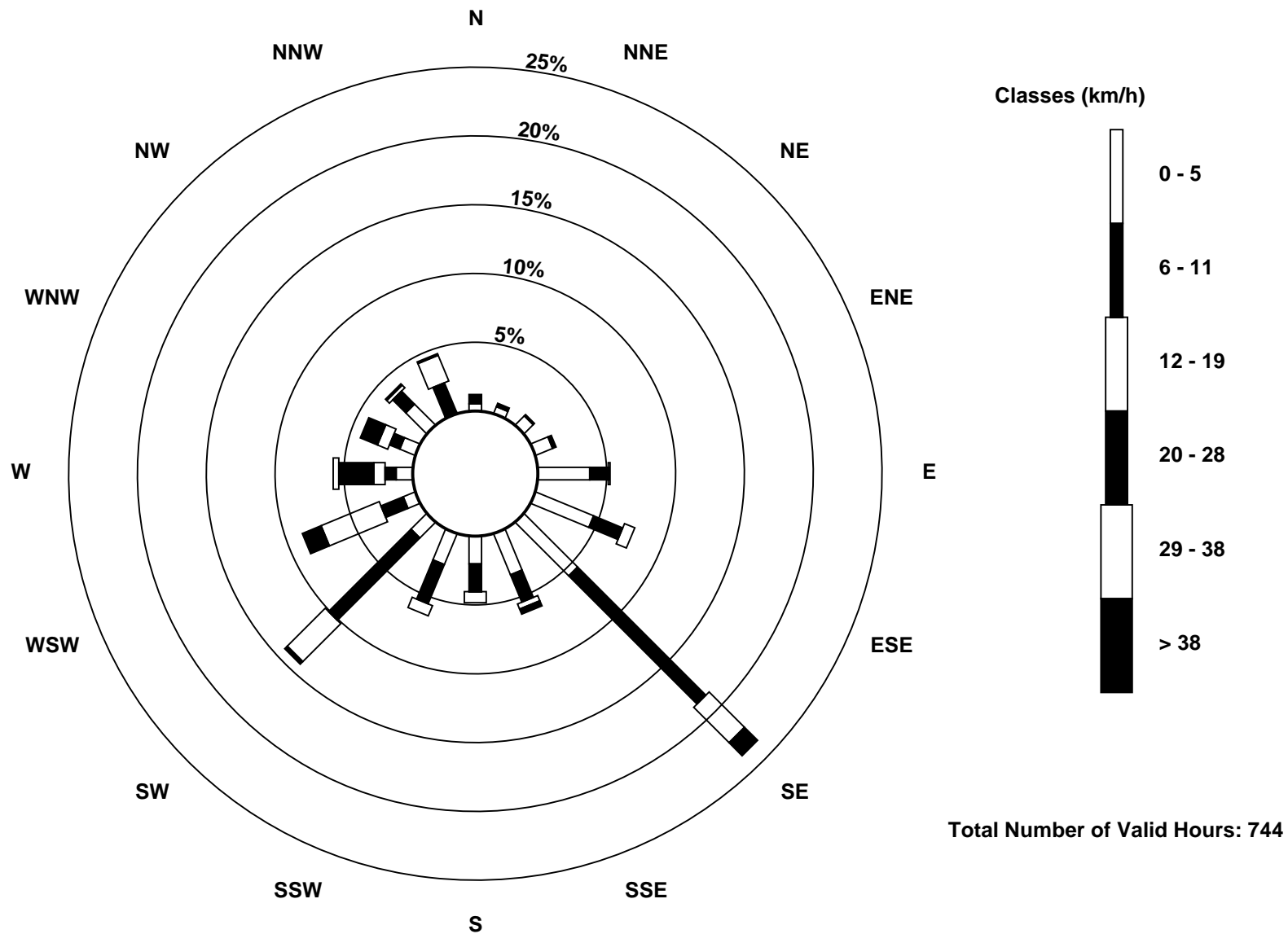
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Wind Speed (WS) - km/h
Athabasca Valley (AMS 7)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Athabasca Valley - August 2017

| | | | |
|---|--|---------------------------|-------|
| Direction of Maximum Speed: 281 deg on Aug 27 14:00 | | Hours in Service: | 744 |
| Direction of Maximum Daily Speed Average: 259.1 deg on Aug 19 | | Hours of Data: | 744 |
| Direction of Minimum Speed: 234 deg on Aug 22 01:00 | | Hours of Missing Data: | 0 |
| Direction of Minimum Daily Speed Average: 0.9 deg on Aug 22 | | Percent Operational Time: | 100.0 |
| Monthly Average Direction: 221.4 deg | | | |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average |
|--------|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 223 | 109 | 210 | 205 | 99 | 127 | 88 | 120 | 165 | 266 | 333 | 335 | 340 | 336 | 340 | 340 | 341 | 340 | 343 | 351 | 321 | 253 | 239 | 84 | 338.1 |
| 2-Aug | 91 | 116 | 112 | 126 | 129 | 132 | 127 | 124 | 86 | 150 | 220 | 227 | 218 | 227 | 234 | 221 | 233 | 239 | 247 | 216 | 211 | 175 | 127 | 88 | 185.7 |
| 3-Aug | 122 | 141 | 137 | 136 | 143 | 134 | 126 | 128 | 114 | 61 | 38 | 282 | 213 | 284 | 182 | 240 | 230 | 103 | 293 | 218 | 353 | 30 | 124 | 354 | 137.6 |
| 4-Aug | 329 | 314 | 317 | 308 | 132 | 99 | 334 | 53 | 144 | 236 | 357 | 49 | 281 | 108 | 43 | 90 | 101 | 23 | 108 | 104 | 32 | 133 | 88 | 47 | 66.5 |
| 5-Aug | 176 | 135 | 148 | 128 | 138 | 130 | 136 | 103 | 110 | 70 | 57 | 89 | 118 | 118 | 168 | 176 | 184 | 191 | 187 | 175 | 199 | 188 | 181 | 149 | 149.2 |
| 6-Aug | 145 | 112 | 137 | 138 | 148 | 119 | 118 | 276 | 313 | 343 | 345 | 340 | 340 | 345 | 338 | 332 | 329 | 323 | 325 | 342 | 22 | 352 | 337 | 320 | 344.5 |
| 7-Aug | 310 | 321 | 290 | 250 | 262 | 327 | 322 | 337 | 340 | 339 | 344 | 333 | 339 | 303 | 330 | 268 | 285 | 277 | 286 | 249 | 204 | 135 | 163 | 136 | 312.4 |
| 8-Aug | 143 | 152 | 148 | 146 | 135 | 134 | 128 | 130 | 92 | 108 | 221 | 214 | 208 | 217 | 221 | 223 | 217 | 218 | 235 | 191 | 166 | 97 | 134 | 156 | 180.9 |
| 9-Aug | 142 | 142 | 136 | 134 | 136 | 138 | 135 | 126 | 110 | 79 | 89 | 225 | 212 | 221 | 235 | 239 | 218 | 229 | 230 | 219 | 185 | 147 | 106 | 138 | 163.2 |
| 10-Aug | 130 | 135 | 142 | 145 | 142 | 156 | 162 | 121 | 207 | 234 | 232 | 226 | 222 | 256 | 328 | 78 | 130 | 112 | 218 | 212 | 183 | 151 | 146 | 142 | 168.0 |
| 11-Aug | 139 | 142 | 136 | 137 | 136 | 135 | 132 | 132 | 126 | 114 | 97 | 43 | 152 | 138 | 120 | 129 | 143 | 144 | 141 | 152 | 148 | 158 | 114 | 152 | 135.0 |
| 12-Aug | 159 | 139 | 151 | 139 | 153 | 151 | 130 | 130 | 130 | 135 | 195 | 181 | 188 | 190 | 191 | 180 | 175 | 175 | 166 | 163 | 162 | 146 | 148 | 126 | 166.6 |
| 13-Aug | 127 | 108 | 61 | 71 | 123 | 123 | 128 | 134 | 130 | 126 | 137 | 144 | 147 | 142 | 136 | 143 | 145 | 142 | 146 | 144 | 141 | 138 | 138 | 131 | 136.3 |
| 14-Aug | 125 | 126 | 126 | 132 | 86 | 121 | 139 | 132 | 137 | 194 | 216 | 240 | 230 | 239 | 230 | 215 | 222 | 221 | 173 | 149 | 125 | 131 | 135 | 142 | 173.1 |
| 15-Aug | 161 | 172 | 219 | 143 | 182 | 212 | 226 | 226 | 221 | 220 | 230 | 216 | 254 | 1 | 360 | 355 | 25 | 306 | 325 | 260 | 342 | 329 | 235 | 226 | 252.4 |
| 16-Aug | 229 | 223 | 220 | 226 | 219 | 193 | 157 | 129 | 100 | 99 | 84 | 214 | 288 | 272 | 334 | 268 | 243 | 248 | 245 | 247 | 229 | 177 | 96 | 165 | 225.1 |
| 17-Aug | 158 | 141 | 136 | 135 | 152 | 130 | 166 | 211 | 211 | 217 | 220 | 214 | 207 | 231 | 308 | 295 | 278 | 280 | 265 | 213 | 174 | 214 | 213 | 187 | 220.3 |
| 18-Aug | 144 | 154 | 140 | 119 | 124 | 131 | 203 | 220 | 218 | 220 | 239 | 240 | 237 | 260 | 265 | 237 | 189 | 221 | 226 | 195 | 224 | 232 | 238 | 231 | 229.0 |
| 19-Aug | 242 | 243 | 246 | 246 | 245 | 249 | 247 | 244 | 254 | 259 | 251 | 252 | 261 | 271 | 274 | 304 | 305 | 314 | 268 | 275 | 265 | 251 | 242 | 250 | 259.1 |
| 20-Aug | 209 | 216 | 234 | 224 | 179 | 212 | 201 | 251 | 246 | 268 | 274 | 273 | 289 | 293 | 303 | 297 | 273 | 266 | 270 | 261 | 253 | 266 | 259 | 247 | 264.5 |
| 21-Aug | 200 | 221 | 208 | 132 | 133 | 131 | 129 | 138 | 211 | 217 | 223 | 228 | 220 | 247 | 271 | 292 | 287 | 262 | 282 | 261 | 245 | 187 | 146 | 132 | 234.8 |
| 22-Aug | 234 | 65 | 110 | 74 | 85 | 113 | 82 | 96 | 51 | 321 | 319 | 305 | 290 | 287 | 298 | 314 | 357 | 94 | 93 | 284 | 317 | 99 | 121 | 123 | 47.6 |
| 23-Aug | 126 | 141 | 121 | 127 | 135 | 134 | 136 | 134 | 138 | 99 | 82 | 246 | 208 | 75 | 122 | 135 | 131 | 132 | 128 | 125 | 137 | 142 | 141 | 120 | 132.1 |
| 24-Aug | 118 | 129 | 137 | 171 | 143 | 139 | 139 | 134 | 63 | 75 | 87 | 123 | 107 | 100 | 104 | 92 | 117 | 123 | 138 | 155 | 200 | 230 | 243 | 212 | 134.7 |
| 25-Aug | 243 | 228 | 191 | 176 | 175 | 182 | 170 | 202 | 209 | 211 | 205 | 212 | 235 | 249 | 238 | 232 | 236 | 265 | 256 | 234 | 232 | 227 | 227 | 238 | 226.6 |
| 26-Aug | 247 | 239 | 218 | 199 | 94 | 114 | 136 | 205 | 214 | 219 | 234 | 230 | 223 | 230 | 224 | 229 | 241 | 242 | 245 | 241 | 207 | 193 | 210 | 218 | 224.5 |
| 27-Aug | 232 | 238 | 230 | 233 | 223 | 178 | 143 | 222 | 234 | 235 | 253 | 260 | 268 | 281 | 279 | 286 | 278 | 286 | 286 | 269 | 122 | 112 | 138 | 212 | 260.9 |
| 28-Aug | 208 | 228 | 204 | 225 | 210 | 123 | 121 | 185 | 206 | 109 | 67 | 297 | 299 | 290 | 287 | 298 | 300 | 312 | 333 | 294 | 268 | 162 | 95 | 80 | 286.7 |
| 29-Aug | 105 | 123 | 130 | 144 | 120 | 121 | 130 | 114 | 84 | 314 | 281 | 313 | 56 | 33 | 318 | 320 | 316 | 324 | 91 | 128 | 91 | 96 | 122 | 122 | 90.6 |
| 30-Aug | 107 | 131 | 133 | 138 | 137 | 133 | 133 | 130 | 131 | 131 | 128 | 131 | 146 | 146 | 146 | 156 | 150 | 145 | 150 | 159 | 146 | 134 | 136 | 145 | 140.0 |
| 31-Aug | 150 | 140 | 144 | 142 | 140 | 140 | 152 | 157 | 131 | 134 | 228 | 219 | 220 | 265 | 236 | 217 | 250 | 270 | 268 | 258 | 251 | 249 | 243 | 241 | 235.6 |

| | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 181.5 | 173.8 | 174.3 | 166.7 | 153.3 | 147.5 | 147.0 | 163.7 | 175.7 | 203.7 | 229.6 | 232.6 | 231.8 | 250.5 | 254.4 | 248.1 | 233.5 | 242.1 | 238.9 | 214.4 | 216.6 | 204.5 | 198.7 | 190.7 |
| Diurnal Average | | | | | | | | | | | | | | | | | | | | | | | |

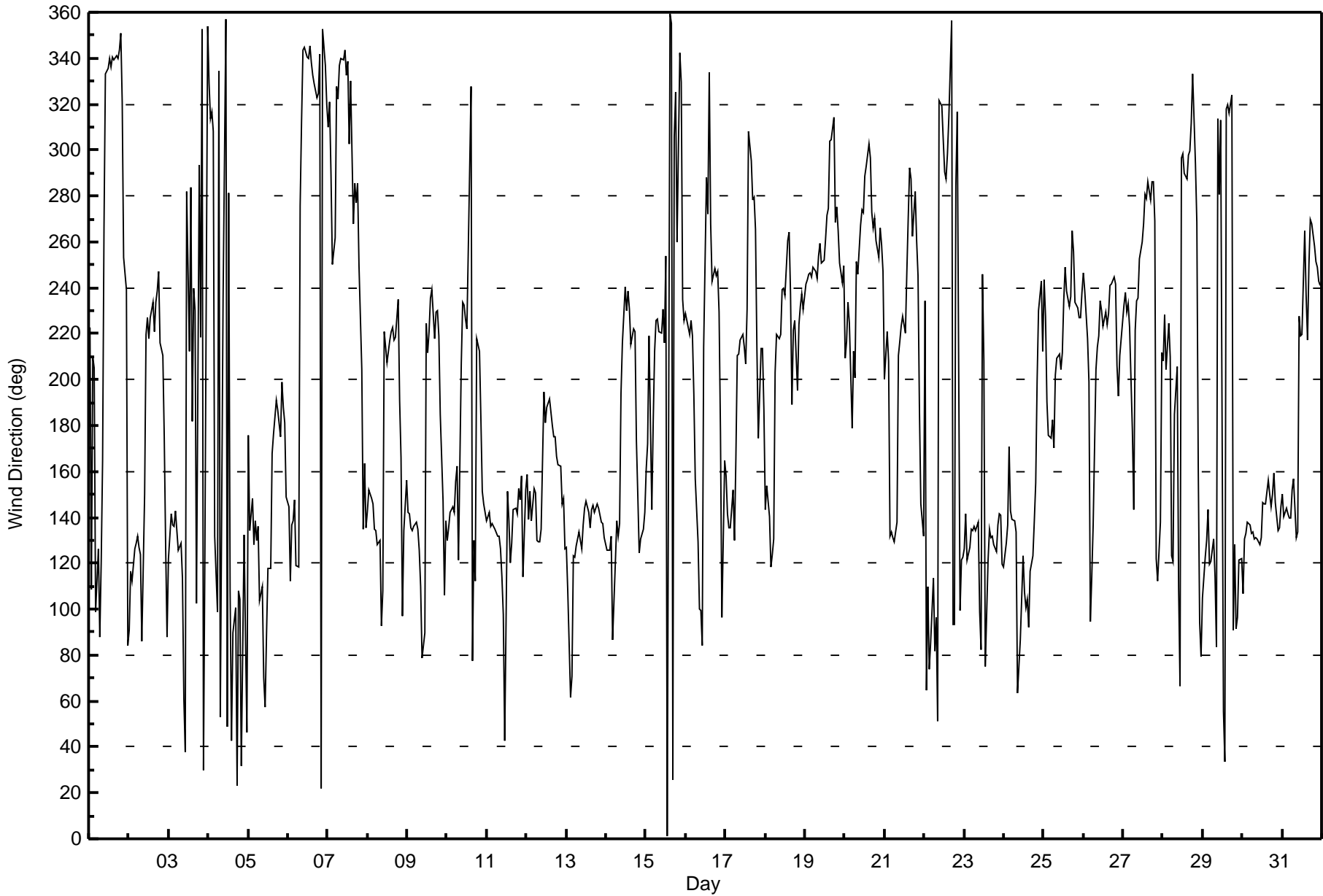
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Athabasca Valley - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 102 deg on Aug 18 00:00 | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|---------------|--|
| Minimum Value: 8 deg on Aug 11 08:00 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Percentiles: P ₁ = 10 P ₁₀ = 13 Q ₁ = 16 Median = 22 Q ₃ = 38 P ₉₀ = 65 P ₉₉ = 93 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 93 | 69 | 78 | 70 | 31 | 12 | 18 | 80 | 64 | 30 | 20 | 13 | 14 | 13 | 14 | 14 | 16 | 15 | 19 | 19 | 32 | 21 | 93 | 71 | 93 | |
| 2-Aug | 35 | 41 | 21 | 19 | 15 | 12 | 10 | 16 | 23 | 75 | 22 | 43 | 38 | 32 | 37 | 17 | 16 | 16 | 14 | 17 | 17 | 54 | 37 | 33 | 75 | |
| 3-Aug | 22 | 9 | 15 | 13 | 13 | 13 | 11 | 11 | 24 | 45 | 65 | 69 | 56 | 72 | 59 | 39 | 63 | 53 | 85 | 77 | 63 | 64 | 38 | 28 | 85 | |
| 4-Aug | 35 | 39 | 58 | 83 | 21 | 75 | 32 | 70 | 20 | 48 | 20 | 81 | 58 | 28 | 26 | 22 | 60 | 85 | 26 | 28 | 47 | 71 | 67 | 84 | 85 | |
| 5-Aug | 76 | 38 | 72 | 26 | 20 | 15 | 14 | 24 | 28 | 29 | 27 | 96 | 22 | 23 | 32 | 23 | 23 | 22 | 20 | 19 | 29 | 25 | 23 | 20 | 96 | |
| 6-Aug | 20 | 24 | 13 | 51 | 52 | 25 | 32 | 77 | 21 | 16 | 16 | 14 | 13 | 17 | 13 | 10 | 11 | 21 | 13 | 23 | 16 | 28 | 21 | 22 | 77 | |
| 7-Aug | 21 | 21 | 18 | 26 | 47 | 24 | 11 | 14 | 13 | 13 | 14 | 28 | 27 | 37 | 50 | 61 | 23 | 31 | 14 | 23 | 22 | 77 | 35 | 33 | 77 | |
| 8-Aug | 15 | 12 | 11 | 12 | 11 | 11 | 12 | 22 | 55 | 79 | 14 | 29 | 32 | 19 | 21 | 31 | 24 | 22 | 26 | 22 | 85 | 42 | 61 | 39 | 85 | |
| 9-Aug | 20 | 19 | 20 | 13 | 13 | 12 | 10 | 10 | 24 | 13 | 64 | 22 | 41 | 25 | 45 | 93 | 23 | 41 | 35 | 23 | 88 | 77 | 42 | 17 | 93 | |
| 10-Aug | 18 | 17 | 43 | 53 | 19 | 46 | 28 | 78 | 36 | 22 | 25 | 28 | 16 | 75 | 16 | 61 | 20 | 75 | 60 | 50 | 67 | 98 | 53 | 53 | 98 | |
| 11-Aug | 31 | 14 | 12 | 12 | 12 | 12 | 11 | 8 | 19 | 26 | 37 | 47 | 82 | 37 | 28 | 30 | 22 | 19 | 14 | 18 | 29 | 21 | 78 | 16 | 82 | |
| 12-Aug | 10 | 13 | 31 | 18 | 22 | 40 | 14 | 17 | 17 | 22 | 26 | 25 | 25 | 24 | 24 | 23 | 21 | 22 | 16 | 15 | 14 | 20 | 22 | 27 | 40 | |
| 13-Aug | 22 | 32 | 14 | 26 | 17 | 17 | 16 | 15 | 14 | 17 | 17 | 17 | 18 | 18 | 18 | 19 | 17 | 17 | 17 | 16 | 17 | 16 | 15 | 17 | 32 | |
| 14-Aug | 19 | 24 | 17 | 16 | 27 | 15 | 21 | 29 | 29 | 33 | 19 | 18 | 16 | 15 | 16 | 23 | 23 | 40 | 24 | 18 | 14 | 19 | 16 | 40 | | |
| 15-Aug | 30 | 36 | 17 | 23 | 51 | 32 | 15 | 10 | 13 | 9 | 18 | 12 | 73 | 74 | 40 | 21 | 24 | 39 | 47 | 98 | 66 | 38 | 59 | 37 | 98 | |
| 16-Aug | 40 | 27 | 18 | 17 | 13 | 42 | 15 | 18 | 42 | 26 | 40 | 42 | 75 | 45 | 59 | 33 | 34 | 20 | 14 | 12 | 24 | 82 | 64 | 22 | 82 | |
| 17-Aug | 15 | 12 | 12 | 29 | 24 | 25 | 50 | 29 | 22 | 14 | 10 | 16 | 32 | 84 | 35 | 16 | 19 | 20 | 30 | 40 | 92 | 73 | 35 | 102 | 102 | |
| 18-Aug | 67 | 21 | 41 | 55 | 46 | 88 | 47 | 17 | 14 | 32 | 18 | 17 | 16 | 17 | 20 | 24 | 28 | 26 | 18 | 24 | 24 | 18 | 13 | 14 | 88 | |
| 19-Aug | 12 | 13 | 11 | 11 | 11 | 10 | 11 | 14 | 17 | 18 | 15 | 16 | 16 | 15 | 11 | 17 | 17 | 30 | 33 | 13 | 10 | 15 | 11 | 12 | 33 | |
| 20-Aug | 43 | 27 | 13 | 26 | 64 | 50 | 73 | 20 | 18 | 16 | 15 | 16 | 20 | 35 | 27 | 30 | 16 | 14 | 11 | 11 | 10 | 11 | 11 | 26 | 73 | |
| 21-Aug | 45 | 19 | 32 | 25 | 19 | 14 | 17 | 29 | 38 | 14 | 13 | 12 | 13 | 20 | 21 | 19 | 25 | 18 | 12 | 9 | 51 | 39 | 45 | 76 | 76 | |
| 22-Aug | 102 | 79 | 76 | 29 | 73 | 28 | 18 | 40 | 92 | 48 | 31 | 20 | 20 | 21 | 15 | 11 | 46 | 27 | 12 | 69 | 75 | 40 | 48 | 46 | 102 | |
| 23-Aug | 24 | 26 | 29 | 32 | 15 | 16 | 18 | 18 | 68 | 92 | 31 | 21 | 62 | 62 | 21 | 17 | 15 | 16 | 17 | 15 | 14 | 14 | 14 | 26 | 92 | |
| 24-Aug | 30 | 22 | 15 | 47 | 20 | 36 | 60 | 51 | 55 | 36 | 18 | 23 | 23 | 22 | 20 | 15 | 21 | 18 | 23 | 25 | 48 | 41 | 15 | 27 | 60 | |
| 25-Aug | 19 | 24 | 23 | 24 | 21 | 24 | 30 | 30 | 22 | 22 | 23 | 20 | 25 | 15 | 16 | 19 | 20 | 14 | 17 | 20 | 16 | 16 | 15 | 14 | 30 | |
| 26-Aug | 12 | 16 | 28 | 65 | 54 | 44 | 63 | 32 | 12 | 16 | 15 | 17 | 20 | 15 | 14 | 15 | 22 | 14 | 15 | 18 | 23 | 19 | 19 | 19 | 65 | |
| 27-Aug | 12 | 11 | 15 | 15 | 16 | 55 | 79 | 36 | 27 | 23 | 19 | 18 | 17 | 12 | 14 | 17 | 16 | 13 | 11 | 17 | 93 | 57 | 54 | 71 | 93 | |
| 28-Aug | 28 | 47 | 78 | 63 | 67 | 32 | 40 | 64 | 43 | 78 | 63 | 72 | 26 | 25 | 23 | 18 | 14 | 15 | 15 | 53 | 65 | 81 | 69 | 15 | 81 | |
| 29-Aug | 25 | 20 | 41 | 54 | 42 | 24 | 12 | 24 | 32 | 24 | 25 | 34 | 83 | 75 | 11 | 10 | 25 | 37 | 44 | 82 | 72 | 48 | 33 | 34 | 83 | |
| 30-Aug | 31 | 19 | 14 | 13 | 16 | 15 | 14 | 15 | 16 | 15 | 17 | 15 | 18 | 17 | 21 | 17 | 18 | 15 | 16 | 14 | 11 | 19 | 14 | 30 | 31 | |
| 31-Aug | 42 | 29 | 21 | 62 | 24 | 37 | 56 | 49 | 41 | 54 | 23 | 15 | 18 | 16 | 20 | 18 | 33 | 13 | 13 | 11 | 9 | 10 | 9 | 8 | 62 | |
| | | 102 | 79 | 78 | 83 | 73 | 88 | 79 | 80 | 92 | 92 | 65 | 96 | 83 | 84 | 59 | 93 | 63 | 85 | 85 | 98 | 93 | 98 | 93 | 102 | |
| | | Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | |





Wood Buffalo Environmental Association

SO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|------------------|-----------------|--------------|
| Station Name: | Athabasca Valley | Station number: | AMS 07 |
| Calibration Date: | August 3, 2017 | Last Cal Date: | July 4, 2017 |
| Start time (MST): | 8:55 | End time (MST): | 13:10 |
| Reason: | Routine | | |

Calibration Standards

| | | | | |
|-----------------------|------------------|-----|------------------|-------------------|
| Cal Gas Concentration | <u>49.2</u> | ppm | Cal Gas Exp Date | February 16, 2019 |
| Calibrator Make/Model | Teledyne API 700 | | Serial Number | 2445 |
| ZAG Make/Model | Teledyne API 701 | | Serial Number | 1864 |

Analyzer Information

Analyzer make: Thermo 45C

Analyzer serial #: 630718530

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|----------------------|--------------|---------------|--------------|--------------|---------------|
| Analyzer Range | 0 - 1000 ppb | | PMT voltage | -619 | -619 |
| Calculated slope | 1.001839 | 0.992550 | Lamp voltage | 804 | 804 |
| Calculated intercept | 1.180382 | 1.665681 | Pressure | 699.4 | 699.4 |
| Analyzer Background | 18.1 | 18.1 | Flow | 0.481 | 0.481 |
| Analyzer Coefficient | 1.012 | 1.012 | Intensity | 43515 | 43515 |

SO₂ Calibration Data

| Set Point | Total air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|---------------------------|----------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5000 | 0.0 | 0.0 | 0.1 | ---- |
| as found span | 4978 | 78.8 | 766.7 | 769.1 | 0.997 |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.4 | ---- |
| high point | 4978 | 78.8 | 766.7 | 772.2 | 0.993 |
| second point | 4973 | 39.5 | 387.7 | 386.7 | 1.003 |
| third point | 4994 | 19.8 | 194.3 | 192.8 | 1.008 |
| as left zero | 5000 | 0.0 | 0.0 | 0.8 | ---- |
| as left span | 5000 | 78.8 | 763.4 | 771.8 | 0.989 |
| Average Correction Factor | | | | | 1.001 |

| | | | | | |
|--------------------|--------|-------------------|--------|----------|-------|
| Corrected As found | 769.00 | Previous response | 764.09 | % change | -0.6% |
|--------------------|--------|-------------------|--------|----------|-------|

* = > +/-5% change initiates investigation

Notes:

No adjustments or maintenance done

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

SO₂ Calibration Summary

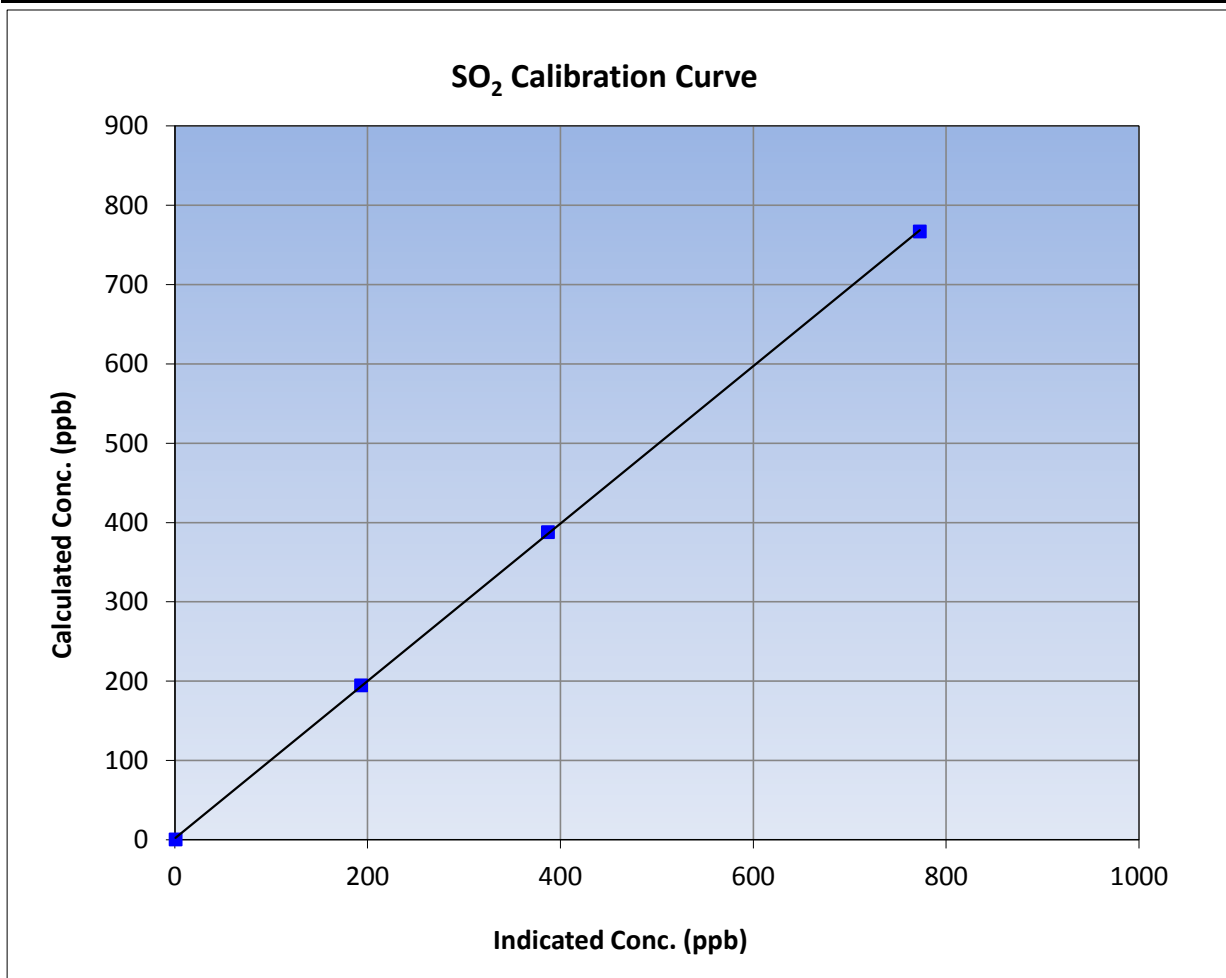
Version-03-2017

Station Information

| | | | |
|------------------|------------------|----------------------|--------------|
| Calibration Date | August 3, 2017 | Previous Calibration | July 4, 2017 |
| Station Name | Athabasca Valley | Station Number | AMS 07 |
| Start Time (MST) | 8:55 | End Time (MST) | 13:10 |
| Analyzer make | Thermo 45C | Analyzer serial # | 630718530 |

Calibration Data

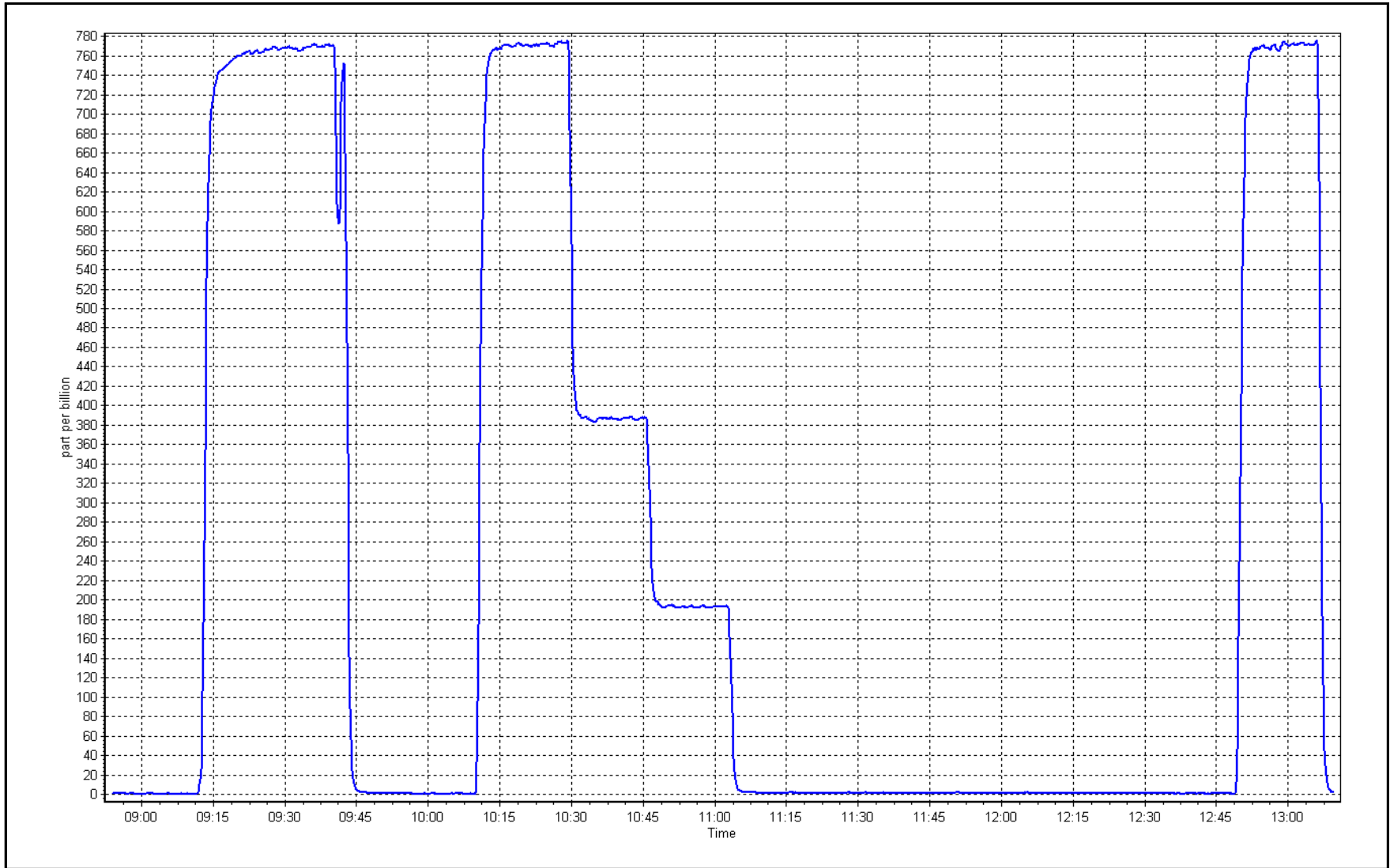
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|-------------|
| 0.0 | 0.4 | ---- | Correlation Coefficient | 0.999960 | ≥0.995 |
| 766.7 | 772.2 | 0.9929 | | | |
| 387.7 | 386.7 | 1.0026 | Slope | 0.992550 | 0.90 - 1.10 |
| 194.3 | 192.8 | 1.0078 | | | |
| | | | Intercept | 1.665681 | +/-30 |



SO2 Calibration Plot

Date: August 3, 2017

Location: Athabasca Valley





Wood Buffalo Environmental Association

TRS Calibration Summary

Version-03-2017

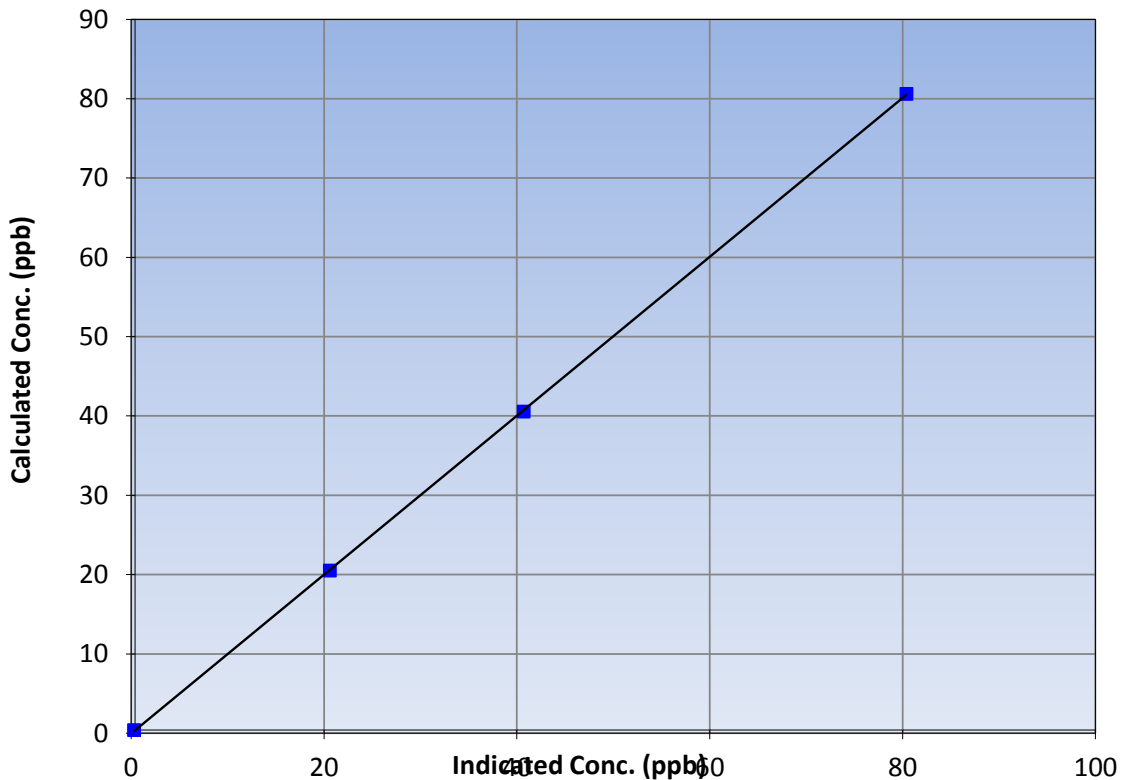
Station Information

| | | | |
|------------------|-----------------|----------------------|------------------|
| Calibration Date | August 14, 2017 | Previous Calibration | July 19, 2017 |
| Station Name | AMS 7 | Station Number | Athabasca Valley |
| Start Time (MST) | 8:40 | End Time (MST) | 10:51 |
| Analyzer make | Thermo 43i LTE | Analyzer serial # | 1507864683 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|---------------|
| 0.0 | -0.1 | ---- | Correlation Coefficient | 0.999981 | |
| 80.2 | 80.0 | 1.0026 | | | ≥ 0.995 |
| 40.2 | 40.3 | 0.9964 | Slope | 1.001799 | |
| 20.1 | 20.2 | 0.9962 | | | $0.90 - 1.10$ |
| | | | Intercept | -0.040881 | ± 3 |

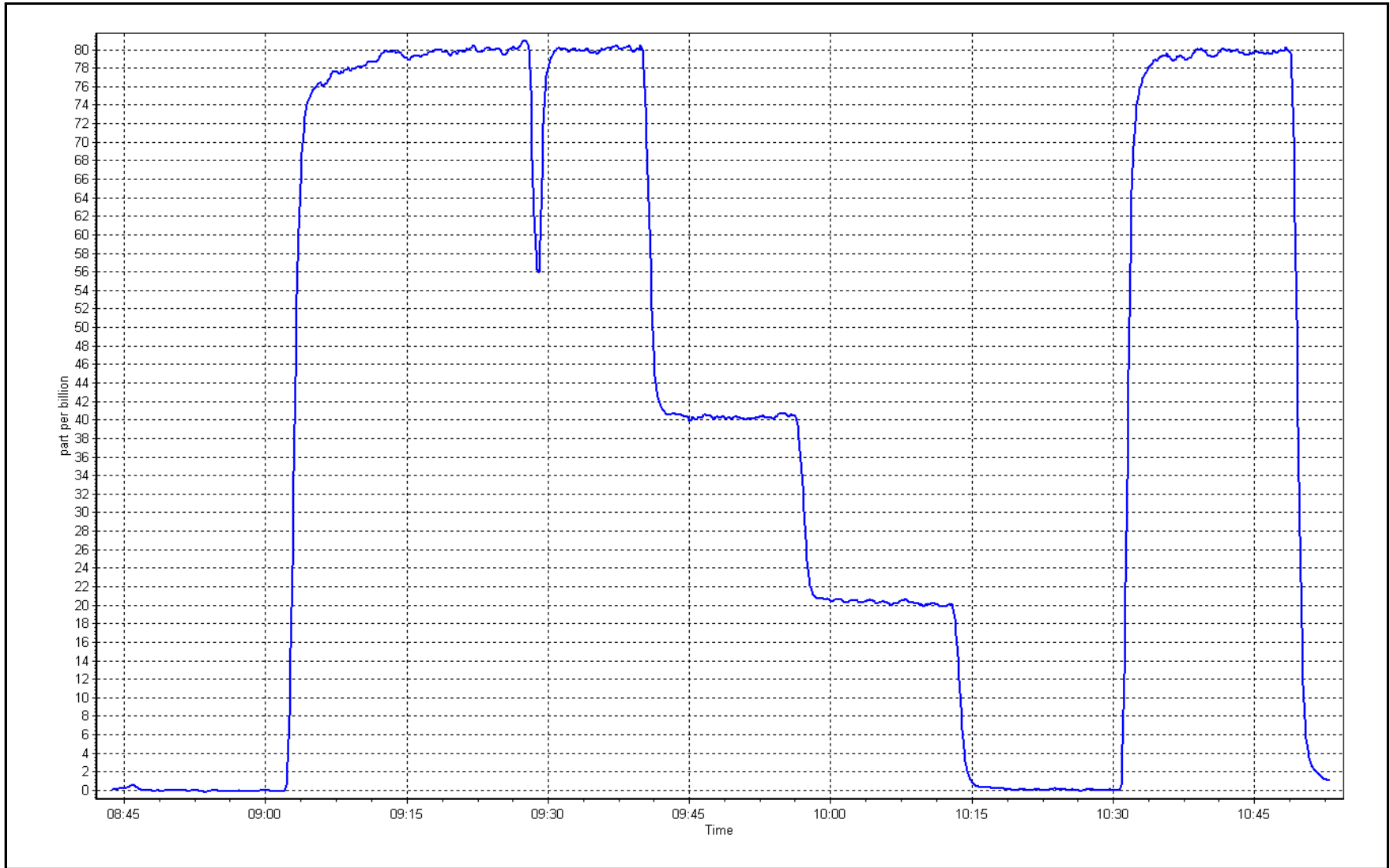
TRS Calibration Curve



TRS Calibration Plot

Date: August 14, 2017

Location: Athabasca Valley





Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|------------------|-----------------|--------------|
| Station Name: | Athabasca Valley | Station number: | AMS 07 |
| Calibration Date: | August 3, 2017 | Last Cal Date: | July 4, 2017 |
| Start time (MST): | 8:55 | End time (MST): | 13:08 |
| Reason: | Maintenance | | |

Calibration Standards

| | | | |
|--------------------|------------------|---------------------|----------------|
| Gas Cert Reference | LL110103 | Cal Gas Expiry Date | February-16-19 |
| CH4 Cal Gas Conc. | <u>488.0</u> ppm | CH4 Equiv Conc. | 1035.3 ppm |
| C3H8 Cal Gas Conc. | <u>199.0</u> ppm | Station temp. | 25 Deg C |
| Calibrator Model | Teledyne API 700 | Serial Number | 2445 |
| ZAG make/model | Teledyne API 701 | Serial Number | 1864 |

Analyzer Information

Analyzer make: Thermo 55i

Analyzer serial #: 1426262594

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|--------------------|--------------|---------------|------------------|--------------|---------------|
| THC Range (ppm) | 0 - 50 ppm | | Column Temp | 75.0 | 75.0 |
| NMHC Range (ppm) | 0 - 25 ppm | | Detector Temp | 175.0 | 175.0 |
| CH4 SP Ratio | 0.000216 | 0.000216 | Flame Temp | 405.0 | 405.0 |
| CH4 Retention time | 13.0 | 13.0 | Carrier Pressure | 36.1 | 36.1 |
| NMHC SP Ratio | 4.15E-05 | 4.15E-05 | Fuel Pressure | 44.8 | 44.8 |
| NMHC Peak Area | 210660 | 210660 | Air Pressure | 26.0 | 26.0 |

Calibration Statistics

| | <u>Start</u> | <u>Finish</u> |
|-----------------|--------------|---------------|
| THC Cal Slope | 0.995877 | 1.001693 |
| THC Cal Offset | 0.017547 | 0.035802 |
| CH4 Cal Slope | 0.999899 | 1.007524 |
| CH4 Cal Offset | 0.018733 | 0.043432 |
| NMHC Cal Slope | 0.991131 | 0.996460 |
| NMHC Cal Offset | 0.000954 | -0.006999 |

Notes: zero adjusted, hydrogen and nitrogen changed

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Version-02-2017

THC Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|--|
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | ---- |
| as found span | 4973 | 78.8 | 16.40 | 16.46 | 0.997 |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | ---- |
| high point | 4973 | 78.8 | 16.40 | 16.37 | 1.002 |
| second point | 4973 | 39.5 | 8.22 | 8.12 | 1.013 |
| third point | 4994 | 19.8 | 4.10 | 4.05 | 1.013 |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | ---- |
| as left span | 4932 | 78.8 | 16.54 | 16.42 | 1.007 |
| Average Correction Factor | | | | | 1.009 |
| Corrected As found | 16.46 | Prev response | 16.45 | *% change | 0.0% |

NMHC Calibration Data

| Set Point | Total air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i> |
|---------------------------|----------------------------|-----------------------------|-------------------------------------|------------------------------------|--|
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | ---- |
| as found span | 4973 | 78.8 | 8.67 | 8.73 | 0.993 |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | ---- |
| high point | 4973 | 78.8 | 8.67 | 8.71 | 0.996 |
| second point | 4973 | 39.5 | 4.35 | 4.36 | 0.997 |
| third point | 4994 | 19.8 | 2.17 | 2.20 | 0.986 |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | ---- |
| as left span | 4932 | 78.8 | 8.74 | 8.74 | 1.000 |
| Average Correction Factor | | | | | 0.993 |
| Corrected As found | 8.73 | Prev response | 8.75 | *% change | 0.2% |

CH4 Calibration Data

| Set Point | Total air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i> |
|---------------------------|----------------------------|-----------------------------|-------------------------------------|------------------------------------|--|
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | ---- |
| as found span | 4973 | 78.8 | 7.73 | 7.73 | 1.000 |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | ---- |
| high point | 4973 | 78.8 | 7.73 | 7.66 | 1.009 |
| second point | 4973 | 39.5 | 3.88 | 3.76 | 1.031 |
| third point | 4994 | 19.8 | 1.93 | 1.85 | 1.046 |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | ---- |
| as left span | 4932 | 78.8 | 7.80 | 7.68 | 1.015 |
| Average Correction Factor | | | | | 1.029 |
| Corrected As found | 7.73 | Prev response | 7.71 | *% change | -0.2% |

* = > +/-5% change initiates investigation



Wood Buffalo Environmental Association

THC Calibration Summary

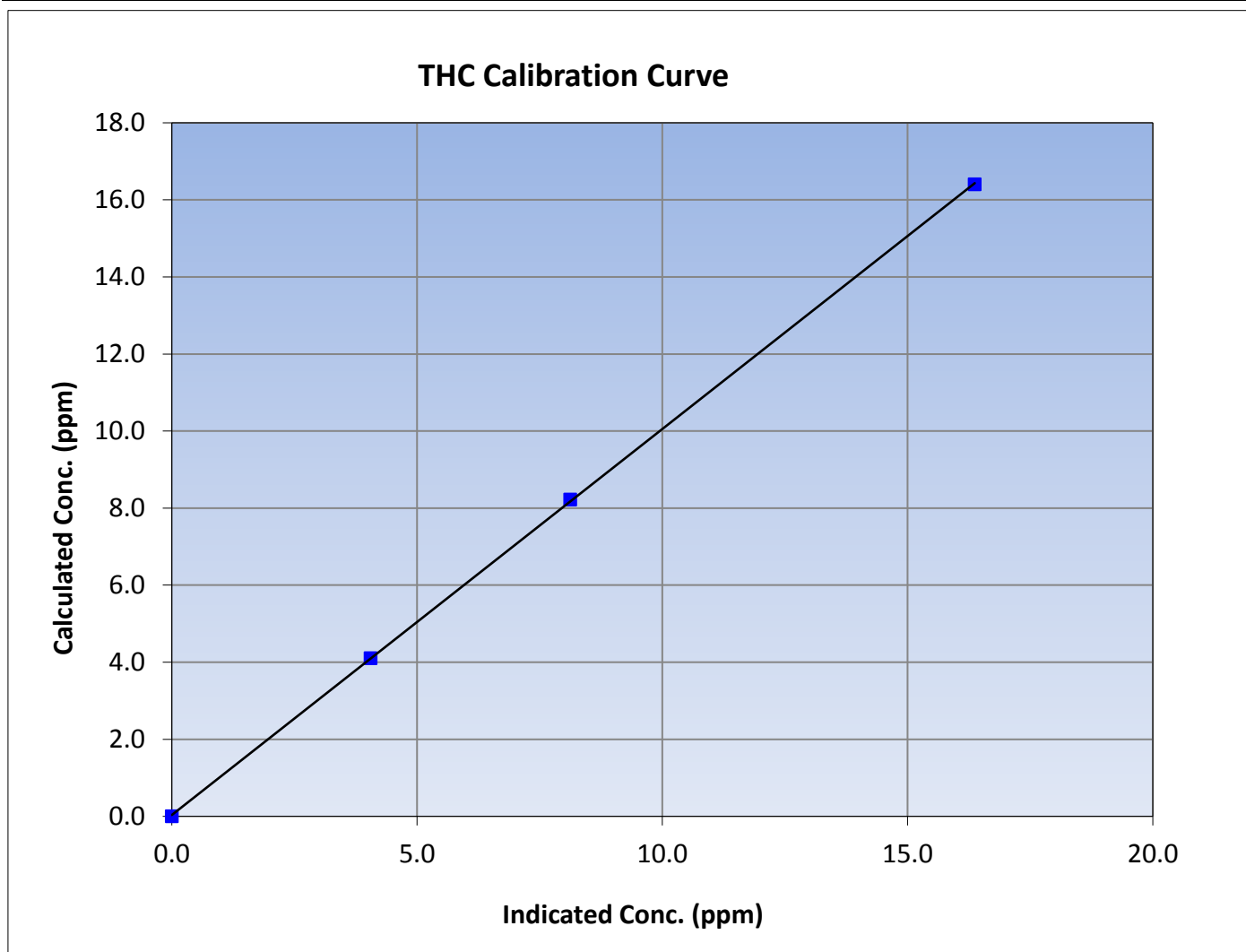
Version-02-2017

Station Information

| | | | |
|------------------|------------------|----------------------|--------------|
| Calibration Date | August 3, 2017 | Previous Calibration | July 4, 2017 |
| Station Name | Athabasca Valley | Station Number | AMS 07 |
| Start Time (MST) | 8:55 | End Time (MST) | 13:08 |
| Analyzer make | Thermo 55i | Analyzer serial # | 1426262594 |

Calibration Data

| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> | | | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|---------------|-------|----------|-------------|
| 0.00 | 0.00 | ---- | Correlation Coefficient | 0.999965 | ≥ 0.995 | | | |
| 16.40 | 16.37 | 1.0021 | | | | | | |
| 8.22 | 8.12 | 1.0127 | | | | Slope | 1.001693 | 0.90 - 1.10 |
| 4.10 | 4.05 | 1.0135 | | | | | | |
| | | | Intercept | 0.035802 | ± 0.5 | | | |





Wood Buffalo Environmental Association

CH₄ Calibration Summary

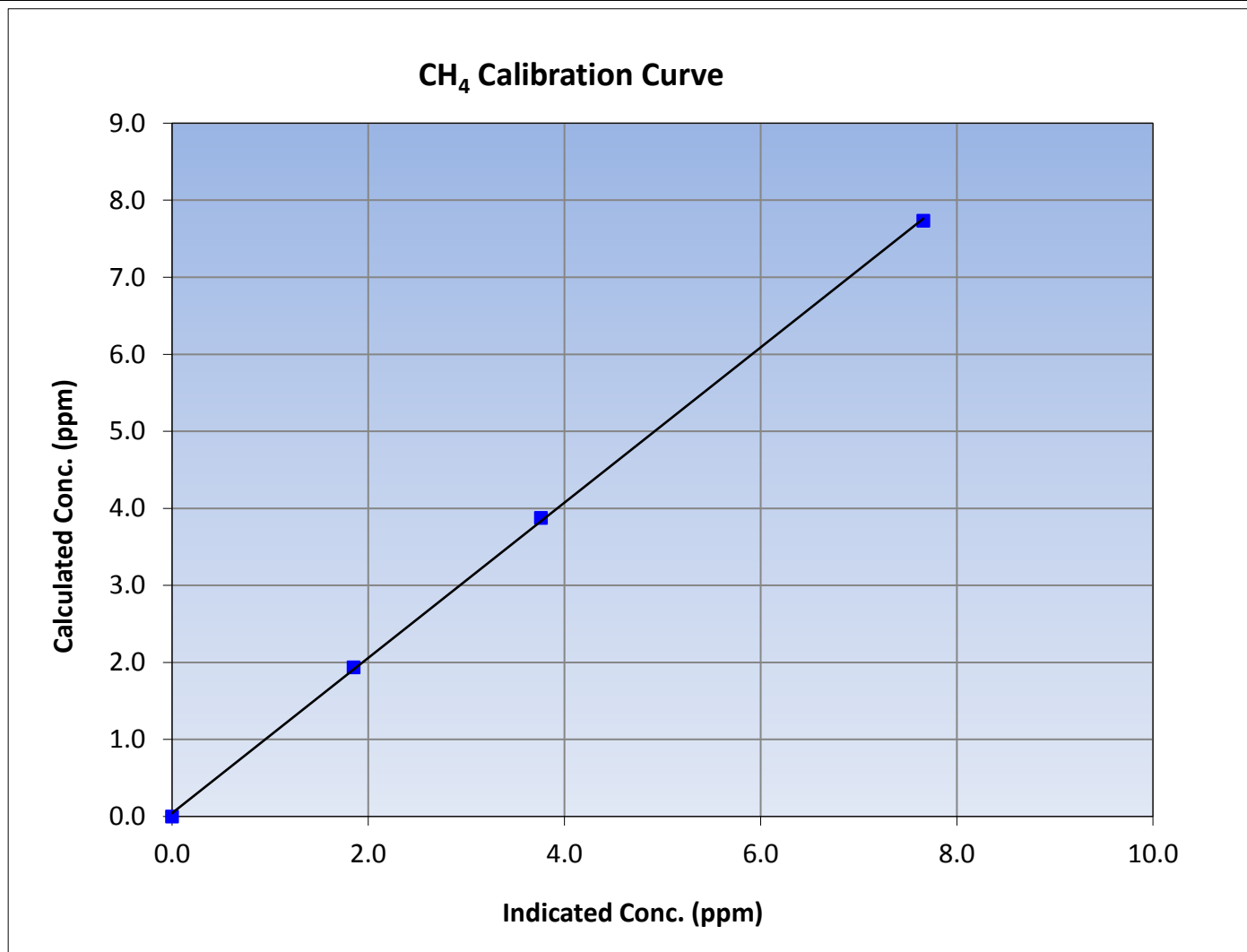
Version-02-2017

Station Information

| | | | |
|------------------|------------------|----------------------|--------------|
| Calibration Date | August 3, 2017 | Previous Calibration | July 4, 2017 |
| Station Name | Athabasca Valley | Station Number | AMS 07 |
| Start Time (MST) | 8:55 | End Time (MST) | 13:08 |
| Analyzer make | Thermo 55i | Analyzer serial # | 1426262594 |

Calibration Data

| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> | | | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|---------------|-------|----------|-------------|
| 0.00 | 0.00 | ---- | Correlation Coefficient | 0.999834 | ≥ 0.995 | | | |
| 7.73 | 7.66 | 1.0095 | | | | | | |
| 3.88 | 3.76 | 1.0309 | | | | Slope | 1.007524 | 0.90 - 1.10 |
| 1.93 | 1.85 | 1.0458 | | | | | | |
| | | | Intercept | 0.043432 | ± 0.5 | | | |





Wood Buffalo Environmental Association

NMHC Calibration Summary

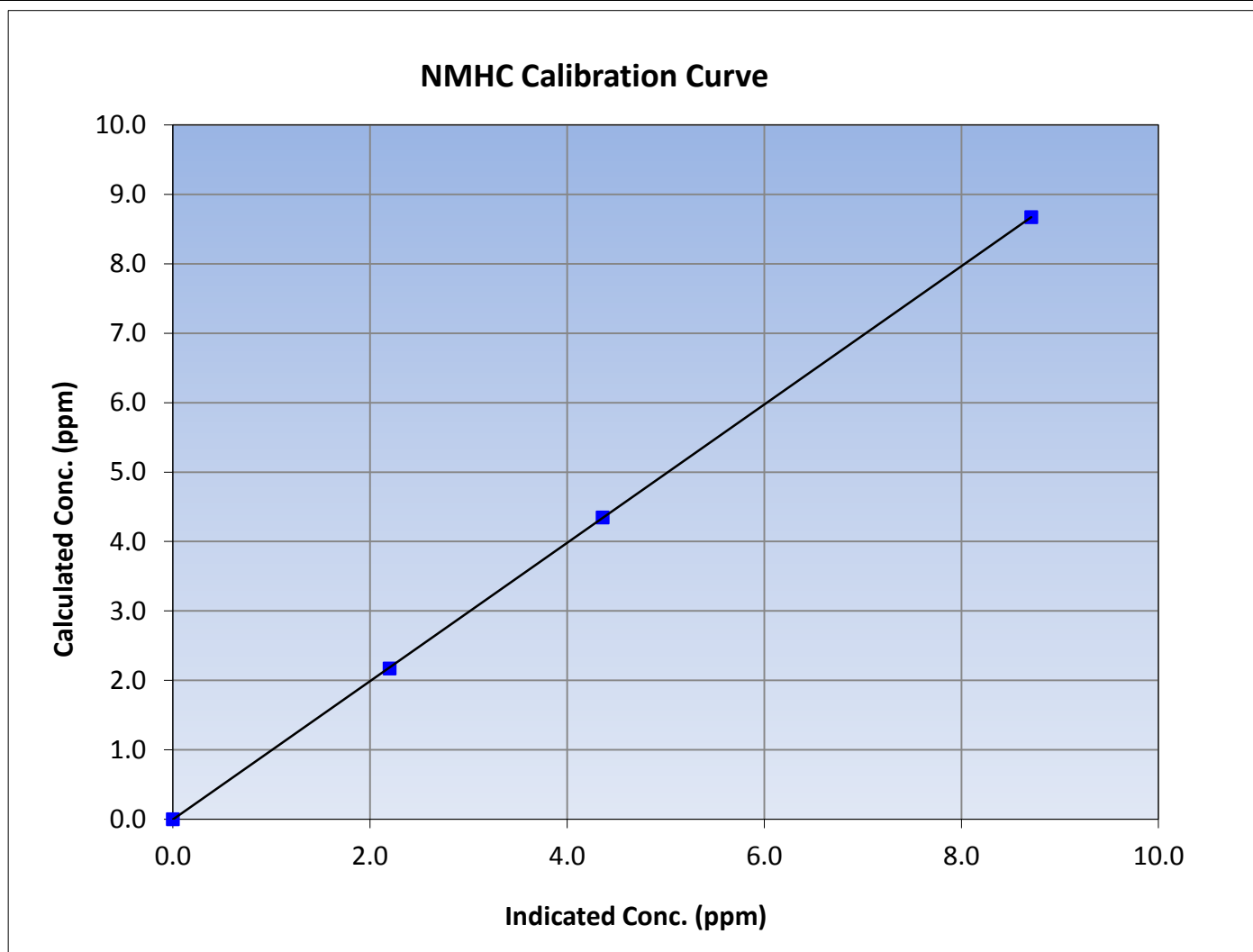
Version-02-2017

Station Information

| | | | |
|------------------|------------------|----------------------|--------------|
| Calibration Date | August 3, 2017 | Previous Calibration | July 4, 2017 |
| Station Name | Athabasca Valley | Station Number | AMS 07 |
| Start Time (MST) | 8:55 | End Time (MST) | 13:08 |
| Analyzer make | Thermo 55i | Analyzer serial # | 1426262594 |

Calibration Data

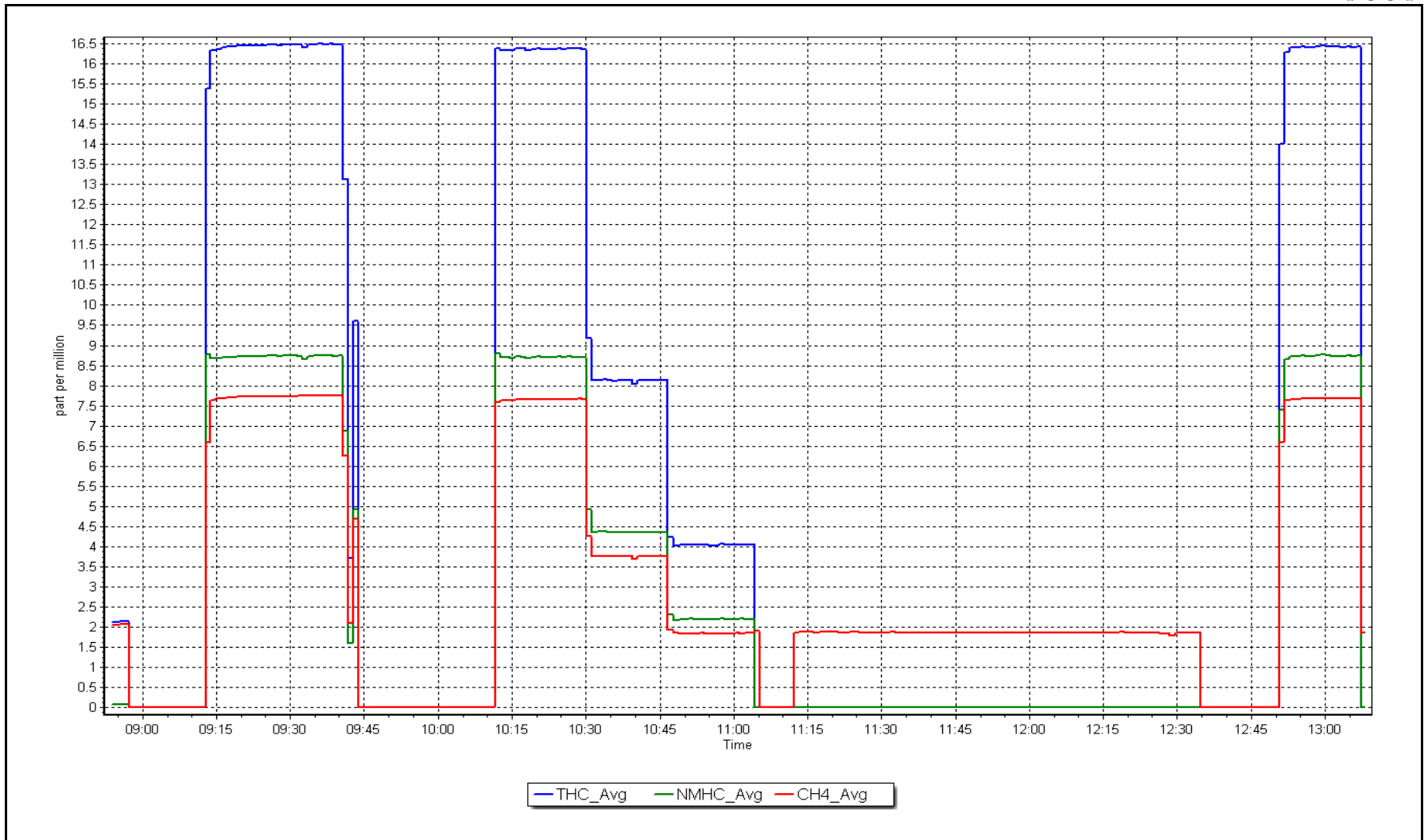
| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> | | | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|---------------|-------|----------|-------------|
| 0.00 | 0.00 | ---- | Correlation Coefficient | 0.999991 | ≥ 0.995 | | | |
| 8.67 | 8.71 | 0.9956 | | | | | | |
| 4.35 | 4.36 | 0.9970 | | | | Slope | 0.996460 | 0.90 - 1.10 |
| 2.17 | 2.20 | 0.9862 | | | | | | |
| | | | Intercept | -0.006999 | ± 0.5 | | | |



NMHC Calibration Plot

Date: August 3, 2017

Location: Athabasca Valley





Wood Buffalo Environmental Association

O₃ Calibration Summary

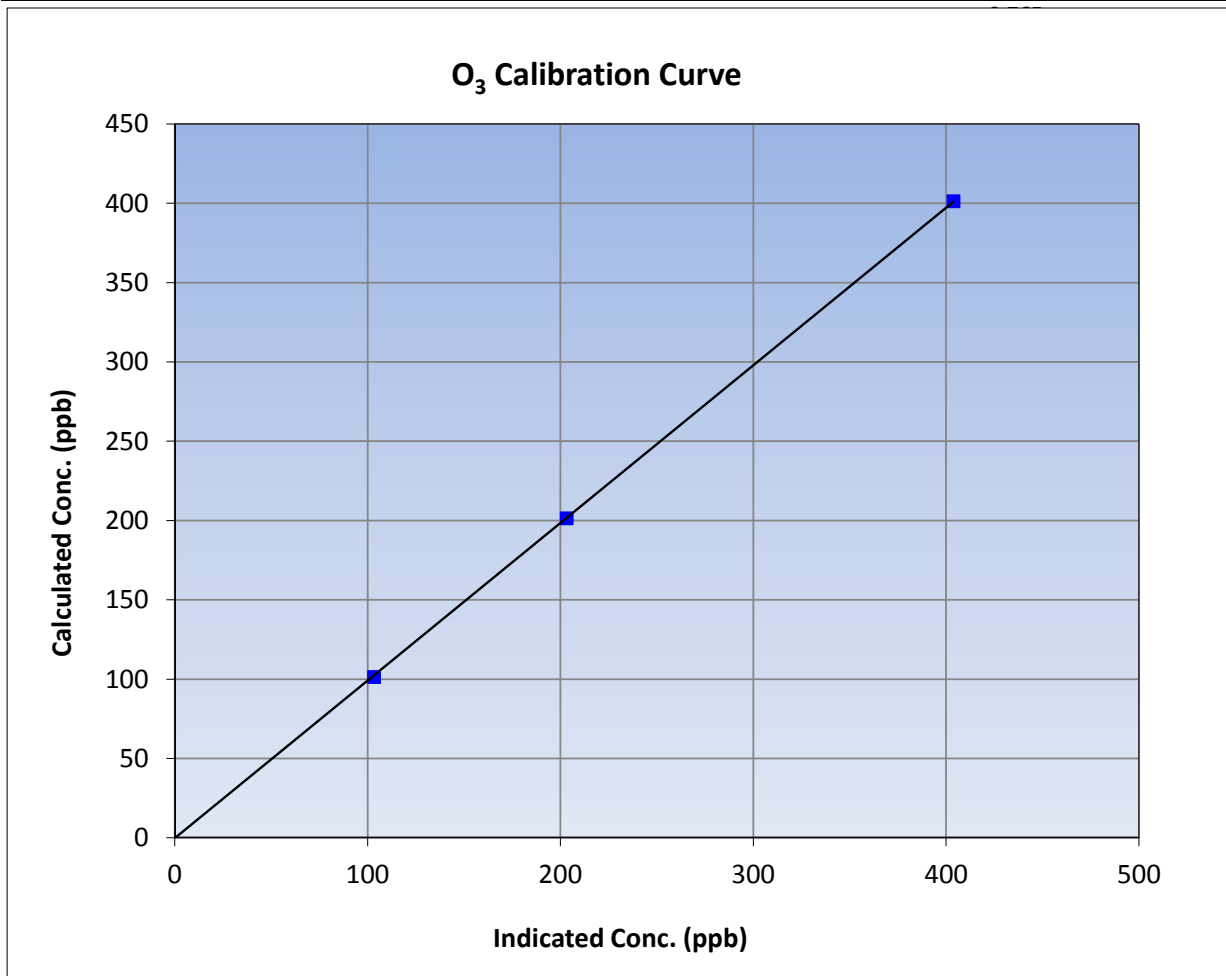
Version-03-2017

Station Information

| | | | |
|------------------|------------------|----------------------|--------------|
| Calibration Date | August 14, 2017 | Previous Calibration | July 6, 2017 |
| Station Name | Athabasca Valley | Station Number | AMS 07 |
| Start Time (MST) | 10:48 | End Time (MST) | 13:10 |
| Analyzer make | Thermo 49i | Analyzer serial # | 1507964700 |

Calibration Data

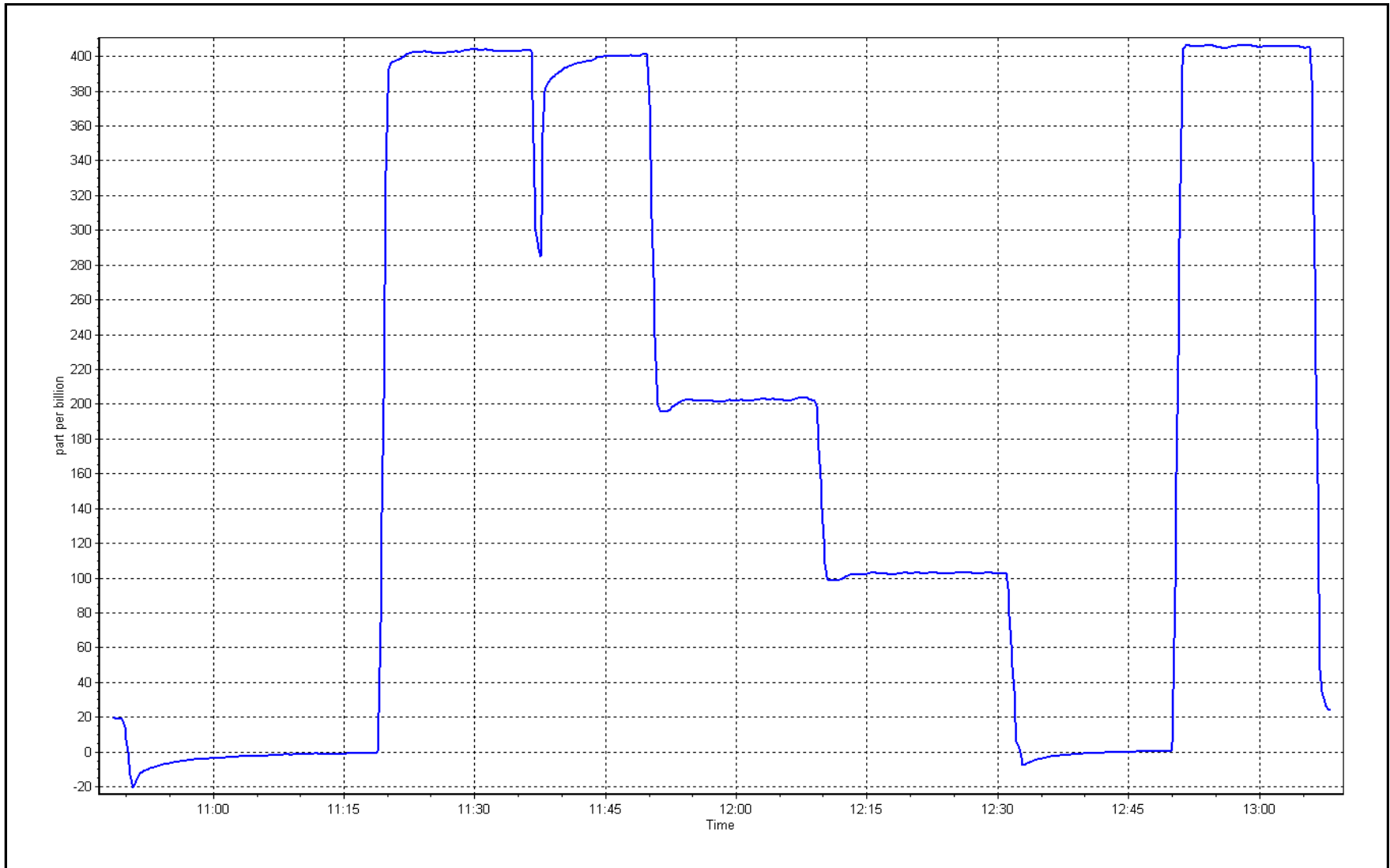
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|-------------|
| 0.0 | -0.6 | ---- | Correlation Coefficient | 0.999977 | ≥0.995 |
| 401.0 | 403.4 | 0.9941 | | | |
| 201.0 | 202.9 | 0.9906 | Slope | 0.993733 | 0.90 - 1.10 |
| 101.0 | 102.9 | 0.9815 | | | |
| | | | Intercept | -0.289829 | +/- 10 |



O₃ Calibration Plot

Date: August 14, 2017

Location: Athabasca Valley





Wood Buffalo Environmental Association

NO_x - NO - NO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|------------------|-----------------|---------------|
| Station Name: | Athabasca Valley | Station number: | AMS 07 |
| Calibration Date: | August 3, 2017 | Last Cal Date: | July 15, 2017 |
| Start time (MST): | 8:55 | End time (MST): | 13:09 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|-------------------|-------------------|---------------------|-----------------|
| NO Gas Cylinder # | LL110103 | Cal Gas Expiry Date | February-16-19 |
| NOX Cal Gas Conc. | <u>50.8</u> ppb | NO Cal Gas Conc. | <u>50.8</u> ppb |
| Calibrator Model | Teledyne API T700 | Serial Number | 2445 |
| ZAG make/model | Teledyne API T701 | Serial Number | 1864 |

Analyzer Information

| | | | | | |
|-----------------------------|--------------|---------------|------------------------------|--------------|---------------|
| Analyzer make: Thermo 42C | | | Analyzer serial #: 601114773 | | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| NO coefficient | 1.526 | 1.526 | NOX Range (ppb) | 0 - 1000 ppb | |
| NOX coefficient | 0.999 | 0.999 | PMT Temperature | -3.5 | -3.5 |
| NO ₂ coefficient | 1.000 | 1.000 | Reaction cell Press | 176.9 | 176.9 |
| NO bkgrnd | 4.3 | 4.3 | Sample Flow | 0.755 | 0.755 |
| NOX bkgrnd | 4.5 | 4.5 | PMT Voltage | -784 | -784 |

Calibration Statistics

| | | |
|----------------------------|--------------|---------------|
| | <u>Start</u> | <u>Finish</u> |
| NO _x Cal Slope | 1.004688 | 1.006052 |
| NO _x Cal Offset | -1.172290 | -1.352697 |
| NO Cal Slope | 1.003553 | 1.003779 |
| NO Cal Offset | -0.670785 | -1.051779 |
| NO ₂ Cal Slope | 1.001652 | 1.008434 |
| NO ₂ Cal Offset | 0.776272 | 1.477046 |



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Version-03-2017

Dilution Calibration Data

| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|----------------------------------|---------------------------|-----------------------------|---|--|---|--|---------------------------------------|--|---|--|
| as found zero | | | | | | -0.1 | 0.0 | 0.3 | ---- | ---- |
| as found span | 4932 | 78.8 | 811.6 | 811.6 | 0.0 | 810.9 | 810.7 | 0.2 | 1.0009 | 1.0012 |
| calibrator zero | 5009 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | 0.3 | ---- | ---- |
| high point | 4932 | 78.8 | 811.6 | 811.6 | 0.0 | 807.4 | 808.9 | -1.4 | 1.0053 | 1.0034 |
| second point | 4973 | 39.5 | 403.5 | 403.5 | 0.0 | 403.4 | 404.2 | -0.6 | 1.0002 | 0.9983 |
| third point | 4994 | 19.7 | 200.4 | 200.4 | 0.0 | 201.4 | 201.3 | 0.0 | 0.9950 | 0.9955 |
| as left zero | 5009 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | 0.3 | ---- | ---- |
| as left span | 4973 | 78.8 | 805.0 | 400.0 | 405.0 | 795.2 | 397.2 | 397.9 | 1.0123 | 1.0070 |
| Average Correction Factor | | | | | | | | | 1.0002 | 0.9991 |

| | | | | |
|--|-----------------------------|----------------|-----------------|-------------------------|
| Corrected As found | NO _x = 811.0 ppb | NO = 810.7 ppb | *Percent Change | NO _x = -0.2% |
| Previous Response | NO _x = 809.0 ppb | NO = 809.4 ppb | *Percent Change | NO = -0.2% |
| <i>* = > +/-5% change initiates investigation</i> | | | | |

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO drop conc (ppb) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | Converter Efficiency <i>Limit = 96-104%</i> |
|----------------------------------|------------------------------|---|--|---------------------------------------|--|---|--|---|--|
| 1st NO ref point | | 0.0 | 804.5 | 807.0 | -2.3 | 1.0089 | 1.0058 | ---- | ---- |
| 1st NO2 (400 ppb O3) | 400.0 | 407.0 | 802.9 | 400.0 | 403.0 | 1.0109 | ---- | 1.0099 | 99.0% |
| 2nd NO2 (200 ppb O3) | 598.4 | 208.6 | 803.0 | 598.4 | 204.6 | 1.0108 | ---- | 1.0196 | 98.1% |
| 3rd NO2 (100 ppb O3) | 700.3 | 106.7 | 802.8 | 700.3 | 102.5 | 1.0110 | ---- | 1.0410 | 96.1% |
| 2nd NO ref point | ---- | 0.0 | 801.7 | 804.1 | -2.3 | 1.0124 | 1.0094 | ---- | ---- |
| Average Correction Factor | | | | | | 1.0113 | 1.0076 | 1.0235 | 97.7% |

Notes: No adjustments or maintenance done

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

Version-03-2017

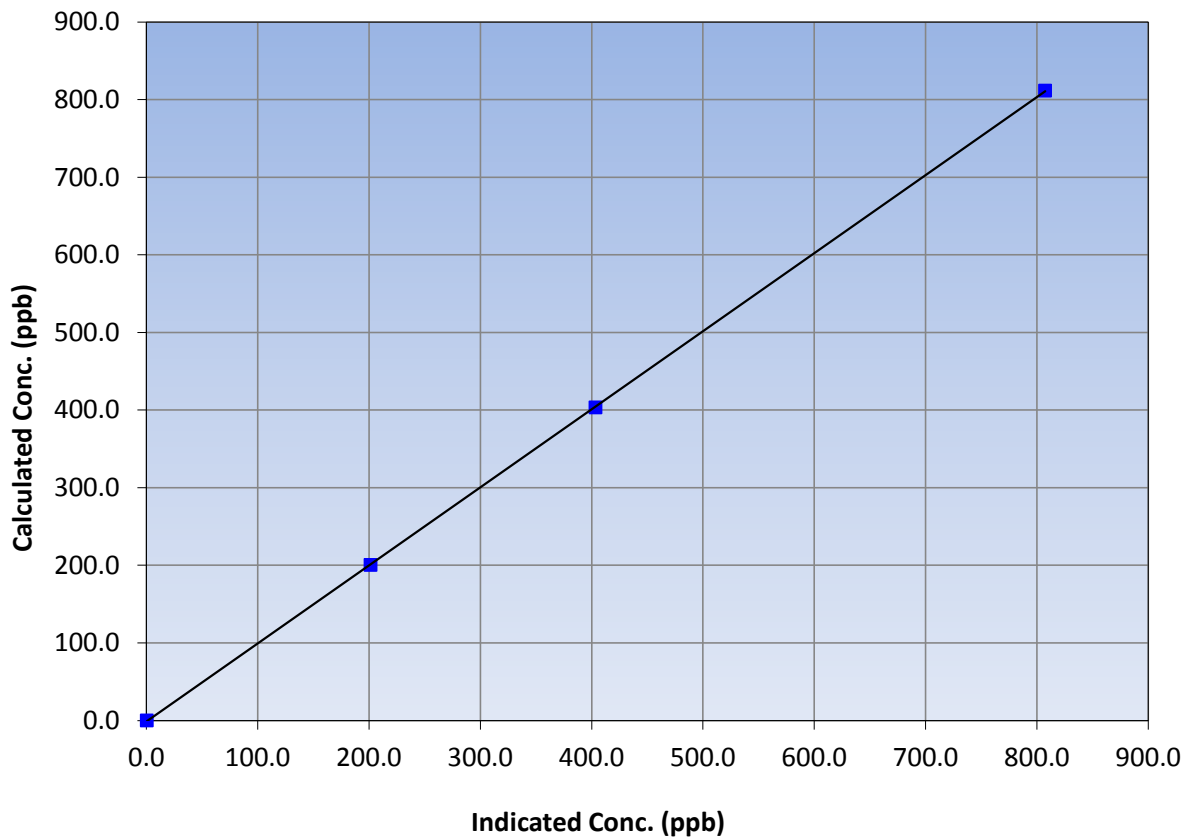
Station Information

| | | | |
|------------------|------------------|----------------------|---------------|
| Calibration Date | August 3, 2017 | Previous Calibration | July 15, 2017 |
| Station Name | Athabasca Valley | Station Number | AMS 07 |
| Start Time (MST) | 8:55 | End Time (MST) | 13:09 |
| Analyzer make | Thermo 42C | Analyzer serial # | 601114773 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|-------------|
| 0.0 | 0.2 | ---- | Correlation Coefficient | ≥0.995 | |
| 811.6 | 807.4 | 1.0053 | | | |
| 403.5 | 403.4 | 1.0002 | | | |
| 200.4 | 201.4 | 0.9950 | | | |
| | | | Slope | 1.006052 | 0.90 - 1.10 |
| | | | Intercept | -1.352697 | +/-20 |

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

Version-03-2017

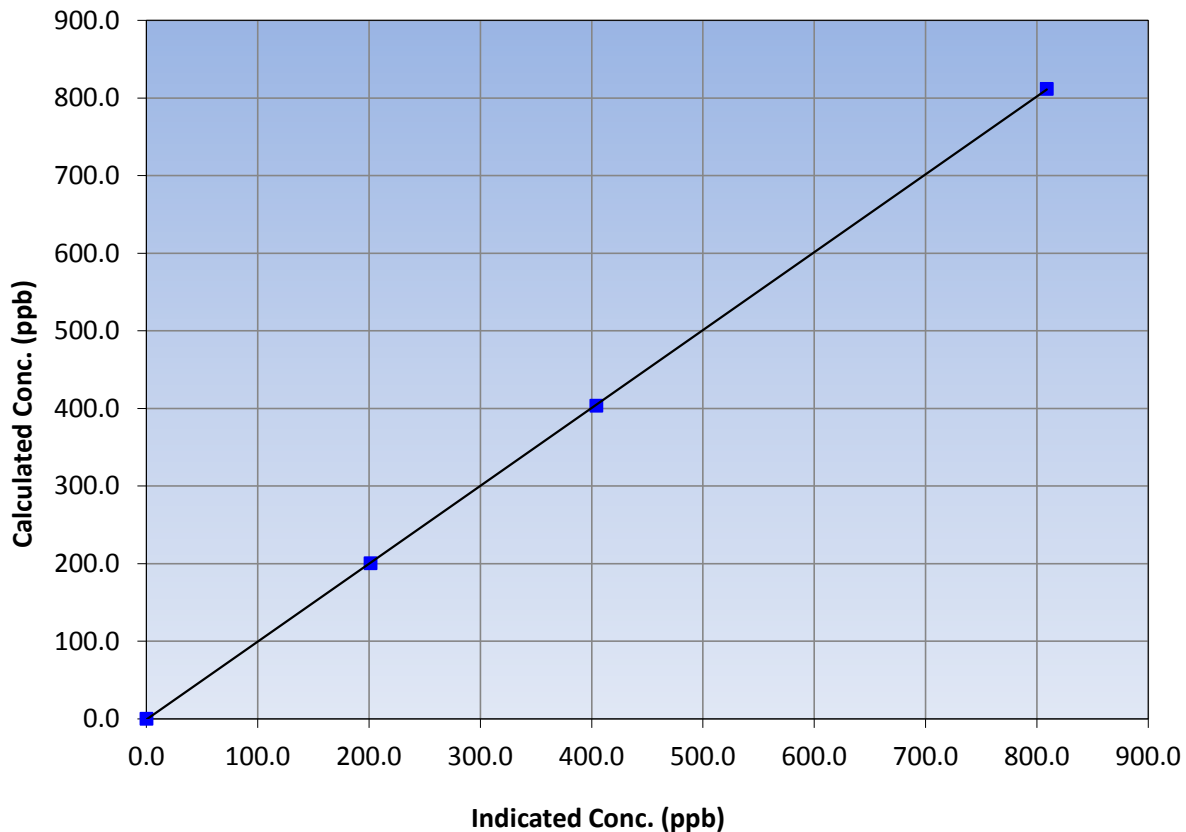
Station Information

| | | | |
|------------------|------------------|----------------------|---------------|
| Calibration Date | August 3, 2017 | Previous Calibration | July 15, 2017 |
| Station Name | Athabasca Valley | Station Number | AMS 07 |
| Start Time (MST) | 8:55 | End Time (MST) | 13:09 |
| Analyzer make | Thermo 42C | Analyzer serial # | 601114773 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | ≥ 0.995 | |
| 811.6 | 808.9 | 1.0034 | | | |
| 403.5 | 404.2 | 0.9983 | | | |
| 200.4 | 201.3 | 0.9955 | | | |
| | | | Slope | 1.003779 | 0.90 - 1.10 |
| | | | Intercept | -1.051779 | +/-20 |

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

Version-03-2017

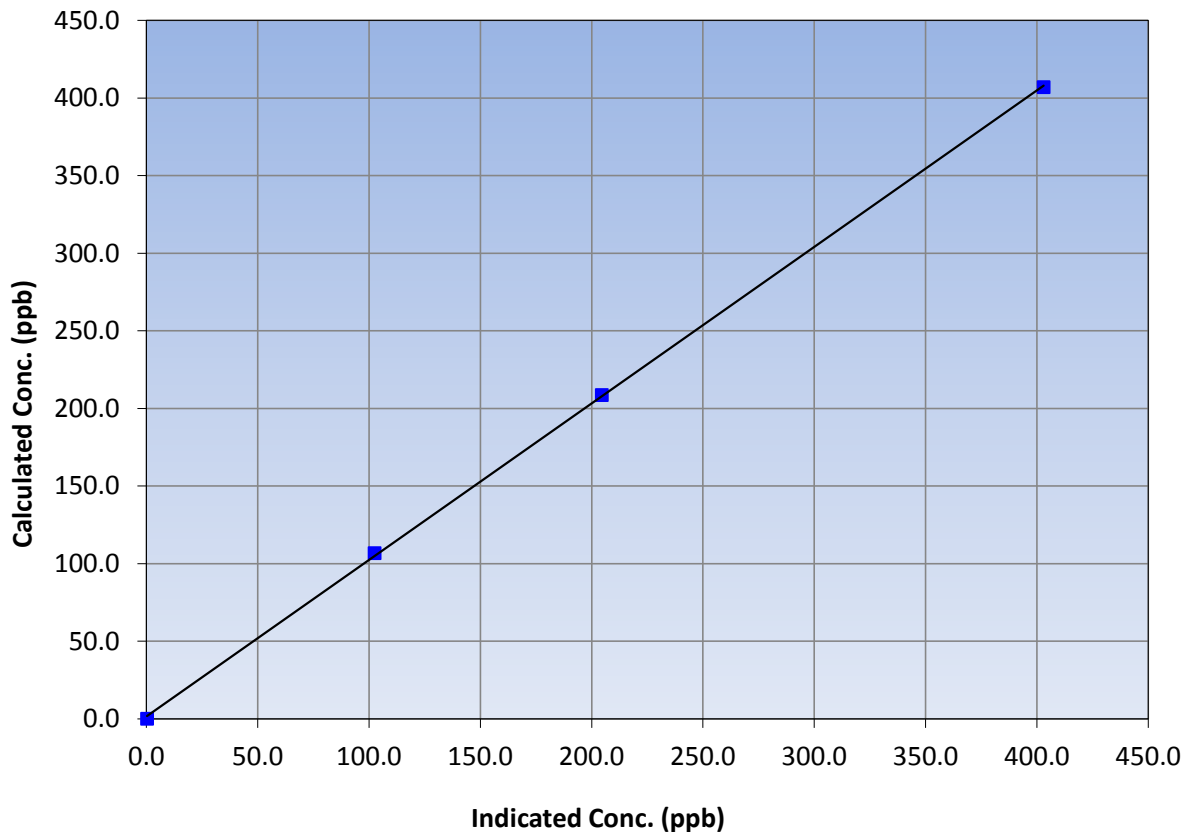
Station Information

| | | | |
|------------------|------------------|----------------------|---------------|
| Calibration Date | August 3, 2017 | Previous Calibration | July 15, 2017 |
| Station Name | Athabasca Valley | Station Number | AMS 07 |
| Start Time (MST) | 8:55 | End Time (MST) | 13:09 |
| Analyzer make | Thermo 42C | Analyzer serial # | 601114773 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.3 | ---- | Correlation Coefficient | ≥0.995 | |
| 407.0 | 403.0 | 1.0099 | | | |
| 208.6 | 204.6 | 1.0196 | | | |
| 106.7 | 102.5 | 1.0410 | | | |
| | | | Slope | 1.008434 | 0.90 - 1.10 |
| | | | Intercept | 1.477046 | +/-20 |

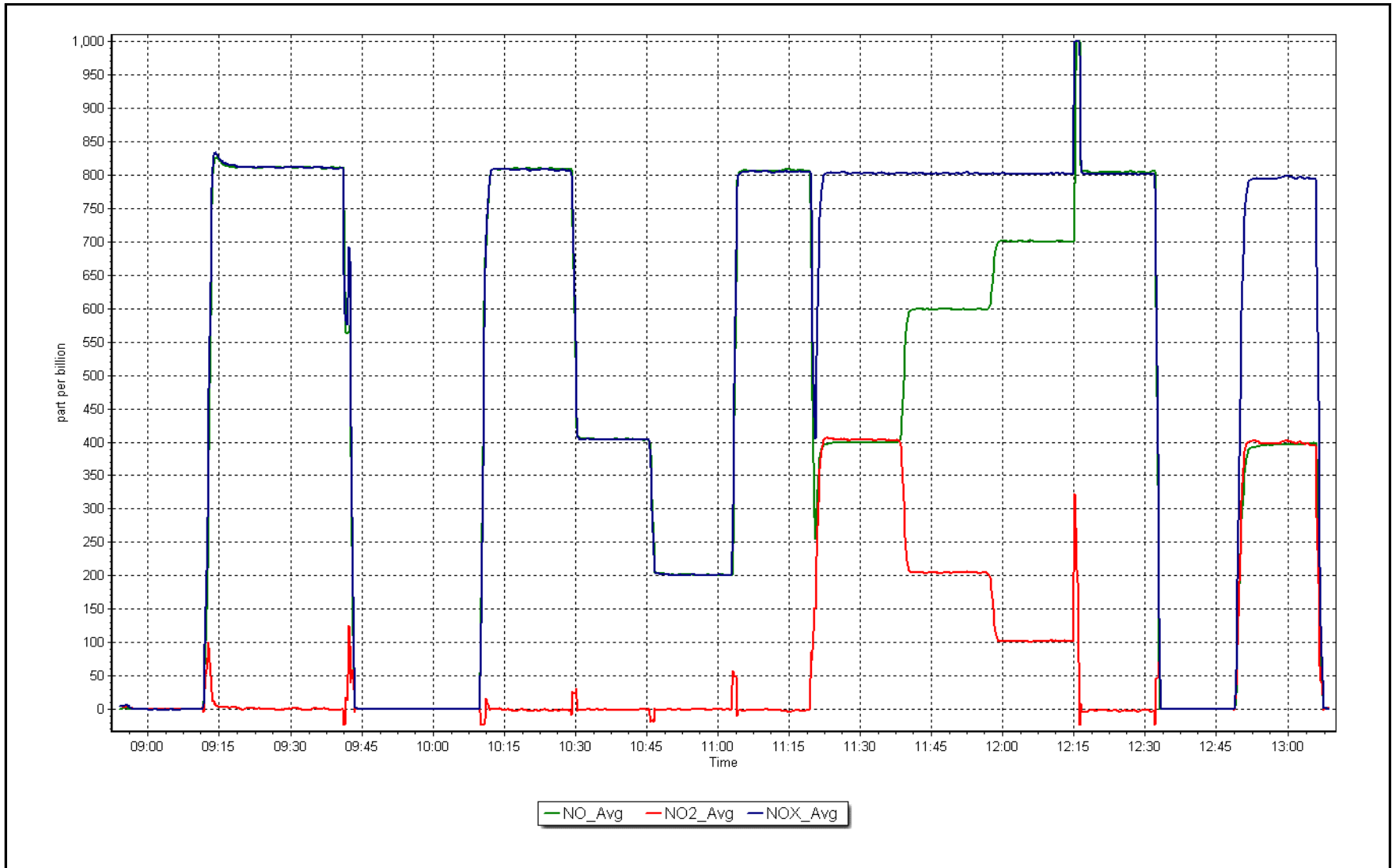
NO₂ Calibration Curve



NO_x Calibration Plot

Date: August 3, 2017

Location: Athabasca Valley





Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-02-2017

Station Information

| | | | |
|------------------------|------------------|-----------------|--------------|
| Station Name: | Athabasca Valley | Station number: | AMS 07 |
| Calibration Date: | August 18, 2017 | Last Cal Date: | July 5, 2017 |
| Start time (MST): | 10:30 | End time (MST): | 11:15 |
| Sharp Model: | Thermo 5030 | S/N: | E515 |
| Particulate Fraction: | PM2.5 | C14 Source S/N: | 3256 |
| Flow Meter Make/Model: | Delta Cal | S/N: | 1450 |
| Temp/RH standard: | Delta Cal | S/N: | 1450 |

Monthly Calibration Test

| <u>Parameter</u> | <u>As found</u> | <u>Measured</u> | <u>As left</u> | <u>Adjusted</u> | (Limits) |
|-----------------------------|-----------------|-------------------------------------|----------------|-------------------------------------|-----------------|
| T1 (°C) | 23 | 22 | 23 | <input type="checkbox"/> | +/- 2 °C |
| P3 (hPa) | 976 | 972 | 976 | <input type="checkbox"/> | +/- 13 hPa |
| flow (LPH) | 1000 | 1000 | 1000 | <input type="checkbox"/> | +/- 50 LPH |
| Nephelometer zero | 2.9 | ----- | -0.2 | <input checked="" type="checkbox"/> | +/- 0.5 ug/m3 |
| Instrument Clock: | Verified | <input type="checkbox"/> | | | |
| Cyclone cleaning : | PM10 Cyclone | <input checked="" type="checkbox"/> | PM2.5 Cyclone | <input checked="" type="checkbox"/> | |
| Date Filter Tape Installed: | | | | | |

Quarterly Calibration Test

Leak Test: Date of check: _____ Last Cal Date: July 5, 2017
 Flow w/o adaptor: _____ Flow w/ adaptor: _____

(Limit) 0.4 LPM

| <u>Adjusted</u> | <u>Current Test</u> | <u>Previous Test</u> | <u>% Change</u> |
|-----------------------------------|--------------------------|--------------------------------|-----------------|
| <input type="checkbox"/> | Foil S/N: _____ | Foil S/N: 2518 | |
| Foil Calibration | Foil Mass: _____ | Foil Mass: 1337 | |
| | Calibration Date: _____ | Calibration Date: July 5, 2017 | |
| (Limit) +/- 5% of previous | Correction Factor: _____ | Correction Factor: 6939 | --- |

Annual Calibration Test

| <u>Parameter</u> | <u>As found</u> | <u>Measured</u> | <u>As left</u> | <u>Adjusted</u> | (Limits) |
|-----------------------------|-----------------|-----------------|----------------|--------------------------|-----------------|
| T2 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| T3 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| T4 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| RH (%) | | | | <input type="checkbox"/> | +/- 10% |
| Date Sample Tube Cleaned: | | | | | |
| Date Pump Rebuilt/Replaced: | | | | | |

Notes: Cyclone head cleaned; Nephelometer adjusted

Calibration by: Melissa Lemay



Wood Buffalo Environmental Association

CO Calibration Summary

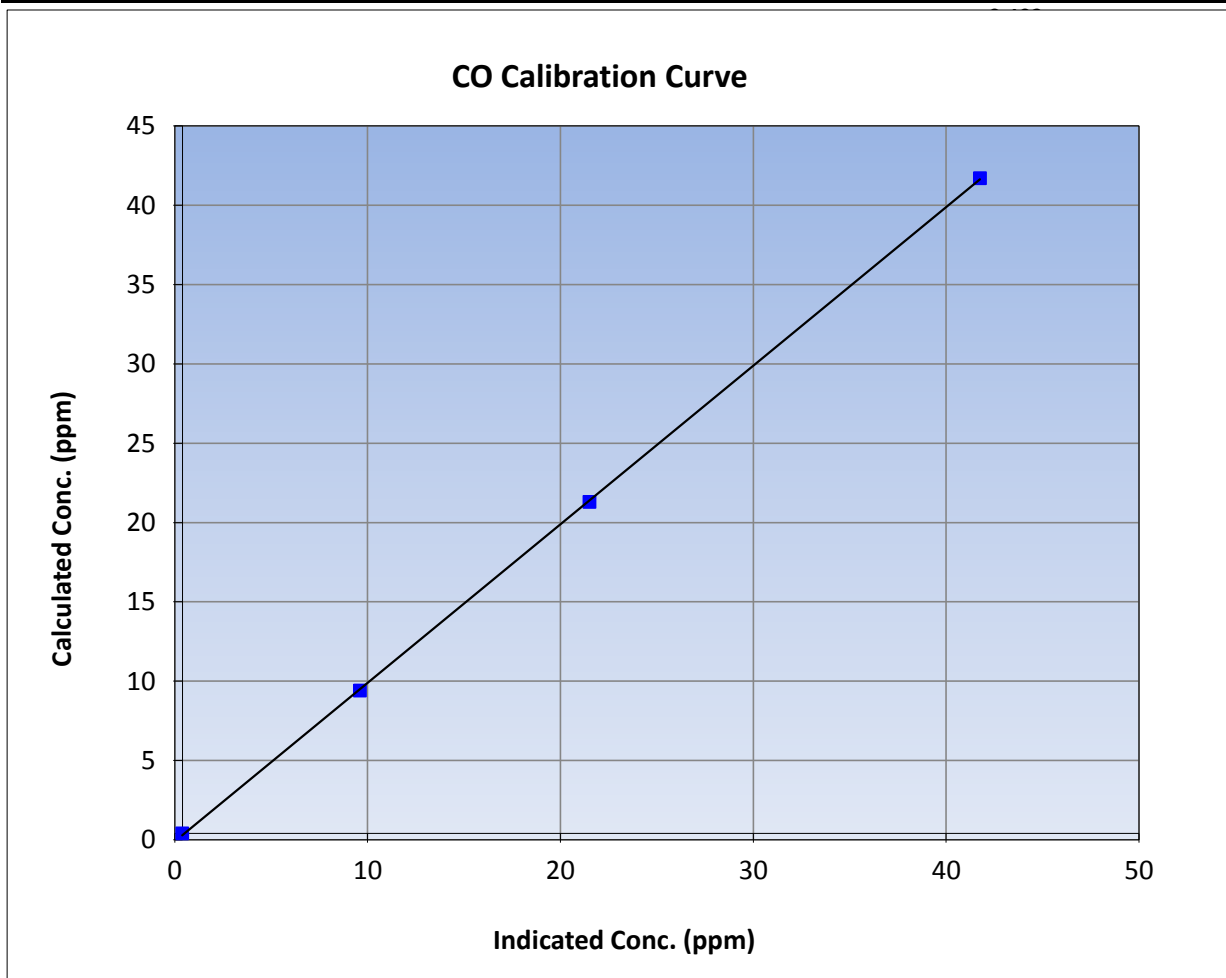
Version-03-2017

Station Information

| | | | |
|------------------|------------------|----------------------|--------------|
| Calibration Date | August 18, 2017 | Previous Calibration | July 5, 2017 |
| Station Name | Athabasca Valley | Station Number | AMS 07 |
| Start Time (MST) | 7:15 | End Time (MST) | 10:27 |
| Analyzer make | Thermo 48i-LTE | Analyzer serial # | 1408761381 |

Calibration Data

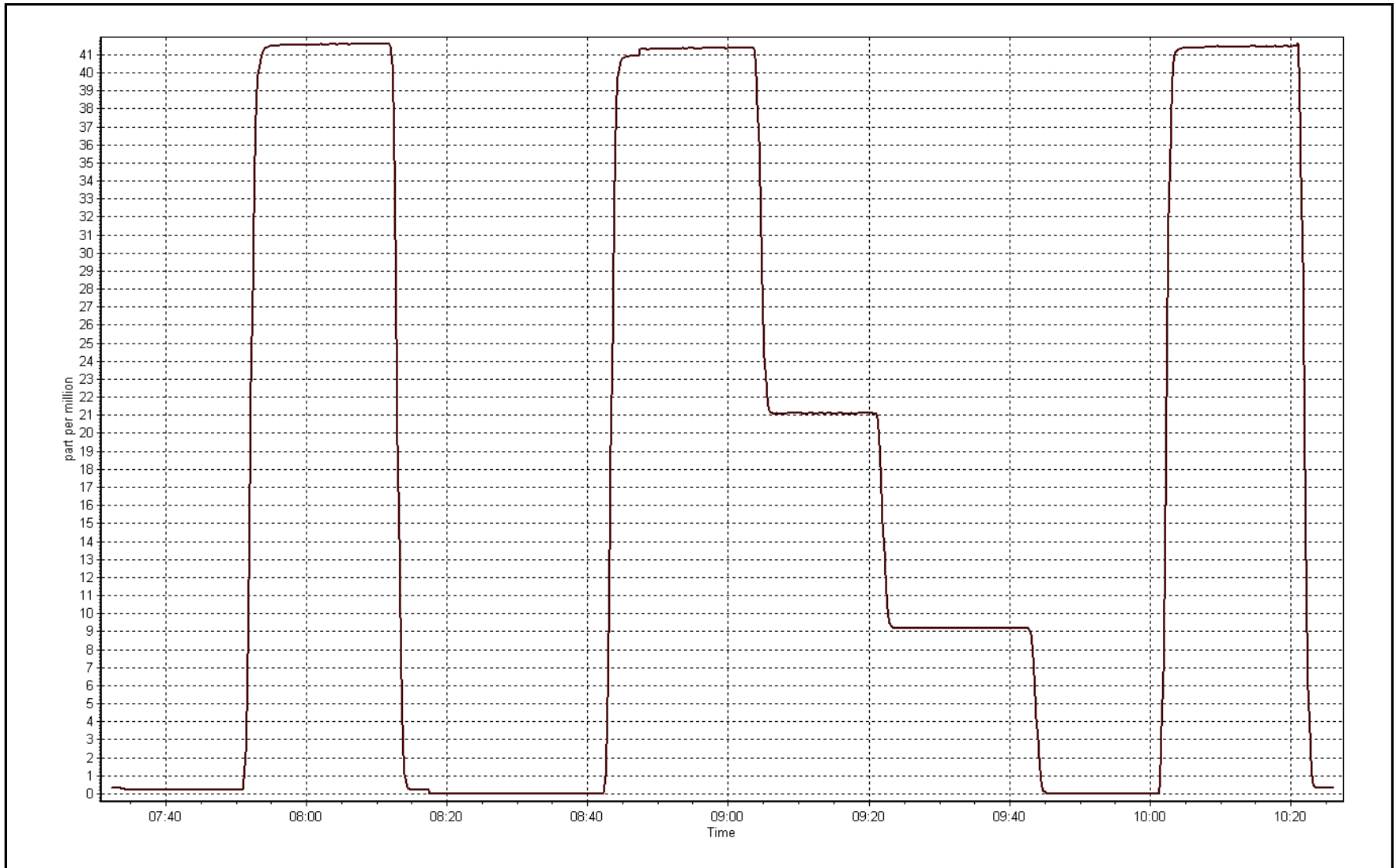
| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | 0.999967 | ≥0.995 |
| 41.3 | 41.4 | 0.9988 | | | |
| 20.9 | 21.1 | 0.9910 | Slope | 0.999764 | 0.90 - 1.10 |
| 9.0 | 9.2 | 0.9787 | | | |
| | | | Intercept | -0.102237 | +/-1.5 |



CO Calibration Plot

Date: August 18, 2017

Location: Athabasca Valley





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 8
FORT CHIPEWYAN
AUGUST 2017**

Operations, Data Collection,
QA/QC, Data Validation and Reporting by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

September 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
AUGUST 2017

MONTHLY SUMMARY for
AMD SECTION III.B.1(c)

| Parameter | Hours of Data | Hours of Calibration | Hours without Data | Operational Time | Maximum 1-Hour Value | 1-Hour Exceedances | Maximum 24-Hour Value | 24-Hour Exceedances |
|---------------------------------------|---------------|----------------------|--------------------|------------------|----------------------|--------------------|-----------------------|---------------------|
| SO2(ppb) Average | 707 | 37 | 37 | 100 | 3 | 0 | 1 | 0 |
| O3(ppb) Average | 708 | 35 | 36 | 99.87 | 68 | 0 | 48 | - |
| NO2(ppb) Average | 707 | 37 | 37 | 100 | 7 | 0 | 2 | - |
| NO(ppb) Average | 707 | 37 | 37 | 100 | 1 | - | 0 | - |
| NOX(ppb) Average | 707 | 37 | 37 | 100 | 7 | - | 2 | - |
| PM2.5(ug/m3) Average | 741 | 1 | 3 | 99.73 | 146 | - | 22.6 | 0 |
| Wind Speed 10 m (km/h) Average | 744 | 0 | 0 | 100 | 32 | - | 22 | - |
| Wind Direction 10 m (deg) Average | 744 | 0 | 0 | 100 | - | - | - | - |
| Temperature 2 m (C) Average | 744 | 0 | 0 | 100 | 30.1 | - | 24.2 | - |
| Relative Humidity (%) Average | 744 | 0 | 0 | 100 | 99 | - | 90 | - |
| Precipitation (mm) Total | 744 | 0 | 0 | 100 | 9.9 | - | 24.4 | - |
| Leaf Wetness (% of range) Average | 744 | 0 | 0 | 100 | 33 | - | 7 | - |
| Global Solar Radiation (W/m2) Average | 744 | 0 | 0 | 100 | 860 | - | 327 | - |

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
AUGUST 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

| Parameter | Number | Mean | StnDev | Total | Percentile | | | | | | | |
|---------------------------------------|--------|-------|--------|-------|------------|------|-----|--------|------|------|------|---|
| | | | | | Min | P10 | Q1 | Median | Q3 | P90 | Max | |
| SO2(ppb) Average | 707 | 0.1 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| O3(ppb) Average | 708 | 26.4 | 10 | - | 7 | 16 | 20 | 25 | 31 | 40 | 68 | |
| NO2(ppb) Average | 707 | 0.4 | 1 | - | 0 | 0 | 0 | 0 | 1 | 1 | 7 | |
| NO(ppb) Average | 707 | 0.1 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | 1 | |
| NOX(ppb) Average | 707 | 0.5 | 1 | - | 0 | 0 | 0 | 0 | 1 | 1 | 7 | |
| PM2.5(ug/m3) Average | 741 | 6.78 | 10.9 | - | 0 | 0.5 | 1.3 | 3.7 | 7.5 | 15.6 | 146 | |
| Wind Speed 10 m (km/h) Average | 744 | 12.8 | 6 | - | 1 | 5 | 8 | 12 | 17 | 22 | 32 | |
| Wind Direction 10 m (deg) Average | 744 | - | - | - | - | - | - | - | - | - | - | |
| Temperature 2 m (C) Average | 744 | 18.3 | 4.5 | - | 9.1 | 12.5 | 15 | 17.9 | 21.4 | 24.5 | 30.1 | |
| Relative Humidity (%) Average | 744 | 65.2 | 17 | - | 25 | 42 | 53 | 65 | 77 | 89 | 99 | |
| Precipitation (mm) Total | 744 | - | - | 57.66 | - | - | - | - | - | - | - | |
| Leaf Wetness (% of range) Average | 744 | 0.9 | 5 | - | -2 | -1 | -1 | -1 | 0 | 4 | 33 | |
| Global Solar Radiation (W/m2) Average | 744 | 224.8 | 264 | - | 0 | 1 | 2 | 92 | 418 | 670 | 860 | |

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
AUGUST 2017

OPERATIONAL NOTES

| Parameter | Period Start | Period End | Duration (Hours) | Notes |
|-----------|-------------------|-------------------|------------------|---|
| O3 | 15 Aug 2017 11:00 | 15 Aug 2017 11:00 | 1 | Maintenance - sample manifold cleaned |
| PM2.5 | 29 Aug 2017 10:00 | 29 Aug 2017 11:00 | 2 | Unstable operation - excessive baseline drift |

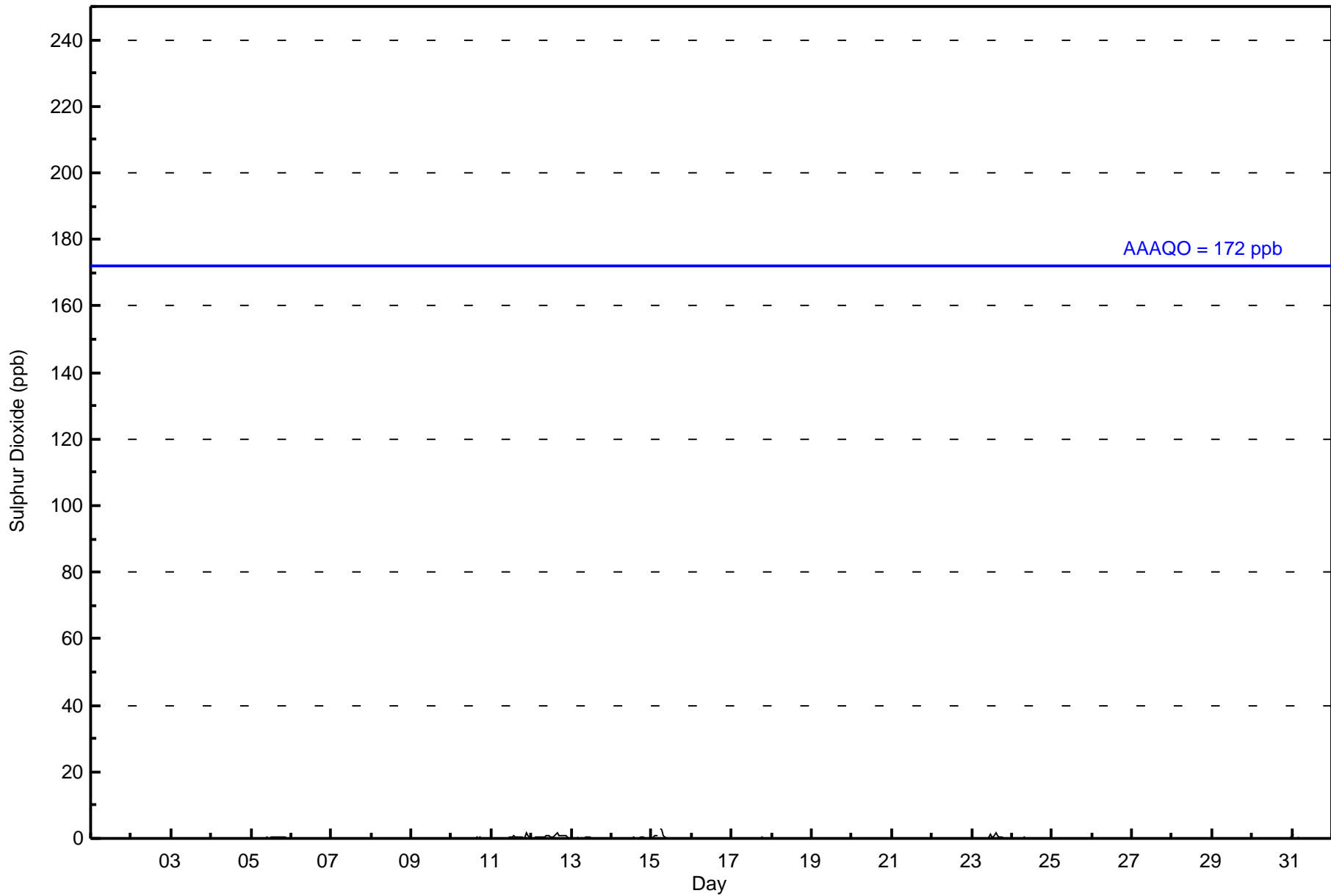


| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | |
|---|-------------------------------|---|---|---|---|---|---|---|---|--|----|----|----|----|----|----|----|----|----|---------------------------------|----|----|----|-----------------|---------------|---------------|
| Maximum Value: 3 ppb on Aug 15 06:00 | | | | | | | | | | Maximum Daily Average: 0.6 ppb on Aug 12 | | | | | | | | | | Hours of Data: 707 | | | | | | |
| Minimum Value: 0 ppb on Aug 2 01:00 | | | | | | | | | | Minimum Daily Average: 0.0 ppb on Aug 29 | | | | | | | | | | Hours of Missing Data: 37 | | | | | | |
| Maximum Diurnal Average: 0.2 ppb at hour 15 | | | | | | | | | | Minimum Diurnal Average: 0.0 ppb at hour 5 | | | | | | | | | | Hours of Calibration: 37 | | | | | | |
| Monthly Average: 0.1 ppb | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1 | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 2-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 3-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 4-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 5-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 6-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 7-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 8-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 9-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 10-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 11-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 0.3 | 2 |
| 12-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0.6 | 2 |
| 13-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 14-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 15-Aug | 0 | 1 | 1 | 1 | Z | 3 | 2 | 1 | 0 | 0 | C | C | C | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -- | 3 |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 17-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 18-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 19-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 20-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 21-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 22-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 23-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 2 |
| 24-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 25-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 26-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 27-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 29-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 30-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 31-Aug | 1 | 1 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 |
| 0.1 0.1 0.1 0.1 0.0 0.2 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.2 0.2 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| 1 1 1 1 0 3 2 1 1 1 1 1 1 1 2 2 1 1 1 1 1 1 2 1 0 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| Z - zerospan C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 10 | 707 | 100.00 | 100.00 |
| 11 - 20 | 0 | 0.00 | 100.00 |
| 21 - 60 | 0 | 0.00 | 100.00 |
| 61 - 110 | 0 | 0.00 | 100.00 |
| 111 - 172 | 0 | 0.00 | 100.00 |
| > 172 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|------------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 10 | 8 | 4 | 6 | 5 | 65 | 45 | 41 | 61 | 42 | 54 | 44 | 67 | 140 | 48 | 38 | 39 | 707 |
| 11 - 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21 - 60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 61 - 110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 111 - 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 8 | 4 | 6 | 5 | 65 | 45 | 41 | 61 | 42 | 54 | 44 | 67 | 140 | 48 | 38 | 39 | 707 |

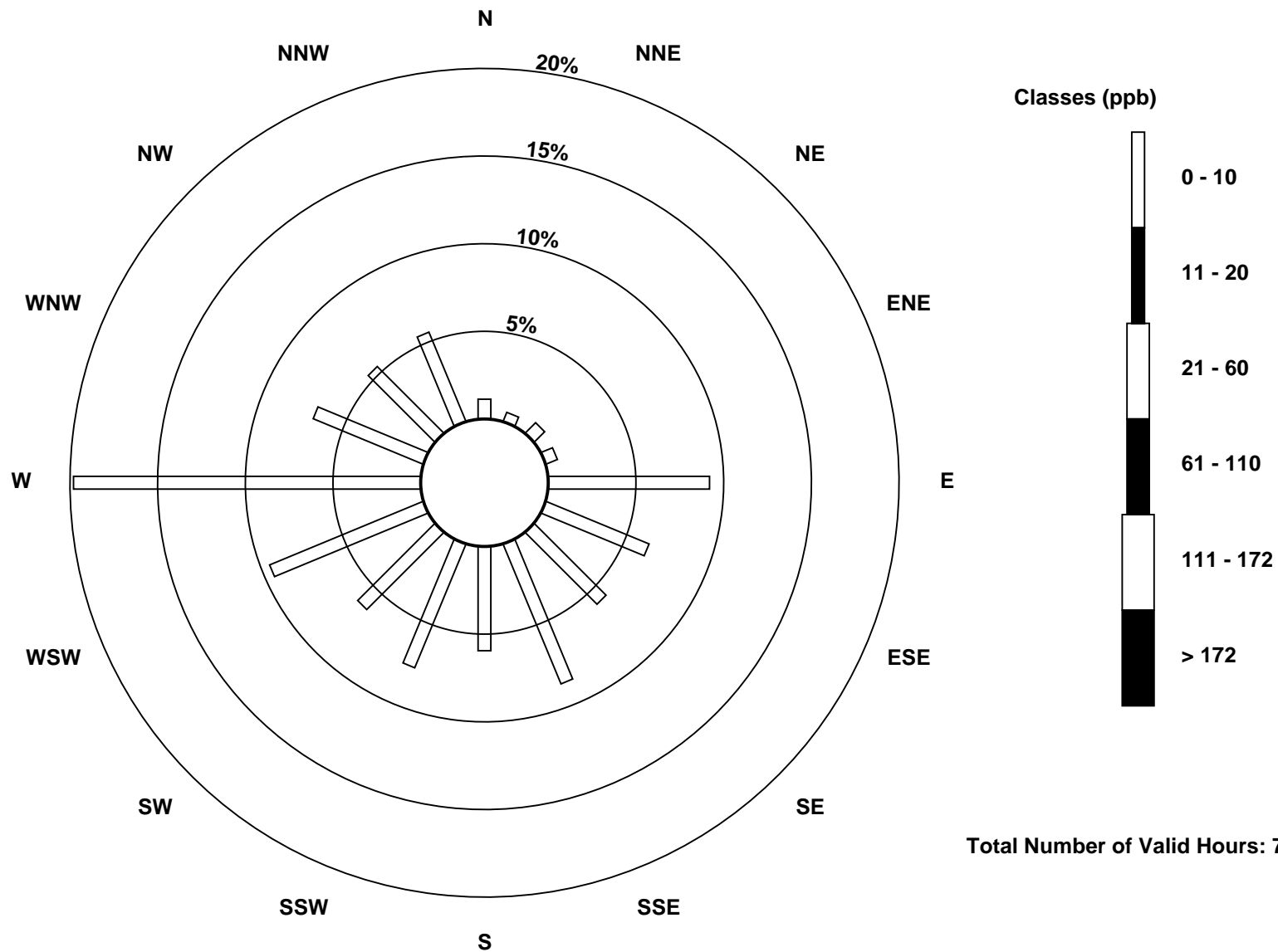
Total Number of Valid Hours: 707

Total Number of Hours: 744

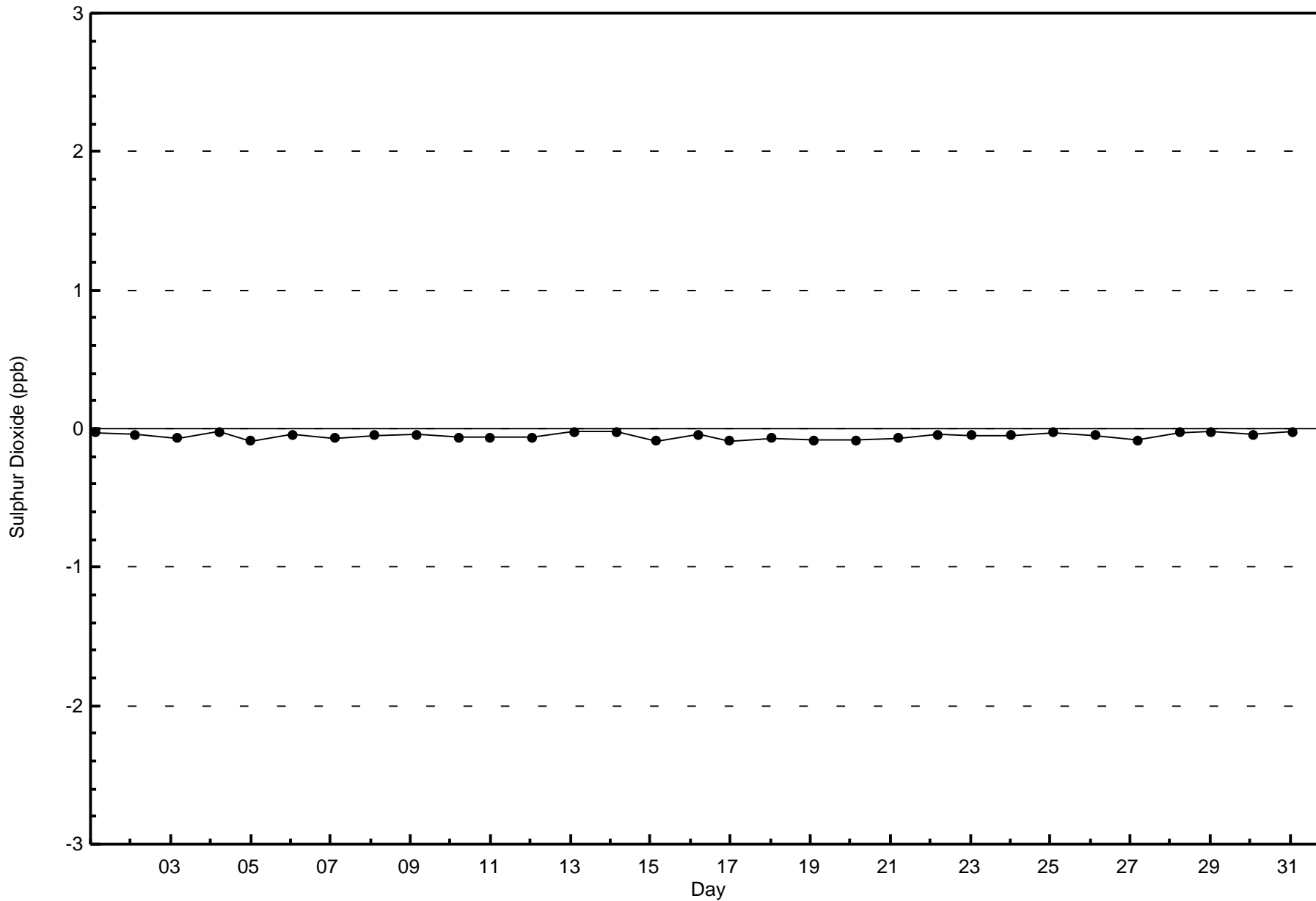


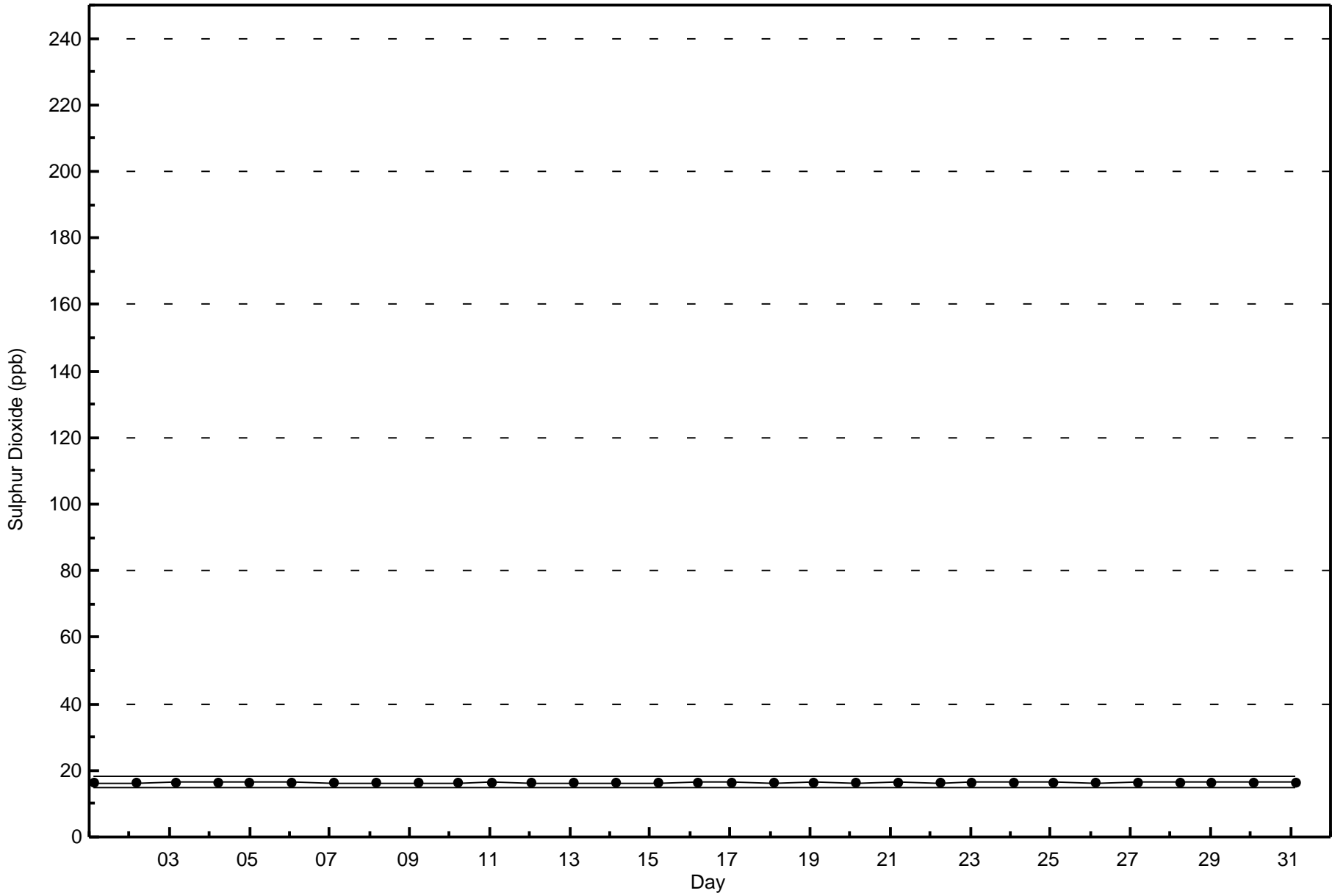
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan (AMS 8)



Total Number of Valid Hours: 707





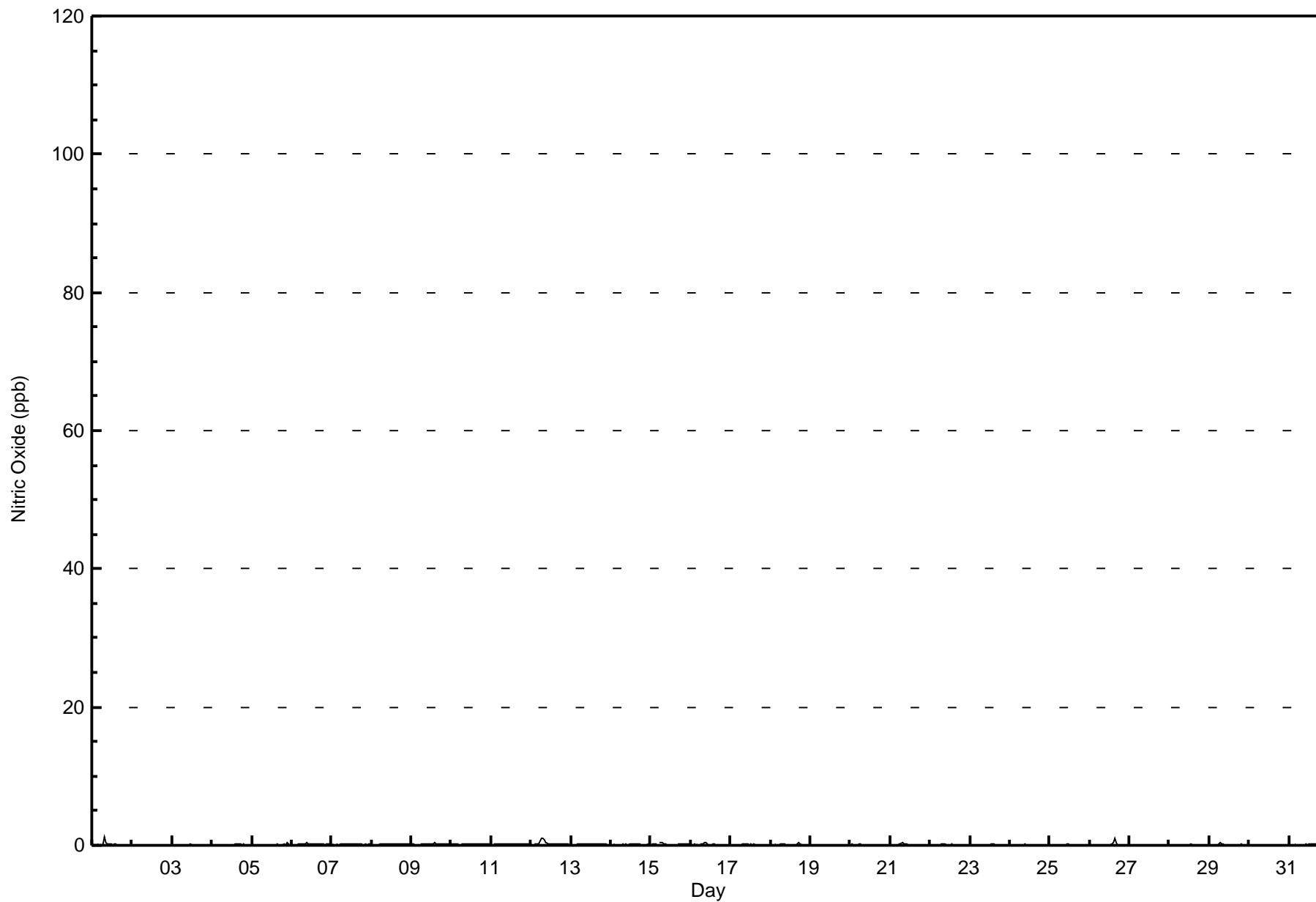


| Maximum Value: 1 ppb on Aug 1 08:00 | | | | | | | | | | | | | | | | | | Maximum Daily Average: 0.3 ppb on Aug 12 | | | | | | Hours in Service: 744 | | | |
|---|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|--|----|----|----|----|----|---------------------------|---------------|---------------|---|
| Minimum Value: 0 ppb on Aug 22 23:00 | | | | | | | | | | | | | | | | | | Minimum Daily Average: 0.0 ppb on Aug 25 | | | | | | Hours of Data: 707 | | | |
| Maximum Diurnal Average: 0.2 ppb at hour 8 | | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 0.1 ppb at hour 24 | | | | | | Hours of Missing Data: 37 | | | |
| Monthly Average: 0.1 ppb | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 O ₃ = 0 P ₉₀ = 0 P ₉₉ = 0 | | | | | | Hours of Calibration: 37 | | | |
| | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 2-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 3-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 4-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 5-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 6-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 7-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 8-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 9-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 10-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 11-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 12-Aug | 0 | Z | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 13-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 14-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 15-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | C | C | C | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -- | 0 |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 17-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 18-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 |
| 19-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 20-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 21-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 22-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 23-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 24-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 25-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 26-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 |
| 27-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 29-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 30-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 31-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | |
| 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.2 0.2 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 0 0 0 0 0 1 1 1 1 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Z - zerospan C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Fort Chipewyan - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Fort Chipewyan - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 707 | 100.00 | 100.00 |
| 21 - 40 | 0 | 0.00 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Fort Chipewyan - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|----|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 8 | 4 | 6 | 5 | 65 | 45 | 41 | 61 | 42 | 54 | 44 | 67 | 140 | 48 | 38 | 39 | 707 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 8 | 4 | 6 | 5 | 65 | 45 | 41 | 61 | 42 | 54 | 44 | 67 | 140 | 48 | 38 | 39 | 707 |

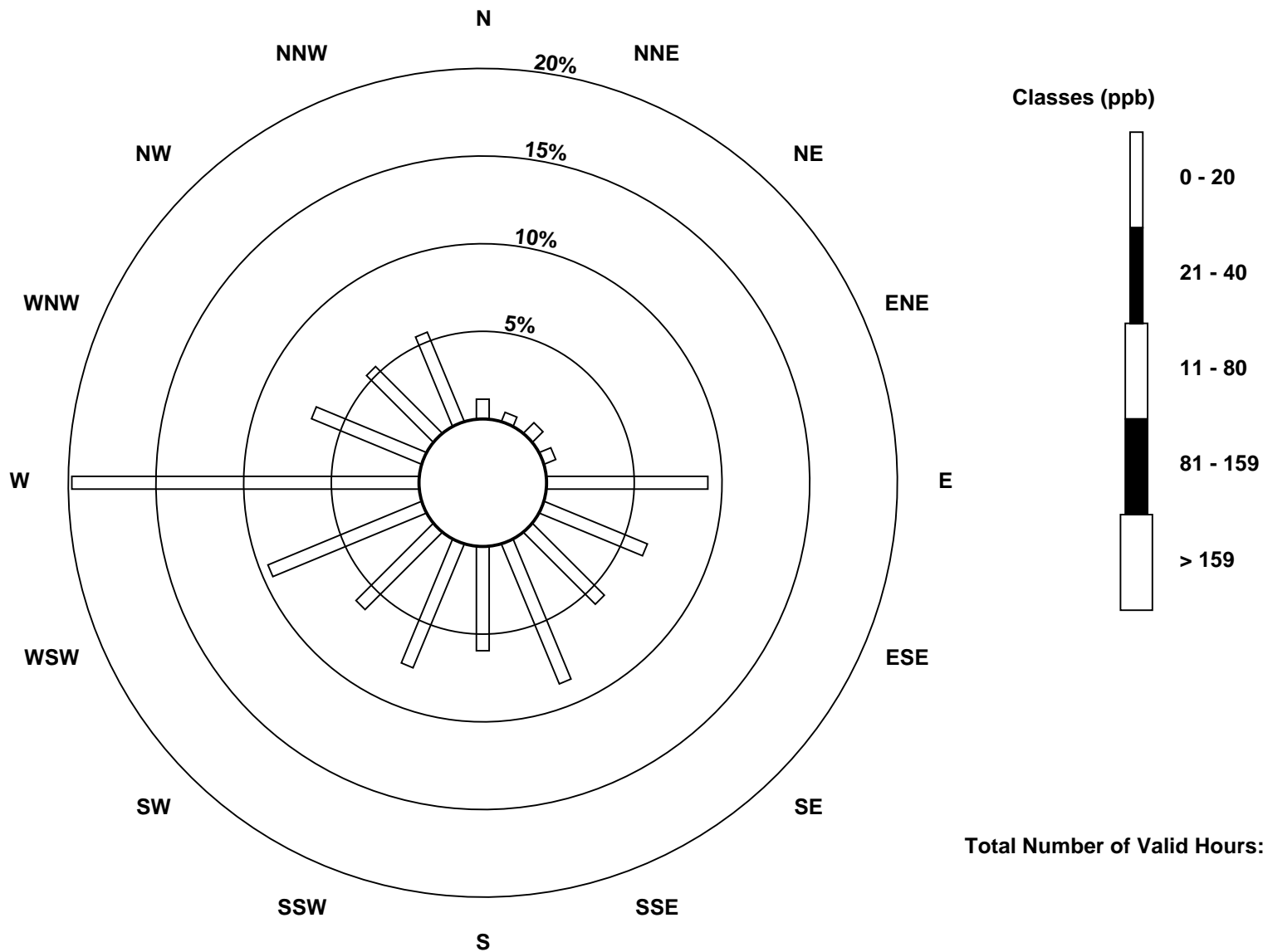
Total Number of Valid Hours: 707

Total Number of Hours: 744

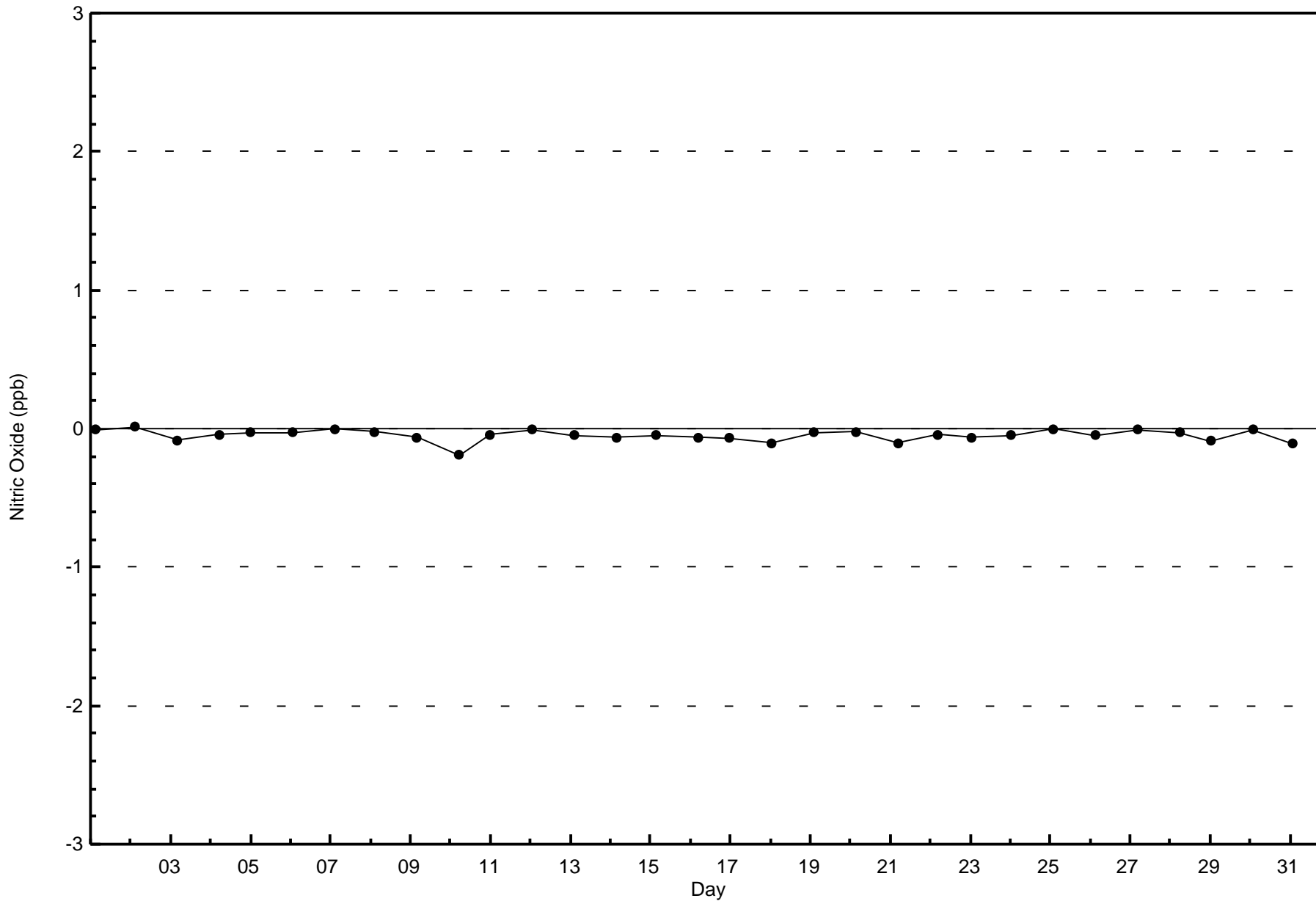


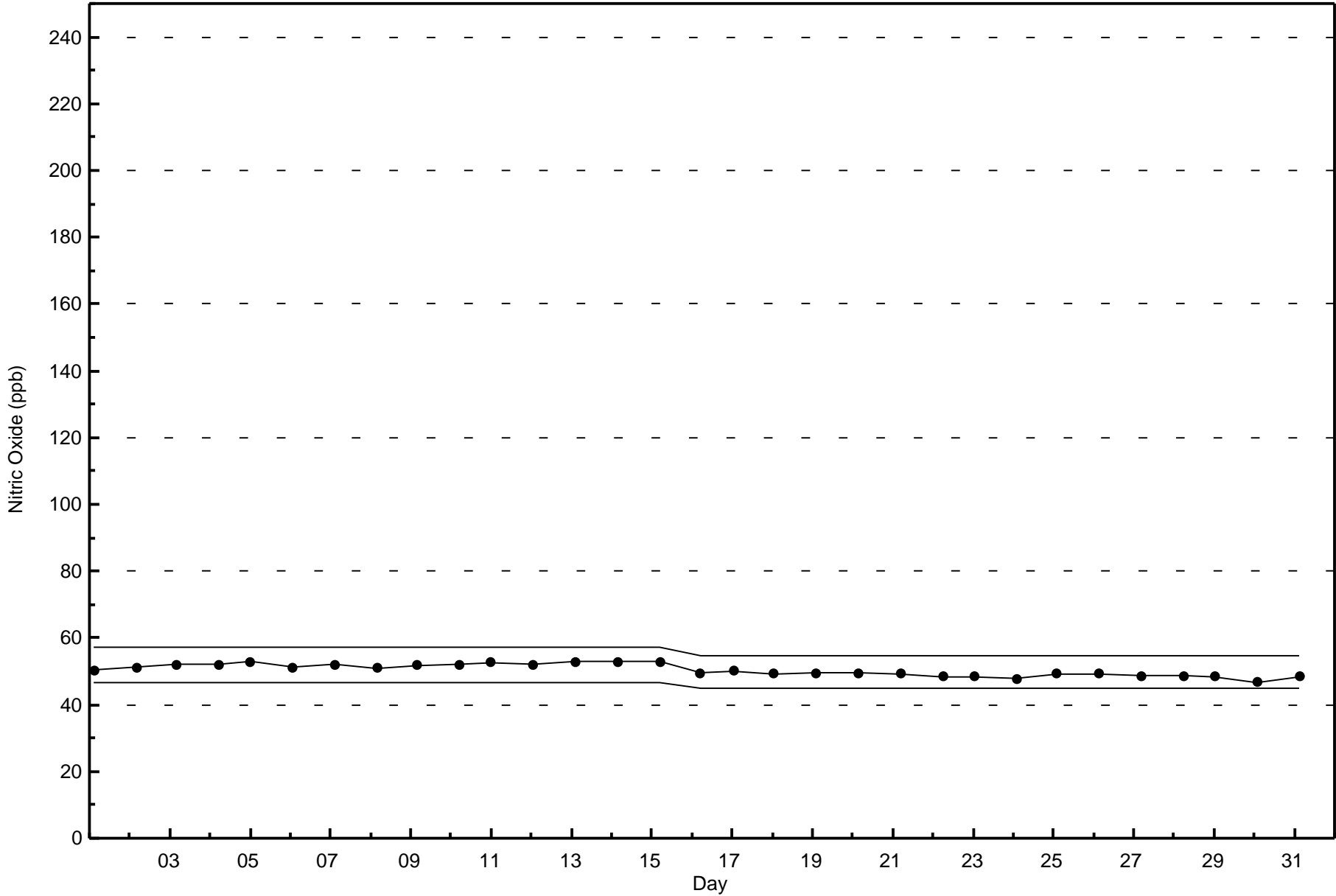
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitric Oxide (NO) - ppb
Fort Chipewyan (AMS 8)



Total Number of Valid Hours: 707







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Fort Chipewyan - August 2017

| | | | | |
|--|--|----------|---------------------------|-------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 7 ppb on Aug 12 05:00 | Maximum Daily Average: 2.2 ppb on Aug 12 | | Hours of Data: | 707 |
| Minimum Value: 0 ppb on Aug 1 13:00 | Minimum Daily Average: 0.0 ppb on Aug 7 | | Hours of Missing Data: | 37 |
| Maximum Diurnal Average: 0.8 ppb at hour 6 | Minimum Diurnal Average: 0.3 ppb at hour 24 | | Hours of Calibration: | 37 |
| Monthly Average: 0.4 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 4 | | Percent Operational Time: | 100.0 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 1 | 4 | Z | 1 | 0 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 4 |
| 2-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0.2 | 1 |
| 3-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 0.6 | 2 |
| 4-Aug | 6 | 1 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0.6 | 6 |
| 5-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0.3 | 1 |
| 6-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 7-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 8-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0.1 | 1 |
| 9-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0.2 | 1 |
| 10-Aug | 0 | 0 | 0 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0.5 | 1 |
| 11-Aug | Z | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.9 | 2 |
| 12-Aug | 2 | Z | 3 | 4 | 7 | 6 | 5 | 4 | 3 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2.2 | 7 |
| 13-Aug | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0.5 | 1 |
| 14-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.3 | 1 |
| 15-Aug | 1 | 3 | 4 | 5 | Z | 6 | 4 | 2 | 1 | 1 | C | C | C | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -- | 6 |
| 16-Aug | 0 | 0 | 1 | 0 | 0 | Z | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0.3 | 1 |
| 17-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.3 | 1 |
| 18-Aug | 0 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0.6 | 1 |
| 19-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.3 | 1 |
| 20-Aug | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 21-Aug | 0 | 0 | 0 | 0 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 22-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0.2 | 1 |
| 23-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0.4 | 2 |
| 24-Aug | 0 | Z | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 2 |
| 25-Aug | 0 | 0 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 26-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 27-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 29-Aug | Z | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 30-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0.2 | 1 |
| 31-Aug | 2 | 2 | Z | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 2 |

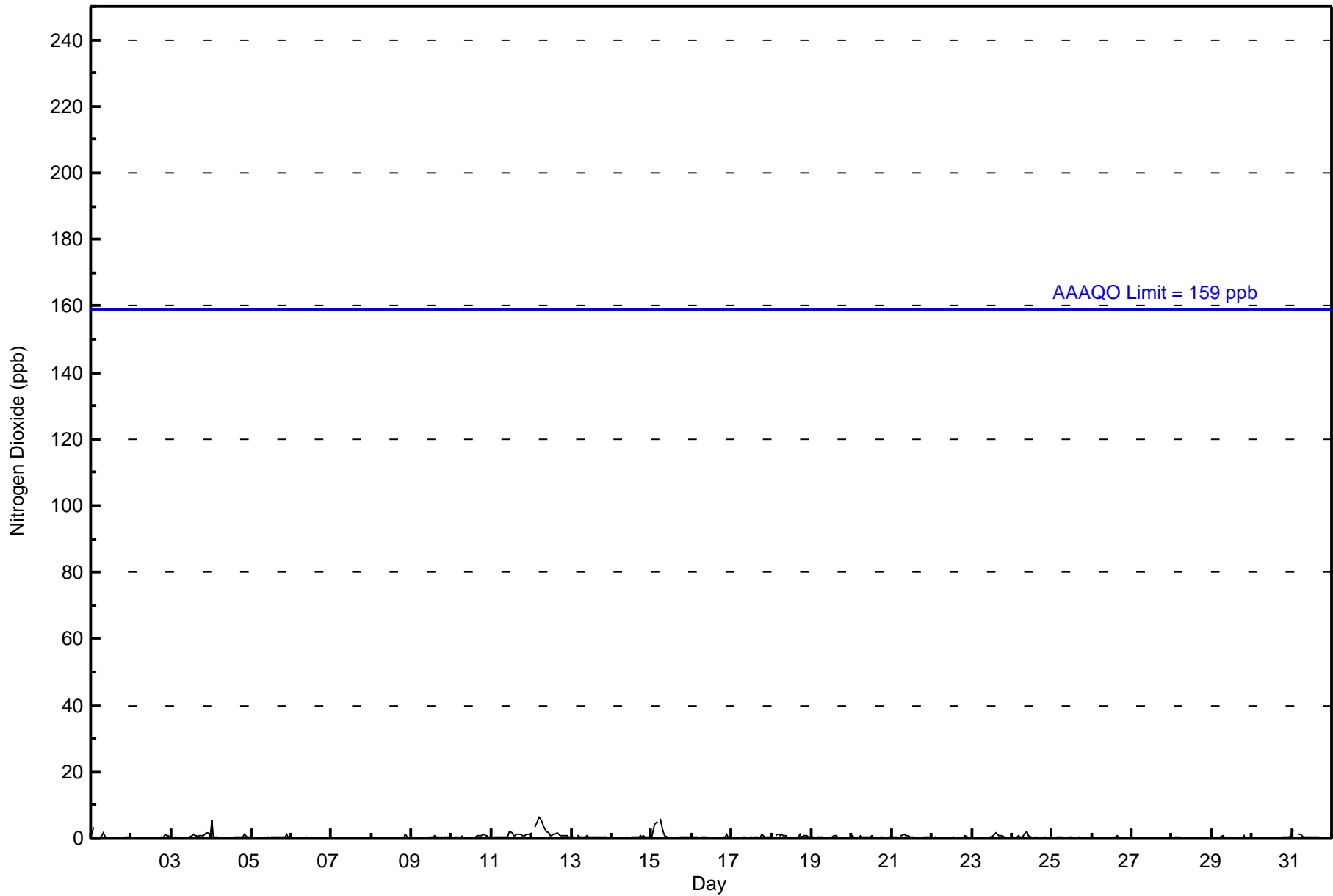
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|-----------------|--|
| 0.6 | 0.5 | 0.5 | 0.7 | 0.6 | 0.8 | 0.6 | 0.5 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.3 | 0.3 | 0.4 | 0.4 | 0.5 | 0.5 | 0.4 | 0.3 | Diurnal Average | | |
| 6 | 4 | 4 | 5 | 7 | 6 | 5 | 4 | 3 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | Diurnal Maximum | |

Z - zerospan C - Calibration
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 707 | 100.00 | 100.00 |
| 21 - 40 | 0 | 0.00 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|----|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 8 | 4 | 6 | 5 | 65 | 45 | 41 | 61 | 42 | 54 | 44 | 67 | 140 | 48 | 38 | 39 | 707 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 8 | 4 | 6 | 5 | 65 | 45 | 41 | 61 | 42 | 54 | 44 | 67 | 140 | 48 | 38 | 39 | 707 |

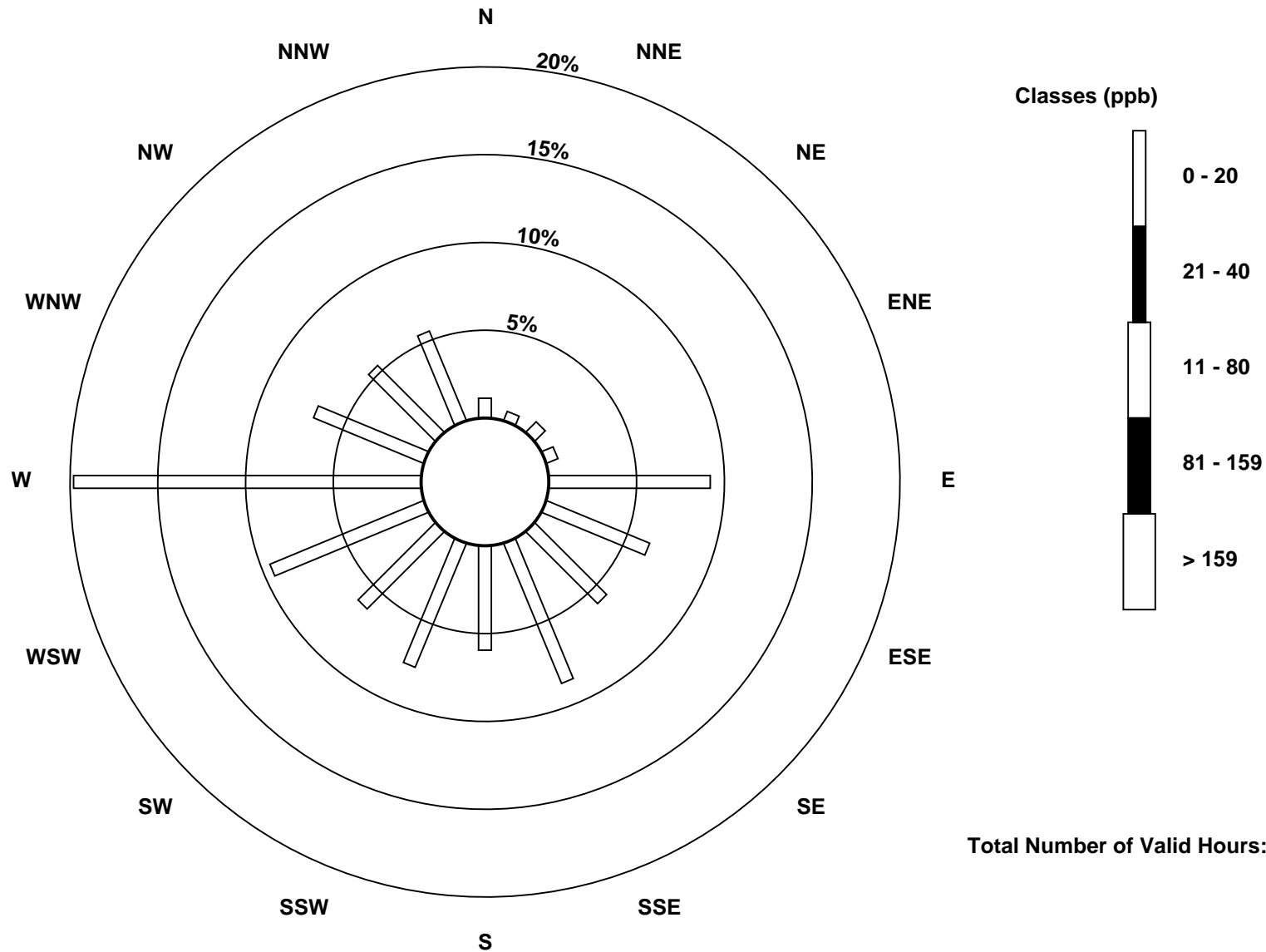
Total Number of Valid Hours: 707

Total Number of Hours: 744

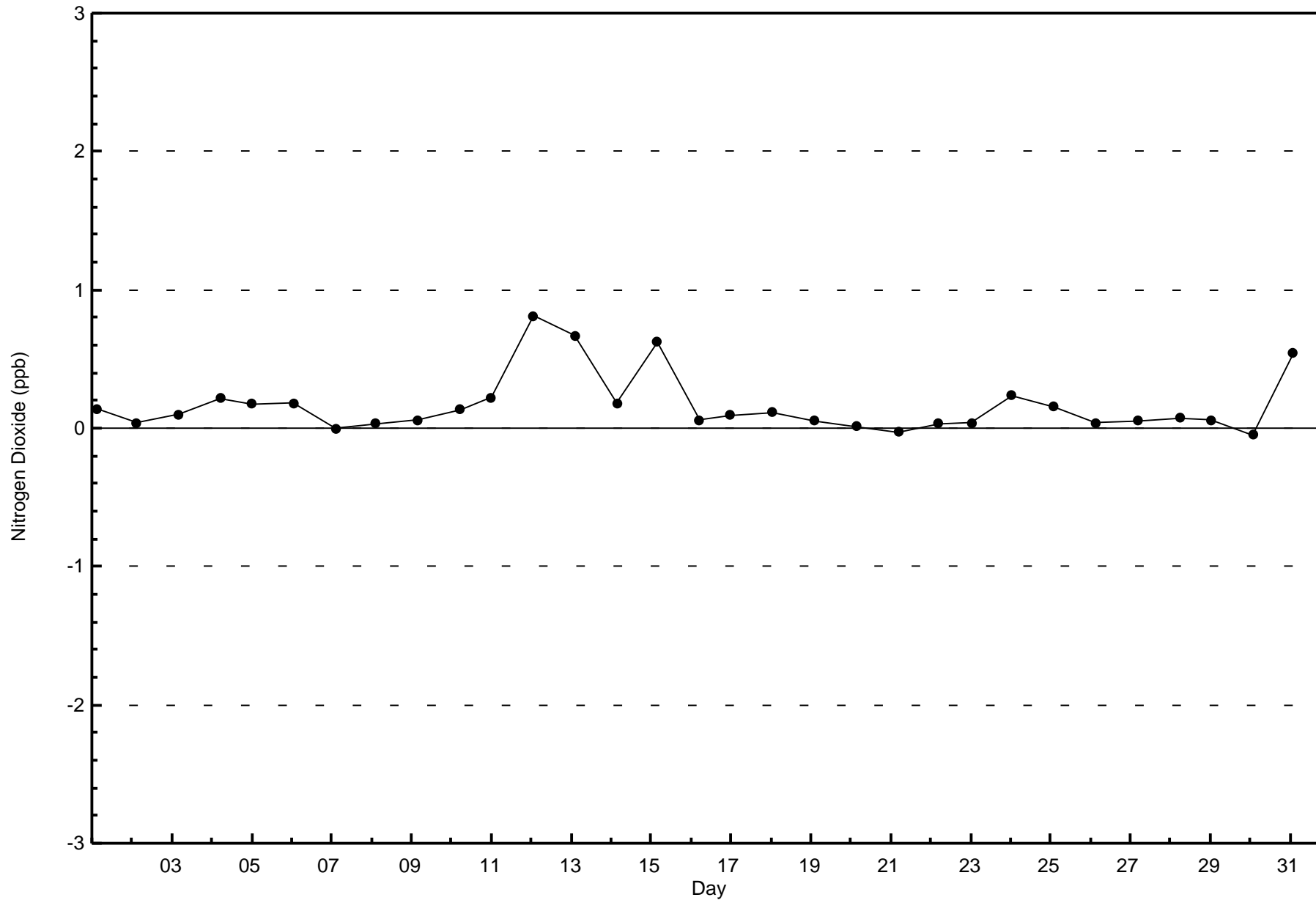


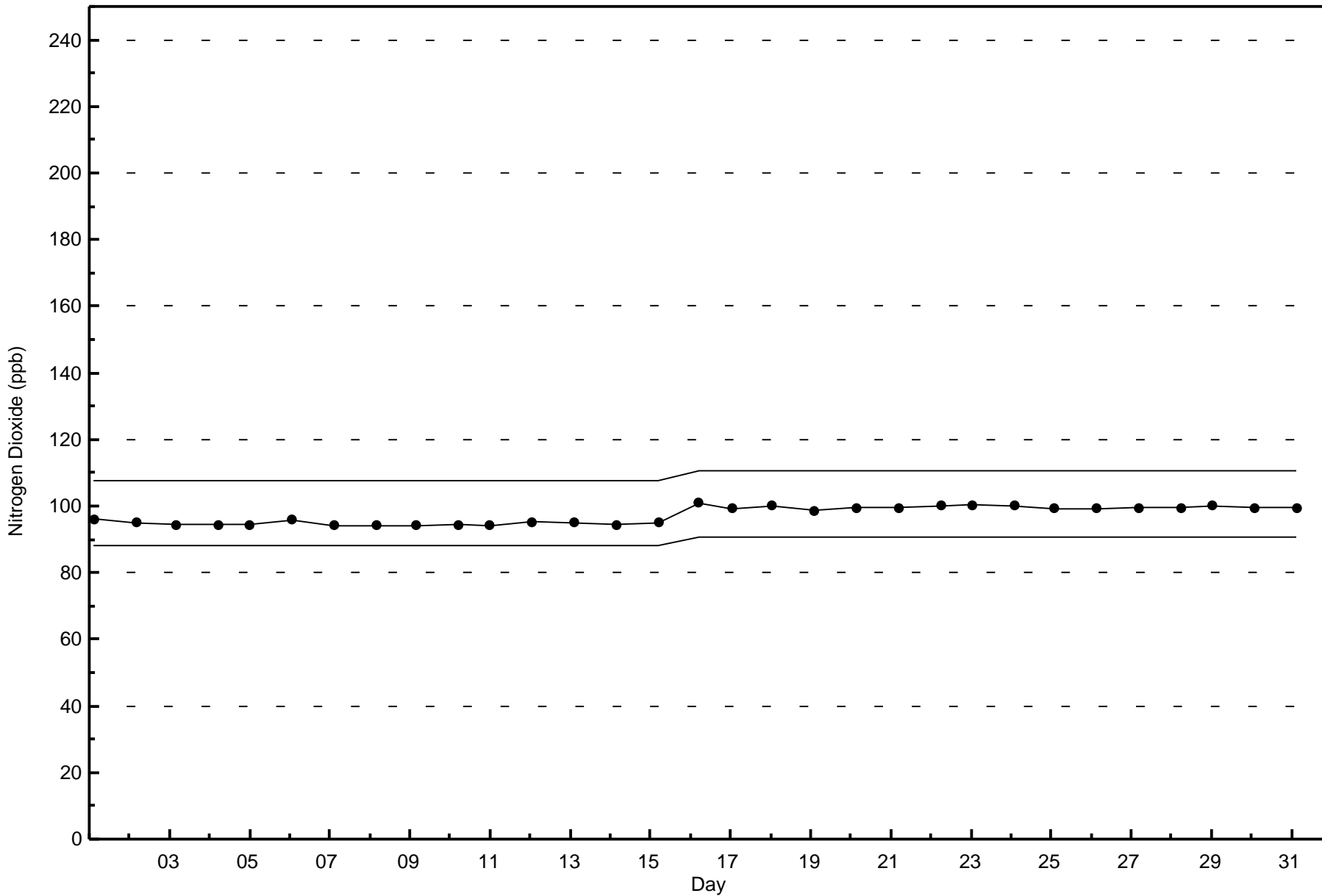
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan (AMS 8)



Total Number of Valid Hours: 707







Wood Buffalo Environmental Association
Summary of Hour Averages

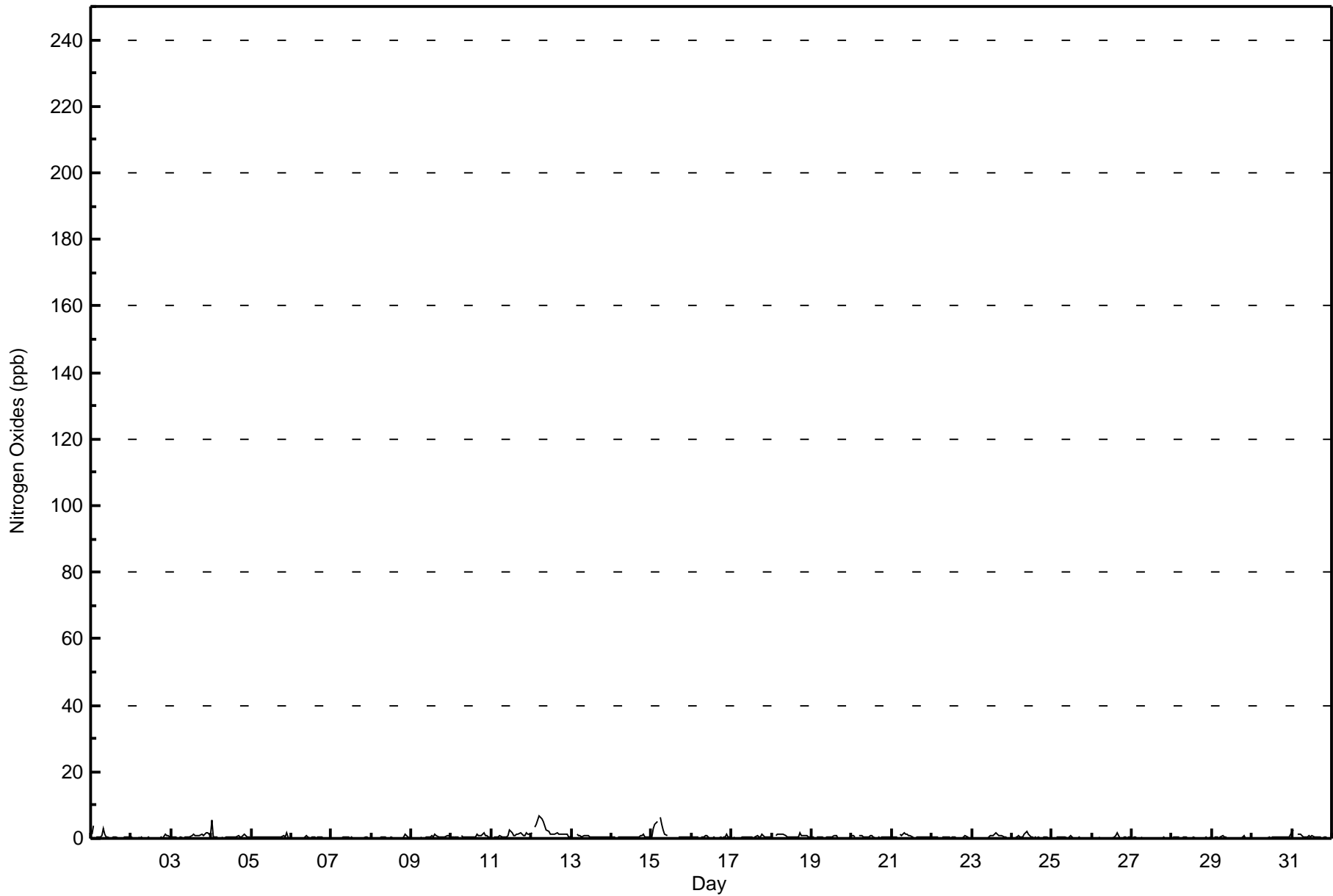
Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - August 2017

| Maximum Value: 7 ppb on Aug 12 05:00 | | | | | | | | | | | | | | | | | Maximum Daily Average: 2.4 ppb on Aug 12 | | | | | | | | | | | | | | | | | Hours in Service: 744 | |
|--|-------------------------------|-----------------|---|---|---|---|---|---|---|----|----|----|----|----|----|----|--|----|----|----|----|----|----|-----------------|---------------|---------------|---|--|--|--|--|--|--|---------------------------|--|
| Minimum Value: 0 ppb on Aug 9 04:00 | | | | | | | | | | | | | | | | | Minimum Daily Average: 0.2 ppb on Aug 27 | | | | | | | | | | | | | | | | | Hours of Data: 707 | |
| Maximum Diurnal Average: 0.9 ppb at hour 6 | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 0.4 ppb at hour 24 | | | | | | | | | | | | | | | | | Hours of Missing Data: 37 | |
| Monthly Average: 0.5 ppb | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 5 | | | | | | | | | | | | | | | | | Hours of Calibration: 37 | |
| | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | |
| 1-Aug | 1 | 4 | Z | 1 | 0 | 1 | 1 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 4 | | | | | | | | |
| 2-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0.3 | 1 | | | | | | | | | |
| 3-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 0.7 | 2 | | | | | | | | | |
| 4-Aug | 6 | 1 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0.7 | 6 | | | | | | | | | |
| 5-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 0.4 | 2 | | | | | | | | | |
| 6-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | |
| 7-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | |
| 8-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0.3 | 1 | | | | | | | | | |
| 9-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0.4 | 1 | | | | | | | | | |
| 10-Aug | 0 | 0 | 0 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 0.6 | 2 | | | | | | | | | |
| 11-Aug | Z | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1.0 | 2 | | | | | | | | | |
| 12-Aug | 2 | Z | 3 | 4 | 7 | 6 | 6 | 5 | 4 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2.4 | 7 | | | | | | | | | |
| 13-Aug | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0.6 | 1 | | | | | | | | | |
| 14-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.5 | 1 | | | | | | | | | |
| 15-Aug | 1 | 3 | 4 | 5 | Z | 6 | 4 | 2 | 1 | 1 | C | C | C | C | C | C | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | -- | 6 | | | | | | | | | |
| 16-Aug | 0 | 0 | 1 | 0 | 1 | Z | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0.4 | 1 | | | | | | | | | |
| 17-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | |
| 18-Aug | 0 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 1 | 1 | 1 | 0 | 0.7 | 2 | | | | | | | | | |
| 19-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.4 | 1 | | | | | | | | | |
| 20-Aug | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 1 | | | | | | | | | |
| 21-Aug | 0 | 0 | 0 | 0 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 1 | | | | | | | | | |
| 22-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | |
| 23-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0.5 | 2 | | | | | | | | | |
| 24-Aug | 0 | Z | 0 | 1 | 1 | 1 | 0 | 1 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 2 | | | | | | | | | |
| 25-Aug | 0 | 0 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | |
| 26-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 2 | | | | | | | | | |
| 27-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | |
| 29-Aug | Z | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | |
| 30-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.3 | 1 | | | | | | | | | |
| 31-Aug | 2 | 2 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 2 | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | | | | | | | |
| Z - zerospan | | C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 707 | 100.00 | 100.00 |
| 21 - 40 | 0 | 0.00 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|------------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 8 | 4 | 6 | 5 | 65 | 45 | 41 | 61 | 42 | 54 | 44 | 67 | 140 | 48 | 38 | 39 | 707 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 8 | 4 | 6 | 5 | 65 | 45 | 41 | 61 | 42 | 54 | 44 | 67 | 140 | 48 | 38 | 39 | 707 |

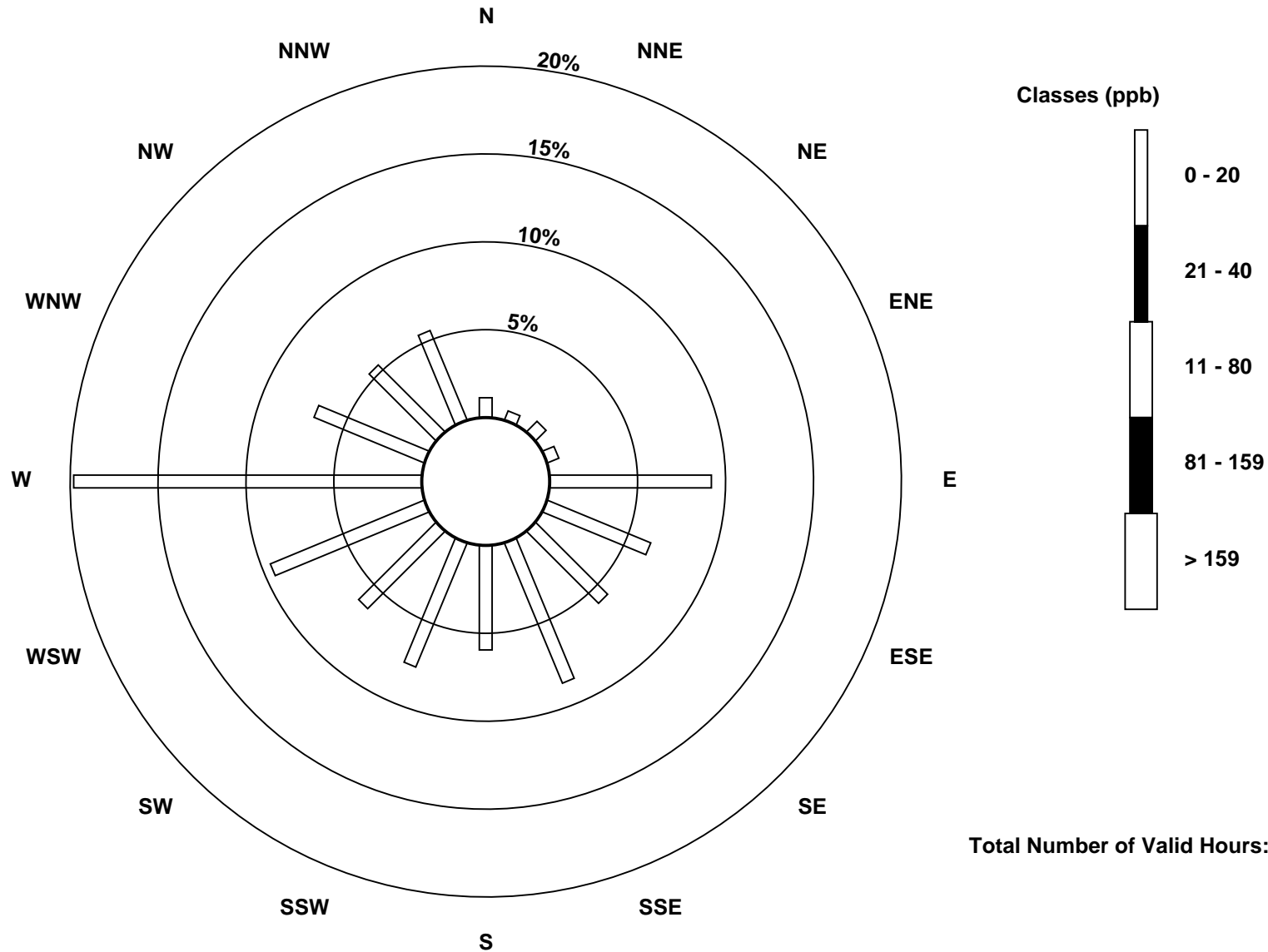
Total Number of Valid Hours: 707

Total Number of Hours: 744

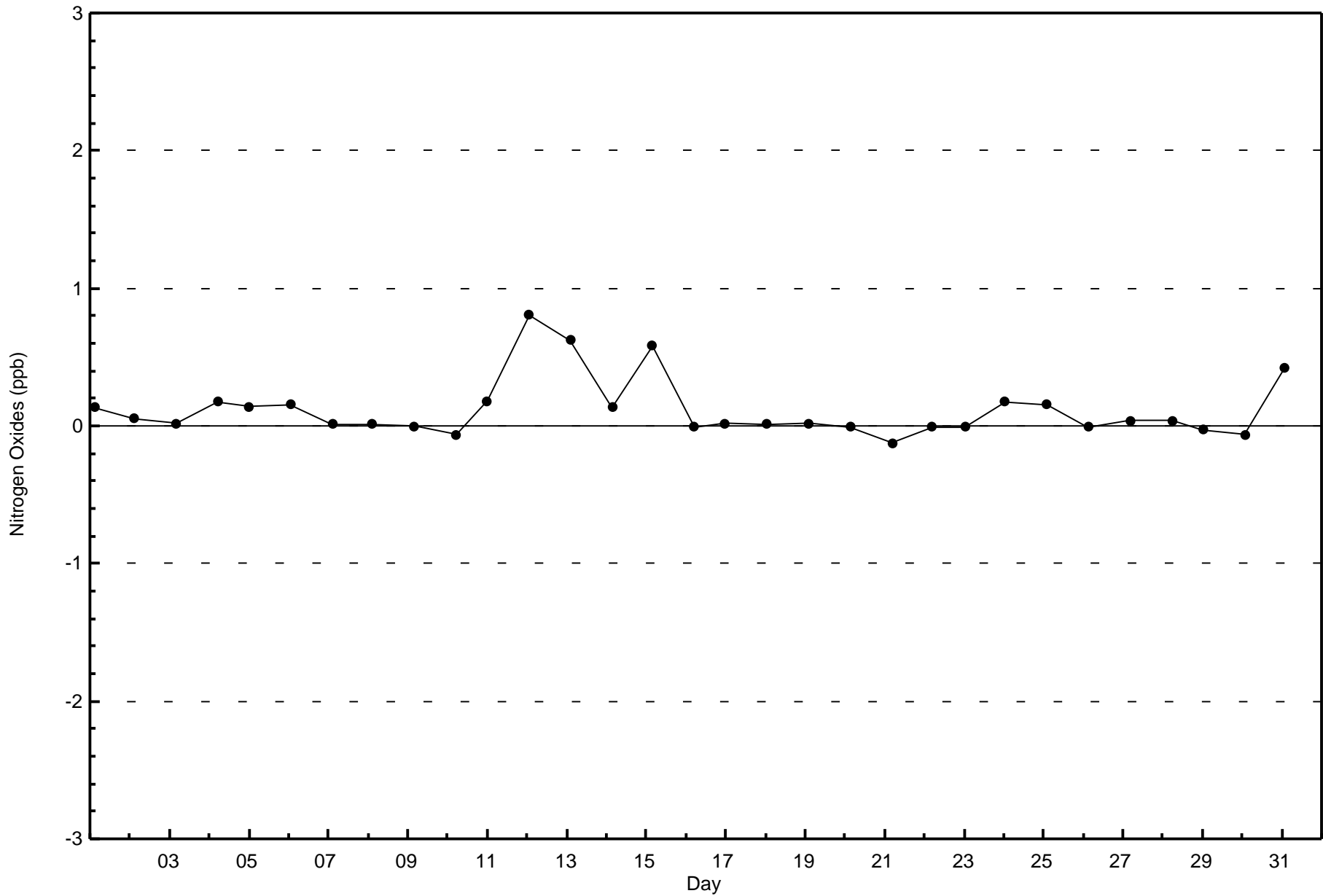


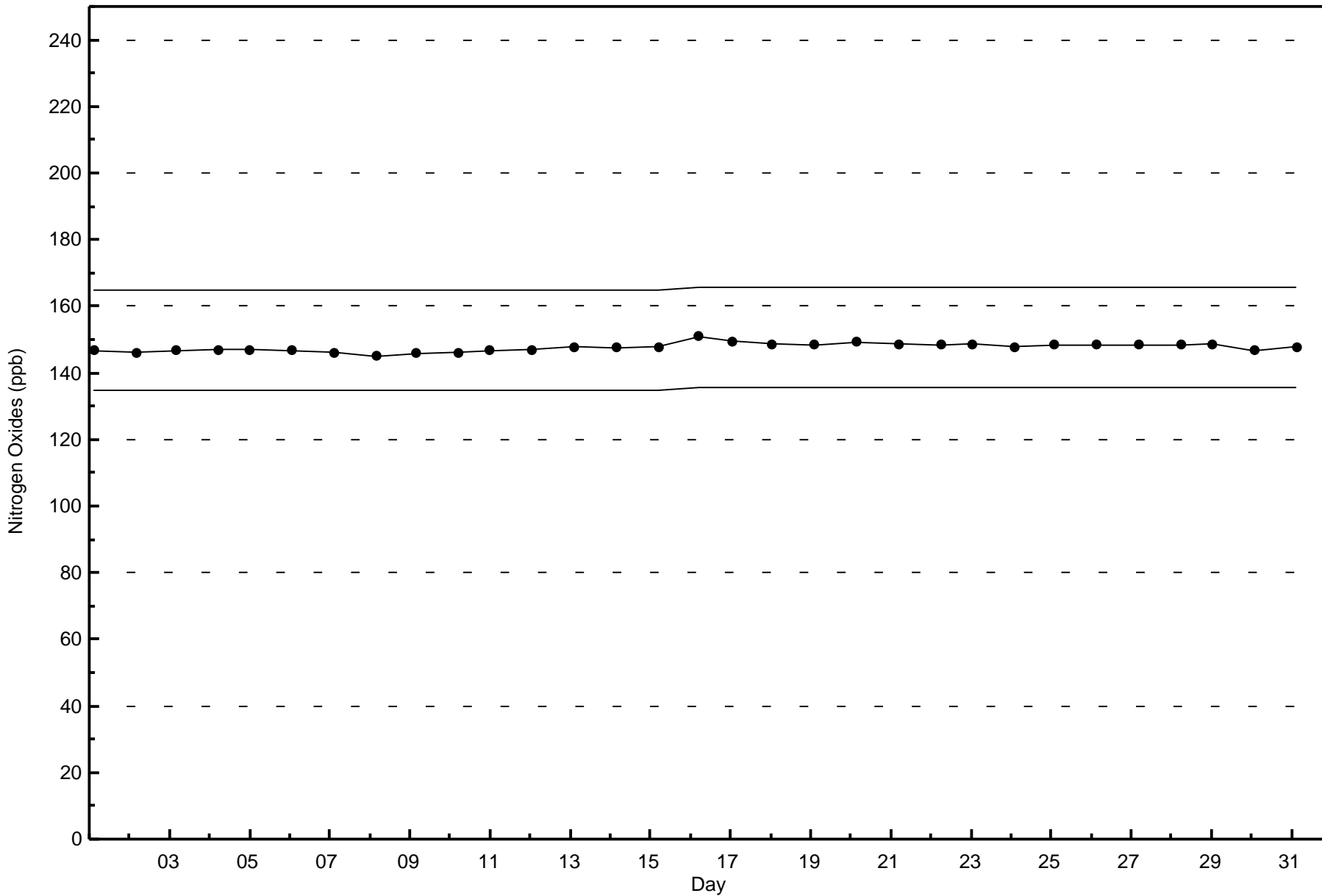
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan (AMS 8)



Total Number of Valid Hours: 707







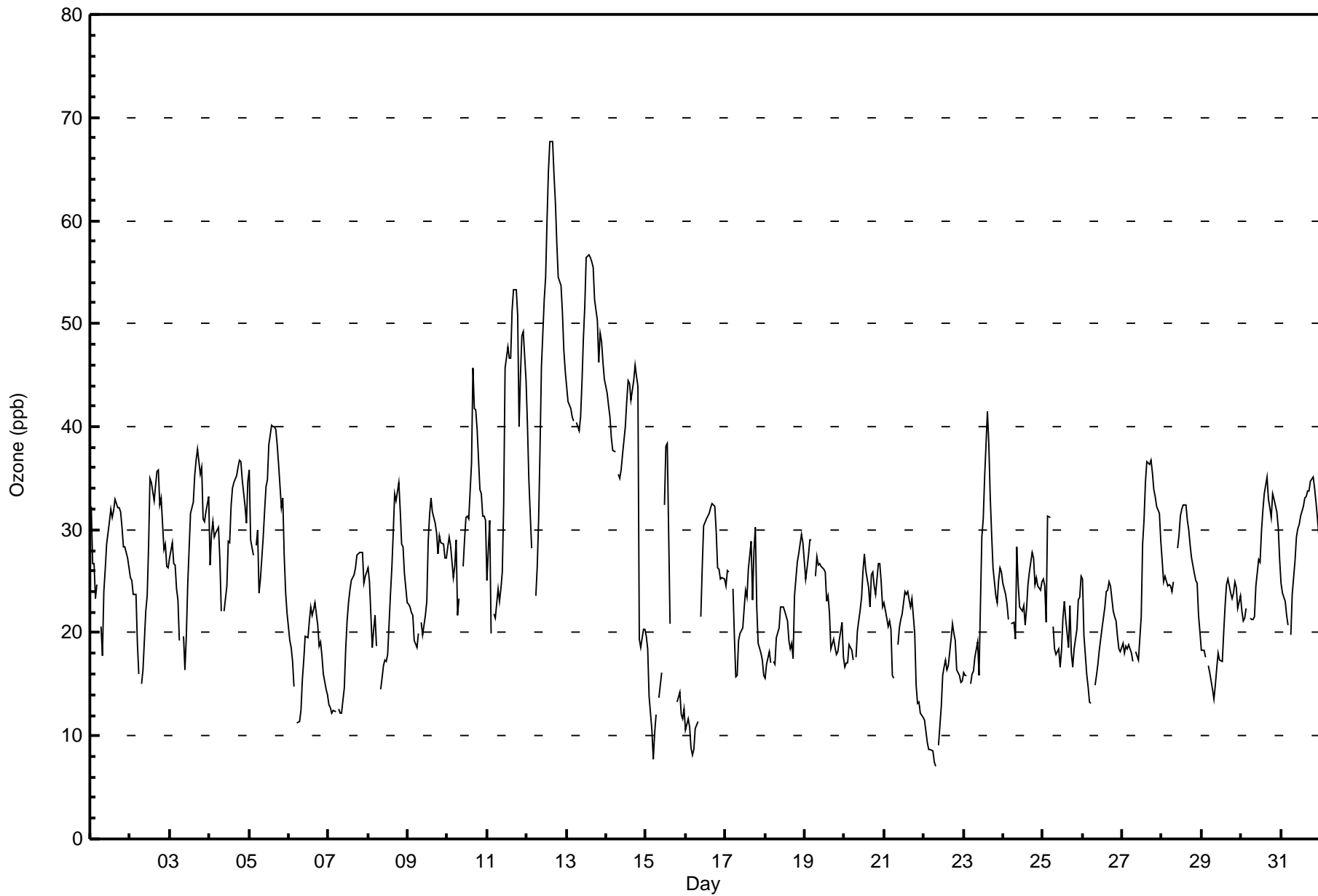
Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Fort Chipewyan - August 2017

| Number of Exceedences (AAAQO): | | 1-hr: 0 | 24-hr: 0 | Hours in Service: 744 | | | | | | | | | | | | | | | | | | Daily Average | | Daily Maximum | | | |
|---|-------------------------------|--|----------|-----------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--------------------------|----|--------------------------------|----|-----------------|---------------|---------------|--|
| Maximum Value: 68 ppb on Aug 12 16:00 | | Maximum Daily Average: 47.9 ppb on Aug 12 | | | | | | | | | | | | | | | | | | Hours of Data: 708 | | Hours of Missing Data: 36 | | | | | |
| Minimum Value: 7 ppb on Aug 22 08:00 | | Minimum Daily Average: 13.9 ppb on Aug 22 | | | | | | | | | | | | | | | | | | Hours of Calibration: 35 | | Percent Operational Time: 99.9 | | | | | |
| Maximum Diurnal Average: 32.6 ppb at hour 16 | | Minimum Diurnal Average: 19.5 ppb at hour 7 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 26.4 ppb | | Percentiles: P ₁ = 9 P ₁₀ = 16 Q ₁ = 20 Median = 25 Q ₃ = 31 P ₉₀ = 40 P ₉₉ = 56 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 32 | 27 | 27 | 23 | 25 | Z | 21 | 18 | 24 | 26 | 29 | 31 | 32 | 31 | 32 | 33 | 32 | 32 | 32 | 30 | 28 | 28 | 27 | 26 | 28.1 | 33 | |
| 2-Aug | 25 | 25 | 24 | 24 | 19 | 16 | Z | 15 | 16 | 22 | 24 | 28 | 35 | 35 | 33 | 34 | 36 | 36 | 32 | 33 | 28 | 29 | 26 | 26 | 27.0 | 36 | |
| 3-Aug | 27 | 29 | 27 | 27 | 24 | 23 | 19 | Z | 20 | 16 | 20 | 25 | 32 | 32 | 33 | 35 | 37 | 38 | 35 | 36 | 31 | 31 | 32 | 33 | 28.7 | 38 | |
| 4-Aug | 27 | 30 | 31 | 29 | 30 | 30 | 27 | Z | 22 | 22 | 24 | 29 | 29 | 32 | 34 | 35 | 35 | 36 | 37 | 37 | 35 | 32 | 31 | 35 | 30.8 | 37 | |
| 5-Aug | 36 | 29 | 28 | Z | 28 | 30 | 24 | 25 | 29 | 32 | 34 | 35 | 38 | 40 | 40 | 40 | 40 | 38 | 36 | 32 | 33 | 28 | 24 | 22 | 32.2 | 40 | |
| 6-Aug | 19 | 19 | 17 | 15 | Z | 11 | 11 | 12 | 15 | 17 | 20 | 20 | 21 | 23 | 22 | 22 | 23 | 21 | 19 | 19 | 18 | 16 | 15 | 14 | 17.7 | 23 | |
| 7-Aug | 13 | 13 | 12 | 12 | 12 | Z | 13 | 12 | 12 | 15 | 18 | 21 | 23 | 24 | 25 | 26 | 26 | 28 | 28 | 28 | 28 | 25 | 25 | 26 | 20.2 | 28 | |
| 8-Aug | 26 | 25 | 19 | 20 | 22 | 19 | Z | 15 | 16 | 17 | 17 | 17 | 18 | 24 | 26 | 30 | 33 | 33 | 35 | 32 | 29 | 28 | 26 | 23 | 23.8 | 35 | |
| 9-Aug | 23 | 22 | 22 | 22 | 19 | 19 | 20 | Z | 21 | 20 | 22 | 23 | 29 | 31 | 33 | 32 | 31 | 30 | 28 | 29 | 29 | 29 | 27 | 27 | 25.5 | 33 | |
| 10-Aug | 28 | 29 | 28 | 25 | 26 | 29 | 22 | 23 | Z | 26 | 29 | 31 | 31 | 31 | 36 | 46 | 42 | 42 | 40 | 34 | 33 | 31 | 31 | 31 | 31.6 | 46 | |
| 11-Aug | 25 | 31 | 20 | Z | 22 | 21 | 24 | 23 | 24 | 26 | 33 | 46 | 48 | 47 | 47 | 51 | 53 | 53 | 51 | 40 | 45 | 49 | 49 | 44 | 37.9 | 53 | |
| 12-Aug | 40 | 35 | 31 | 28 | Z | 24 | 26 | 31 | 38 | 46 | 52 | 55 | 60 | 65 | 68 | 68 | 64 | 62 | 58 | 55 | 54 | 51 | 47 | 45 | 47.9 | 68 | |
| 13-Aug | 44 | 42 | 42 | 41 | 40 | Z | 40 | 40 | 41 | 44 | 48 | 52 | 56 | 57 | 56 | 56 | 55 | 52 | 50 | 46 | 49 | 48 | 46 | 45 | 47.5 | 57 | |
| 14-Aug | 43 | 42 | 41 | 39 | 38 | 38 | Z | 35 | 35 | 36 | 37 | 40 | 42 | 44 | 44 | 43 | 44 | 46 | 45 | 44 | 19 | 19 | 20 | 20 | 37.2 | 46 | |
| 15-Aug | 20 | 18 | 14 | 11 | 8 | 10 | 12 | Z | 14 | 16 | M | 32 | 38 | 38 | 21 | C | C | C | C | 13 | 14 | 12 | 12 | 13 | 17.6 | 38 | |
| 16-Aug | 11 | 12 | 11 | 9 | 8 | 9 | 11 | 11 | Z | 22 | 26 | 30 | 31 | 31 | 32 | 32 | 32 | 32 | 30 | 26 | 26 | 25 | 25 | 25 | 22.1 | 32 | |
| 17-Aug | 25 | 26 | 26 | Z | 24 | 20 | 16 | 16 | 19 | 20 | 20 | 22 | 24 | 23 | 26 | 29 | 23 | 28 | 30 | 22 | 19 | 18 | 17 | 16 | 22.2 | 30 | |
| 18-Aug | 16 | 17 | 18 | 17 | Z | 17 | 17 | 20 | 20 | 22 | 23 | 23 | 22 | 21 | 19 | 18 | 19 | 17 | 24 | 27 | 28 | 29 | 30 | 29 | 21.4 | 30 | |
| 19-Aug | 25 | 26 | 28 | 29 | 29 | Z | 26 | 27 | 27 | 27 | 26 | 26 | 26 | 23 | 24 | 22 | 18 | 19 | 19 | 18 | 18 | 19 | 21 | 18 | 23.5 | 29 | |
| 20-Aug | 17 | 17 | 17 | 19 | 18 | 17 | Z | 18 | 20 | 22 | 24 | 26 | 28 | 26 | 24 | 22 | 26 | 26 | 25 | 24 | 27 | 27 | 25 | 23 | 22.4 | 28 | |
| 21-Aug | 23 | 21 | 21 | 21 | 20 | 16 | 16 | Z | 19 | 21 | 21 | 22 | 24 | 24 | 24 | 23 | 23 | 23 | 20 | 15 | 13 | 13 | 12 | 12 | 19.4 | 24 | |
| 22-Aug | 12 | 10 | 9 | 9 | 9 | 9 | 7 | 7 | Z | 9 | 13 | 16 | 17 | 17 | 16 | 17 | 19 | 21 | 20 | 19 | 16 | 16 | 15 | 15 | 13.9 | 21 | |
| 23-Aug | 16 | 16 | 16 | Z | 15 | 16 | 16 | 18 | 19 | 16 | 23 | 29 | 31 | 35 | 42 | 38 | 33 | 30 | 26 | 24 | 23 | 25 | 26 | 26 | 24.3 | 42 | |
| 24-Aug | 25 | 24 | 23 | 21 | Z | 21 | 21 | 19 | 28 | 25 | 23 | 22 | 23 | 21 | 22 | 25 | 26 | 28 | 27 | 25 | 25 | 25 | 24 | 25 | 23.8 | 28 | |
| 25-Aug | 25 | 25 | 21 | 31 | 31 | Z | 21 | 19 | 18 | 18 | 17 | 18 | 21 | 23 | 21 | 19 | 23 | 18 | 17 | 18 | 20 | 23 | 23 | 26 | 21.6 | 31 | |
| 26-Aug | 25 | 20 | 16 | 15 | 13 | 13 | Z | 15 | 16 | 17 | 18 | 19 | 21 | 23 | 24 | 24 | 25 | 25 | 22 | 22 | 21 | 20 | 18 | 18 | 19.5 | 25 | |
| 27-Aug | 19 | 18 | 19 | 18 | 19 | 18 | 17 | Z | 18 | 18 | 17 | 22 | 29 | 31 | 35 | 37 | 36 | 37 | 36 | 34 | 33 | 32 | 32 | 29 | 26.2 | 37 | |
| 28-Aug | 27 | 25 | 25 | 25 | 25 | 25 | 24 | 25 | Z | 28 | 29 | 31 | 32 | 32 | 32 | 31 | 30 | 29 | 27 | 26 | 25 | 25 | 22 | 20 | 27.0 | 32 | |
| 29-Aug | 18 | 18 | 18 | Z | 17 | 16 | 15 | 14 | 15 | 17 | 18 | 17 | 17 | 20 | 23 | 25 | 25 | 24 | 23 | 24 | 25 | 24 | 22 | 24 | 19.9 | 25 | |
| 30-Aug | 22 | 21 | 21 | 22 | Z | 21 | 21 | 21 | 22 | 25 | 27 | 27 | 30 | 32 | 34 | 35 | 33 | 32 | 31 | 33 | 33 | 32 | 30 | 27 | 27.5 | 35 | |
| 31-Aug | 25 | 24 | 23 | 22 | 21 | Z | 20 | 24 | 27 | 29 | 30 | 31 | 31 | 32 | 33 | 33 | 34 | 34 | 35 | 35 | 34 | 33 | 31 | 29 | 29.1 | 35 | |
| 24.5 23.7 22.4 22.1 21.6 19.5 19.5 20.2 22.1 23.1 25.4 27.9 30.3 31.3 31.6 32.6 32.6 32.3 31.2 29.0 27.8 27.1 26.3 25.5 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | |
| 44 42 42 41 40 38 40 40 41 46 52 55 60 65 68 68 64 62 58 55 54 51 49 45 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | |
| Z - zerospan C - Calibration M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | | |





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Fort Chipewyan - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 203 | 28.67 | 28.67 |
| 21 - 50 | 482 | 68.08 | 96.75 |
| 51 - 82 | 23 | 3.25 | 100.00 |
| > 83 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Ozone (O₃) - ppb
Fort Chipewyan - August 2017

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|----|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 2 | 1 | 0 | 1 | 8 | 18 | 5 | 8 | 7 | 13 | 12 | 20 | 37 | 24 | 19 | 28 | 203 |
| 21 - 50 | 6 | 4 | 6 | 4 | 54 | 29 | 32 | 45 | 31 | 37 | 32 | 47 | 100 | 24 | 21 | 10 | 482 |
| 51 - 82 | 0 | 0 | 0 | 0 | 4 | 0 | 3 | 6 | 6 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 23 |
| > 83 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 8 | 5 | 6 | 5 | 66 | 47 | 40 | 59 | 44 | 54 | 44 | 67 | 137 | 48 | 40 | 38 | 708 |

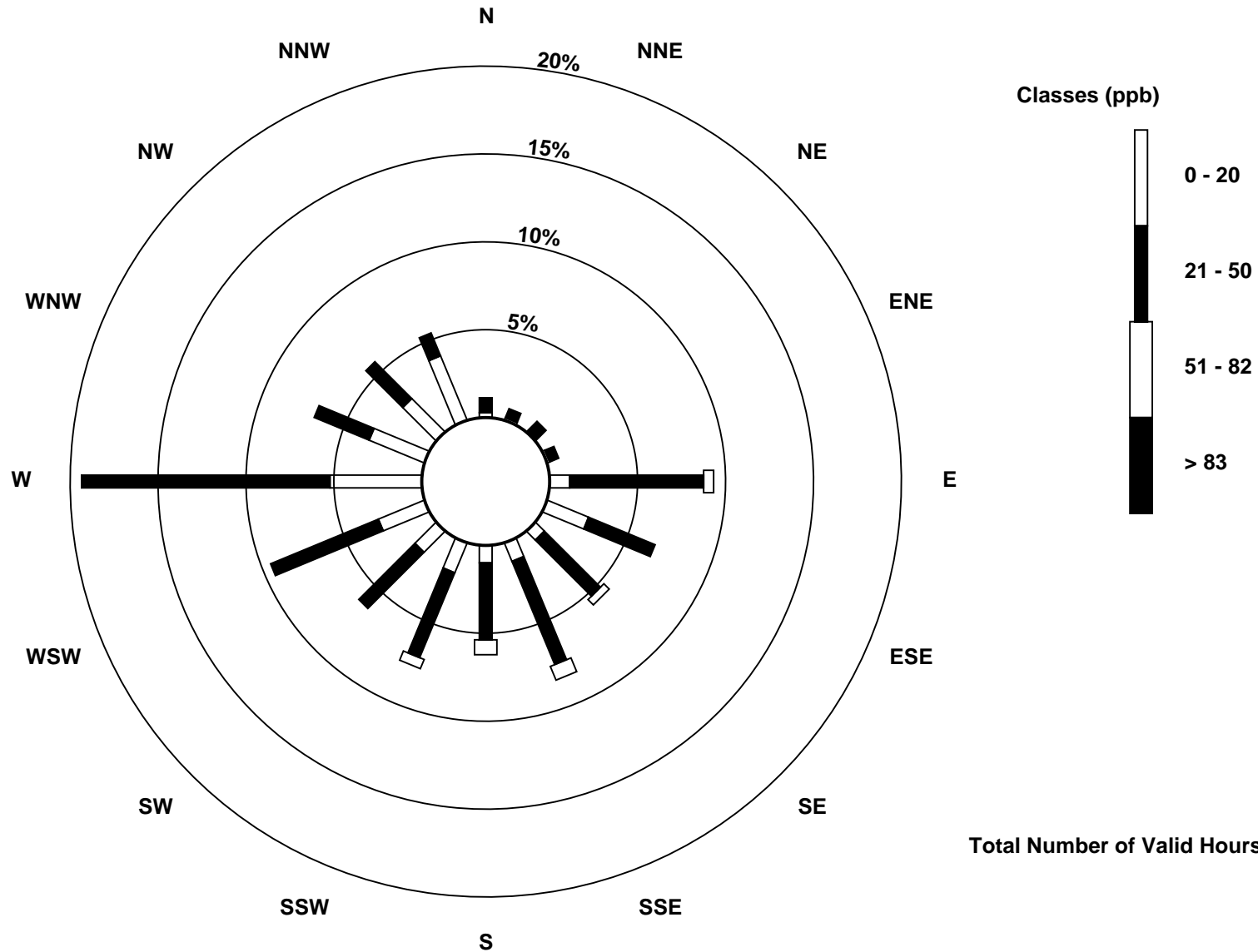
Total Number of Valid Hours: 708

Total Number of Hours: 744

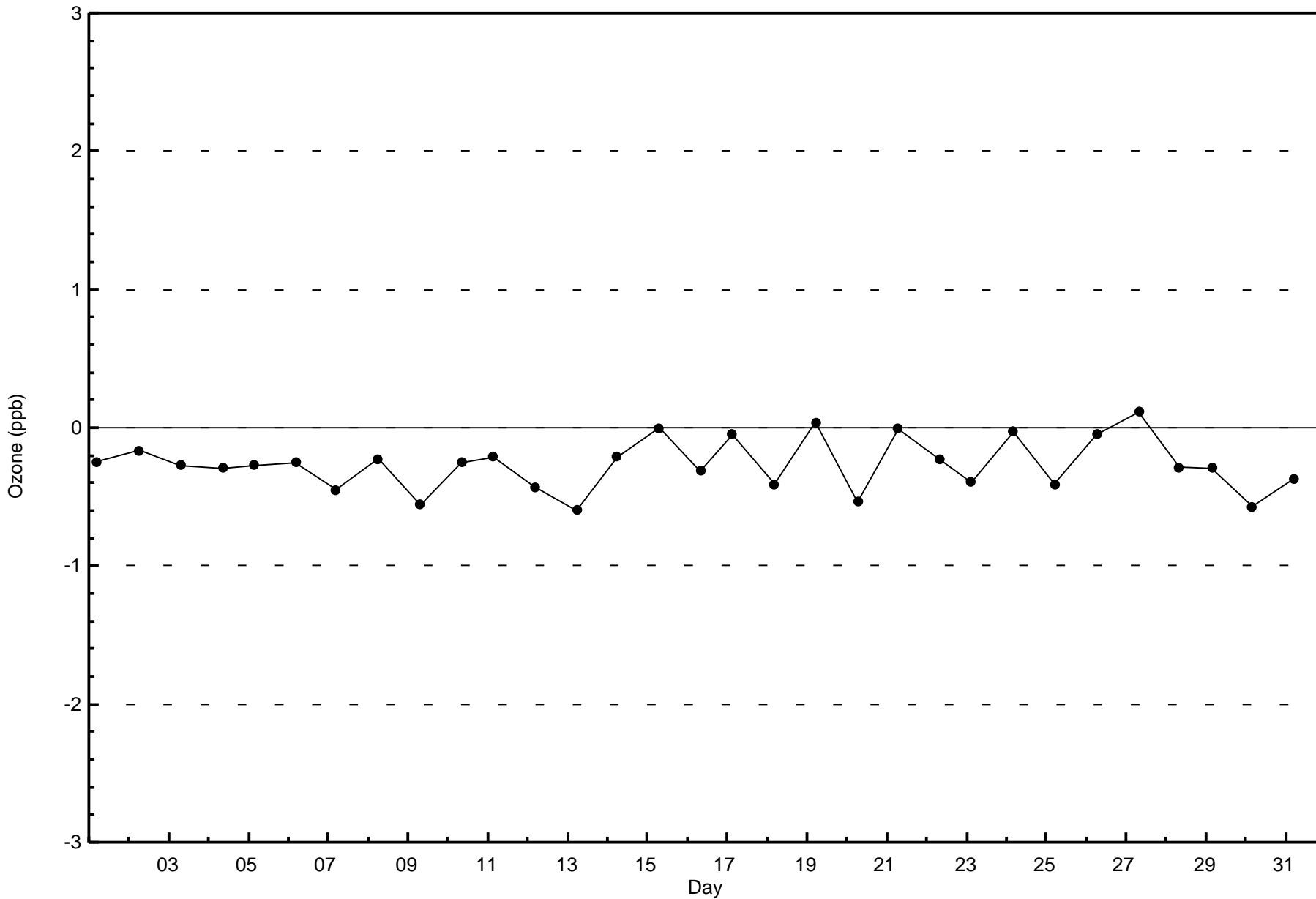


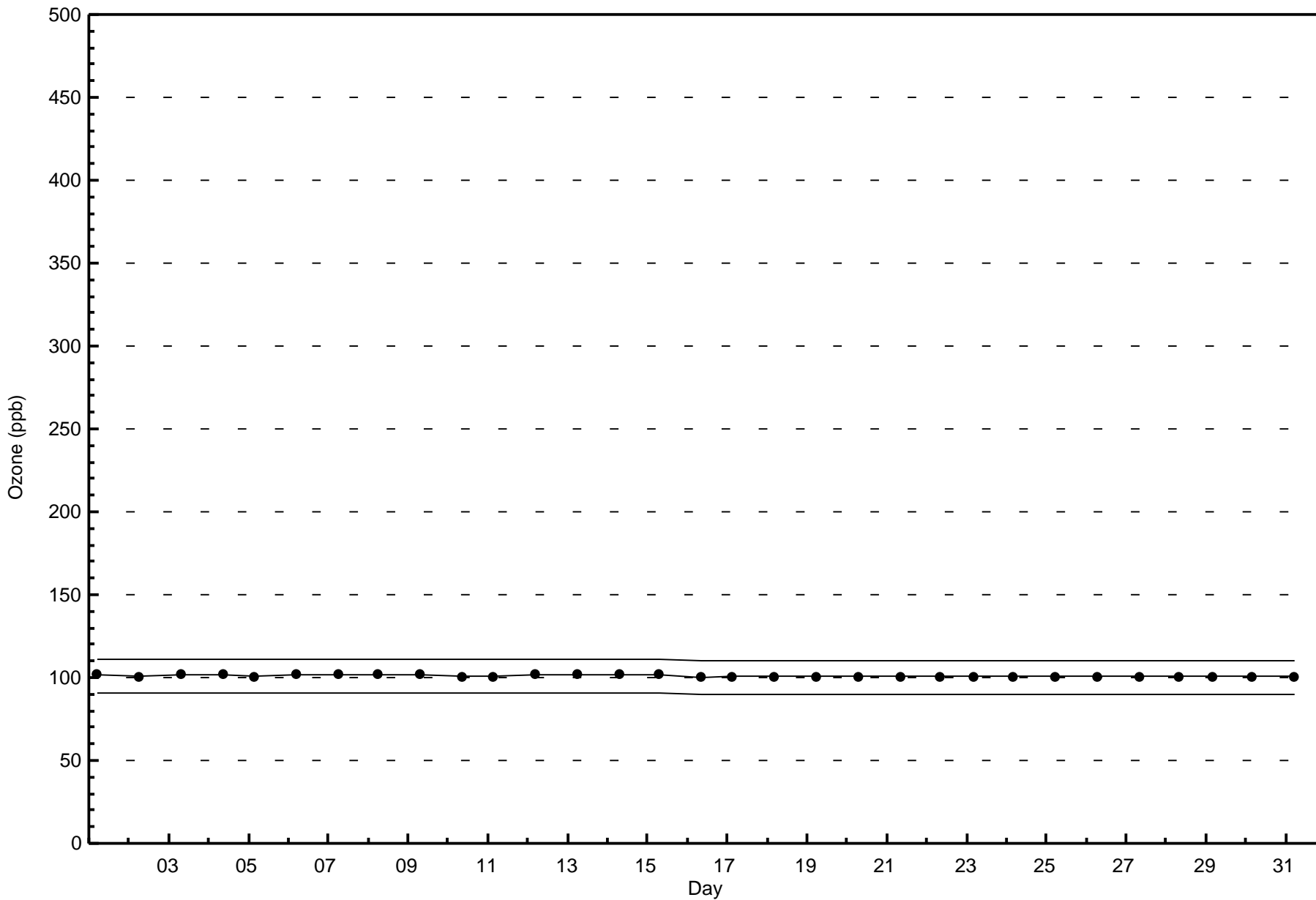
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Ozone (O₃) - ppb
Fort Chipewyan (AMS 8)



Total Number of Valid Hours: 708





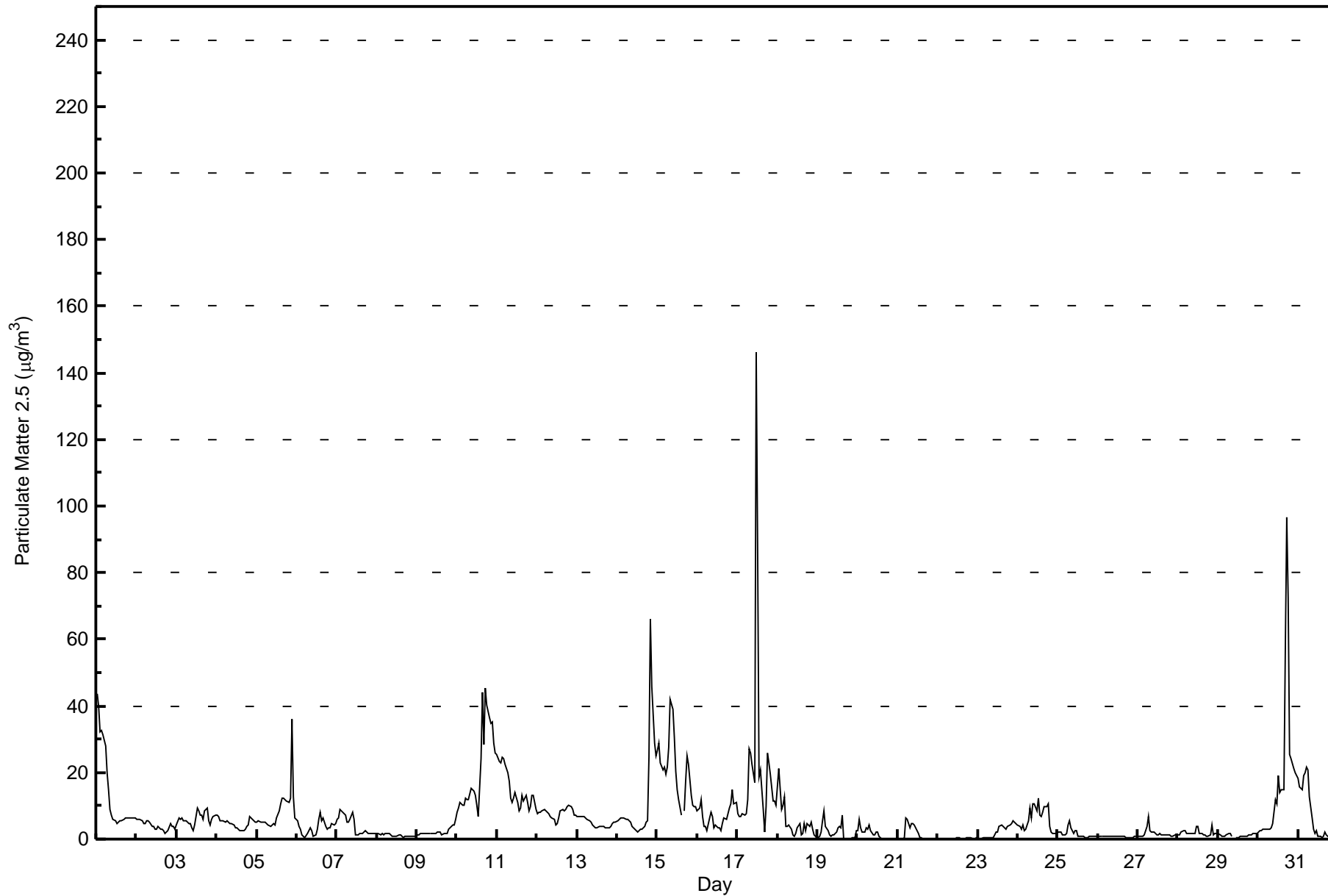


| Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 146.0 µg/m ³ on Aug 17 12:00 Minimum Value: 0.0 µg/m ³ on Aug 22 07:00 Maximum Diurnal Average: 8.9 µg/m ³ at hour 12 Monthly Average: 6.78 µg/m ³ | | Maximum Daily Average: 22.6 µg/m ³ on Aug 17 Minimum Daily Average: 0.2 µg/m ³ on Aug 22 Minimum Diurnal Average: 4.6 µg/m ³ at hour 14 Percentiles: P ₁ = 0.0 P ₁₀ = 0.5 Q ₁ = 1.3 Median = 3.7 Q ₃ = 7.5 P ₉₀ = 15.6 P ₉₉ = 35.5 | | Hours in Service: 744 Hours of Data: 741 Hours of Missing Data: 3 Hours of Calibration: 1 Percent Operational Time: 99.7 | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|--|------|--|------|------|------|------|------|------|------|-------|------|------|------|------|------|------|------|------|------|------|------|-----------------|---------------|---------------|-----|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 43.6 | 40.0 | 32.1 | 32.6 | 31.3 | 27.9 | 19.8 | 14.9 | 8.9 | 7.4 | 5.9 | 5.4 | 4.8 | 5.3 | 5.4 | 5.5 | 5.9 | 6.2 | 6.3 | 6.3 | 6.1 | 6.5 | 6.4 | 6.3 | 14.2 | 43.6 | |
| 2-Aug | 6.0 | 5.7 | 6.0 | 5.4 | 4.5 | 4.6 | 5.3 | 5.6 | 4.9 | 4.0 | 3.7 | 3.0 | 3.2 | 3.6 | 3.1 | 2.8 | 2.4 | 1.8 | 2.1 | 2.4 | 4.7 | 3.9 | 3.6 | 3.1 | 4.0 | 6.0 | |
| 3-Aug | 4.3 | 6.3 | 6.0 | 6.2 | 5.6 | 5.6 | 5.4 | 4.8 | 4.7 | 3.4 | 2.6 | 4.0 | 9.2 | 8.7 | 7.1 | 7.0 | 5.8 | 8.5 | 9.2 | 5.6 | 4.4 | 5.9 | 6.9 | 7.1 | 6.0 | 9.2 | |
| 4-Aug | 7.2 | 7.0 | 5.6 | 5.7 | 5.5 | 5.3 | 5.6 | 5.0 | 4.7 | 4.5 | 4.3 | 3.5 | 3.4 | 2.9 | 2.5 | 2.7 | 2.6 | 2.9 | 3.8 | 4.2 | 6.8 | 6.0 | 5.3 | 5.1 | 4.7 | 7.2 | |
| 5-Aug | 5.3 | 5.3 | 5.3 | 5.3 | 5.2 | 5.2 | 4.6 | 4.3 | 3.9 | 4.4 | 4.5 | 4.4 | 6.3 | 8.6 | 10.7 | 12.3 | 12.3 | 11.8 | 11.3 | 10.9 | 12.4 | 36.2 | 12.8 | 6.3 | 8.7 | 36.2 | |
| 6-Aug | 5.3 | 3.7 | 3.1 | 1.1 | 0.7 | 0.6 | 1.5 | 2.5 | 3.2 | 2.6 | 0.8 | 1.1 | 3.0 | 6.0 | 8.0 | 5.3 | 6.4 | 3.9 | 3.0 | 3.3 | 3.3 | 4.6 | 4.3 | 4.8 | 3.4 | 8.0 | |
| 7-Aug | 5.8 | 6.2 | 9.1 | 8.4 | 7.7 | 7.1 | 5.0 | 5.3 | 6.1 | 8.1 | 5.9 | 1.3 | 1.2 | 1.4 | 1.6 | 1.8 | 2.1 | 2.4 | 2.1 | 1.8 | 1.6 | 1.7 | 1.7 | 1.7 | 4.0 | 9.1 | |
| 8-Aug | 1.7 | 1.8 | 1.4 | 1.5 | 1.5 | 1.6 | 1.8 | 1.6 | 1.2 | 1.0 | 1.0 | 1.0 | 1.1 | 1.2 | 1.1 | 0.9 | 0.6 | 0.7 | 0.7 | 0.7 | 0.8 | 0.9 | 0.9 | 1.1 | 1.2 | 1.8 | |
| 9-Aug | 1.2 | 1.3 | 1.5 | 1.6 | 1.7 | 1.7 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.7 | 2.1 | 2.1 | 1.9 | 1.4 | 1.6 | 1.5 | 1.9 | 3.0 | 3.5 | 4.1 | 4.2 | 5.8 | 2.2 | 5.8 | |
| 10-Aug | 7.9 | 9.1 | 11.1 | 10.0 | 10.2 | 12.3 | 11.7 | 12.0 | 15.4 | 14.9 | 14.5 | 12.9 | 10.0 | 6.7 | 24.1 | 44.2 | 28.3 | 45.1 | 40.2 | 36.4 | 34.6 | 35.1 | 29.0 | 25.8 | 20.9 | 45.1 | |
| 11-Aug | 25.2 | 23.1 | 23.0 | 24.5 | 24.3 | 22.5 | 20.1 | 17.5 | 12.2 | 11.1 | 12.4 | 14.0 | 11.1 | 8.6 | 9.3 | 13.0 | 11.4 | 13.1 | 11.1 | 8.4 | 9.7 | 13.1 | 13.0 | 8.7 | 15.0 | 25.2 | |
| 12-Aug | 7.5 | 7.9 | 8.0 | 8.5 | 9.0 | 8.5 | 7.9 | 7.5 | 6.9 | 6.3 | 5.7 | 4.4 | 4.6 | 6.3 | 8.3 | 8.8 | 8.6 | 9.1 | 9.6 | 10.0 | 9.8 | 8.7 | 7.4 | 7.1 | 7.8 | 10.0 | |
| 13-Aug | 6.8 | 6.7 | 6.7 | 6.7 | 6.8 | 6.4 | 5.8 | 5.4 | 4.9 | 4.3 | 3.8 | 3.3 | 3.6 | 3.8 | 3.7 | 3.8 | 3.9 | 3.4 | 3.3 | 3.2 | 3.7 | 4.5 | 5.1 | 5.3 | 4.8 | 6.8 | |
| 14-Aug | 5.7 | 6.0 | 6.2 | 6.3 | 6.4 | 6.0 | 5.8 | 5.6 | 5.0 | 3.9 | 3.5 | 2.7 | 2.2 | 2.7 | 2.8 | 3.0 | 3.6 | 4.9 | 5.4 | 24.5 | 66.0 | 46.0 | 29.0 | 25.0 | 11.6 | 66.0 | |
| 15-Aug | 26.6 | 28.9 | 23.0 | 20.6 | 21.7 | 19.4 | 21.7 | 27.6 | 42.0 | 39.1 | 30.5 | 20.5 | 15.0 | 11.7 | 7.0 | C | 8.4 | 17.2 | 24.9 | 22.6 | 13.1 | 10.3 | 9.8 | 9.9 | 20.5 | 42.0 | |
| 16-Aug | 8.4 | 9.5 | 12.1 | 6.7 | 3.9 | 3.7 | 2.4 | 6.4 | 8.2 | 6.6 | 3.2 | 4.1 | 3.6 | 3.5 | 2.7 | 4.8 | 6.3 | 5.9 | 7.5 | 9.2 | 10.5 | 14.8 | 10.6 | 11.0 | 6.9 | 14.8 | |
| 17-Aug | 7.7 | 6.6 | 6.9 | 7.6 | 7.4 | 7.6 | 12.0 | 27.2 | 25.8 | 22.5 | 17.1 | 146.0 | 87.7 | 18.5 | 20.8 | 9.0 | 2.3 | 9.6 | 25.9 | 22.9 | 19.4 | 11.3 | 11.3 | 10.2 | 22.6 | 146.0 | |
| 18-Aug | 15.7 | 21.1 | 9.1 | 10.2 | 12.8 | 3.9 | 3.8 | 4.1 | 2.9 | 1.5 | 0.9 | 1.9 | 3.4 | 4.7 | 1.4 | 1.6 | 4.8 | 2.4 | 4.7 | 4.0 | 5.0 | 2.8 | 1.5 | 0.7 | 5.2 | 21.1 | |
| 19-Aug | 0.5 | 1.1 | 1.9 | 5.6 | 8.4 | 3.7 | 2.6 | 1.1 | 0.7 | 1.2 | 1.4 | 1.9 | 3.2 | 3.8 | 3.3 | 7.3 | 0.2 | 0.1 | 0.2 | 0.1 | 0.2 | 0.3 | 0.4 | 2.5 | 2.2 | 8.4 | |
| 20-Aug | 2.7 | 6.0 | 3.3 | 2.0 | 2.1 | 3.3 | 3.2 | 4.0 | 2.5 | 1.5 | 1.3 | 2.1 | 2.0 | 0.7 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 1.6 | 6.0 | |
| 21-Aug | 0.1 | 0.1 | 0.1 | 0.1 | 0.3 | 6.4 | 5.9 | 3.5 | 4.8 | 4.8 | 4.4 | 3.2 | 1.5 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 1.5 | 6.4 | |
| 22-Aug | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | 0.2 | 0.2 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.4 | 0.2 | 0.2 | 0.2 | 0.2 | 0.4 | 0.4 |
| 23-Aug | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.4 | 0.3 | 1.2 | 2.2 | 2.0 | 4.0 | 4.2 | 3.9 | 3.2 | 3.0 | 3.7 | 4.1 | 4.7 | 5.3 | 5.0 | 4.6 | 2.2 | 5.3 | |
| 24-Aug | 4.1 | 4.0 | 3.1 | 4.3 | 2.7 | 3.0 | 5.6 | 9.5 | 6.4 | 10.7 | 10.5 | 8.5 | 12.1 | 7.3 | 7.0 | 8.2 | 9.6 | 9.6 | 10.8 | 3.7 | 2.2 | 1.5 | 1.5 | 1.7 | 6.1 | 12.1 | |
| 25-Aug | 2.0 | 2.2 | 2.1 | 1.3 | 1.3 | 1.7 | 4.1 | 5.4 | 3.5 | 1.5 | 2.7 | 2.4 | 1.1 | 0.7 | 0.7 | 0.8 | 0.5 | 0.4 | 0.4 | 0.7 | 0.8 | 0.9 | 0.9 | 1.0 | 1.6 | 5.4 | |
| 26-Aug | 1.0 | 0.9 | 0.8 | 0.9 | 0.8 | 0.9 | 0.8 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.7 | 0.6 | 0.7 | 0.9 | 0.7 | 0.6 | 0.6 | 0.6 | 0.5 | 0.6 | 0.8 | 0.8 | 0.8 | 1.0 | |
| 27-Aug | 0.8 | 0.9 | 0.9 | 1.0 | 1.1 | 3.7 | 6.9 | 2.7 | 2.0 | 2.0 | 2.1 | 1.4 | 1.1 | 1.6 | 1.3 | 1.4 | 1.4 | 1.5 | 1.3 | 1.1 | 1.0 | 1.0 | 1.2 | 1.1 | 1.7 | 6.9 | |
| 28-Aug | 1.2 | 1.4 | 2.0 | 2.6 | 2.4 | 1.6 | 1.7 | 1.9 | 1.7 | 1.7 | 1.7 | 3.7 | 3.8 | 1.9 | 1.5 | 1.1 | 1.3 | 1.1 | 1.0 | 1.1 | 4.3 | 1.3 | 1.8 | 1.6 | 1.9 | 4.3 | |
| 29-Aug | 1.9 | 1.4 | 1.0 | 1.0 | 0.8 | 1.1 | 1.8 | 1.6 | 0.7 | UO | UO | 0.4 | 0.5 | 0.7 | 0.9 | 0.9 | 0.9 | 1.0 | 1.2 | 1.2 | 1.3 | 1.5 | 1.6 | 1.8 | 1.2 | 1.9 | |
| 30-Aug | 2.3 | 2.5 | 2.7 | 3.0 | 2.9 | 2.9 | 2.8 | 2.9 | 3.5 | 4.8 | 12.1 | 10.7 | 19.1 | 14.0 | 15.0 | 14.8 | 57.4 | 96.8 | 72.3 | 25.4 | 24.3 | 21.2 | 19.9 | 19.2 | 18.9 | 96.8 | |
| 31-Aug | 18.0 | 15.9 | 14.9 | 19.2 | 19.8 | 21.6 | 20.6 | 12.6 | 6.2 | 2.8 | 1.8 | 2.7 | 0.7 | 0.7 | 0.6 | 0.7 | 2.0 | 1.2 | 1.0 | 0.6 | 0.4 | 0.3 | 0.3 | 0.3 | 6.9 | 21.6 | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | |
| 7.3 7.5 6.8 6.8 6.7 6.4 6.4 6.6 6.3 6.0 5.4 8.9 7.2 4.6 5.1 5.6 6.3 8.6 8.6 7.0 8.2 8.1 6.3 5.8 43.6 40.0 32.1 32.6 31.3 27.9 21.7 27.6 42.0 39.1 30.5 146.0 87.7 18.5 24.1 44.2 57.4 96.8 72.3 36.4 66.0 46.0 29.0 25.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C - Calibration UO - Unstable Operation Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³ | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Chipewyan - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Chipewyan - August 2017**

| Concentration Ranges ($\mu\text{g}/\text{m}^3$) | Number of Hours | % | Cumulative % |
|---|------------------------|----------|---------------------|
| 1 - 5 | 329 | 44.40 | 44.40 |
| 6 - 15 | 197 | 26.59 | 70.99 |
| 16 - 25 | 41 | 5.53 | 76.52 |
| 26 - 80 | 30 | 4.05 | 80.57 |
| > 81.0 | 3 | 0.40 | 80.97 |

Total Number of Valid Hours: 741

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Fort Chipewyan - August 2017**

| Concentration Ranges (μg/m ³) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|--|----------------|-----|----|-----|----|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 1 - 5 | 3 | 2 | 1 | 0 | 40 | 26 | 20 | 33 | 16 | 19 | 25 | 22 | 73 | 21 | 13 | 15 | 329 |
| 6 - 15 | 2 | 1 | 4 | 4 | 18 | 7 | 15 | 19 | 24 | 27 | 12 | 19 | 18 | 8 | 10 | 9 | 197 |
| 16 - 25 | 1 | 0 | 0 | 0 | 0 | 3 | 1 | 8 | 3 | 5 | 7 | 2 | 7 | 4 | 0 | 0 | 41 |
| 26 - 80 | 3 | 2 | 1 | 0 | 1 | 0 | 2 | 3 | 2 | 0 | 2 | 7 | 3 | 3 | 0 | 1 | 30 |
| > 81.0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 3 |
| Totals | 9 | 5 | 6 | 4 | 59 | 36 | 39 | 63 | 45 | 51 | 46 | 50 | 103 | 36 | 23 | 25 | 600 |

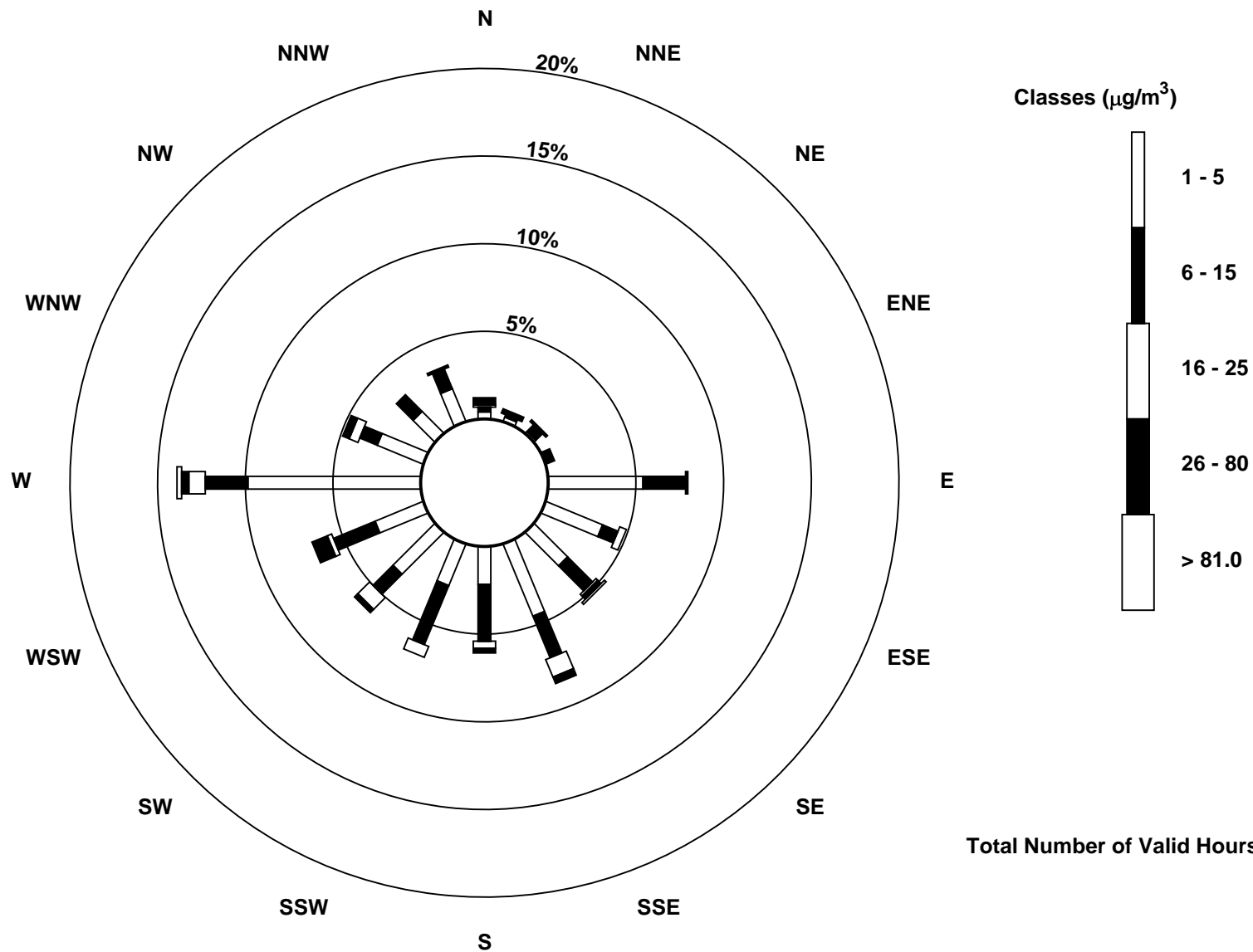
Total Number of Valid Hours: 741

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Chipewyan (AMS 8)



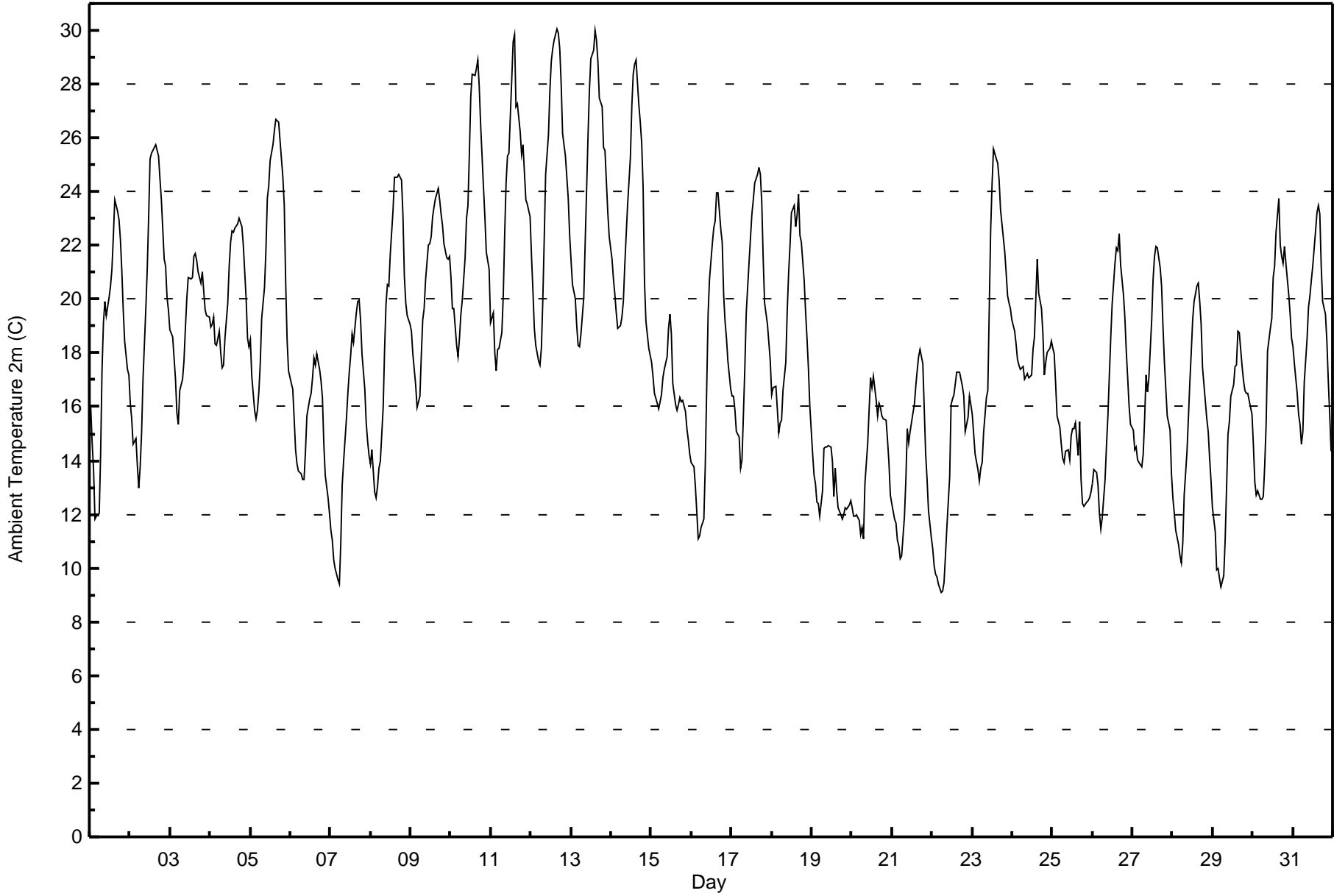


| Maximum Value: 30.1 C on Aug 12 16:00 Maximum Daily Average: 24.2 C on Aug 12 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: | 744 | | | |
|--|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------------------|-------|------|---------------|---------------|
| Minimum Value: 9.1 C on Aug 22 06:00 Minimum Daily Average: 13.1 C on Aug 19 | | | | | | | | | | | | | | | | | | | | | | Hours of Data: | 744 | | | |
| Maximum Diurnal Average: 22.3 C at hour 16 Minimum Diurnal Average: 14.1 C at hour 6 | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: | 0 | | | |
| Monthly Average: 18.30 C Percentiles: P ₁ = 9.6 P ₁₀ = 12.5 Q ₁ = 15.0 Median = 17.9 Q ₃ = 21.4 P ₉₀ = 24.5 P ₉₉ = 29.5 | | | | | | | | | | | | | | | | | | | | | | Hours of Calibration: | 0 | | | |
| | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: | 100.0 | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 16.0 | 14.7 | 13.6 | 11.8 | 11.9 | 12.1 | 14.2 | 17.4 | 19.1 | 19.9 | 19.4 | 20.1 | 20.5 | 21.1 | 22.3 | 23.7 | 23.3 | 23.0 | 22.2 | 21.1 | 19.6 | 18.4 | 17.4 | 17.2 | 18.3 | 23.7 |
| 2-Aug | 16.1 | 15.5 | 14.6 | 14.8 | 13.8 | 13.0 | 13.7 | 15.0 | 17.0 | 19.7 | 21.1 | 23.1 | 25.2 | 25.4 | 25.6 | 25.8 | 25.5 | 25.3 | 24.5 | 23.7 | 21.5 | 21.2 | 20.1 | 19.6 | 20.0 | 25.8 |
| 3-Aug | 18.8 | 18.6 | 17.8 | 17.0 | 15.8 | 15.4 | 16.6 | 17.0 | 17.7 | 18.9 | 20.0 | 20.8 | 20.8 | 21.6 | 21.7 | 21.4 | 21.0 | 20.6 | 21.0 | 20.3 | 19.6 | 19.4 | 19.3 | 19.2 | 21.7 | 21.7 |
| 4-Aug | 19.0 | 19.0 | 19.3 | 18.3 | 18.3 | 18.8 | 18.0 | 17.4 | 17.6 | 18.5 | 19.9 | 21.2 | 22.1 | 22.6 | 22.5 | 22.6 | 22.8 | 23.0 | 22.9 | 22.7 | 22.0 | 20.0 | 18.6 | 18.2 | 20.2 | 23.0 |
| 5-Aug | 18.5 | 17.1 | 15.9 | 15.6 | 15.8 | 16.6 | 17.6 | 19.3 | 20.5 | 21.8 | 23.7 | 24.2 | 25.2 | 25.8 | 26.3 | 26.7 | 26.7 | 26.6 | 25.9 | 24.6 | 23.5 | 20.6 | 18.5 | 17.3 | 21.4 | 26.7 |
| 6-Aug | 16.9 | 16.7 | 15.5 | 14.4 | 13.9 | 13.6 | 13.5 | 13.3 | 13.3 | 14.4 | 15.6 | 16.3 | 16.5 | 17.1 | 17.8 | 17.5 | 18.0 | 17.4 | 17.0 | 16.3 | 14.6 | 13.5 | 12.6 | 12.0 | 15.3 | 18.0 |
| 7-Aug | 11.4 | 11.0 | 10.3 | 10.0 | 9.6 | 9.4 | 10.9 | 13.1 | 14.0 | 15.5 | 16.5 | 17.3 | 17.9 | 18.7 | 18.4 | 19.5 | 19.9 | 20.0 | 19.2 | 18.0 | 16.7 | 15.4 | 14.7 | 14.2 | 15.1 | 20.0 |
| 8-Aug | 13.9 | 14.4 | 12.8 | 12.6 | 13.0 | 13.7 | 14.0 | 16.0 | 18.1 | 19.8 | 20.6 | 20.5 | 21.6 | 23.4 | 24.5 | 24.5 | 24.5 | 24.6 | 24.5 | 23.1 | 20.9 | 19.9 | 19.4 | 19.1 | 19.1 | 24.6 |
| 9-Aug | 18.8 | 18.0 | 17.4 | 16.8 | 16.0 | 16.4 | 17.9 | 19.2 | 19.6 | 20.7 | 22.0 | 22.1 | 22.3 | 23.1 | 23.4 | 23.8 | 24.1 | 23.7 | 23.2 | 22.8 | 22.0 | 21.6 | 21.5 | 21.6 | 20.8 | 24.1 |
| 10-Aug | 20.8 | 19.7 | 19.6 | 18.3 | 17.9 | 18.5 | 19.4 | 20.0 | 21.5 | 23.0 | 23.5 | 25.4 | 27.5 | 28.4 | 28.3 | 28.6 | 28.9 | 27.9 | 26.5 | 24.1 | 23.0 | 21.7 | 21.4 | 21.1 | 23.1 | 28.9 |
| 11-Aug | 19.1 | 19.5 | 18.0 | 17.3 | 18.1 | 18.2 | 18.7 | 20.1 | 22.4 | 24.3 | 25.4 | 25.4 | 28.2 | 29.6 | 29.9 | 27.2 | 27.3 | 26.2 | 25.4 | 25.8 | 24.7 | 23.7 | 23.6 | 23.1 | 23.4 | 29.9 |
| 12-Aug | 21.6 | 20.3 | 18.9 | 18.3 | 17.7 | 17.6 | 18.2 | 20.0 | 22.2 | 24.7 | 26.1 | 27.7 | 28.9 | 29.3 | 29.6 | 30.1 | 29.9 | 29.3 | 28.0 | 26.2 | 25.3 | 24.5 | 23.7 | 22.4 | 24.2 | 30.1 |
| 13-Aug | 21.4 | 20.5 | 20.0 | 19.0 | 18.3 | 18.2 | 18.7 | 20.1 | 22.1 | 24.1 | 26.0 | 27.8 | 28.9 | 29.3 | 30.0 | 29.6 | 28.8 | 27.5 | 27.1 | 25.6 | 25.6 | 24.4 | 23.2 | 22.3 | 24.1 | 30.0 |
| 14-Aug | 21.5 | 20.7 | 20.2 | 19.5 | 18.9 | 19.0 | 19.3 | 19.9 | 21.2 | 22.4 | 23.5 | 25.3 | 27.2 | 28.4 | 28.7 | 28.9 | 27.2 | 26.6 | 25.8 | 24.2 | 20.6 | 19.2 | 18.2 | 17.9 | 22.7 | 28.9 |
| 15-Aug | 17.7 | 17.1 | 16.5 | 16.2 | 15.9 | 16.2 | 16.4 | 17.1 | 17.4 | 17.9 | 18.9 | 19.5 | 18.7 | 16.9 | 16.1 | 15.9 | 16.1 | 16.3 | 16.2 | 16.2 | 15.8 | 15.2 | 14.8 | 14.2 | 16.6 | 19.5 |
| 16-Aug | 13.9 | 13.8 | 13.0 | 12.1 | 11.1 | 11.2 | 11.5 | 11.8 | 13.8 | 16.7 | 19.4 | 20.7 | 22.1 | 22.7 | 22.9 | 24.0 | 24.0 | 22.6 | 22.1 | 20.2 | 19.2 | 18.5 | 17.7 | 16.6 | 17.6 | 24.0 |
| 17-Aug | 16.4 | 16.4 | 15.9 | 15.1 | 14.9 | 13.7 | 14.0 | 15.7 | 17.5 | 19.5 | 21.4 | 22.3 | 23.2 | 23.7 | 24.3 | 24.7 | 24.9 | 24.6 | 23.6 | 21.5 | 19.8 | 19.1 | 18.4 | 17.7 | 19.5 | 24.9 |
| 18-Aug | 16.4 | 16.7 | 16.8 | 15.9 | 15.0 | 15.4 | 15.5 | 16.6 | 17.6 | 19.6 | 21.0 | 22.0 | 23.2 | 23.5 | 22.7 | 23.1 | 23.9 | 22.4 | 22.1 | 20.7 | 19.5 | 18.6 | 17.5 | 16.0 | 19.2 | 23.9 |
| 19-Aug | 14.2 | 13.5 | 13.2 | 12.5 | 12.4 | 11.9 | 12.9 | 14.5 | 14.5 | 14.5 | 14.6 | 14.5 | 14.0 | 12.7 | 13.7 | 12.9 | 12.3 | 12.0 | 11.8 | 12.0 | 12.2 | 12.2 | 12.4 | 12.5 | 13.1 | 14.6 |
| 20-Aug | 12.2 | 11.9 | 11.9 | 12.0 | 11.8 | 11.2 | 11.5 | 11.1 | 13.1 | 14.7 | 15.9 | 17.1 | 16.7 | 17.1 | 16.2 | 15.7 | 16.1 | 16.0 | 15.6 | 15.6 | 15.5 | 14.8 | 13.9 | 12.7 | 14.2 | 17.1 |
| 21-Aug | 12.4 | 11.8 | 11.7 | 11.0 | 10.8 | 10.3 | 10.5 | 11.9 | 13.3 | 15.2 | 14.7 | 15.1 | 15.8 | 16.1 | 16.8 | 17.3 | 17.9 | 18.1 | 17.6 | 15.9 | 14.2 | 13.3 | 12.1 | 11.1 | 14.0 | 18.1 |
| 22-Aug | 10.7 | 10.1 | 9.8 | 9.7 | 9.4 | 9.1 | 9.1 | 9.5 | 10.5 | 11.5 | 13.4 | 16.1 | 16.3 | 16.4 | 16.9 | 17.3 | 17.3 | 17.0 | 16.8 | 16.4 | 15.1 | 15.6 | 16.4 | 16.1 | 13.6 | 17.3 |
| 23-Aug | 15.7 | 15.0 | 14.2 | 13.7 | 13.2 | 13.7 | 13.9 | 15.0 | 16.3 | 16.6 | 19.6 | 22.5 | 24.3 | 25.6 | 25.2 | 25.0 | 24.5 | 23.3 | 22.8 | 21.8 | 21.0 | 20.1 | 19.8 | 19.7 | 19.3 | 25.6 |
| 24-Aug | 19.2 | 18.8 | 18.4 | 17.7 | 17.5 | 17.4 | 17.5 | 17.0 | 17.1 | 17.2 | 17.1 | 17.2 | 18.2 | 18.6 | 20.1 | 21.5 | 20.2 | 19.7 | 18.7 | 17.2 | 17.7 | 18.0 | 18.2 | 18.4 | 18.3 | 21.5 |
| 25-Aug | 18.2 | 18.0 | 16.9 | 15.7 | 15.2 | 14.6 | 14.1 | 13.9 | 14.4 | 14.4 | 14.0 | 14.9 | 15.2 | 15.2 | 15.4 | 14.2 | 15.4 | 13.3 | 12.4 | 12.3 | 12.4 | 12.5 | 12.6 | 12.8 | 14.5 | 18.2 |
| 26-Aug | 13.2 | 13.7 | 13.6 | 13.1 | 12.0 | 11.4 | 11.9 | 13.3 | 14.6 | 15.7 | 17.1 | 18.6 | 19.8 | 21.4 | 21.9 | 21.8 | 22.4 | 21.3 | 20.2 | 19.3 | 18.1 | 17.1 | 16.0 | 15.4 | 16.8 | 22.4 |
| 27-Aug | 15.1 | 14.4 | 14.5 | 14.0 | 14.0 | 13.8 | 14.2 | 15.6 | 17.2 | 16.5 | 17.1 | 19.3 | 20.8 | 21.6 | 22.0 | 21.9 | 21.2 | 20.5 | 19.0 | 17.6 | 16.7 | 15.7 | 15.1 | 13.5 | 17.1 | 22.0 |
| 28-Aug | 12.6 | 12.0 | 11.4 | 10.9 | 10.5 | 10.2 | 10.9 | 12.7 | 14.4 | 15.6 | 16.9 | 18.0 | 19.3 | 19.9 | 20.5 | 20.6 | 19.9 | 19.1 | 17.5 | 16.2 | 15.6 | 15.1 | 14.1 | 13.2 | 15.3 | 20.6 |
| 29-Aug | 12.2 | 11.4 | 10.0 | 10.0 | 9.6 | 9.3 | 9.7 | 11.0 | 13.0 | 15.0 | 15.5 | 16.4 | 16.8 | 17.5 | 17.6 | 18.8 | 18.7 | 17.5 | 17.0 | 16.6 | 16.5 | 16.5 | 16.2 | 15.7 | 14.5 | 18.8 |
| 30-Aug | 14.6 | 13.2 | 12.7 | 12.9 | 12.6 | 12.5 | 12.7 | 13.8 | 15.4 | 18.1 | 18.9 | 19.3 | 20.8 | 21.2 | 22.5 | 23.8 | 22.0 | 21.6 | 21.3 | 21.9 | 21.3 | 20.2 | 19.4 | 18.6 | 18.0 | 23.8 |
| 31-Aug | 18.2 | 17.6 | 16.5 | 15.7 | 15.3 | 14.6 | 15.1 | 16.9 | 18.5 | 19.7 | 20.1 | 20.7 | 21.2 | 22.5 | 23.2 | 23.5 | 23.2 | 21.2 | 19.9 | 19.4 | 18.4 | 17.0 | 15.7 | 14.4 | 18.7 | 23.5 |
| | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | |
| | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 2m (AT 2m) - C
Fort Chipewyan - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C
Fort Chipewyan - August 2017**

| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 14 | 1.88 | 1.88 |
| 10 - 20 | 484 | 65.05 | 66.94 |
| > 20 | 246 | 33.06 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744

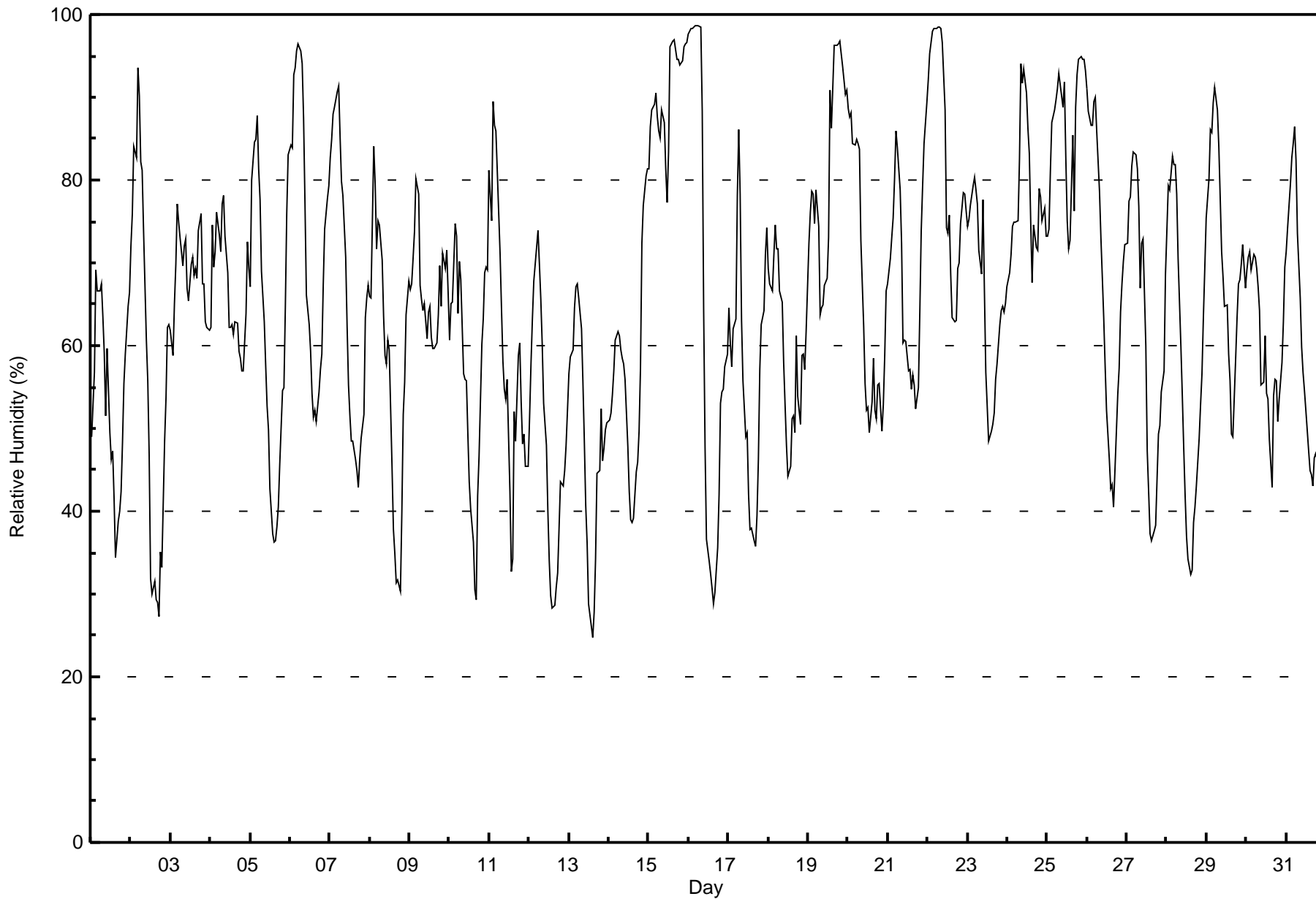


Wood Buffalo Environmental Association

Summary of Hour Averages

**Relative Humidity (RH) - %
Fort Chipewyan - August 2017**

| Maximum Value: 99 % on Aug 16 07:00 | | | | | | | | | | | | | | | | | Maximum Daily Average: 90.2 % on Aug 15 | | | | | | | | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|------|---------------|---------------|------|------|------|------|------|------|------|---------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|--|
| Minimum Value: 25 % on Aug 13 15:00 | | | | | | | | | | | | | | | | | Minimum Daily Average: 48.3 % on Aug 13 | | | | | | | | | | | | | | | | | Hours of Data: 744 | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 80.9 % at hour 6 | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 49.6 % at hour 15 | | | | | | | | | | | | | | | | | Hours of Missing Data: 0 | | | | | | | | | | | | | | | |
| Monthly Average: 65.2 % | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 29 P ₁₀ = 42 Q ₁ = 53 Median = 65 Q ₃ = 77 P ₉₀ = 89 P ₉₉ = 98 | | | | | | | | | | | | | | | | | Hours of Calibration: 0 | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 49 | 53 | 57 | 69 | 67 | 67 | 67 | 64 | 59 | 51 | 60 | 50 | 46 | 47 | 42 | 34 | 39 | 40 | 42 | 48 | 55 | 59 | 65 | 66 | 54.0 | 69 | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 72 | 76 | 84 | 83 | 94 | 90 | 82 | 81 | 74 | 61 | 56 | 47 | 32 | 30 | 32 | 29 | 29 | 27 | 35 | 33 | 48 | 54 | 62 | 63 | 57.2 | 94 | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 62 | 59 | 65 | 70 | 77 | 75 | 73 | 70 | 72 | 73 | 67 | 65 | 70 | 71 | 69 | 69 | 68 | 74 | 76 | 67 | 67 | 63 | 62 | 62 | 68.6 | 77 | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 62 | 74 | 69 | 71 | 76 | 73 | 71 | 77 | 78 | 73 | 69 | 62 | 62 | 61 | 63 | 63 | 59 | 58 | 57 | 57 | 64 | 73 | 69 | 67.0 | 78 | | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 67 | 80 | 85 | 85 | 88 | 81 | 78 | 69 | 63 | 58 | 53 | 50 | 43 | 37 | 36 | 36 | 38 | 40 | 46 | 55 | 55 | 65 | 76 | 83 | 61.0 | 88 | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 84 | 84 | 93 | 94 | 96 | 97 | 96 | 94 | 88 | 77 | 66 | 63 | 59 | 54 | 51 | 52 | 51 | 54 | 57 | 59 | 67 | 74 | 78 | 79 | 73.6 | 97 | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 83 | 85 | 88 | 89 | 91 | 91 | 85 | 80 | 78 | 71 | 62 | 55 | 52 | 48 | 48 | 46 | 45 | 43 | 46 | 49 | 52 | 63 | 66 | 67 | 66.0 | 91 | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 66 | 66 | 84 | 79 | 72 | 75 | 75 | 70 | 64 | 59 | 58 | 61 | 59 | 45 | 38 | 35 | 31 | 32 | 30 | 40 | 52 | 56 | 64 | 68 | 57.4 | 84 | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 67 | 67 | 71 | 74 | 80 | 78 | 67 | 66 | 64 | 65 | 61 | 64 | 65 | 61 | 60 | 60 | 60 | 64 | 70 | 65 | 71 | 69 | 71 | 66 | 66.9 | 80 | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 61 | 65 | 65 | 75 | 73 | 64 | 70 | 68 | 57 | 56 | 56 | 49 | 43 | 40 | 36 | 31 | 29 | 42 | 47 | 60 | 63 | 69 | 69 | 69 | 56.6 | 75 | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 81 | 75 | 89 | 87 | 86 | 81 | 71 | 64 | 58 | 55 | 54 | 56 | 42 | 33 | 34 | 52 | 48 | 59 | 60 | 53 | 48 | 49 | 45 | 45 | 59.5 | 89 | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 51 | 58 | 63 | 68 | 72 | 74 | 70 | 66 | 60 | 53 | 48 | 40 | 34 | 30 | 28 | 29 | 31 | 33 | 38 | 44 | 43 | 45 | 48 | 52 | 49.0 | 74 | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 57 | 59 | 59 | 65 | 67 | 67 | 66 | 62 | 56 | 48 | 41 | 36 | 29 | 26 | 25 | 28 | 34 | 45 | 45 | 52 | 46 | 48 | 50 | 51 | 48.3 | 67 | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 51 | 52 | 54 | 57 | 61 | 62 | 61 | 59 | 59 | 58 | 56 | 48 | 42 | 39 | 39 | 39 | 45 | 46 | 50 | 57 | 72 | 77 | 81 | 81 | 56.1 | 81 | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 81 | 86 | 88 | 89 | 91 | 88 | 86 | 85 | 89 | 87 | 81 | 77 | 83 | 96 | 97 | 97 | 96 | 95 | 95 | 94 | 94 | 96 | 97 | 97 | 90.2 | 97 | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 98 | 98 | 98 | 98 | 99 | 99 | 99 | 99 | 88 | 64 | 48 | 37 | 34 | 32 | 31 | 29 | 30 | 36 | 42 | 53 | 54 | 55 | 58 | 59 | 64.0 | 99 | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 64 | 60 | 57 | 62 | 63 | 78 | 86 | 78 | 63 | 56 | 49 | 49 | 42 | 38 | 38 | 36 | 36 | 39 | 46 | 57 | 62 | 64 | 71 | 74 | 57.2 | 86 | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 69 | 67 | 67 | 71 | 75 | 72 | 72 | 67 | 65 | 58 | 53 | 48 | 44 | 46 | 51 | 51 | 50 | 61 | 54 | 50 | 59 | 59 | 57 | 62 | 59.5 | 75 | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 72 | 76 | 79 | 78 | 75 | 79 | 74 | 64 | 65 | 65 | 67 | 68 | 73 | 91 | 86 | 91 | 96 | 96 | 96 | 97 | 95 | 94 | 90 | 91 | 81.6 | 97 | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 89 | 88 | 88 | 84 | 84 | 85 | 84 | 84 | 73 | 62 | 56 | 52 | 53 | 49 | 53 | 58 | 52 | 51 | 55 | 55 | 50 | 53 | 59 | 67 | 66.0 | 89 | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 67 | 71 | 73 | 75 | 80 | 86 | 84 | 79 | 72 | 60 | 61 | 61 | 57 | 57 | 55 | 56 | 55 | 52 | 55 | 64 | 74 | 79 | 84 | 89 | 68.7 | 89 | | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 92 | 95 | 97 | 98 | 98 | 98 | 98 | 98 | 98 | 97 | 88 | 74 | 74 | 76 | 69 | 63 | 63 | 63 | 69 | 70 | 75 | 78 | 78 | 76 | 82.8 | 98 | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 74 | 75 | 77 | 79 | 80 | 79 | 77 | 72 | 69 | 78 | 67 | 57 | 53 | 48 | 50 | 51 | 52 | 56 | 58 | 62 | 64 | 65 | 64 | 65 | 65.5 | 80 | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 67 | 69 | 71 | 74 | 75 | 75 | 75 | 82 | 94 | 92 | 93 | 90 | 86 | 83 | 75 | 68 | 75 | 72 | 72 | 79 | 78 | 75 | 77 | 73 | 77.9 | 94 | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 73 | 74 | 81 | 87 | 88 | 90 | 91 | 93 | 92 | 89 | 92 | 83 | 75 | 72 | 73 | 86 | 76 | 89 | 93 | 95 | 95 | 95 | 93 | 93 | 86.1 | 95 | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 91 | 88 | 87 | 87 | 90 | 90 | 86 | 79 | 73 | 68 | 63 | 58 | 52 | 46 | 43 | 43 | 41 | 45 | 54 | 57 | 64 | 67 | 70 | 72 | 67.3 | 91 | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 72 | 77 | 78 | 82 | 83 | 83 | 81 | 77 | 67 | 72 | 73 | 60 | 47 | 42 | 37 | 37 | 38 | 38 | 44 | 49 | 50 | 54 | 57 | 69 | 61.2 | 83 | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 74 | 79 | 79 | 83 | 82 | 82 | 78 | 71 | 60 | 54 | 48 | 42 | 37 | 34 | 32 | 33 | 39 | 41 | 43 | 49 | 53 | 57 | 63 | 69 | 57.5 | 83 | | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 75 | 80 | 86 | 86 | 89 | 91 | 88 | 84 | 78 | 71 | 68 | 65 | 65 | 59 | 56 | 49 | 49 | 58 | 63 | 67 | 68 | 70 | 72 | 67 | 71.1 | 91 | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 69 | 71 | 71 | 69 | 71 | 71 | 69 | 67 | 64 | 55 | 56 | 61 | 54 | 54 | 49 | 43 | 54 | 56 | 56 | 51 | 54 | 58 | 63 | 70 | 60.6 | 71 | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 71 | 74 | 79 | 83 | 84 | 86 | 82 | 74 | 66 | 60 | 57 | 55 | 52 | 47 | 45 | 44 | 43 | 46 | 47 | 46 | 48 | 56 | 61 | 69 | 61.5 | 86 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 71.4 | 73.6 | 76.9 | 79.0 | 80.8 | 80.9 | 78.9 | 75.5 | 71.1 | 66.0 | 62.1 | 57.5 | 53.6 | 51.5 | 49.6 | 49.6 | 50.2 | 53.3 | 56.2 | 59.2 | 62.5 | 65.5 | 68.6 | 70.4 | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | | | | | | | 98 | 98 | 98 | 98 | 99 | 99 | 99 | 99 | 98 | 97 | 93 | 90 | 86 | 96 | 97 | 97 | 96 | 96 | 96 | 97 | 95 | 96 | 97 | 97 | Diurnal Maximum | |





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Fort Chipewyan - August 2017

| Concentration Ranges (%) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 0 | 0.00 | 0.00 |
| 20 - 40 | 63 | 8.47 | 8.47 |
| 40 - 60 | 226 | 30.38 | 38.84 |
| 60 - 80 | 300 | 40.32 | 79.17 |
| 80 - 100 | 155 | 20.83 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Precipitation (PC) - mm

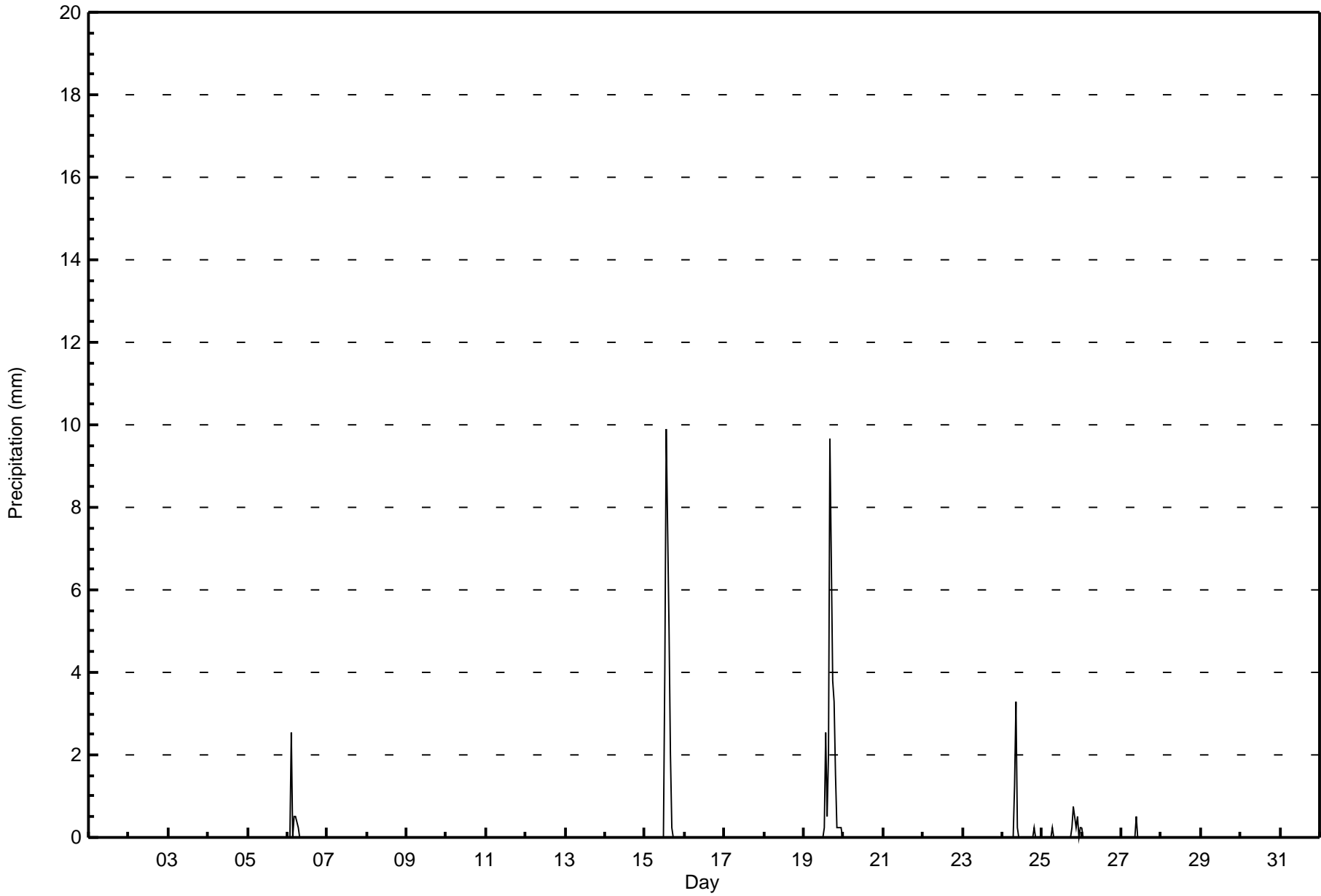
Fort Chipewyan - August 2017

| Maximum Value: 9.9 mm on Aug 15 14:00 Maximum Daily Total: 24.4 mm on Aug 19 | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|---------------|---------------|------|------|-----|
| Minimum Value: 0.0 mm on Aug 1 01:00 Maximum Diurnal Total: 12.4 mm at hour 14 Monthly Total: 57.66 mm | | Minimum Daily Total: 0.0 mm on Aug 1 Minimum Diurnal Total: 0.0 mm at hour 2 Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 3.3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | |
| 1-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| 2-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 3-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 4-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 5-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 6-Aug | 0.0 | 0.0 | 2.5 | 0.0 | 0.5 | 0.5 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.8 | 2.5 |
| 7-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 8-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 9-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 10-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 11-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 12-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 13-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 14-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 15-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.1 | 9.9 | 5.1 | 2.0 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 21.3 | 9.9 |
| 16-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 17-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 18-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 19-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 2.5 | 0.5 | 2.0 | 9.7 | 3.8 | 3.3 | 1.5 | 0.3 | 0.3 | 0.3 | 0.0 | 0.0 | 24.4 | 9.7 | |
| 20-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 21-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 22-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 23-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 24-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.3 | 3.3 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 5.1 | 3.3 | |
| 25-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.8 | 0.3 | 0.5 | 0.0 | 0.3 | 2.3 | 0.8 | 0.8 | |
| 26-Aug | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.3 | |
| 27-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 | 0.5 | |
| 28-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 29-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 30-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 31-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Fort Chipewyan - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Precipitation (PC) - mm
Fort Chipewyan - August 2017**

| Concentration Ranges (mm) | Number of Hours | % | Cumulative % |
|----------------------------------|------------------------|----------|---------------------|
| 0 - 0.3 | 725 | 97.45 | 97.45 |
| 0.4 - 0.5 | 5 | 0.67 | 98.12 |
| 0.6 - 0.7 | 0 | 0.00 | 98.12 |
| 0.8 - 1.4 | 2 | 0.27 | 98.39 |
| 1.5 - 10 | 12 | 1.61 | 100.00 |
| > 10 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Leaf Wetness (SW) - %

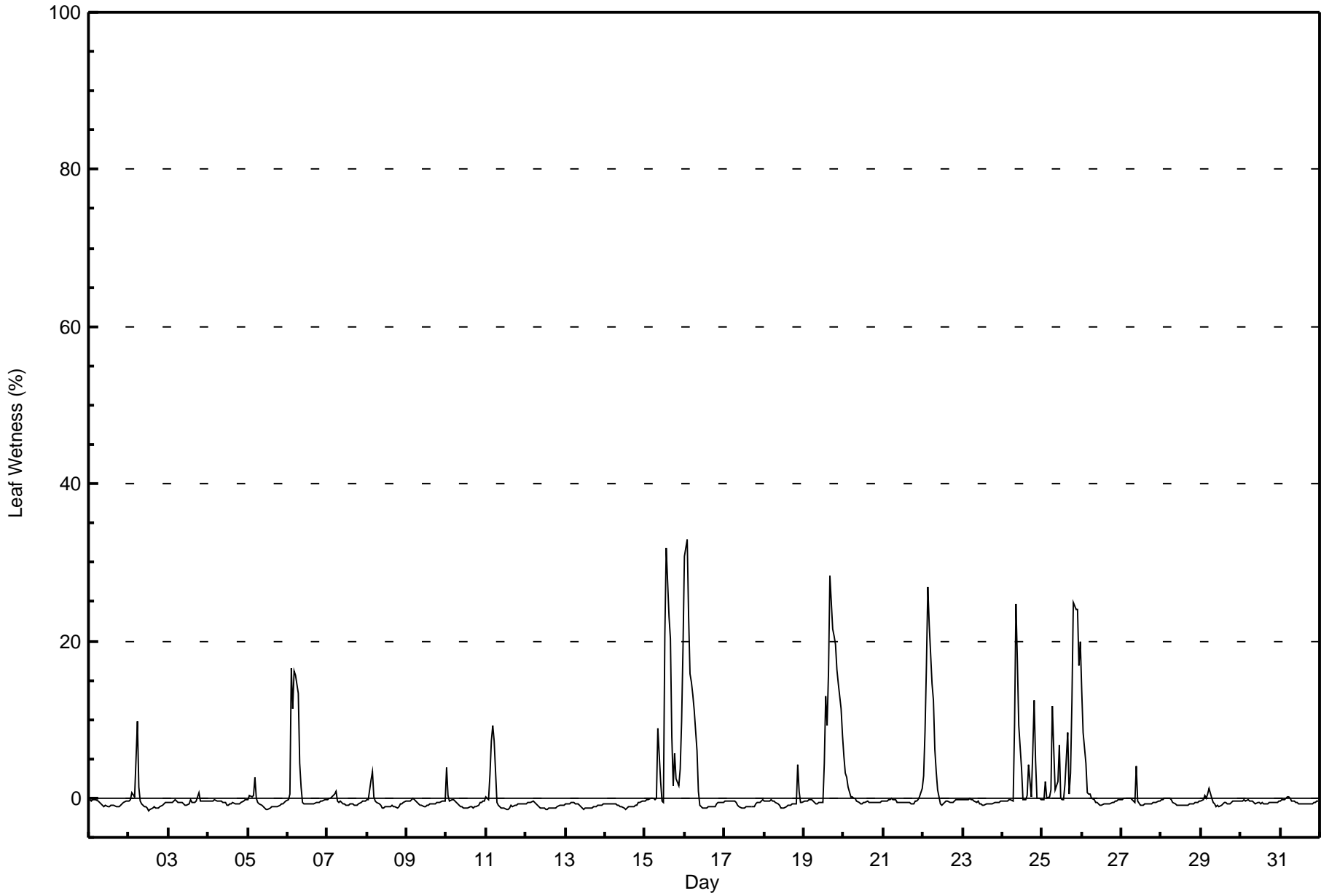
Fort Chipewyan - August 2017

| Maximum Value: 33 % on Aug 16 02:00 Maximum Daily Average: 7.4 % on Aug 19 | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | | |
|--|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|------|---------------|---------------|
| Minimum Value: -2 % on Aug 2 13:00 Minimum Daily Average: -1.0 % on Aug 12 Maximum Diurnal Average: 2.2 % at hour 5 Minimum Diurnal Average: -0.8 % at hour 12 Monthly Average: 0.9 % Percentiles: P ₁ = -1 P ₁₀ = -1 Q ₁ = -1 Median = -1 O ₃ = 0 P ₉₀ = 4 P ₉₉ = 24 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | 0 | 0 | -0.7 | 0 | |
| 2-Aug | 0 | 0 | 1 | 0 | 5 | 10 | 1 | 0 | -1 | -1 | -1 | -1 | -2 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -0.1 | 10 |
| 3-Aug | -1 | -1 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | 0 | -1 | -1 | -1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | -0.5 | 1 | |
| 4-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | 0 | 0 | -0.5 | 0 | |
| 5-Aug | 0 | 0 | 0 | 0 | 3 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | 0 | 0 | -0.6 | 3 |
| 6-Aug | 0 | 1 | 17 | 11 | 16 | 16 | 13 | 4 | 1 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | 0 | 0 | 0 | 0 | 2.9 | 17 | |
| 7-Aug | 0 | 0 | 0 | 0 | 1 | 1 | 0 | -1 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | 0 | 0 | -0.5 | 1 | |
| 8-Aug | 0 | 0 | 2 | 3 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | 0 | -0.5 | 3 | |
| 9-Aug | 0 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | 0 | 0 | 0 | -0.6 | 0 | |
| 10-Aug | 4 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | 0 | 0 | -0.6 | 4 | |
| 11-Aug | 0 | 0 | 3 | 7 | 9 | 7 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | 0.4 | 9 | |
| 12-Aug | -1 | -1 | -1 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1.0 | 0 | |
| 13-Aug | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -0.9 | -1 | |
| 14-Aug | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | 0 | 0 | -0.9 | 0 | |
| 15-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 2 | 0 | -1 | 21 | 32 | 23 | 20 | 8 | 2 | 6 | 3 | 1 | 4 | 10 | 19 | 6.5 | 32 |
| 16-Aug | 31 | 33 | 23 | 16 | 15 | 13 | 11 | 6 | 1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | 5.6 | 33 | |
| 17-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | 0 | 0 | -0.8 | 0 | |
| 18-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | 4 | 1 | -1 | -1 | -0.4 | 4 |
| 19-Aug | 0 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | 5 | 13 | 9 | 16 | 28 | 22 | 21 | 20 | 16 | 15 | 11 | 8 | 7.4 | 28 |
| 20-Aug | 5 | 3 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | 0 | 0 | -1 | -1 | 0 | 0 | -1 | -1 | 0 | 0 | 0.2 | 5 |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | 0 | 0 | 0 | 0 | 1 | -0.3 | 1 |
| 22-Aug | 3 | 9 | 17 | 27 | 22 | 15 | 12 | 6 | 3 | 1 | -1 | -1 | -1 | -1 | 0 | 0 | -1 | -1 | -1 | 0 | 0 | 0 | 0 | 4.5 | 27 | |
| 23-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | 0 | 0 | -0.5 | 0 | |
| 24-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 25 | 17 | 9 | 4 | 0 | 0 | 0 | 4 | 0 | 6 | 12 | 5 | 0 | 0 | 0 | 3.7 | 25 | |
| 25-Aug | 0 | 0 | 2 | 0 | 0 | 1 | 12 | 6 | 1 | 2 | 7 | 0 | 0 | 0 | 2 | 8 | 1 | 3 | 12 | 25 | 24 | 24 | 17 | 20 | 6.9 | 25 |
| 26-Aug | 14 | 8 | 4 | 1 | 0 | 1 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | 0 | 0 | 0 | 0 | 0.8 | 14 |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 4 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | 0 | 0 | 0 | -0.3 | 4 |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | 0 | 0 | -0.6 | 0 |
| 29-Aug | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | 0 | 0 | 0 | 0 | 0 | -0.4 | 1 |
| 30-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | 0 | 0 | -0.5 | 0 |
| 31-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | 0 | 0 | -0.4 | 0 |
| 1.5 1.5 2.1 2.0 2.2 1.9 1.3 0.6 0.7 0.1 -0.3 -0.8 -0.1 0.6 0.3 0.7 0.5 0.1 0.7 1.3 1.1 1.0 0.8 1.2 | | | | | | | | | | | | | | | | | Diurnal Average | | | | | | | | | |
| 31 33 23 27 22 16 13 9 25 17 9 4 21 32 23 20 28 22 21 25 24 24 17 20 | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Leaf Wetness (SW) - %
Fort Chipewyan - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Leaf Wetness (SW) - %
Fort Chipewyan - August 2017

| Concentration Ranges (%) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 0.3 | 27 | 19.57 | 19.57 |
| 0.4 - 0.5 | 5 | 3.62 | 23.19 |
| 0.6 - 0.7 | 5 | 3.62 | 26.81 |
| 0.8 - 1.4 | 11 | 7.97 | 34.78 |
| 1.5 - 10 | 47 | 34.06 | 68.84 |
| > 10 | 42 | 30.43 | 99.28 |

Total Number of Valid Hours: 138

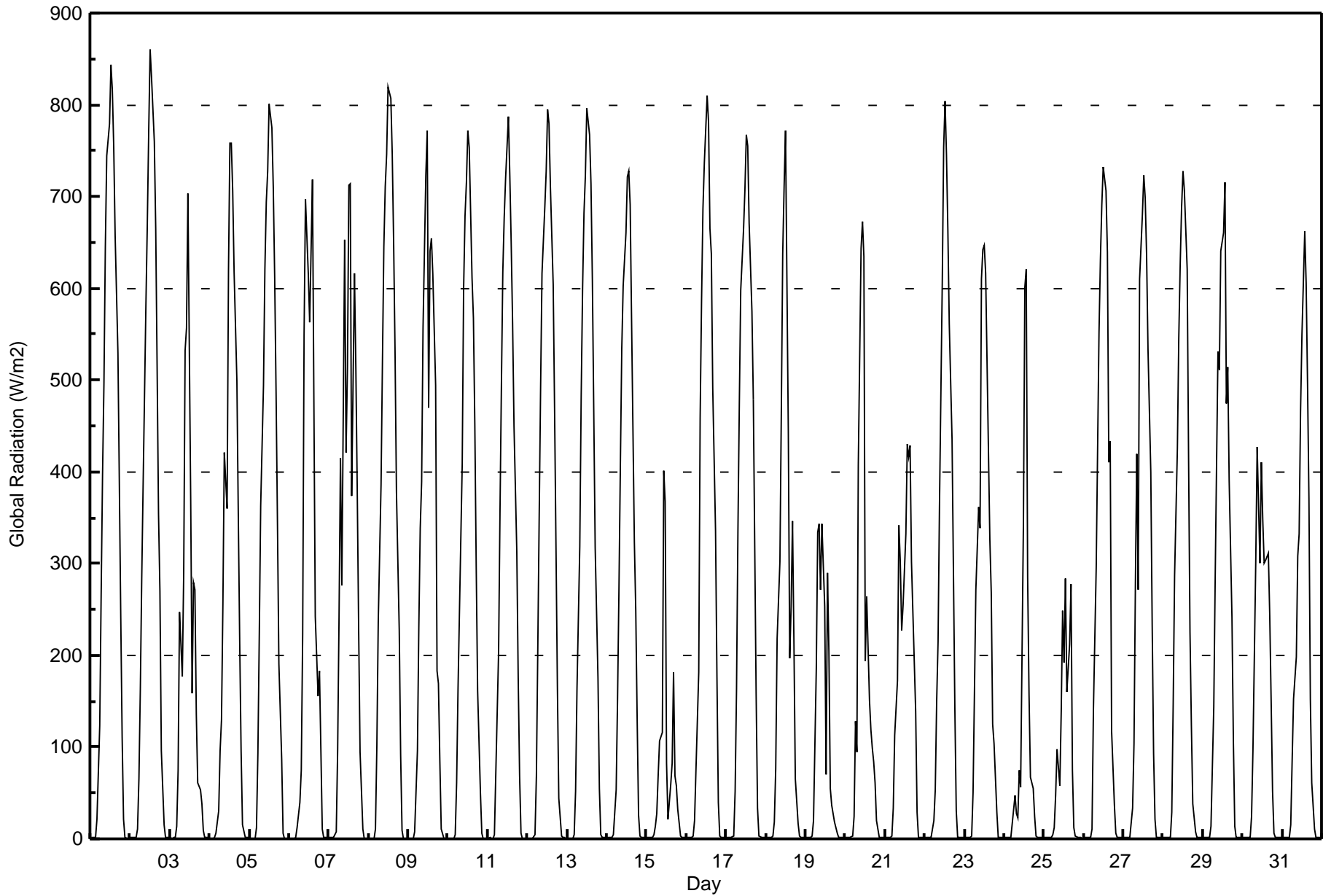
Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

Global Radiation (GR) - W/m2
Fort Chipewyan - August 2017

| Maximum Value: 860 W/m2 on Aug 2 13:00 Maximum Daily Average: 326.9 W/m2 on Aug 1 | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | |
|---|-------------------------------|-----|-----|-----|-----|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---|------|-----|-----|-----|-----|-----------------|---------------|
| Minimum Value: 0 W/m2 on Aug 6 04:00 Minimum Daily Average: 71.2 W/m2 on Aug 15 Maximum Diurnal Average: 615.4 W/m2 at hour 13 Minimum Diurnal Average: 1.1 W/m2 at hour 1 Monthly Average: 224.8 W/m2 Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 92 Q ₃ = 418 P ₉₀ = 670 P ₉₉ = 805 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 1 | 1 | 1 | 1 | 21 | 124 | 265 | 397 | 496 | 646 | 745 | 779 | 844 | 816 | 753 | 658 | 530 | 388 | 244 | 111 | 21 | 1 | 1 | 1 | 326.9 | 844 |
| 2-Aug | 1 | 1 | 1 | 1 | 10 | 66 | 163 | 284 | 386 | 583 | 670 | 772 | 860 | 830 | 759 | 666 | 512 | 354 | 270 | 95 | 15 | 1 | 1 | 1 | 304.3 | 860 |
| 3-Aug | 1 | 1 | 1 | 1 | 14 | 75 | 248 | 177 | 289 | 533 | 557 | 703 | 367 | 159 | 279 | 272 | 136 | 61 | 53 | 39 | 9 | 1 | 1 | 1 | 165.7 | 703 |
| 4-Aug | 1 | 1 | 1 | 1 | 6 | 30 | 96 | 129 | 257 | 420 | 360 | 619 | 758 | 758 | 706 | 617 | 499 | 353 | 215 | 96 | 15 | 1 | 1 | 1 | 247.4 | 758 |
| 5-Aug | 1 | 1 | 1 | 1 | 12 | 93 | 222 | 363 | 495 | 620 | 695 | 728 | 801 | 775 | 709 | 612 | 484 | 342 | 191 | 88 | 7 | 1 | 1 | 1 | 301.7 | 801 |
| 6-Aug | 0 | 0 | 0 | 0 | 2 | 13 | 39 | 75 | 222 | 549 | 697 | 616 | 562 | 640 | 718 | 479 | 243 | 156 | 182 | 97 | 10 | 1 | 1 | 1 | 221.0 | 718 |
| 7-Aug | 1 | 1 | 1 | 1 | 7 | 97 | 244 | 414 | 277 | 652 | 421 | 514 | 713 | 715 | 374 | 616 | 512 | 379 | 229 | 95 | 11 | 0 | 0 | 0 | 261.3 | 715 |
| 8-Aug | 0 | 1 | 0 | 0 | 10 | 101 | 236 | 386 | 520 | 645 | 711 | 745 | 820 | 808 | 746 | 650 | 530 | 379 | 228 | 91 | 10 | 1 | 1 | 1 | 317.5 | 820 |
| 9-Aug | 0 | 0 | 1 | 1 | 8 | 96 | 231 | 338 | 389 | 557 | 724 | 772 | 469 | 640 | 654 | 615 | 495 | 183 | 169 | 85 | 11 | 1 | 0 | 0 | 268.3 | 772 |
| 10-Aug | 0 | 1 | 0 | 1 | 5 | 61 | 163 | 246 | 408 | 600 | 679 | 716 | 772 | 753 | 612 | 567 | 452 | 295 | 162 | 51 | 6 | 0 | 0 | 1 | 272.9 | 772 |
| 11-Aug | 1 | 1 | 0 | 0 | 5 | 72 | 204 | 359 | 495 | 617 | 677 | 720 | 787 | 723 | 649 | 561 | 450 | 312 | 176 | 69 | 6 | 0 | 0 | 0 | 286.8 | 787 |
| 12-Aug | 0 | 0 | 0 | 0 | 5 | 68 | 207 | 353 | 491 | 616 | 687 | 728 | 794 | 779 | 711 | 604 | 466 | 317 | 167 | 45 | 3 | 1 | 1 | 1 | 293.5 | 794 |
| 13-Aug | 1 | 1 | 1 | 1 | 4 | 52 | 164 | 319 | 482 | 600 | 682 | 724 | 797 | 768 | 714 | 608 | 464 | 317 | 175 | 54 | 4 | 2 | 2 | 2 | 289.0 | 797 |
| 14-Aug | 2 | 2 | 2 | 2 | 5 | 54 | 155 | 273 | 407 | 534 | 603 | 660 | 721 | 728 | 690 | 566 | 323 | 248 | 130 | 26 | 3 | 2 | 2 | 2 | 255.7 | 728 |
| 15-Aug | 2 | 2 | 2 | 2 | 4 | 14 | 27 | 69 | 107 | 117 | 401 | 368 | 82 | 22 | 59 | 82 | 182 | 68 | 58 | 32 | 3 | 2 | 2 | 2 | 71.2 | 401 |
| 16-Aug | 2 | 2 | 2 | 2 | 3 | 20 | 74 | 181 | 459 | 586 | 687 | 737 | 810 | 782 | 665 | 637 | 491 | 336 | 177 | 39 | 4 | 2 | 2 | 2 | 279.1 | 810 |
| 17-Aug | 2 | 2 | 2 | 2 | 3 | 52 | 163 | 335 | 474 | 597 | 664 | 708 | 768 | 755 | 671 | 574 | 479 | 318 | 158 | 33 | 3 | 2 | 2 | 2 | 282.0 | 768 |
| 18-Aug | 2 | 2 | 2 | 2 | 3 | 18 | 77 | 218 | 302 | 465 | 638 | 711 | 772 | 444 | 197 | 254 | 346 | 217 | 66 | 18 | 3 | 2 | 2 | 2 | 198.4 | 772 |
| 19-Aug | 2 | 2 | 2 | 2 | 3 | 20 | 186 | 334 | 343 | 272 | 343 | 254 | 71 | 289 | 205 | 55 | 37 | 18 | 12 | 6 | 2 | 2 | 2 | 2 | 102.6 | 343 |
| 20-Aug | 2 | 2 | 2 | 2 | 3 | 25 | 129 | 94 | 407 | 643 | 673 | 634 | 193 | 265 | 152 | 119 | 98 | 85 | 61 | 20 | 2 | 1 | 1 | 1 | 150.5 | 673 |
| 21-Aug | 1 | 1 | 1 | 1 | 2 | 33 | 113 | 172 | 342 | 303 | 227 | 255 | 333 | 430 | 416 | 429 | 303 | 248 | 138 | 28 | 2 | 2 | 2 | 2 | 157.7 | 430 |
| 22-Aug | 2 | 2 | 2 | 1 | 2 | 20 | 54 | 150 | 215 | 362 | 606 | 753 | 804 | 747 | 664 | 562 | 435 | 289 | 142 | 30 | 2 | 2 | 2 | 1 | 243.6 | 804 |
| 23-Aug | 1 | 1 | 1 | 1 | 2 | 51 | 161 | 272 | 361 | 338 | 610 | 641 | 647 | 616 | 423 | 326 | 269 | 126 | 103 | 28 | 2 | 1 | 1 | 1 | 207.7 | 647 |
| 24-Aug | 1 | 1 | 1 | 1 | 2 | 17 | 47 | 28 | 23 | 74 | 56 | 346 | 600 | 620 | 285 | 157 | 67 | 55 | 24 | 4 | 2 | 1 | 1 | 1 | 100.6 | 620 |
| 25-Aug | 1 | 1 | 1 | 1 | 1 | 4 | 12 | 48 | 98 | 58 | 139 | 249 | 193 | 284 | 161 | 213 | 277 | 75 | 12 | 3 | 1 | 1 | 1 | 1 | 76.5 | 284 |
| 26-Aug | 1 | 1 | 1 | 1 | 1 | 11 | 141 | 296 | 426 | 553 | 631 | 691 | 732 | 707 | 639 | 411 | 434 | 118 | 36 | 6 | 1 | 1 | 1 | 1 | 243.3 | 732 |
| 27-Aug | 1 | 1 | 1 | 1 | 1 | 34 | 104 | 278 | 419 | 272 | 610 | 681 | 723 | 699 | 636 | 533 | 400 | 232 | 94 | 21 | 2 | 2 | 2 | 2 | 239.5 | 723 |
| 28-Aug | 2 | 2 | 2 | 2 | 2 | 29 | 147 | 286 | 425 | 547 | 626 | 688 | 728 | 707 | 621 | 415 | 226 | 124 | 39 | 7 | 2 | 2 | 2 | 2 | 234.6 | 728 |
| 29-Aug | 2 | 2 | 2 | 2 | 2 | 13 | 143 | 282 | 409 | 531 | 510 | 641 | 661 | 716 | 474 | 514 | 391 | 242 | 106 | 14 | 2 | 2 | 2 | 2 | 235.9 | 716 |
| 30-Aug | 2 | 2 | 2 | 2 | 2 | 24 | 98 | 200 | 301 | 427 | 301 | 411 | 347 | 301 | 303 | 311 | 243 | 149 | 52 | 7 | 2 | 2 | 2 | 2 | 145.5 | 427 |
| 31-Aug | 2 | 2 | 2 | 2 | 2 | 15 | 85 | 152 | 198 | 309 | 332 | 465 | 549 | 662 | 606 | 496 | 371 | 153 | 60 | 10 | 2 | 2 | 2 | 2 | 186.6 | 662 |
| | 1.1 | 1.1 | 1.1 | 1.2 | 4.9 | 45.1 | 141.9 | 242.3 | 352.4 | 471.9 | 547.2 | 613.9 | 615.4 | 610.9 | 524.2 | 457.4 | 359.5 | 223.7 | 126.8 | 43.5 | 5.2 | 1.2 | 1.2 | 1.2 | Diurnal Average | |
| | 2 | 2 | 2 | 2 | 21 | 124 | 265 | 414 | 520 | 652 | 745 | 779 | 860 | 830 | 759 | 666 | 530 | 388 | 270 | 111 | 21 | 2 | 2 | 2 | Diurnal Maximum | |





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Global Radiation (GR) - W/m2
Fort Chipewyan - August 2017

| Concentration Ranges (W/m2) | Number of Hours | % | Cumulative % |
|------------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 302 | 40.59 | 40.59 |
| 21 - 100 | 83 | 11.16 | 51.75 |
| 101 - 300 | 112 | 15.05 | 66.80 |
| 301 - 600 | 125 | 16.80 | 83.60 |
| 601 - 900 | 122 | 16.40 | 100.00 |
| > 900 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h
Fort Chipewyan - August 2017

| | | |
|--|--|---------------------------------|
| Maximum Speed: 32 km/h on Aug 25 22:00 | Maximum Daily Speed Average: 21.7 km/h on Aug 13 | Hours in Service: 744 |
| Minimum Speed Value: 1 km/h on Aug 1 08:00 | Minimum Daily Speed Average: 1.1 km/h on Aug 1 | Hours of Data: 744 |
| Maximum Diurnal Speed Average: 7.8 km/h at hour 15 | Minimum Diurnal Speed Average: 2.8 km/h at hour 22 | Hours of Missing Data: 0 |
| Monthly Average Velocity: 4.8 km/h 217.5 deg | Percentiles: P ₁ = 3 P ₁₀ = 5 Q ₁ = 8 Median = 12 Q ₃ = 17 P ₉₀ = 22 P ₉₉ = 29 | Percent Operational Time: 100.0 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | NE13 | NNE12 | NNE9 | NNW4 | N11 | N9 | N5 | W1 | SSW5 | SW8 | SE11 | ESE14 | ESE13 | ESE13 | SE11 | SW7 | WSW14 | WSW14 | WSW13 | WSW10 | WSW8 | WSW8 | WSW8 | WSW7 | SSW1.1 | WSW14 |
| 2-Aug | W7 | W7 | W6 | W7 | WSW5 | WSW4 | SW4 | SW6 | SW8 | SSW9 | SSE5 | SSE7 | SSW11 | SW11 | SW13 | SW11 | SW11 | SW10 | SW9 | SW4 | ESE3 | E4 | E4 | E5 | SW5.3 | SW13 |
| 3-Aug | ESE6 | ESE7 | ESE7 | SE5 | SE2 | SSW2 | SSE4 | ESE3 | ESE6 | E8 | E7 | E11 | E10 | E8 | E13 | E18 | E14 | E6 | ENE10 | E15 | NE8 | NE9 | NNE1 | ENE3 | E6.9 | E18 |
| 4-Aug | NE8 | ENE11 | NE13 | NE8 | ENE10 | E13 | SE15 | ESE10 | SE16 | SE15 | ESE8 | E8 | E8 | E11 | E15 | E12 | E10 | E8 | ESE6 | E3 | E3 | WNW8 | W6 | NW5 | E7.2 | SE16 |
| 5-Aug | NNW5 | WSW3 | W5 | W6 | W3 | NNW5 | WNW4 | WNW5 | W8 | W9 | SW11 | SW13 | SW14 | WSW15 | SW16 | SW14 | WSW12 | W8 | WSW6 | SW7 | W6 | N16 | N17 | N13 | W6.4 | N17 |
| 6-Aug | NNE8 | N8 | NNW8 | N10 | NNW8 | NW10 | NNW11 | NNW11 | NNW11 | NNW14 | NW14 | NW15 | NW14 | NW15 | NNW13 | NW16 | NNW11 | NNW13 | NNW13 | NNW12 | NW11 | NW10 | NW10 | NNW10 | NNW11.2 | NW16 |
| 7-Aug | NNW12 | NNW12 | NNW12 | NNW13 | NNW8 | NNW11 | NNW7 | NNW8 | NW6 | NW9 | NNW11 | W11 | W12 | WSW12 | WSW9 | SW10 | S9 | SSW6 | S8 | SSW8 | WSW6 | WSW6 | SW6 | SW5 | WNW5.4 | NNW13 |
| 8-Aug | S4 | SE4 | SSW5 | SSW5 | SSE4 | SE7 | S7 | S5 | S6 | S9 | SSE7 | ESE9 | ESE9 | SSW7 | WSW14 | W12 | W9 | W7 | WSW6 | SSW4 | SSE3 | E6 | E6 | E6 | S3.5 | WSW14 |
| 9-Aug | ESE10 | ESE7 | E6 | E5 | ESE5 | E6 | SE5 | SE5 | E5 | E6 | E8 | E11 | E11 | E11 | E13 | E13 | E12 | E10 | E12 | E10 | E10 | E9 | ESE7 | ESE8 | E8.4 | E13 |
| 10-Aug | S1 | S4 | E7 | NNW4 | NW5 | NW6 | E3 | SSW5 | SSW5 | SSE4 | SE6 | SE6 | S9 | SSW11 | WSW10 | W11 | WNW8 | WSW10 | W10 | SW8 | WSW7 | WSW6 | WSW6 | W6 | WSW3.7 | W11 |
| 11-Aug | WNW5 | WNW6 | SSW3 | SW3 | ESE4 | ESE6 | SSE6 | SSW4 | S7 | SSE7 | SSE8 | ESE12 | S8 | SW14 | SSW9 | E14 | E16 | E17 | E15 | S15 | S18 | S22 | SSW26 | SSW25 | SSE7.5 | SSW26 |
| 12-Aug | SSW18 | SSW15 | SSW14 | SSW13 | SSW16 | SSW18 | SSW17 | S19 | S19 | S16 | SSE19 | SSE24 | S30 | SSW31 | SSW29 | SSW24 | SSW19 | S17 | S16 | S17 | S19 | S18 | S22 | S23 | S19.3 | SSW31 |
| 13-Aug | S25 | S21 | S22 | SSE18 | SSE18 | SSE21 | SSE23 | SSE21 | SSE20 | SSE22 | SSE22 | SSE18 | SSE31 | SSE31 | SSE26 | SE21 | SE23 | SE19 | SE18 | SE20 | SE25 | SSE24 | SSE22 | SSE22 | SSE21.7 | SSE31 |
| 14-Aug | SSE21 | SSE23 | SSE22 | SSE22 | SSE19 | SSE18 | SSE20 | SSE14 | SE10 | ESE13 | E14 | E9 | SSE7 | SSW16 | SSW18 | SW12 | W13 | WNW8 | W8 | WSW15 | WSW15 | WSW9 | SW10 | SW8 | S9.6 | SSE23 |
| 15-Aug | S12 | S15 | S14 | SSE15 | SSE10 | SSE14 | SSE15 | SSE14 | SE13 | SE5 | E7 | ESE9 | ESE5 | S6 | W15 | WNW15 | WNW13 | W11 | WNW10 | W8 | WNW10 | WNW8 | NW8 | NW6 | SSW4.5 | S15 |
| 16-Aug | W5 | WNW3 | NW6 | NW6 | WNW5 | WNW5 | WNW9 | WNW10 | WNW9 | NW8 | NW7 | NNW5 | SW2 | WSW6 | SE5 | SW5 | SSW7 | SE8 | S10 | SSW8 | SSW4 | SSE3 | SSW4 | WSW4 | W3.2 | S10 |
| 17-Aug | SW4 | SW5 | WSW6 | W6 | W6 | WSW6 | W7 | WNW10 | WNW10 | W10 | W10 | W13 | W14 | W17 | W15 | W16 | W14 | WSW14 | WSW11 | W10 | W9 | W7 | WSW5 | SW6 | W9.4 | W17 |
| 18-Aug | SW10 | SW12 | SSW14 | SW10 | SW8 | SSW11 | SW13 | SSW16 | SSW14 | SW19 | SW20 | SW20 | SW18 | SW14 | WSW9 | SW7 | SSE5 | ESE9 | WSW9 | WNW7 | SW7 | WNW5 | N4 | NNW8 | SW9.2 | SW20 |
| 19-Aug | WNW8 | WNW10 | WNW12 | W11 | W15 | W14 | W14 | WSW20 | W24 | WSW22 | WSW23 | W20 | W16 | W12 | W18 | W18 | WNW14 | WNW17 | WNW16 | W15 | W17 | W16 | W16 | W11 | W15.4 | W24 |
| 20-Aug | WNW10 | W10 | W13 | W16 | W17 | W17 | W15 | W15 | W20 | W26 | W26 | W28 | W24 | WNW21 | NW15 | NW14 | NW15 | NW13 | WNW12 | WNW14 | NW21 | NW20 | WNW14 | WNW13 | WNW16.2 | W28 |
| 21-Aug | WNW13 | W12 | W11 | WNW11 | W11 | W13 | W12 | W10 | W13 | WNW12 | W12 | W15 | WNW18 | WNW15 | WNW13 | NW9 | NW11 | NW13 | NNW9 | NNW6 | NNW8 | NNW7 | NNW7 | NNW8 | WNW10.3 | WNW18 |
| 22-Aug | NNW8 | NNW9 | NNW8 | NNW8 | NNW8 | NW6 | NW6 | NNW6 | NNW6 | NW5 | WNW7 | SSW8 | SE10 | ESE13 | ESE13 | ESE14 | E17 | E16 | ESE17 | E14 | ENE11 | E14 | E21 | ESE19 | ENE5.5 | E21 |
| 23-Aug | ESE17 | ESE15 | ESE14 | ESE13 | SE12 | ESE17 | ESE19 | ESE16 | ESE19 | E22 | ESE19 | SSE22 | SSE23 | S26 | S28 | SSW29 | SSW32 | S25 | S21 | SSE21 | SSE23 | SSE22 | SSE22 | S20 | SSE17.7 | SSW32 |
| 24-Aug | S20 | S18 | S12 | S14 | SSE12 | SSE14 | SSE11 | S18 | SSW19 | SE14 | SSW19 | SE18 | E21 | E22 | E17 | E13 | ESE21 | SE28 | SE17 | NNE4 | E15 | E17 | E17 | ESE18 | SE13.2 | SE28 |
| 25-Aug | ESE15 | SE14 | SW9 | W9 | W11 | W14 | WSW14 | SW9 | SW16 | SSW14 | SSW18 | S23 | SSW26 | SSW26 | SSW25 | SSW21 | WSW19 | WSW23 | WSW19 | W23 | W26 | W32 | W29 | W28 | WSW14.9 | W32 |
| 26-Aug | W26 | W21 | W20 | W18 | WSW17 | W15 | W15 | W18 | W18 | W19 | WSW19 | W18 | W18 | W18 | W20 | W16 | W15 | W11 | W9 | WSW11 | WSW9 | WSW10 | WSW11 | WSW13 | W15.9 | W26 |
| 27-Aug | WSW11 | WSW10 | WSW10 | WSW8 | W9 | W11 | WSW10 | W13 | W19 | W18 | W19 | WNW15 | W16 | W20 | W25 | W27 | W27 | W23 | W17 | W14 | W15 | W13 | W13 | W13 | W15.5 | W27 |
| 28-Aug | W12 | W13 | W13 | W13 | W13 | W13 | W12 | W14 | W18 | W22 | W25 | W26 | W27 | W26 | W22 | W19 | W19 | NNW12 | NNW9 | NNW7 | NW8 | NW9 | W6 | WNW7 | W14.4 | W27 |
| 29-Aug | W6 | WNW8 | WNW7 | WNW9 | NW8 | WNW8 | NW7 | WNW6 | NNW7 | W5 | NW8 | WNW8 | NW7 | WNW8 | W6 | WSW7 | SE5 | ESE9 | E14 | ESE19 | E20 | E24 | ESE24 | ESE22 | ENE1.5 | ESE24 |
| 30-Aug | SE19 | SSE21 | SSE22 | SSE25 | SSE21 | SSE22 | SSE23 | SE22 | SE23 | SE22 | SE20 | ESE20 | SE23 | SE24 | SE22 | SE24 | SE21 | SE19 | SSE17 | SSE23 | SSE23 | SSE22 | S22 | S22 | SSE21.0 | SSE25 |
| 31-Aug | SSW19 | SSW15 | SSW10 | SW12 | SW10 | SW10 | SW8 | SW10 | WSW12 | WSW16 | WSW16 | W17 | WSW21 | WSW24 | W24 | W24 | W22 | W24 | W22 | W19 | W14 | W13 | W12 | W11 | WSW14.9 | W24 |

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------|--------|-------|-------|-------|-------|--------|-------|-------|-------|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|-----------------|--|
| SSW3.7 | SSW4.2 | SW4.0 | SW4.2 | SW3.8 | SW4.2 | SSW5.0 | SW5.4 | SW5.8 | SW5.2 | SW5.3 | SSW5.3 | SSW6.8 | SW7.8 | SW7.8 | SW6.4 | SW5.1 | SW3.9 | SW3.8 | SW4.1 | SW3.6 | SW2.8 | SSW3.9 | SSW4.1 | Diurnal Average | |
| W26 | SSE23 | SSE22 | SSE25 | SSE21 | SSE22 | SSE23 | SE22 | W24 | W26 | W26 | W28 | SSE31 | SSW31 | SSW29 | SSW29 | SSW32 | SE28 | W22 | SSE23 | W26 | W32 | W29 | W28 | Diurnal Maximum | |

All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

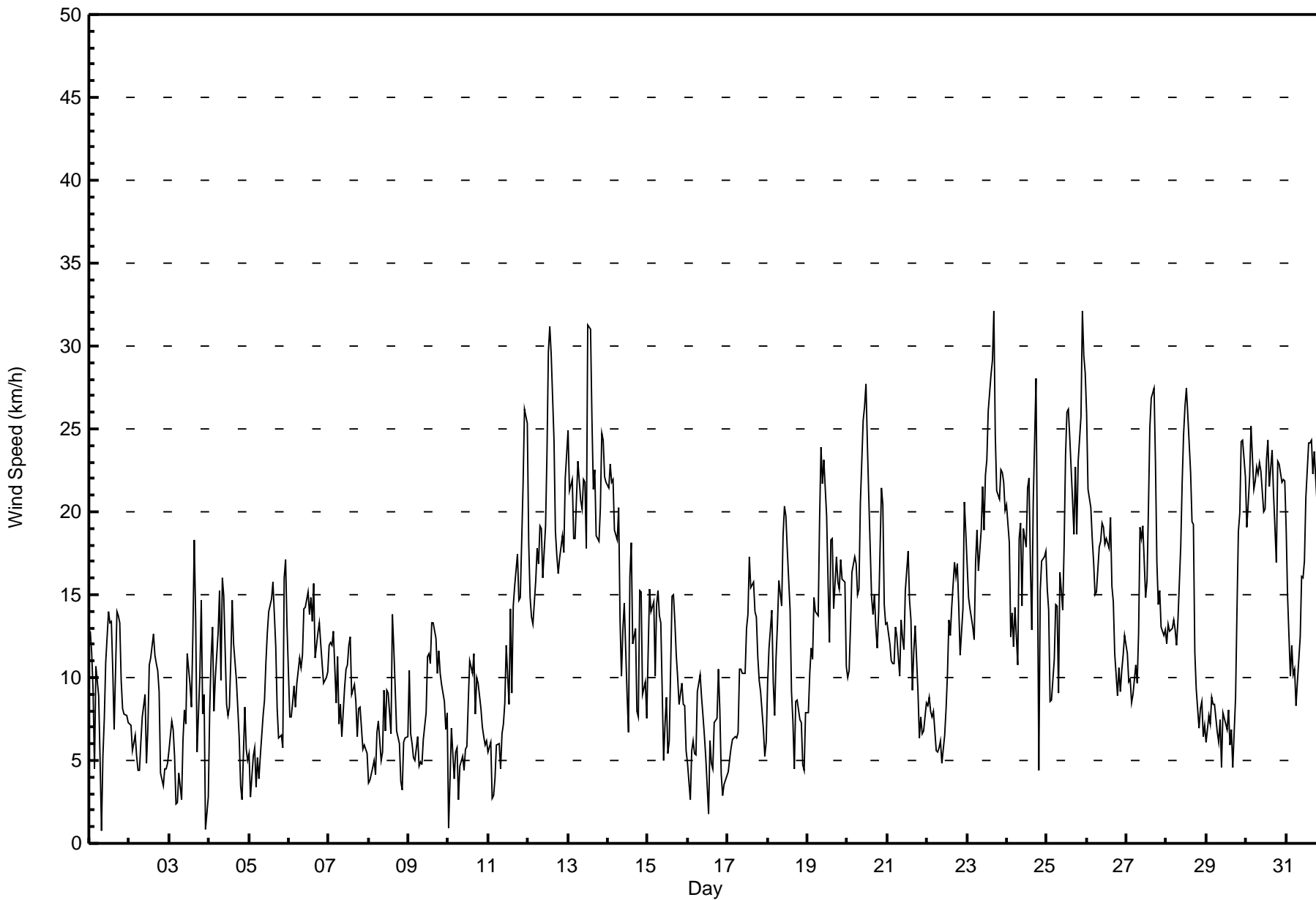
Wind Speed (WS) - km/h
Fort Chipewyan - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on Aug 24 08:00 Minimum Value: 0 km/h on Aug 29 02:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 7 | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | |
|--|-------------------------------|---|---|---|---|---|---|----|---|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 3 | 2 | 3 | 2 | 3 | 2 | 2 | 1 | 1 | 3 | 2 | 1 | 1 | 2 | 3 | 4 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 4 |
| 2-Aug | 2 | 3 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 1 | 1 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 3 |
| 3-Aug | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 2 | 3 | 2 | 1 | 3 | 2 | 2 | 2 | 1 | 3 |
| 4-Aug | 3 | 1 | 2 | 2 | 2 | 3 | 4 | 1 | 2 | 4 | 2 | 1 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 4 |
| 5-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 3 | 3 | 2 | 3 | 4 | 3 | 3 | 3 | 2 | 2 | 1 | 2 | 5 | 5 | 5 | 5 |
| 6-Aug | 3 | 3 | 2 | 4 | 3 | 3 | 3 | 3 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 5 | 4 | 3 | 3 | 2 | 3 | 5 |
| 7-Aug | 3 | 3 | 3 | 3 | 4 | 3 | 4 | 3 | 2 | 3 | 3 | 4 | 4 | 5 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 5 |
| 8-Aug | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 3 | 4 | 3 | 3 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 4 |
| 9-Aug | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 3 |
| 10-Aug | 5 | 3 | 1 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 2 | 5 |
| 11-Aug | 3 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 1 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 3 |
| 12-Aug | 4 | 2 | 2 | 2 | 4 | 2 | 3 | 2 | 2 | 2 | 3 | 4 | 5 | 5 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 3 | 2 | 6 |
| 13-Aug | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 5 | 5 | 4 | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 5 |
| 14-Aug | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 5 | 3 | 4 | 4 | 3 | 2 | 2 | 7 | 5 | 2 | 2 | 2 | 2 | 7 |
| 15-Aug | 2 | 2 | 2 | 3 | 2 | 3 | 2 | 2 | 3 | 2 | 1 | 2 | 3 | 6 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 6 |
| 16-Aug | 1 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 1 | 2 | 2 | 1 | 3 |
| 17-Aug | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 4 | 4 | 3 | 2 | 2 | 2 | 1 | 2 | 3 | 5 |
| 18-Aug | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 4 | 4 | 3 | 2 | 2 | 1 | 2 | 5 | 3 | 3 | 3 | 2 | 2 | 5 |
| 19-Aug | 1 | 2 | 4 | 3 | 3 | 3 | 4 | 5 | 6 | 6 | 5 | 6 | 5 | 5 | 6 | 6 | 6 | 5 | 4 | 4 | 4 | 4 | 5 | 3 | 6 |
| 20-Aug | 2 | 2 | 3 | 4 | 4 | 4 | 3 | 4 | 6 | 6 | 7 | 7 | 6 | 6 | 5 | 4 | 5 | 4 | 3 | 4 | 7 | 7 | 3 | 3 | 7 |
| 21-Aug | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 3 | 4 | 5 | 3 | 4 | 3 | 4 | 4 | 4 | 2 | 2 | 1 | 1 | 1 | 5 |
| 22-Aug | 2 | 2 | 1 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 4 | 1 | 3 | 2 | 2 | 4 |
| 23-Aug | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 4 | 5 | 6 | 5 | 3 | 3 | 3 | 4 | 3 | 3 | 3 | 6 |
| 24-Aug | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 11 | 6 | 2 | 4 | 2 | 3 | 4 | 4 | 1 | 4 | 4 | 4 | 2 | 3 | 2 | 2 | 2 | 11 |
| 25-Aug | 2 | 3 | 2 | 2 | 4 | 4 | 4 | 2 | 3 | 4 | 3 | 4 | 4 | 4 | 4 | 5 | 4 | 5 | 5 | 4 | 6 | 7 | 8 | 7 | 8 |
| 26-Aug | 7 | 5 | 5 | 4 | 4 | 3 | 3 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 3 | 3 | 2 | 2 | 1 | 2 | 2 | 2 | 7 |
| 27-Aug | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 4 | 4 | 5 | 5 | 5 | 5 | 6 | 6 | 7 | 7 | 7 | 5 | 3 | 3 | 3 | 3 | 2 | 7 |
| 28-Aug | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 6 | 7 | 8 | 6 | 7 | 6 | 6 | 5 | 3 | 2 | 2 | 2 | 1 | 1 | 8 |
| 29-Aug | 1 | 0 | 2 | 1 | 1 | 2 | 3 | 2 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 2 | 3 | 2 | 2 | 2 | 3 | 2 | 3 |
| 30-Aug | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 1 | 3 | 2 | 2 | 3 | 2 | 2 | 3 | 3 | 4 | 3 | 3 | 3 | 4 |
| 31-Aug | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 6 | 6 | 7 | 6 | 6 | 5 | 6 | 3 | 3 | 3 | 3 | 7 |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Fort Chipewyan - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Fort Chipewyan - August 2017**

| Wind Speed Ranges (km/h) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 5 | 81 | 10.89 | 10.89 |
| 6 - 11 | 278 | 37.37 | 48.25 |
| 12 - 19 | 258 | 34.68 | 82.93 |
| 20 - 28 | 118 | 15.86 | 98.79 |
| 29 - 38 | 9 | 1.21 | 100.00 |
| > 38 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Fort Chipewyan - August 2017**

| Wind Speed Ranges (km/h) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-----------------------------|----------------|-----|----|-----|----|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 5 | 2 | 2 | 0 | 1 | 8 | 5 | 8 | 7 | 4 | 12 | 7 | 5 | 5 | 7 | 4 | 4 | 81 |
| 6 - 11 | 4 | 2 | 4 | 4 | 27 | 18 | 8 | 8 | 8 | 16 | 26 | 34 | 39 | 29 | 23 | 28 | 278 |
| 12 - 19 | 3 | 1 | 2 | 0 | 26 | 22 | 12 | 16 | 17 | 18 | 13 | 20 | 72 | 16 | 11 | 9 | 258 |
| 20 - 28 | 0 | 0 | 0 | 0 | 6 | 4 | 14 | 31 | 15 | 7 | 1 | 8 | 29 | 1 | 2 | 0 | 118 |
| 29 - 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 4 | 0 | 0 | 2 | 0 | 0 | 0 | 9 |
| > 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 9 | 5 | 6 | 5 | 67 | 49 | 42 | 64 | 45 | 57 | 47 | 67 | 147 | 53 | 40 | 41 | 744 |

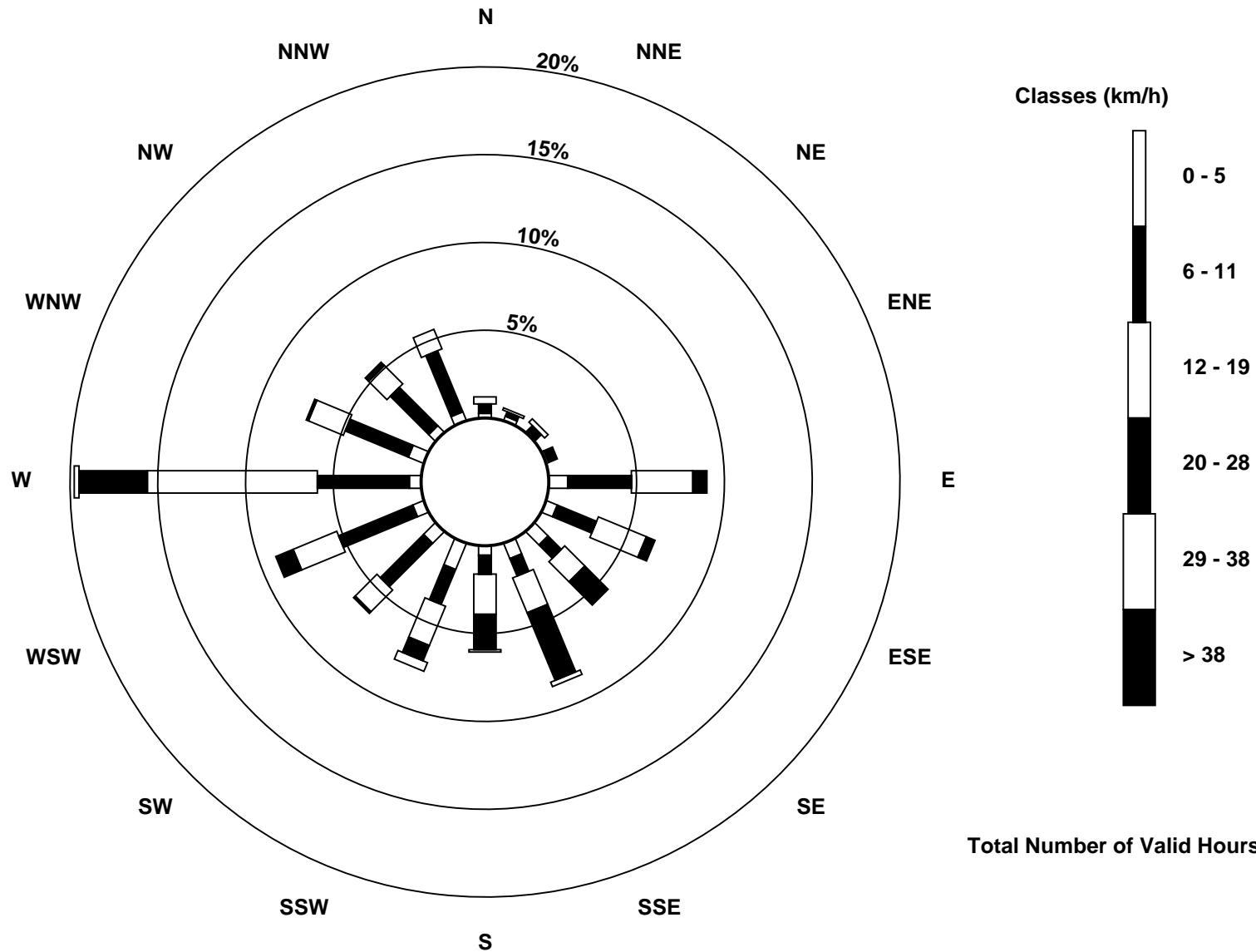
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Wind Speed (WS) - km/h
Fort Chipewyan (AMS 8)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Fort Chipewyan - August 2017

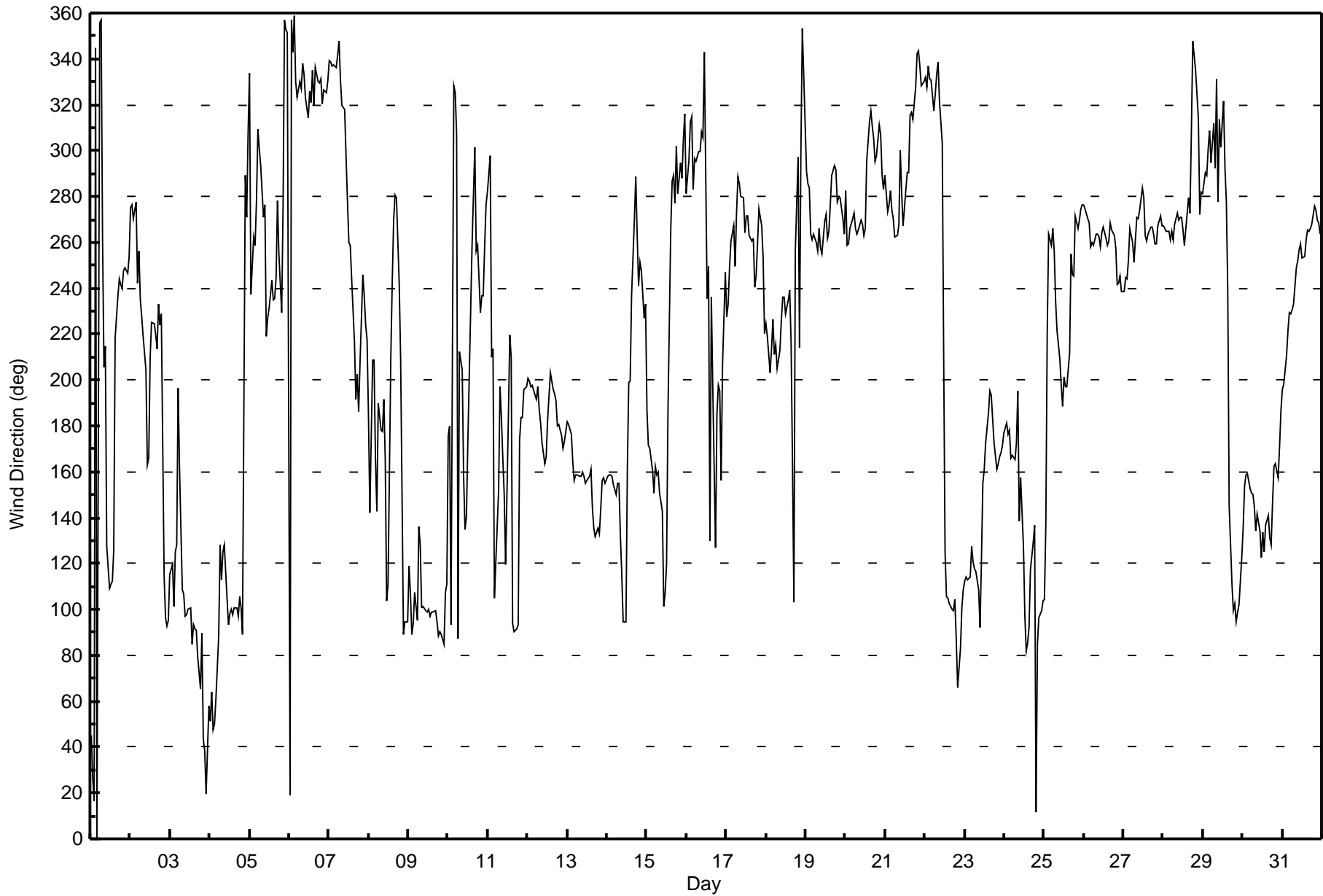
| Direction of Maximum Speed: 270 deg on Aug 25 22:00 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 | | | | |
|--|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------------------------|-------|-----|---------------|-------|
| Direction of Maximum Daily Speed Average: 156.0 deg on Aug 13 | | | | | | | | | | | | | | | | | | | | | | Hours of Data: 744 | | | | |
| Direction of Minimum Speed: 263 deg on Aug 1 08:00 | | | | | | | | | | | Direction of Minimum Daily Speed Average: 1.1 deg on Aug 1 | | | | | | | | | | | Hours of Missing Data: 0 | | | | |
| Monthly Average Direction: 256.4 deg | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 45 | 26 | 16 | 345 | 1 | 356 | 357 | 263 | 206 | 215 | 128 | 109 | 111 | 113 | 126 | 219 | 237 | 244 | 241 | 240 | 248 | 249 | 246 | 254 | 212.6 | |
| 2-Aug | 275 | 277 | 270 | 277 | 242 | 256 | 235 | 228 | 219 | 204 | 163 | 166 | 209 | 225 | 225 | 219 | 214 | 233 | 224 | 229 | 115 | 97 | 93 | 95 | 221.7 | |
| 3-Aug | 115 | 120 | 102 | 125 | 128 | 196 | 162 | 108 | 107 | 97 | 98 | 100 | 101 | 85 | 93 | 91 | 91 | 79 | 65 | 90 | 43 | 38 | 20 | 58 | 92.5 | |
| 4-Aug | 51 | 64 | 48 | 50 | 61 | 88 | 128 | 113 | 125 | 128 | 104 | 93 | 98 | 100 | 98 | 101 | 100 | 97 | 105 | 100 | 89 | 289 | 271 | 307 | 93.8 | |
| 5-Aug | 334 | 238 | 263 | 259 | 278 | 309 | 301 | 294 | 271 | 276 | 219 | 227 | 232 | 244 | 235 | 235 | 244 | 278 | 255 | 230 | 276 | 357 | 352 | 352 | 269.2 | |
| 6-Aug | 19 | 357 | 343 | 359 | 330 | 323 | 330 | 327 | 338 | 333 | 323 | 314 | 326 | 321 | 335 | 320 | 336 | 330 | 330 | 331 | 321 | 326 | 325 | 331 | 330.8 | |
| 7-Aug | 339 | 339 | 337 | 337 | 336 | 342 | 348 | 331 | 320 | 318 | 297 | 278 | 260 | 258 | 244 | 216 | 191 | 203 | 186 | 208 | 246 | 237 | 224 | 218 | 286.2 | |
| 8-Aug | 185 | 142 | 209 | 209 | 166 | 143 | 190 | 178 | 178 | 191 | 165 | 104 | 111 | 211 | 243 | 270 | 281 | 280 | 242 | 208 | 150 | 89 | 95 | 94 | 187.6 | |
| 9-Aug | 119 | 107 | 89 | 94 | 108 | 95 | 136 | 128 | 101 | 101 | 100 | 99 | 100 | 97 | 99 | 99 | 99 | 94 | 89 | 90 | 89 | 85 | 107 | 111 | 99.9 | |
| 10-Aug | 176 | 180 | 94 | 328 | 325 | 307 | 87 | 212 | 205 | 158 | 135 | 141 | 173 | 201 | 258 | 280 | 301 | 256 | 259 | 229 | 237 | 237 | 257 | 277 | 237.6 | |
| 11-Aug | 282 | 298 | 210 | 214 | 105 | 121 | 152 | 197 | 184 | 166 | 150 | 120 | 184 | 219 | 210 | 94 | 91 | 92 | 93 | 174 | 184 | 184 | 196 | 197 | 165.6 | |
| 12-Aug | 201 | 199 | 197 | 197 | 193 | 192 | 197 | 187 | 181 | 173 | 163 | 167 | 183 | 193 | 203 | 196 | 194 | 191 | 180 | 181 | 176 | 170 | 173 | 178 | 186.0 | |
| 13-Aug | 182 | 181 | 176 | 164 | 156 | 159 | 158 | 158 | 158 | 160 | 158 | 155 | 156 | 158 | 161 | 145 | 135 | 132 | 135 | 133 | 144 | 156 | 157 | 155 | 156.0 | |
| 14-Aug | 158 | 158 | 159 | 158 | 155 | 150 | 155 | 155 | 132 | 116 | 95 | 94 | 162 | 199 | 200 | 236 | 269 | 289 | 289 | 264 | 241 | 251 | 248 | 227 | 233 | 177.5 |
| 15-Aug | 187 | 171 | 170 | 161 | 151 | 162 | 158 | 160 | 150 | 142 | 101 | 107 | 120 | 186 | 265 | 286 | 289 | 277 | 302 | 281 | 294 | 288 | 305 | 316 | 201.7 | |
| 16-Aug | 281 | 296 | 313 | 315 | 283 | 296 | 295 | 299 | 300 | 308 | 305 | 343 | 235 | 250 | 130 | 236 | 198 | 127 | 186 | 198 | 195 | 156 | 207 | 247 | 263.1 | |
| 17-Aug | 228 | 233 | 249 | 260 | 267 | 249 | 273 | 289 | 286 | 280 | 280 | 264 | 272 | 272 | 263 | 260 | 262 | 240 | 245 | 259 | 274 | 267 | 253 | 220 | 263.0 | |
| 18-Aug | 225 | 219 | 203 | 214 | 227 | 211 | 216 | 205 | 213 | 226 | 236 | 236 | 229 | 235 | 239 | 216 | 162 | 103 | 256 | 297 | 214 | 300 | 353 | 333 | 226.5 | |
| 19-Aug | 291 | 285 | 284 | 264 | 261 | 263 | 260 | 256 | 266 | 257 | 255 | 269 | 272 | 262 | 265 | 277 | 289 | 293 | 292 | 278 | 279 | 280 | 271 | 264 | 271.0 | |
| 20-Aug | 282 | 259 | 259 | 266 | 270 | 273 | 266 | 264 | 266 | 270 | 268 | 263 | 266 | 295 | 313 | 317 | 311 | 305 | 296 | 298 | 311 | 307 | 289 | 283 | 281.7 | |
| 21-Aug | 289 | 273 | 277 | 282 | 274 | 270 | 262 | 263 | 268 | 300 | 281 | 267 | 283 | 290 | 290 | 316 | 317 | 314 | 328 | 342 | 344 | 337 | 328 | 330 | 291.8 | |
| 22-Aug | 332 | 327 | 337 | 331 | 331 | 317 | 324 | 333 | 339 | 321 | 303 | 212 | 125 | 105 | 105 | 103 | 100 | 100 | 104 | 86 | 66 | 83 | 100 | 108 | 77.8 | |
| 23-Aug | 112 | 114 | 113 | 114 | 127 | 121 | 118 | 116 | 109 | 92 | 121 | 155 | 161 | 172 | 185 | 195 | 193 | 183 | 173 | 161 | 163 | 167 | 168 | 171 | 152.6 | |
| 24-Aug | 177 | 181 | 176 | 178 | 166 | 167 | 165 | 173 | 195 | 139 | 158 | 128 | 97 | 82 | 85 | 92 | 117 | 130 | 137 | 12 | 85 | 97 | 100 | 103 | 133.5 | |
| 25-Aug | 104 | 137 | 221 | 263 | 259 | 266 | 256 | 234 | 222 | 209 | 197 | 189 | 201 | 197 | 197 | 212 | 255 | 246 | 245 | 271 | 266 | 270 | 274 | 276 | 234.8 | |
| 26-Aug | 277 | 275 | 271 | 268 | 258 | 260 | 259 | 264 | 263 | 262 | 258 | 264 | 267 | 262 | 259 | 260 | 268 | 266 | 263 | 257 | 242 | 242 | 245 | 238 | 262.1 | |
| 27-Aug | 239 | 245 | 244 | 252 | 266 | 260 | 251 | 261 | 271 | 270 | 274 | 283 | 279 | 263 | 261 | 263 | 267 | 267 | 264 | 259 | 259 | 268 | 272 | 267 | 264.2 | |
| 28-Aug | 267 | 266 | 265 | 265 | 261 | 265 | 261 | 268 | 273 | 270 | 271 | 271 | 265 | 259 | 273 | 280 | 273 | 308 | 348 | 335 | 325 | 313 | 272 | 282 | 274.4 | |
| 29-Aug | 281 | 291 | 289 | 301 | 309 | 295 | 312 | 292 | 331 | 278 | 313 | 301 | 322 | 293 | 277 | 238 | 145 | 111 | 99 | 102 | 95 | 99 | 102 | 123 | 68.5 | |
| 30-Aug | 135 | 154 | 159 | 160 | 153 | 150 | 150 | 145 | 134 | 142 | 134 | 123 | 134 | 125 | 137 | 141 | 131 | 128 | 147 | 162 | 164 | 157 | 171 | 187 | 146.9 | |
| 31-Aug | 196 | 198 | 210 | 222 | 230 | 229 | 230 | 233 | 249 | 252 | 257 | 260 | 253 | 254 | 261 | 266 | 265 | 266 | 268 | 276 | 274 | 270 | 268 | 263 | 251.7 | |
| 205.8 | 206.1 | 216.0 | 226.1 | 227.5 | 218.6 | 208.1 | 216.2 | 221.2 | 222.0 | 215.9 | 206.8 | 206.8 | 215.4 | 221.6 | 228.3 | 227.1 | 222.7 | 216.9 | 219.9 | 223.0 | 224.2 | 212.4 | 212.4 | | | |
| Diurnal Average | | | | | | | | | | | | | | | | | | | | | | | | | | |
| All monthly, daily, and diurnal averages have been calculated using vector methods | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Fort Chipewyan - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 99 deg on Aug 16 13:00 Minimum Value: 4 deg on Aug 30 12:00 Percentiles: P ₁ = 5 P ₁₀ = 7 Q ₁ = 10 Median = 15 Q ₃ = 21 P ₉₀ = 34 P ₉₉ = 68 | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|--|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 10 | 14 | 32 | 65 | 20 | 20 | 39 | 91 | 35 | 49 | 7 | 8 | 10 | 11 | 53 | 70 | 18 | 18 | 12 | 11 | 10 | 6 | 10 | 7 | 91 | |
| 2-Aug | 15 | 16 | 18 | 12 | 15 | 15 | 13 | 11 | 13 | 14 | 46 | 38 | 21 | 24 | 20 | 19 | 14 | 15 | 10 | 9 | 35 | 17 | 16 | 16 | 46 | |
| 3-Aug | 28 | 33 | 19 | 24 | 58 | 59 | 42 | 53 | 11 | 12 | 11 | 6 | 8 | 21 | 6 | 5 | 13 | 31 | 10 | 12 | 32 | 16 | 87 | 20 | 87 | |
| 4-Aug | 22 | 8 | 9 | 18 | 15 | 20 | 6 | 12 | 10 | 10 | 12 | 12 | 9 | 6 | 5 | 5 | 6 | 6 | 12 | 16 | 51 | 18 | 37 | 33 | 51 | |
| 5-Aug | 60 | 50 | 26 | 19 | 38 | 26 | 28 | 25 | 17 | 30 | 22 | 15 | 17 | 20 | 15 | 19 | 25 | 25 | 27 | 20 | 34 | 21 | 20 | 24 | 60 | |
| 6-Aug | 22 | 27 | 22 | 21 | 20 | 18 | 22 | 21 | 24 | 23 | 25 | 25 | 27 | 28 | 31 | 22 | 27 | 25 | 23 | 24 | 17 | 18 | 16 | 17 | 31 | |
| 7-Aug | 18 | 16 | 16 | 17 | 61 | 16 | 27 | 25 | 29 | 31 | 31 | 28 | 27 | 28 | 32 | 28 | 19 | 18 | 13 | 25 | 15 | 9 | 15 | 21 | 61 | |
| 8-Aug | 31 | 46 | 19 | 22 | 46 | 37 | 15 | 17 | 22 | 11 | 41 | 9 | 12 | 59 | 24 | 25 | 25 | 34 | 17 | 24 | 34 | 11 | 13 | 18 | 59 | |
| 9-Aug | 27 | 31 | 17 | 13 | 14 | 12 | 24 | 19 | 19 | 15 | 10 | 6 | 6 | 7 | 6 | 5 | 6 | 12 | 8 | 6 | 8 | 13 | 20 | 12 | 31 | |
| 10-Aug | 98 | 56 | 24 | 72 | 35 | 38 | 52 | 29 | 17 | 29 | 21 | 13 | 19 | 12 | 26 | 22 | 43 | 24 | 16 | 21 | 9 | 14 | 15 | 22 | 98 | |
| 11-Aug | 27 | 13 | 46 | 32 | 20 | 20 | 26 | 35 | 22 | 28 | 24 | 22 | 49 | 14 | 44 | 9 | 5 | 5 | 15 | 19 | 5 | 6 | 6 | 6 | 49 | |
| 12-Aug | 8 | 7 | 8 | 7 | 8 | 8 | 9 | 7 | 7 | 9 | 11 | 12 | 11 | 11 | 12 | 14 | 9 | 9 | 6 | 4 | 5 | 9 | 8 | 8 | 14 | |
| 13-Aug | 5 | 7 | 8 | 8 | 7 | 7 | 7 | 8 | 8 | 9 | 8 | 10 | 10 | 9 | 10 | 12 | 6 | 5 | 9 | 7 | 7 | 8 | 7 | 6 | 12 | |
| 14-Aug | 7 | 7 | 6 | 7 | 7 | 6 | 8 | 13 | 15 | 9 | 8 | 15 | 48 | 19 | 16 | 31 | 15 | 22 | 17 | 21 | 17 | 16 | 14 | 19 | 48 | |
| 15-Aug | 15 | 12 | 9 | 12 | 12 | 10 | 11 | 9 | 10 | 33 | 15 | 14 | 60 | 72 | 24 | 18 | 16 | 16 | 17 | 20 | 16 | 15 | 15 | 20 | 72 | |
| 16-Aug | 11 | 34 | 31 | 12 | 17 | 16 | 12 | 11 | 15 | 20 | 34 | 51 | 99 | 64 | 58 | 66 | 34 | 21 | 11 | 30 | 41 | 51 | 25 | 32 | 99 | |
| 17-Aug | 9 | 15 | 12 | 12 | 10 | 13 | 14 | 16 | 15 | 19 | 23 | 21 | 23 | 19 | 20 | 20 | 21 | 13 | 13 | 14 | 11 | 17 | 25 | 22 | 25 | |
| 18-Aug | 9 | 11 | 13 | 16 | 19 | 13 | 12 | 10 | 13 | 12 | 17 | 15 | 12 | 17 | 15 | 15 | 39 | 13 | 32 | 21 | 38 | 46 | 52 | 31 | 52 | |
| 19-Aug | 13 | 10 | 16 | 13 | 14 | 13 | 14 | 16 | 17 | 17 | 18 | 18 | 27 | 22 | 17 | 19 | 23 | 18 | 15 | 15 | 15 | 15 | 15 | 16 | 27 | |
| 20-Aug | 16 | 13 | 14 | 15 | 14 | 14 | 15 | 15 | 16 | 17 | 16 | 17 | 16 | 23 | 22 | 21 | 20 | 19 | 19 | 19 | 19 | 18 | 16 | 14 | 23 | |
| 21-Aug | 14 | 14 | 13 | 12 | 13 | 13 | 13 | 16 | 15 | 20 | 20 | 16 | 18 | 18 | 17 | 27 | 26 | 19 | 25 | 15 | 16 | 13 | 12 | 12 | 27 | |
| 22-Aug | 14 | 16 | 16 | 19 | 22 | 48 | 61 | 27 | 30 | 44 | 43 | 39 | 16 | 6 | 6 | 6 | 6 | 7 | 6 | 13 | 7 | 11 | 6 | 8 | 61 | |
| 23-Aug | 8 | 8 | 7 | 13 | 12 | 6 | 7 | 9 | 9 | 5 | 23 | 10 | 10 | 11 | 9 | 8 | 8 | 7 | 9 | 9 | 10 | 9 | 9 | 10 | 23 | |
| 24-Aug | 8 | 7 | 10 | 11 | 19 | 16 | 31 | 38 | 12 | 15 | 14 | 18 | 11 | 8 | 8 | 6 | 18 | 7 | 19 | 50 | 10 | 11 | 7 | 9 | 50 | |
| 25-Aug | 8 | 16 | 38 | 17 | 15 | 17 | 19 | 25 | 14 | 14 | 10 | 9 | 9 | 8 | 10 | 13 | 19 | 13 | 15 | 16 | 17 | 15 | 16 | 16 | 38 | |
| 26-Aug | 15 | 15 | 15 | 16 | 14 | 15 | 15 | 16 | 17 | 17 | 17 | 19 | 19 | 19 | 18 | 18 | 16 | 14 | 13 | 13 | 10 | 12 | 11 | 9 | 19 | |
| 27-Aug | 8 | 13 | 11 | 13 | 12 | 11 | 13 | 18 | 14 | 17 | 17 | 19 | 23 | 18 | 17 | 17 | 16 | 16 | 15 | 14 | 13 | 15 | 14 | 12 | 23 | |
| 28-Aug | 12 | 13 | 11 | 12 | 13 | 12 | 14 | 16 | 16 | 15 | 16 | 15 | 17 | 17 | 18 | 19 | 17 | 40 | 23 | 20 | 19 | 18 | 17 | 11 | 40 | |
| 29-Aug | 9 | 8 | 27 | 8 | 8 | 15 | 43 | 33 | 29 | 58 | 38 | 43 | 50 | 45 | 52 | 38 | 31 | 10 | 7 | 7 | 6 | 6 | 6 | 6 | 58 | |
| 30-Aug | 9 | 7 | 7 | 7 | 8 | 7 | 6 | 8 | 6 | 10 | 11 | 4 | 7 | 9 | 9 | 9 | 4 | 4 | 16 | 9 | 10 | 9 | 11 | 6 | 16 | |
| 31-Aug | 7 | 8 | 13 | 11 | 11 | 11 | 16 | 24 | 14 | 16 | 17 | 18 | 16 | 16 | 18 | 17 | 16 | 15 | 15 | 15 | 16 | 15 | 15 | 13 | 24 | |
| | | 98 | 56 | 46 | 72 | 61 | 59 | 61 | 91 | 35 | 58 | 46 | 51 | 99 | 72 | 58 | 70 | 43 | 40 | 32 | 50 | 51 | 51 | 87 | 33 | |
| | | Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | |





Wood Buffalo Environmental Association

SO₂ Calibration Summary

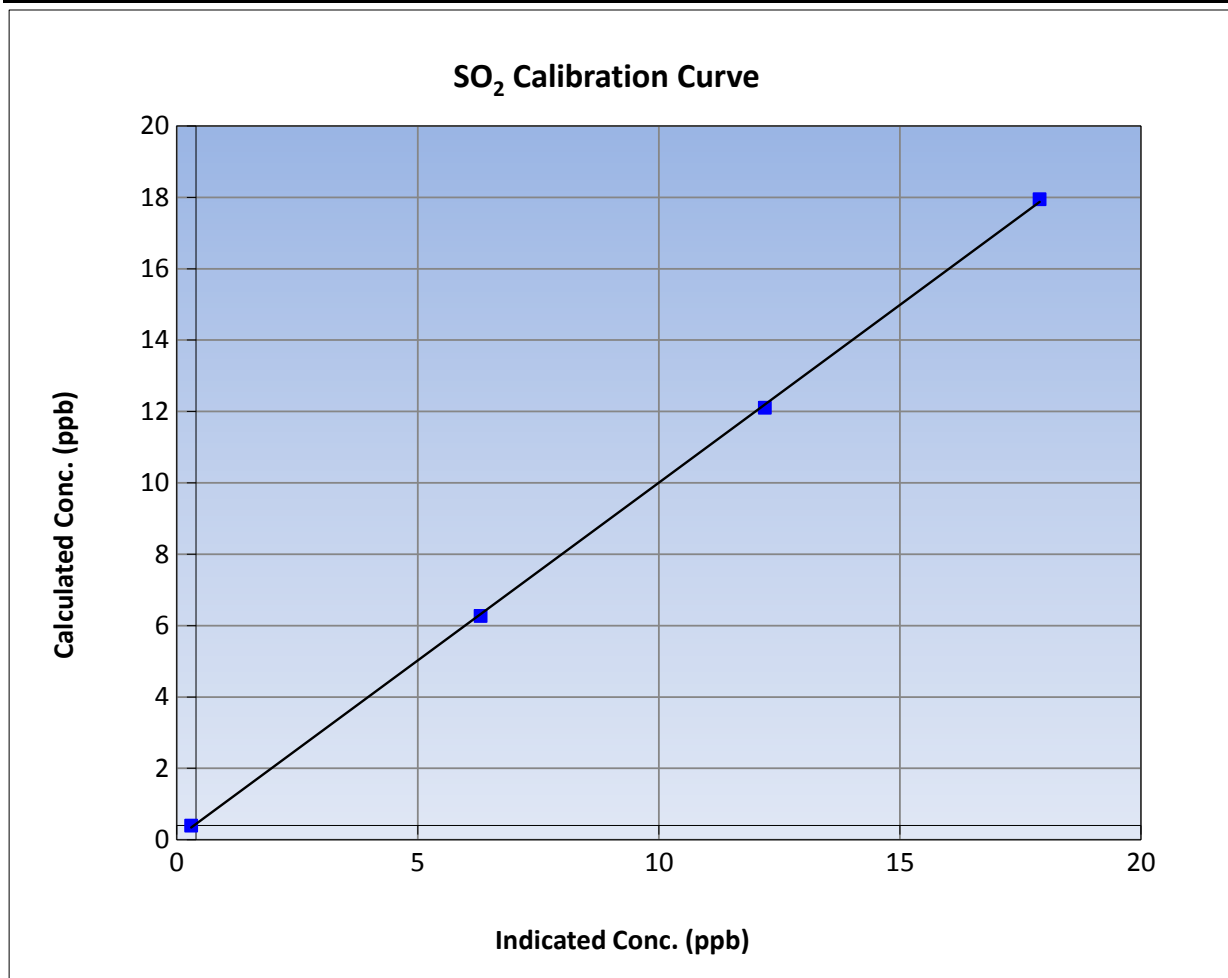
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 15, 2017 | Previous Calibration | July 12, 2017 |
| Station Name | Fort Chipewyan | Station Number | AMS 08 |
| Start Time (MST) | 10:10 | End Time (MST) | 15:20 |
| Analyzer make | Thermo 43i-TLE | Analyzer serial # | 1136451241 |

Calibration Data

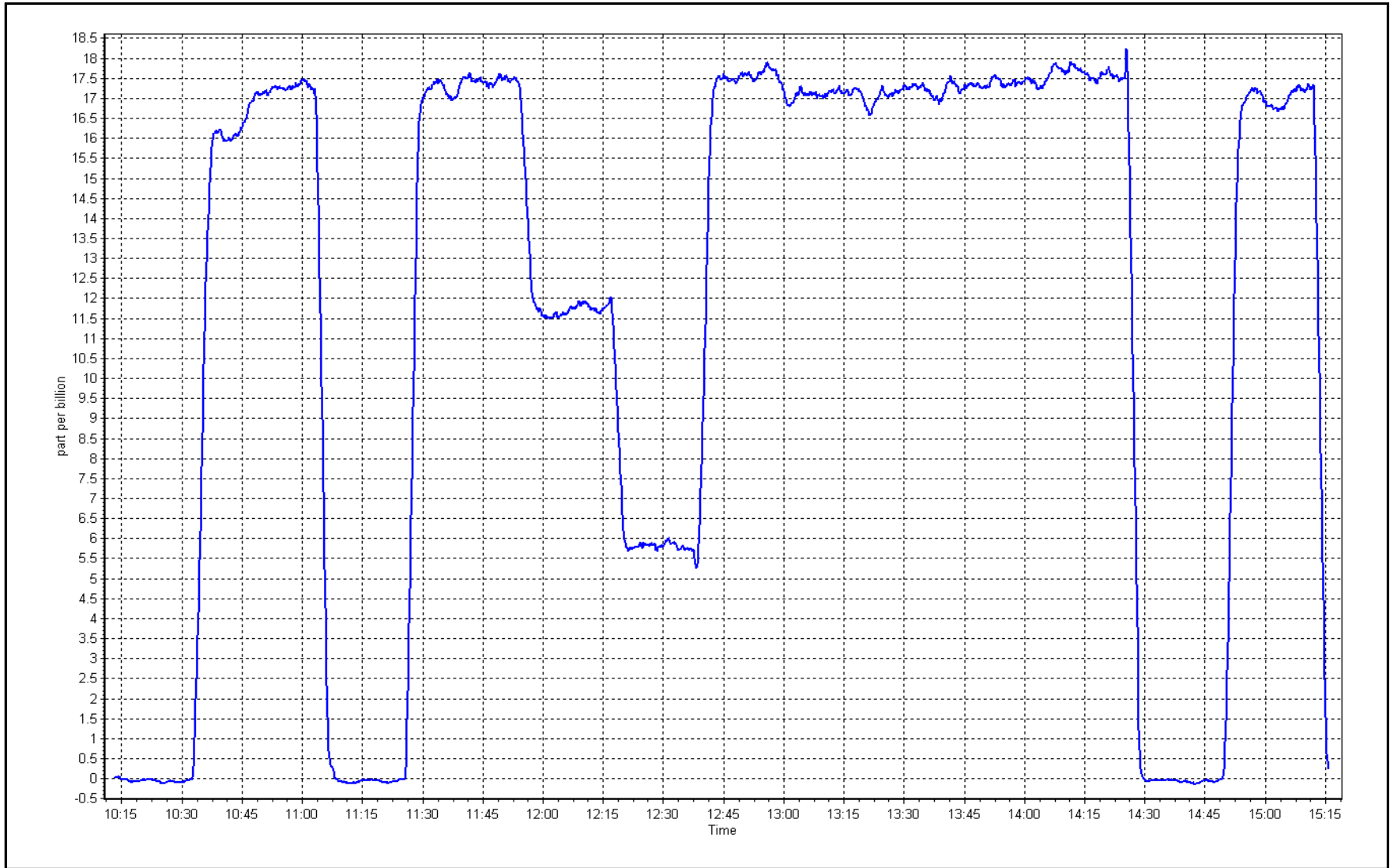
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | -0.1 | ---- | Correlation Coefficient | 0.999895 | ≥0.995 |
| 17.5 | 17.5 | 1.0027 | | | |
| 11.7 | 11.8 | 0.9925 | Slope | 0.996097 | 0.90 - 1.10 |
| 5.9 | 5.9 | 0.9958 | | | |
| | | | Intercept | 0.042568 | +/-30 |



SO2 Calibration Plot

Date: August 15, 2017

Location: Fort Chipewyan





Wood Buffalo Environmental Association

O₃ Calibration Summary

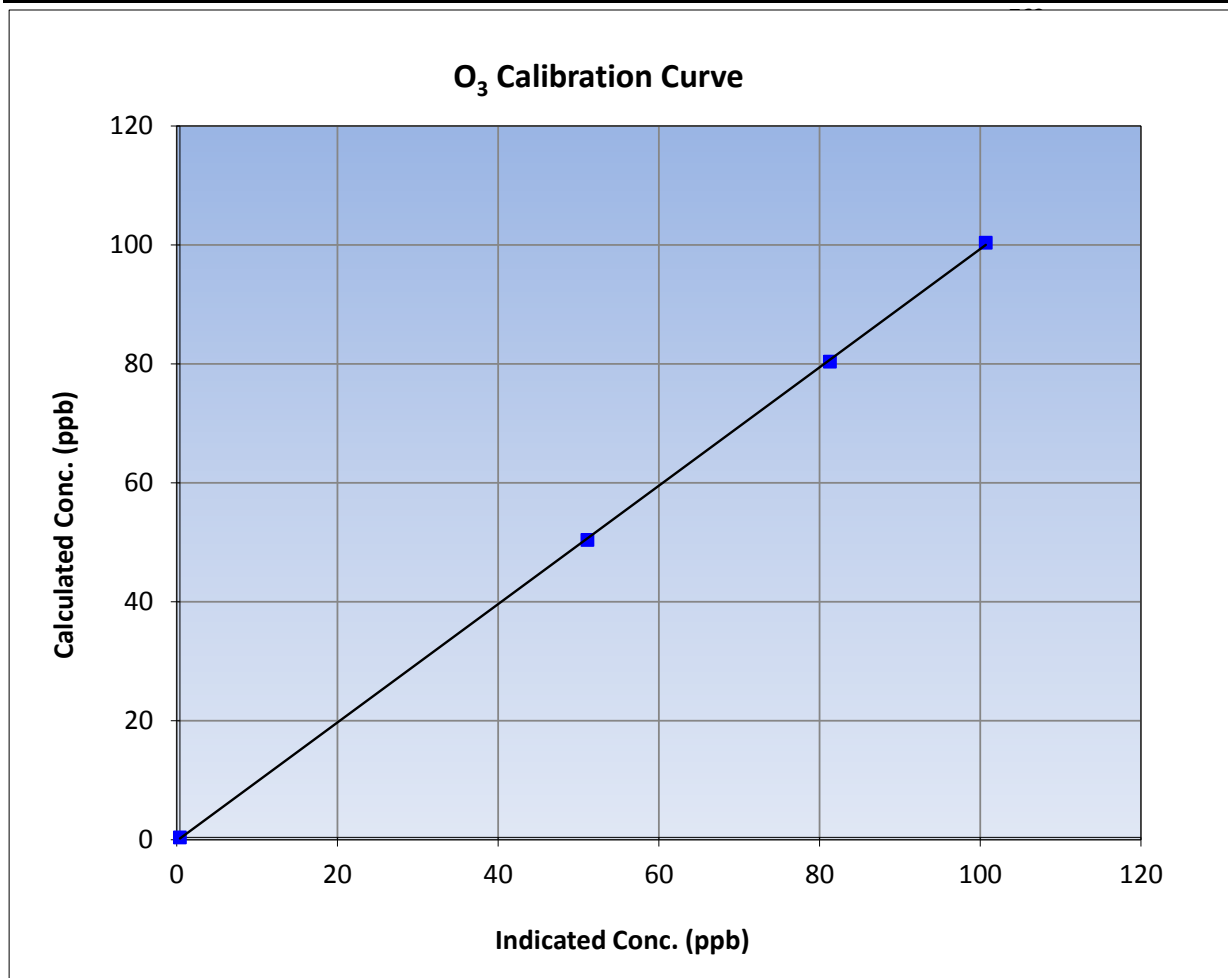
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 15, 2017 | Previous Calibration | July 12, 2017 |
| Station Name | Fort Chipewyan | Station Number | AMS 08 |
| Start Time (MST) | 13:15 | End Time (MST) | 18:25 |
| Analyzer make | API T400 | Analyzer serial # | 1020 |

Calibration Data

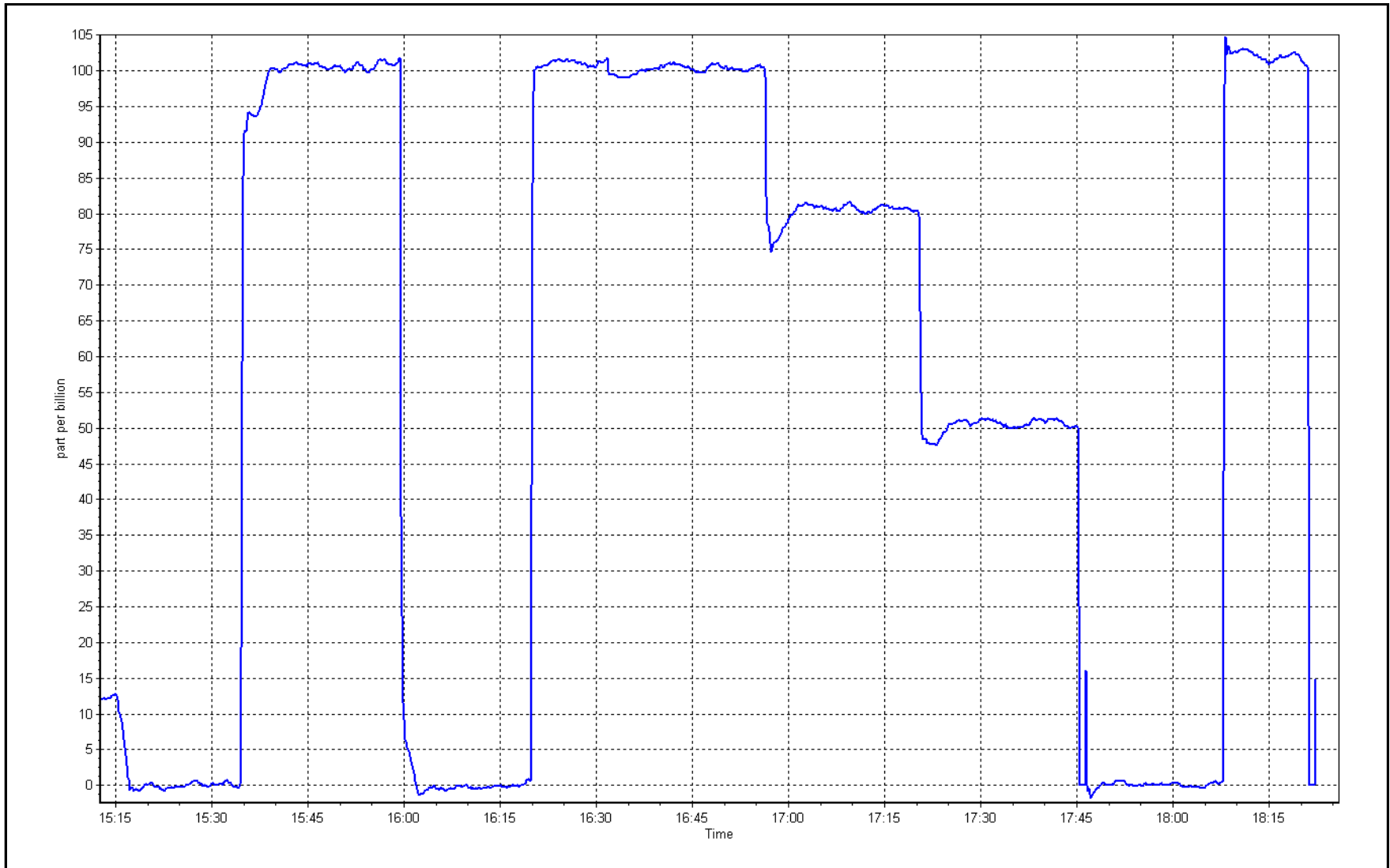
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|--------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | ≥0.995 | |
| 100.0 | 100.3 | 0.9970 | | | |
| 80.0 | 80.9 | 0.9889 | Slope | 0.90 - 1.10 | |
| 50.0 | 50.7 | 0.9862 | | | |
| | | | Intercept | -0.189348 | +/- 10 |



O₃ Calibration Plot

Date: August 15, 2017

Location: Fort Chipewyan





Wood Buffalo Environmental Association

NO_x - NO - NO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|---------------|
| Station Name: | Fort Chipewyan | Station number: | AMS 08 |
| Calibration Date: | August 15, 2017 | Last Cal Date: | July 12, 2017 |
| Start time (MST): | 10:10 | End time (MST): | 15:15 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|-------------------|-----------------|---------------------|-------------------|
| NO Gas Cylinder # | LL79696 | Cal Gas Expiry Date | February 13, 2018 |
| NOX Cal Gas Conc. | <u>20.1</u> ppb | NO Cal Gas Conc. | <u>20.1</u> ppb |
| Calibrator Model | API T700 | Serial Number | 2656 |
| ZAG make/model | ATI T701 | Serial Number | 4698 |

Analyzer Information

| | | | | | |
|--------------------------|--------------|---------------|--------------------------|--------------|---------------|
| Analyzer make: API T200u | | | Analyzer serial #: 11039 | | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| NO slope | 1.313 | 1.325 | NOX Range (ppb) | 0 - 1000 ppb | |
| NOX slope | 1.328 | 1.344 | PMT Temperature | 5.1 | 5.0 |
| NO2 slope | 1.000 | 1.000 | Reaction cell Press | 5.1 | 5.0 |
| NO offset | 0.1 | 0.1 | Sample Flow | 1122 | 1105 |
| NOX offset | 0.2 | 0.2 | PMT Voltage | 502.0 | 502.0 |

Calibration Statistics

| | | |
|----------------------------|--------------|---------------|
| | <u>Start</u> | <u>Finish</u> |
| NO _x Cal Slope | 1.004752 | 0.996543 |
| NO _x Cal Offset | 0.221130 | -0.088701 |
| NO Cal Slope | 1.003543 | 0.995759 |
| NO Cal Offset | 0.160754 | 0.119878 |
| NO ₂ Cal Slope | 1.009610 | 1.005642 |
| NO ₂ Cal Offset | 0.439061 | -0.014409 |



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Version-03-2017

Dilution Calibration Data

| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|----------------------------------|---------------------------|-----------------------------|---|--|---|--|---------------------------------------|--|---|--|
| as found zero | 5996 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.4 | ---- | ---- |
| as found span | 5955 | 44.8 | 150.1 | 150.1 | 0.0 | 149.5 | 149.3 | 0.2 | 1.0039 | 1.0053 |
| calibrator zero | 5996 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | ---- | ---- |
| high point | 5955 | 44.8 | 150.1 | 150.1 | 0.0 | 150.5 | 150.6 | 0.0 | 0.9972 | 0.9966 |
| second point | 5970 | 29.9 | 100.2 | 100.2 | 0.0 | 100.9 | 100.6 | 0.3 | 0.9927 | 0.9957 |
| third point | 5985 | 15.0 | 50.3 | 50.3 | 0.0 | 50.5 | 50.1 | 0.1 | 0.9950 | 1.0030 |
| as left zero | 5996 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | ---- | ---- |
| as left span | 5955 | 44.8 | 150.1 | 53.4 | 96.7 | 149.9 | 54.6 | 95.3 | 1.0012 | 0.9780 |
| Average Correction Factor | | | | | | | | | 0.9950 | 0.9984 |

| | | | | |
|--------------------|-----------------------------|----------------|-----------------|------------------------|
| Corrected As found | NO _x = 149.2 ppb | NO = 149.3 ppb | *Percent Change | NO _x = 0.0% |
| Previous Response | NO _x = 149.2 ppb | NO = 149.4 ppb | *Percent Change | NO = 0.1% |

* = > +/-5% change initiates investigation

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO drop conc (ppb) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | Converter Efficiency <i>Limit = 96-104%</i> |
|----------------------------------|------------------------------|---|--|---------------------------------------|--|---|--|---|--|
| 1st NO ref point | | 0.0 | 150.9 | 150.6 | 0.3 | 0.9946 | 0.9966 | ---- | ---- |
| 1st NO2 (100 ppb O3) | 53.4 | 97.2 | 150.1 | 53.4 | 96.7 | 0.9999 | ---- | 1.0052 | 99.5% |
| 2nd NO2 (80 ppb O3) | 71.9 | 78.7 | 150.1 | 71.9 | 78.2 | 0.9999 | ---- | 1.0064 | 99.4% |
| 3rd NO2 (50 ppb O3) | 102.4 | 48.2 | 150.3 | 102.4 | 48.0 | 0.9986 | ---- | 1.0042 | 99.6% |
| 2nd NO ref point | ---- | 0.0 | 150.2 | 150.4 | -0.2 | 0.9992 | 0.9979 | ---- | ---- |
| Average Correction Factor | | | | | | 0.9994 | 0.9972 | 1.0052 | 99.5% |

Notes:

Span adjusted.

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

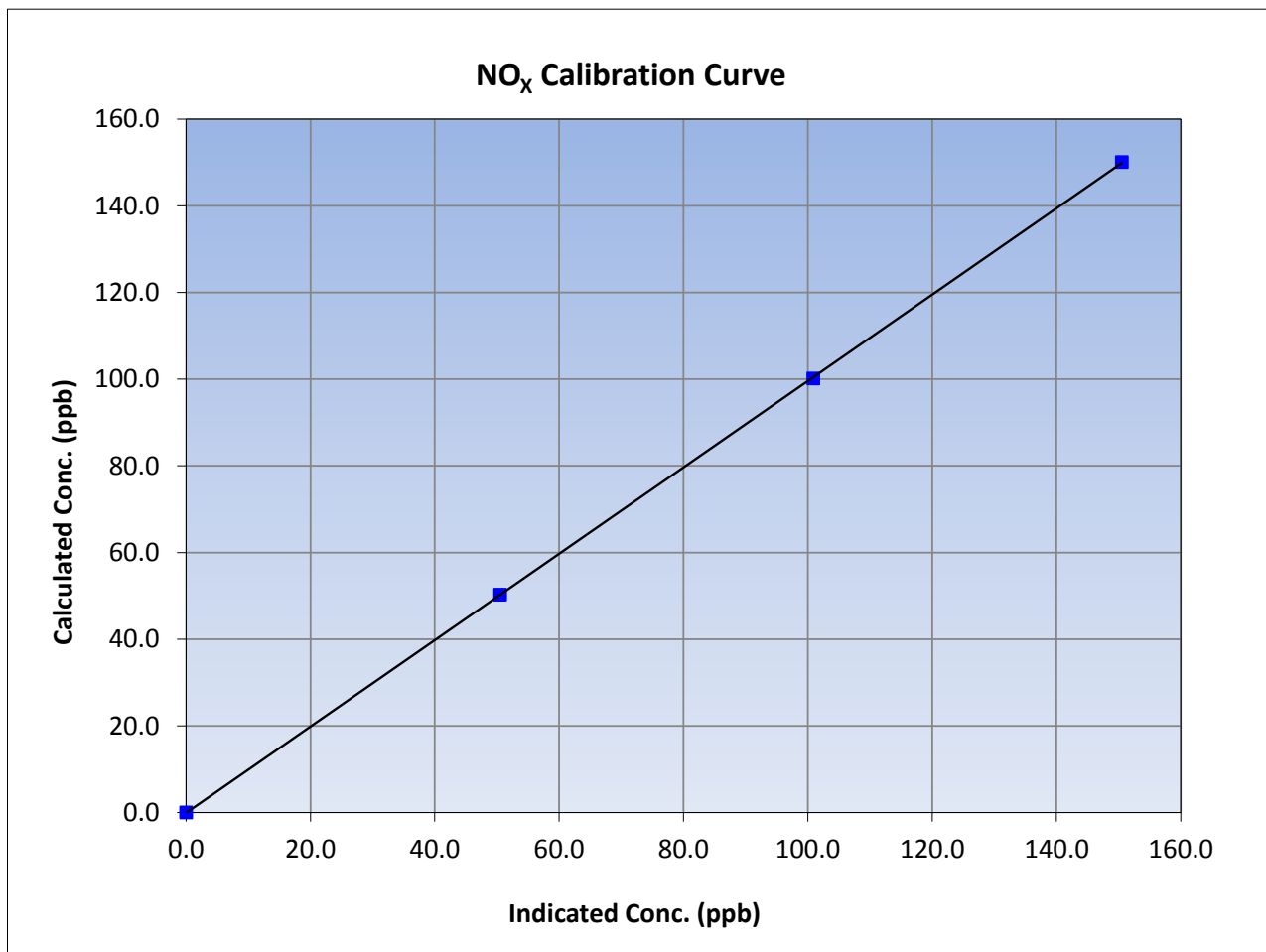
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 15, 2017 | Previous Calibration | July 12, 2017 |
| Station Name | Fort Chipewyan | Station Number | AMS 08 |
| Start Time (MST) | 10:10 | End Time (MST) | 15:15 |
| Analyzer make | API T200u | Analyzer serial # | 11039 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | ≥0.995 | |
| 150.1 | 150.5 | 0.9972 | | | |
| 100.2 | 100.9 | 0.9927 | | | |
| 50.3 | 50.5 | 0.9950 | | | |
| | | | Slope | 0.996543 | 0.90 - 1.10 |
| | | | Intercept | -0.088701 | +/-20 |





Wood Buffalo Environmental Association

NO Calibration Summary

Version-03-2017

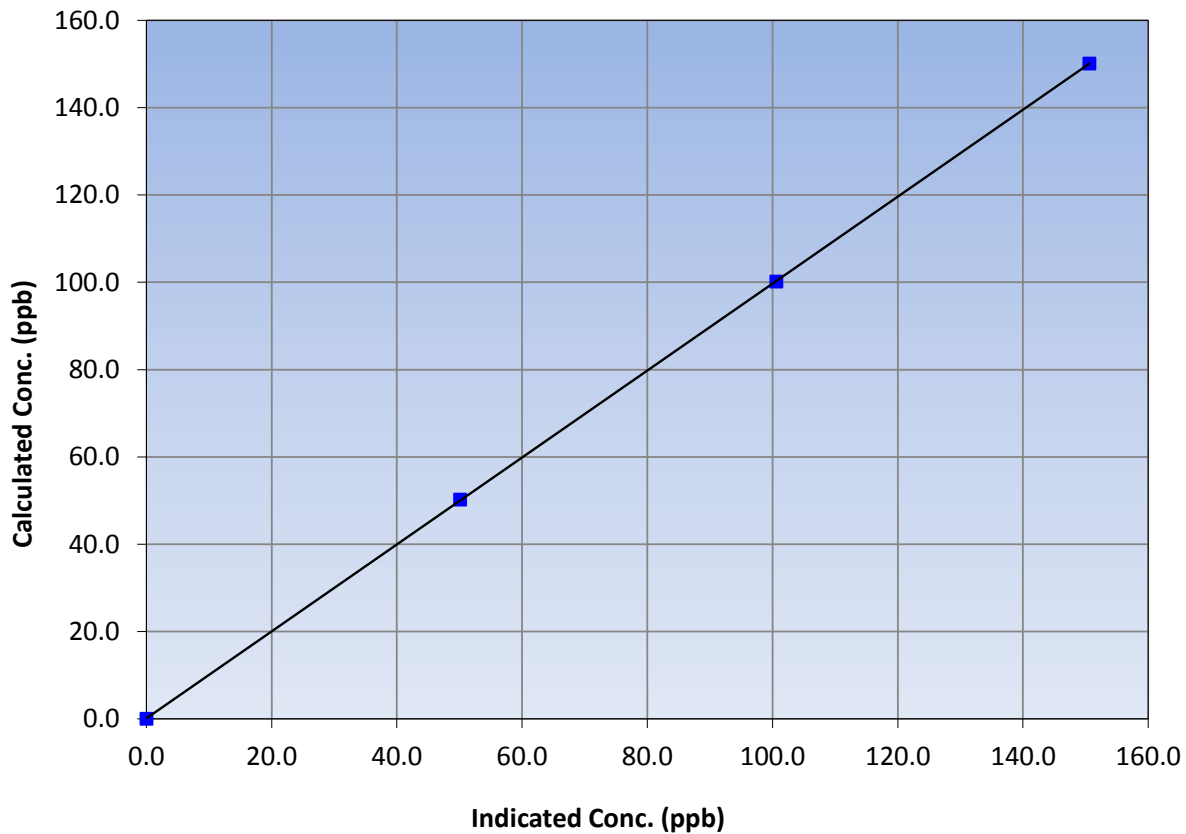
Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 15, 2017 | Previous Calibration | July 12, 2017 |
| Station Name | Fort Chipewyan | Station Number | AMS 08 |
| Start Time (MST) | 10:10 | End Time (MST) | 15:15 |
| Analyzer make | API T200u | Analyzer serial # | 11039 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | ≥0.995 | |
| 150.1 | 150.6 | 0.9966 | | | |
| 100.2 | 100.6 | 0.9957 | | | |
| 50.3 | 50.1 | 1.0030 | | | |
| | | | Slope | 0.995759 | 0.90 - 1.10 |
| | | | Intercept | 0.119878 | +/-20 |

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

Version-03-2017

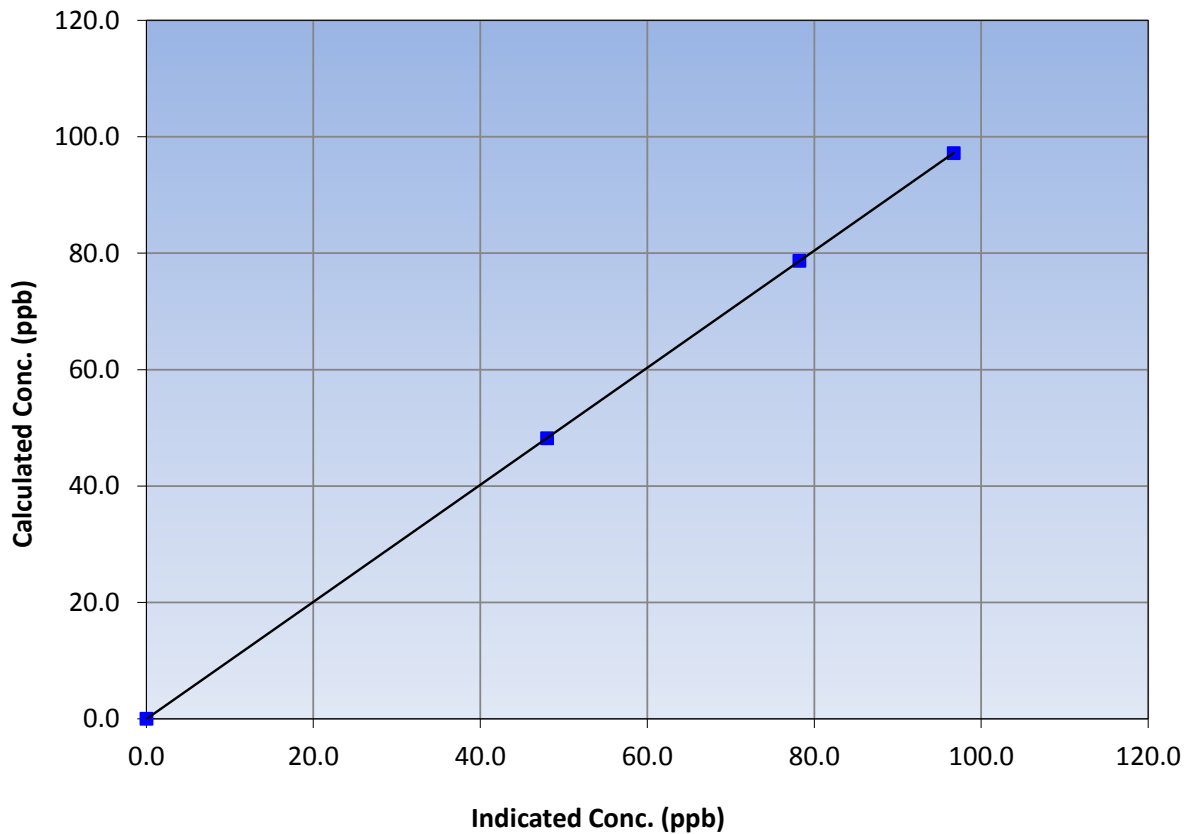
Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 15, 2017 | Previous Calibration | July 12, 2017 |
| Station Name | Fort Chipewyan | Station Number | AMS 08 |
| Start Time (MST) | 10:10 | End Time (MST) | 15:15 |
| Analyzer make | API T200u | Analyzer serial # | 11039 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | ≥0.995 | |
| 97.2 | 96.7 | 1.0052 | | | |
| 78.7 | 78.2 | 1.0064 | | | |
| 48.2 | 48.0 | 1.0042 | | | |
| | | | Slope | 1.005642 | 0.90 - 1.10 |
| | | | Intercept | -0.014409 | +/-20 |

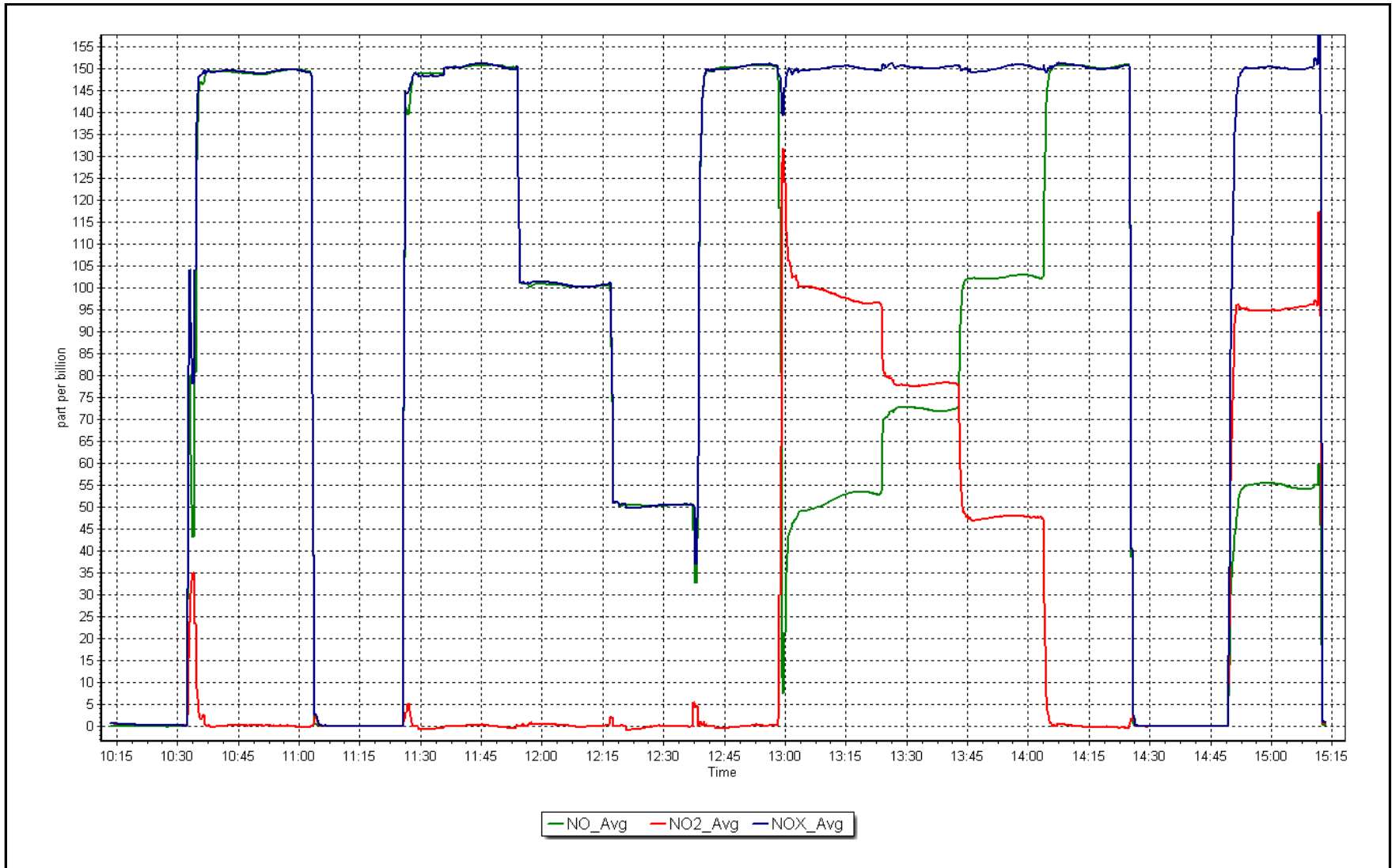
NO₂ Calibration Curve



NO_x Calibration Plot

Date: August 15, 2017

Location: Fort Chipewyan





Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-02-2017

Station Information

| | | | |
|------------------------|-----------------|-----------------|---------------|
| Station Name: | Fort Chipewyan | Station number: | AMS 08 |
| Calibration Date: | August 15, 2017 | Last Cal Date: | July 12, 2017 |
| Start time (MST): | 14:55 | End time (MST): | 15:40 |
| Sharp Model: | Thermo 5030 | S/N: | CM-2383 |
| Particulate Fraction: | PM2.5 | C14 Source S/N: | 10384 |
| Flow Meter Make/Model: | Delta Cal | S/N: | 1451 |
| Temp/RH standard: | Delta Cal | S/N: | 1451 |

Monthly Calibration Test

| <u>Parameter</u> | <u>As found</u> | <u>Measured</u> | <u>As left</u> | <u>Adjusted</u> | (Limits) |
|-----------------------------|-----------------|-------------------------------------|----------------|-------------------------------------|-----------------|
| T1 (°C) | 15 | 15.9 | 15 | <input type="checkbox"/> | +/- 2 °C |
| P3 (hPa) | 973 | 973.25 | 973 | <input type="checkbox"/> | +/- 13 hPa |
| flow (LPH) | 1000 | 986 | 1000 | <input checked="" type="checkbox"/> | +/- 50 LPH |
| Nephelometer zero | 0.1 | ----- | 0.1 | <input type="checkbox"/> | +/- 0.5 ug/m3 |
| Instrument Clock: | Verified | <input checked="" type="checkbox"/> | | | |
| Cyclone cleaning : | PM10 Cyclone | <input checked="" type="checkbox"/> | PM2.5 Cyclone | <input checked="" type="checkbox"/> | |
| Date Filter Tape Installed: | | | | | |

Quarterly Calibration Test

Leak Test: _____ Date of check: _____ Last Cal Date: June 2, 2017
 Flow w/o adaptor: _____ Flow w/ adaptor: _____

(Limit) 0.4 LPM

| <u>Adjusted</u> | <u>Current Test</u> | <u>Previous Test</u> | <u>% Change</u> |
|-----------------------------------|--------------------------|--------------------------|-----------------|
| <input type="checkbox"/> | Foil S/N: _____ | Foil S/N: _____ | |
| Foil Calibration | Foil Mass: _____ | Foil Mass: _____ | |
| | Calibration Date: _____ | Calibration Date: _____ | |
| (Limit) +/- 5% of previous | Correction Factor: _____ | Correction Factor: _____ | --- |

Annual Calibration Test

| <u>Parameter</u> | <u>As found</u> | <u>Measured</u> | <u>As left</u> | <u>Adjusted</u> | (Limits) |
|-----------------------------|-----------------|-----------------|----------------|--------------------------|-----------------|
| T2 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| T3 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| T4 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| RH (%) | | | | <input type="checkbox"/> | +/- 10% |
| Date Sample Tube Cleaned: | | June 2, 2017 | | | |
| Date Pump Rebuilt/Replaced: | | Not available | | | |

Notes: Flow adjusted. Cyclone head cleaned.

Calibration by: Devin Russell



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 9
BARGE LANDING
AUGUST 2017**

Operations, Data Collection,
QA/QC, Data Validation and Reporting by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

September 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
AUGUST 2017

MONTHLY SUMMARY for
AMD SECTION III.B.1(c)

| Parameter | Hours of Data | Hours of Calibration | Hours without Data | Operational Time | Maximum 1-Hour Value | 1-Hour Exceedances | Maximum 24-Hour Value | 24-Hour Exceedances |
|-----------------------------------|---------------|----------------------|--------------------|------------------|----------------------|--------------------|-----------------------|---------------------|
| TRS(ppb) Average | 710 | 34 | 34 | 100 | 3 | 0 | 1 | 0 |
| THC(ppm) Average | 711 | 33 | 33 | 100 | 3.9 | - | 2.5 | - |
| Temperature (C) Average | 744 | 0 | 0 | 100 | 32.1 | - | 24.4 | - |
| Relative Humidity (%) Average | 744 | 0 | 0 | 100 | 99 | - | 89 | - |
| Wind Speed 10 m (km/h) Average | 737 | 2 | 7 | 99.33 | 20 | - | 12 | - |
| Wind Direction 10 m (deg) Average | 737 | 2 | 7 | 99.33 | - | - | - | - |

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
AUGUST 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

| Parameter | Number | Mean | StnDev | Total | Percentile | | | | | | |
|-----------------------------------|--------|-------|--------|-------|------------|------|------|--------|------|------|------|
| | | | | | Min | P10 | Q1 | Median | Q3 | P90 | Max |
| TRS(ppb) Average | 710 | 0.4 | 0 | - | 0 | 0 | 0 | 0 | 0 | 1 | 3 |
| THC(ppm) Average | 711 | 2.23 | 0.2 | - | 2 | 2 | 2.1 | 2.1 | 2.3 | 2.5 | 3.9 |
| Temperature (C) Average | 744 | 18.26 | 5.7 | - | 4.3 | 11.3 | 13.8 | 17.6 | 22.9 | 26.2 | 32.1 |
| Relative Humidity (%) Average | 744 | 61.6 | 22 | - | 22 | 31 | 42 | 62 | 81 | 93 | 99 |
| Wind Speed 10 m (km/h) Average | 737 | 6.5 | 4 | - | 0 | 2 | 4 | 6 | 9 | 12 | 20 |
| Wind Direction 10 m (deg) Average | 737 | - | - | - | - | - | - | - | - | - | - |

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
AUGUST 2017

OPERATIONAL NOTES

| Parameter | Period Start | Period End | Duration (Hours) | Notes |
|----------------------------|-------------------|-------------------|------------------|-----------------------------------|
| Wind Speed, Wind Direction | 02 Aug 2017 02:00 | 02 Aug 2017 02:00 | 1 | Flat line in sensor output signal |
| Wind Speed, Wind Direction | 04 Aug 2017 05:00 | 04 Aug 2017 06:00 | 2 | Flat line in sensor output signal |
| Wind Speed, Wind Direction | 07 Aug 2017 03:00 | 07 Aug 2017 03:00 | 1 | Flat line in sensor output signal |
| Wind Speed, Wind Direction | 27 Aug 2017 22:00 | 27 Aug 2017 22:00 | 1 | Flat line in sensor output signal |



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

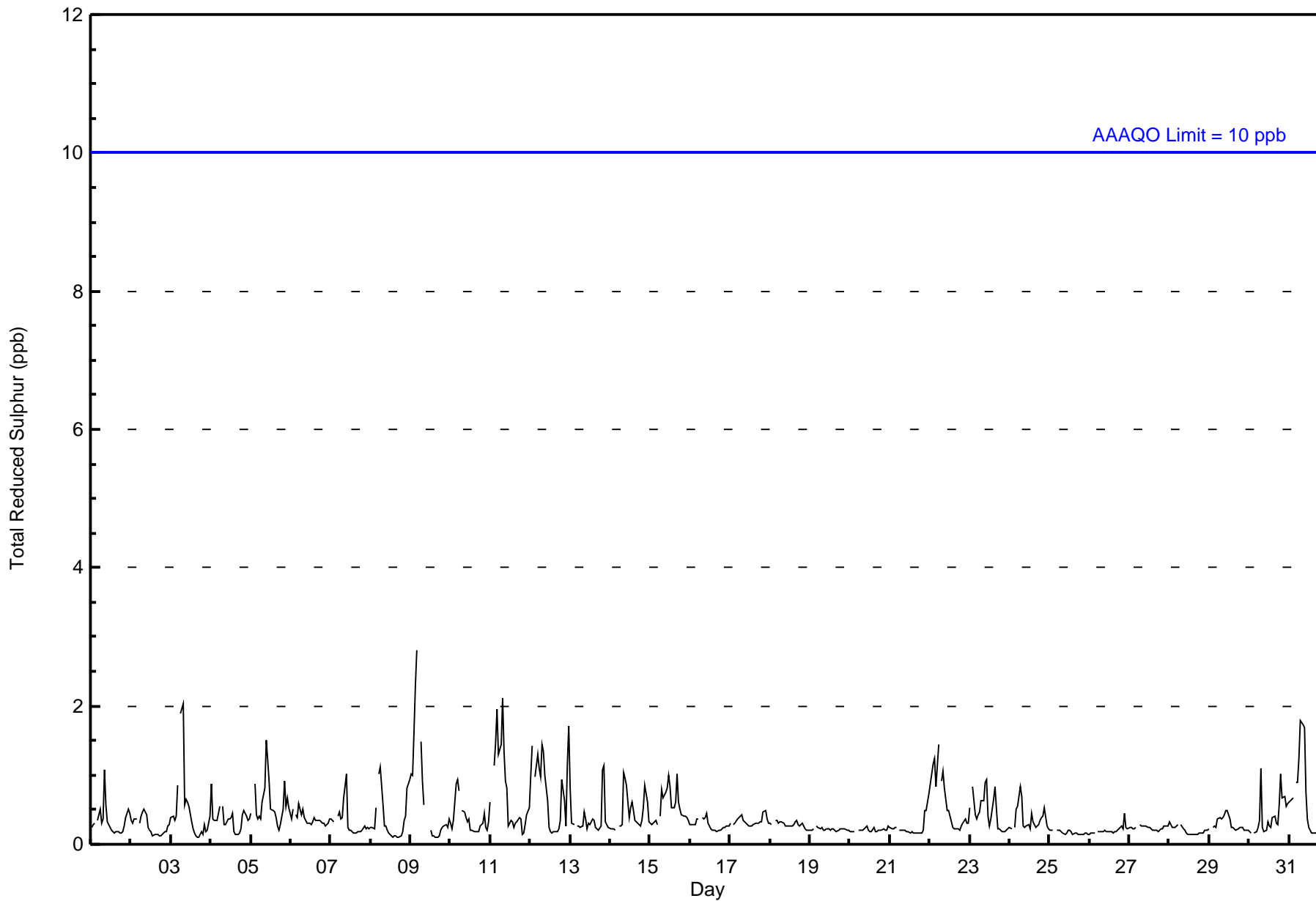
Barge Landing - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3 ppb on Aug 9 05:00 Maximum Daily Average: 0.8 ppb on Aug 12 | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 710 Hours of Missing Data: 34 Hours of Calibration: 34 Percent Operational Time: 100.0 | | | | | | | | | |
|---|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|---|----|----|----|----|----|----|-----------------|---------------|---------------|
| Minimum Value: 0 ppb on Aug 9 17:00 Minimum Daily Average: 0.2 ppb on Aug 25 Maximum Diurnal Average: 0.6 ppb at hour 8 Minimum Diurnal Average: 0.2 ppb at hour 18 Monthly Average: 0.4 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 O ₃ = 0 P ₉₀ = 1 P ₉₉ = 2 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0 | 0 | 0 | Z | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0.3 | 1 | |
| 2-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | |
| 3-Aug | 0 | 0 | 0 | 0 | 1 | Z | 2 | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 2 | |
| 4-Aug | 1 | 0 | 0 | 0 | 0 | 1 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | |
| 5-Aug | 0 | Z | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0.6 | 1 | |
| 6-Aug | 0 | 1 | Z | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | |
| 7-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | |
| 8-Aug | 0 | 0 | 0 | 1 | Z | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.4 | 1 | |
| 9-Aug | 1 | 1 | 2 | 2 | 3 | Z | 1 | 1 | 1 | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 3 | |
| 10-Aug | 0 | 0 | 0 | 1 | 1 | 1 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | |
| 11-Aug | 1 | Z | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.7 | 2 | |
| 12-Aug | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0.8 | 2 | |
| 13-Aug | 1 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0.4 | 1 | |
| 14-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0.5 | 1 | |
| 15-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0.5 | 1 | |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | |
| 17-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | |
| 18-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | |
| 19-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | |
| 20-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.2 | 1 | |
| 22-Aug | 1 | 1 | 1 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 1 | |
| 23-Aug | 1 | Z | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 1 | |
| 24-Aug | 0 | 0 | Z | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0.4 | 1 | |
| 25-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | |
| 26-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | |
| 29-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | |
| 30-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0.4 | 1 | |
| 31-Aug | 1 | 1 | 1 | Z | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 2 | |
| 0.4 0.4 0.4 0.5 0.6 0.5 0.6 0.6 0.6 0.6 0.5 0.4 0.3 0.3 0.3 0.3 0.3 0.2 0.2 0.2 0.3 0.4 0.3 0.4 0.4 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| 1 1 2 2 3 1 2 2 2 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 2 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| Z - zerospan C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Barge Landing - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Barge Landing - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2 | 709 | 99.86 | 99.86 |
| 3 - 4 | 1 | 0.14 | 100.00 |
| 5 - 7 | 0 | 0.00 | 100.00 |
| 8 - 11 | 0 | 0.00 | 100.00 |
| > 11 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Barge Landing - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2 | 25 | 14 | 15 | 12 | 10 | 12 | 49 | 90 | 75 | 82 | 86 | 95 | 43 | 33 | 28 | 33 | 702 |
| 3 - 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 5 - 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 - 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 25 | 14 | 15 | 12 | 10 | 12 | 49 | 90 | 76 | 82 | 86 | 95 | 43 | 33 | 28 | 33 | 703 |

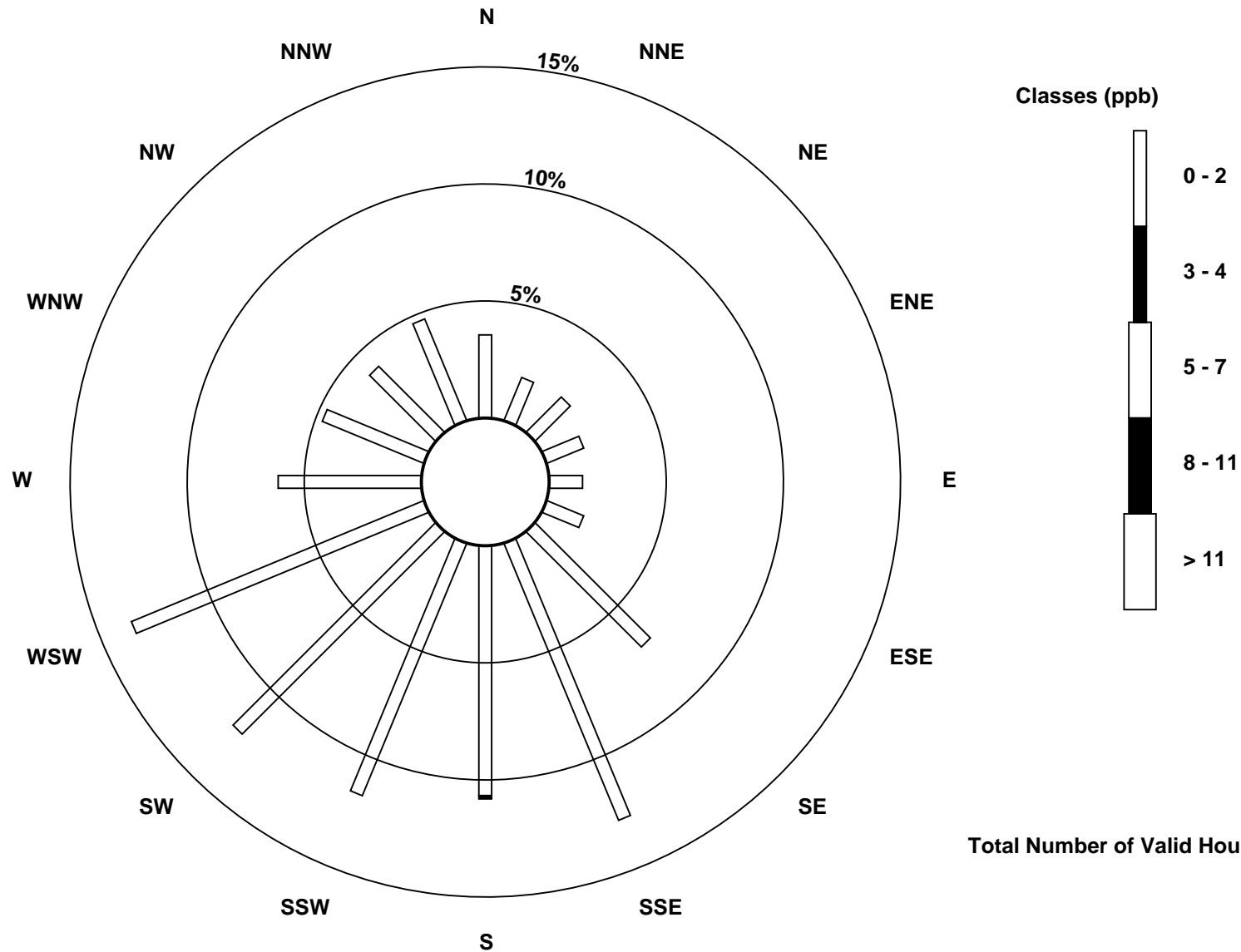
Total Number of Valid Hours: 703

Total Number of Hours: 744

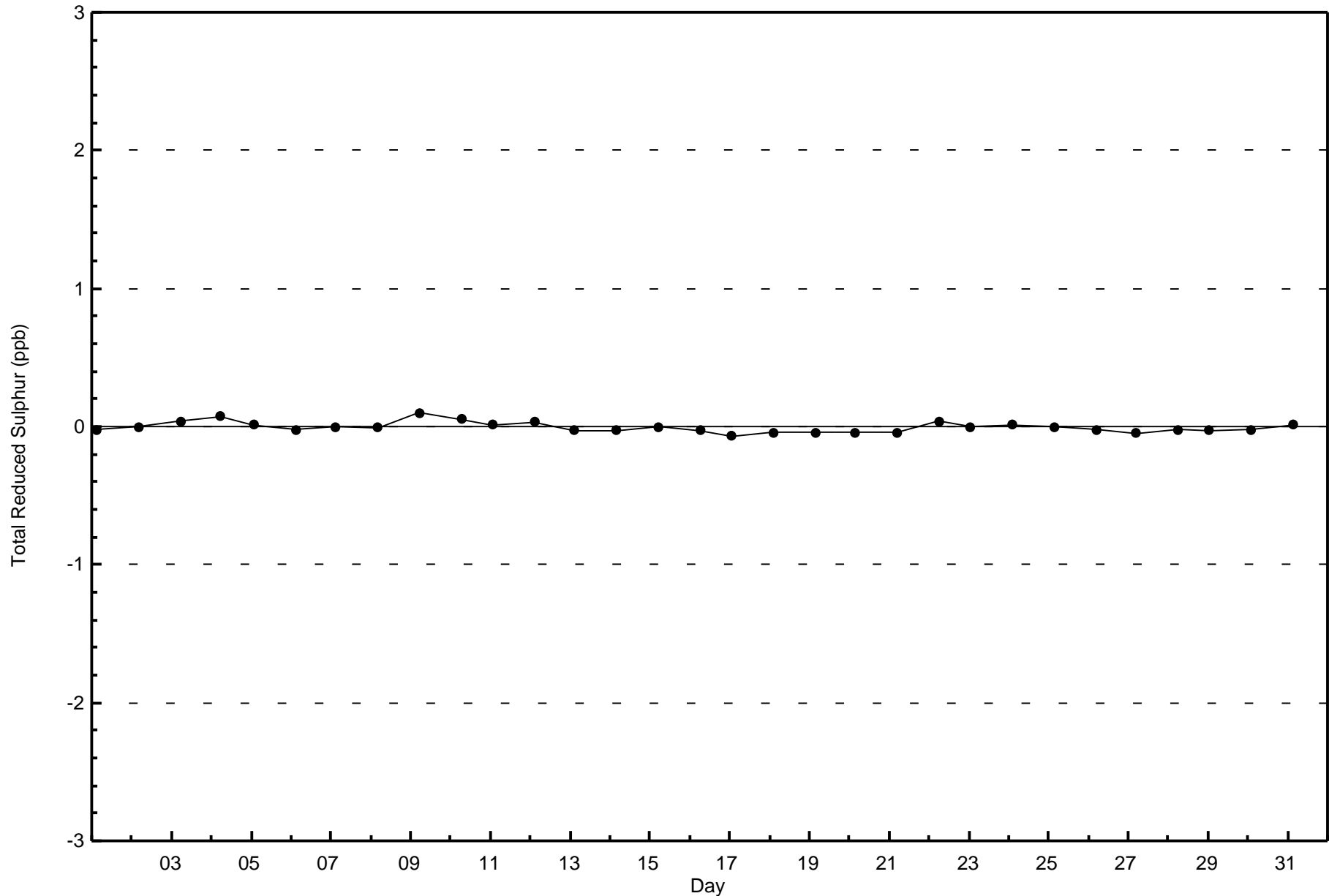


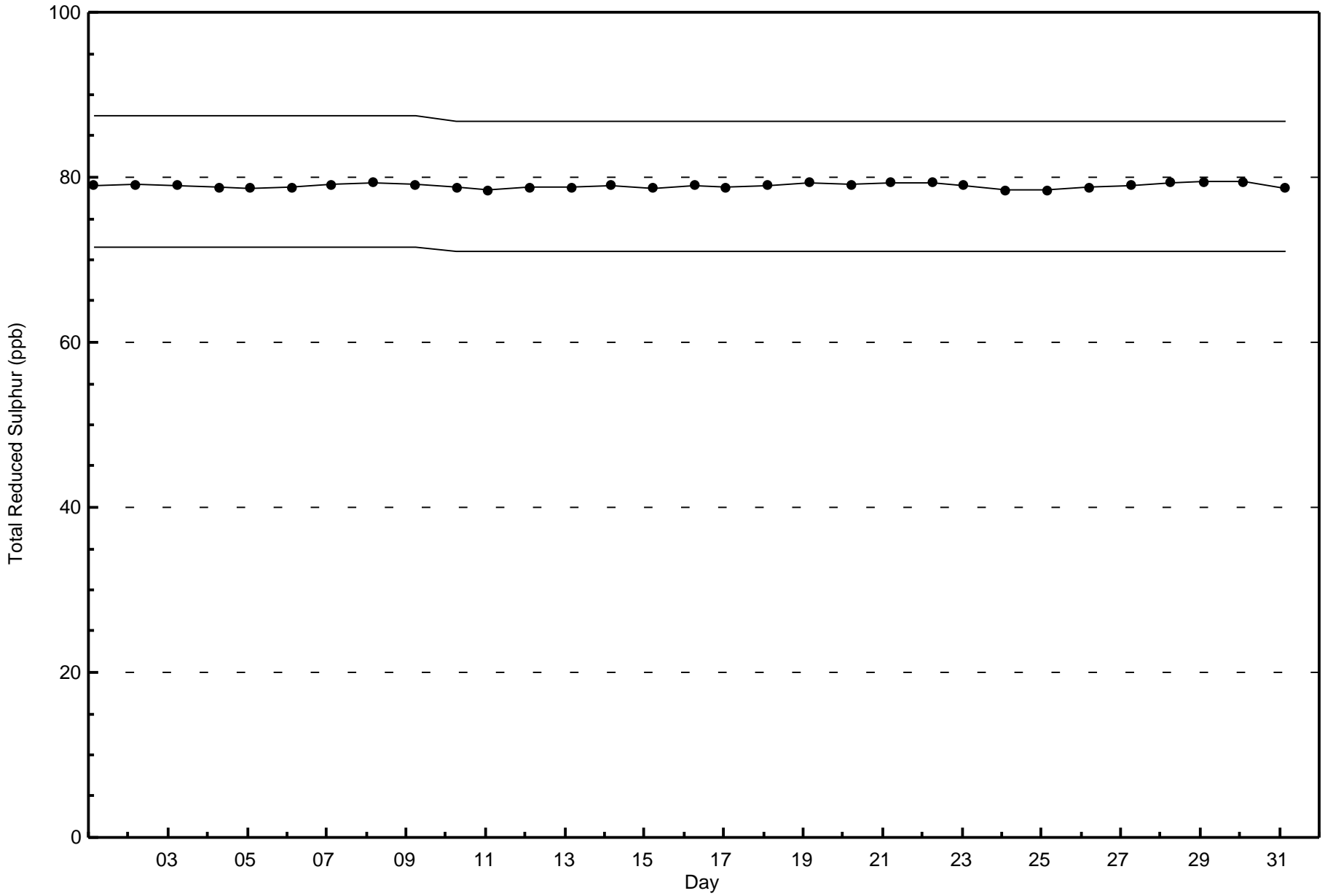
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Total Reduced Sulphur (TRS) - ppb
Barge Landing (AMS 9)



Total Number of Valid Hours: 703







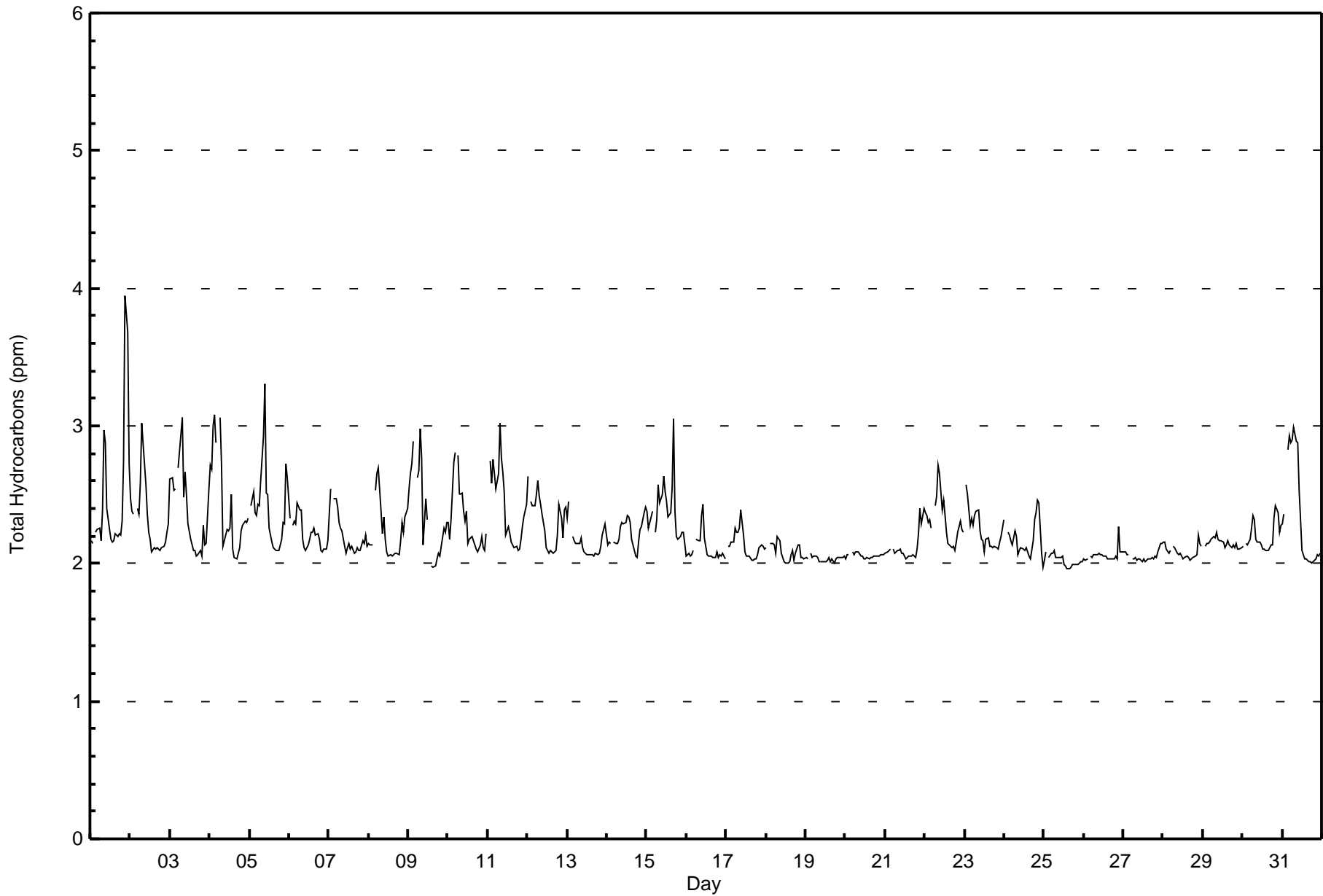
Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Barge Landing - August 2017

| Maximum Value: 3.9 ppm on Aug 1 22:00 Maximum Daily Average: 2.5 ppm on Aug 1 | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 711 Hours of Missing Data: 33 Hours of Calibration: 33 Percent Operational Time: 100.0 | | | | | | |
|--|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|-----|-----|-----|-----------------|---------------|---------------|
| Minimum Value: 2.0 ppm on Aug 25 15:00 Minimum Daily Average: 2.0 ppm on Aug 25 Maximum Diurnal Average: 2.4 ppm at hour 8 Minimum Diurnal Average: 2.1 ppm at hour 18 Monthly Average: 2.23 ppm Percentiles: P ₁ = 2.0 P ₁₀ = 2.0 Q ₁ = 2.1 Median = 2.1 Q ₃ = 2.3 P ₉₀ = 2.5 P ₉₉ = 3.0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 2.2 | 2.1 | Z | 2.2 | 2.2 | 2.3 | 2.2 | 2.4 | 3.0 | 2.9 | 2.4 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.7 | 3.9 | 3.7 | 2.7 | 2.5 | 3.9 |
| 2-Aug | 2.5 | 2.4 | 2.4 | Z | 2.4 | 2.4 | 2.6 | 3.0 | 2.9 | 2.6 | 2.4 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.3 | 2.3 | 3.0 |
| 3-Aug | 2.6 | 2.6 | 2.5 | 2.5 | Z | 2.7 | 2.8 | 3.1 | 2.5 | 2.7 | 2.5 | 2.3 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.3 | 2.1 | 2.1 | 2.5 | 2.4 | 3.1 |
| 4-Aug | 2.7 | 2.7 | 3.0 | 3.1 | 2.9 | Z | 3.1 | 2.7 | 2.1 | 2.2 | 2.2 | 2.2 | 2.3 | 2.5 | 2.1 | 2.0 | 2.0 | 2.1 | 2.1 | 2.2 | 2.3 | 2.3 | 2.3 | 2.3 | 2.4 | 3.1 |
| 5-Aug | Z | 2.4 | 2.5 | 2.4 | 2.4 | 2.4 | 2.4 | 2.6 | 2.9 | 3.3 | 2.5 | 2.5 | 2.3 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.3 | 2.3 | 2.7 | 2.6 | 2.4 | 3.3 |
| 6-Aug | 2.3 | Z | 2.3 | 2.3 | 2.3 | 2.4 | 2.4 | 2.4 | 2.2 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.4 |
| 7-Aug | 2.4 | 2.5 | Z | 2.5 | 2.5 | 2.4 | 2.3 | 2.3 | 2.2 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.2 | 2.1 | 2.2 | 2.5 |
| 8-Aug | 2.1 | 2.1 | 2.1 | Z | 2.5 | 2.7 | 2.7 | 2.4 | 2.2 | 2.3 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.3 | 2.2 | 2.3 | 2.4 | 2.2 | 2.7 |
| 9-Aug | 2.5 | 2.7 | 2.7 | 2.9 | Z | 2.6 | 2.7 | 3.0 | 2.8 | 2.1 | 2.5 | 2.3 | C | C | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.3 | 2.2 | 2.3 | 2.4 | 3.0 |
| 10-Aug | 2.3 | 2.2 | 2.3 | 2.7 | 2.8 | Z | 2.8 | 2.5 | 2.5 | 2.4 | 2.3 | 2.4 | 2.1 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.1 | 2.2 | 2.3 | 2.8 |
| 11-Aug | Z | 2.7 | 2.6 | 2.8 | 2.7 | 2.5 | 2.7 | 3.0 | 2.8 | 2.7 | 2.5 | 2.2 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.3 | 2.3 | 2.4 | 2.4 | 3.0 |
| 12-Aug | 2.6 | Z | 2.5 | 2.4 | 2.4 | 2.5 | 2.6 | 2.5 | 2.4 | 2.4 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.4 | 2.3 | 2.2 | 2.4 | 2.4 | 2.3 | 2.6 |
| 13-Aug | 2.3 | 2.5 | Z | 2.2 | 2.2 | 2.1 | 2.1 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.3 | 2.1 | 2.5 |
| 14-Aug | 2.1 | 2.2 | 2.1 | Z | 2.2 | 2.1 | 2.1 | 2.2 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.1 | 2.1 | 2.0 | 2.2 | 2.2 | 2.3 | 2.4 | 2.4 | 2.2 | 2.4 |
| 15-Aug | 2.4 | 2.3 | 2.3 | 2.4 | Z | 2.2 | 2.3 | 2.6 | 2.4 | 2.5 | 2.6 | 2.5 | 2.5 | 2.3 | 2.4 | 2.5 | 3.1 | 2.4 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.4 | 2.4 | 3.1 |
| 16-Aug | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | Z | 2.2 | 2.2 | 2.2 | 2.3 | 2.4 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.1 | 2.0 | 2.1 | 2.1 | 2.1 | 2.0 | 2.1 | 2.4 |
| 17-Aug | Z | 2.1 | 2.1 | 2.2 | 2.2 | 2.3 | 2.2 | 2.2 | 2.3 | 2.4 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.4 |
| 18-Aug | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.0 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.2 |
| 19-Aug | 2.0 | 2.0 | Z | 2.1 | 2.0 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | 2.1 |
| 20-Aug | 2.0 | 2.1 | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 |
| 21-Aug | 2.1 | 2.1 | 2.1 | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.1 | 2.2 | 2.4 | 2.3 | 2.4 | 2.1 | 2.4 |
| 22-Aug | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | Z | 2.4 | 2.5 | 2.7 | 2.7 | 2.4 | 2.5 | 2.4 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.3 | 2.2 | 2.2 | 2.3 | 2.7 |
| 23-Aug | Z | 2.6 | 2.5 | 2.3 | 2.3 | 2.3 | 2.3 | 2.4 | 2.4 | 2.2 | 2.2 | 2.2 | 2.1 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.3 | 2.2 | 2.6 |
| 24-Aug | 2.3 | Z | 2.2 | 2.2 | 2.2 | 2.1 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.2 | 2.3 | 2.4 | 2.5 | 2.4 | 2.1 | 2.0 | 2.2 | 2.5 |
| 25-Aug | 2.0 | 2.1 | Z | 2.0 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 |
| 26-Aug | 2.0 | 2.0 | 2.0 | Z | 2.1 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | 2.3 | 2.1 | 2.1 | 2.1 | 2.3 |
| 27-Aug | 2.1 | 2.1 | 2.1 | 2.1 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 |
| 28-Aug | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.2 | 2.1 | 2.1 | 2.1 | 2.2 |
| 29-Aug | Z | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 |
| 30-Aug | 2.1 | Z | 2.1 | 2.1 | 2.2 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.3 | 2.4 | 2.4 | 2.2 | 2.3 | 2.2 | 2.4 |
| 31-Aug | 2.3 | 2.4 | Z | 2.8 | 2.9 | 2.9 | 2.9 | 3.0 | 2.9 | 2.9 | 2.5 | 2.3 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.4 | 3.0 |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| Z - zerospan C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | | | |





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Barge Landing - August 2017**

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2.0 | 115 | 16.17 | 16.17 |
| 2.1 - 3.0 | 589 | 82.84 | 99.02 |
| 3.1 - 10.0 | 7 | 0.98 | 100.00 |
| > 10.0 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 711

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Barge Landing - August 2017**

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2.0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 5 | 15 | 44 | 17 | 15 | 11 | 3 | 113 |
| 2.1 - 3.0 | 24 | 14 | 15 | 12 | 9 | 13 | 46 | 89 | 76 | 80 | 69 | 48 | 25 | 17 | 18 | 31 | 586 |
| 3.1 - 10.0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 0 | 0 | 1 | 7 |
| > 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 25 | 14 | 15 | 12 | 10 | 13 | 47 | 90 | 77 | 86 | 84 | 94 | 43 | 32 | 29 | 35 | 706 |

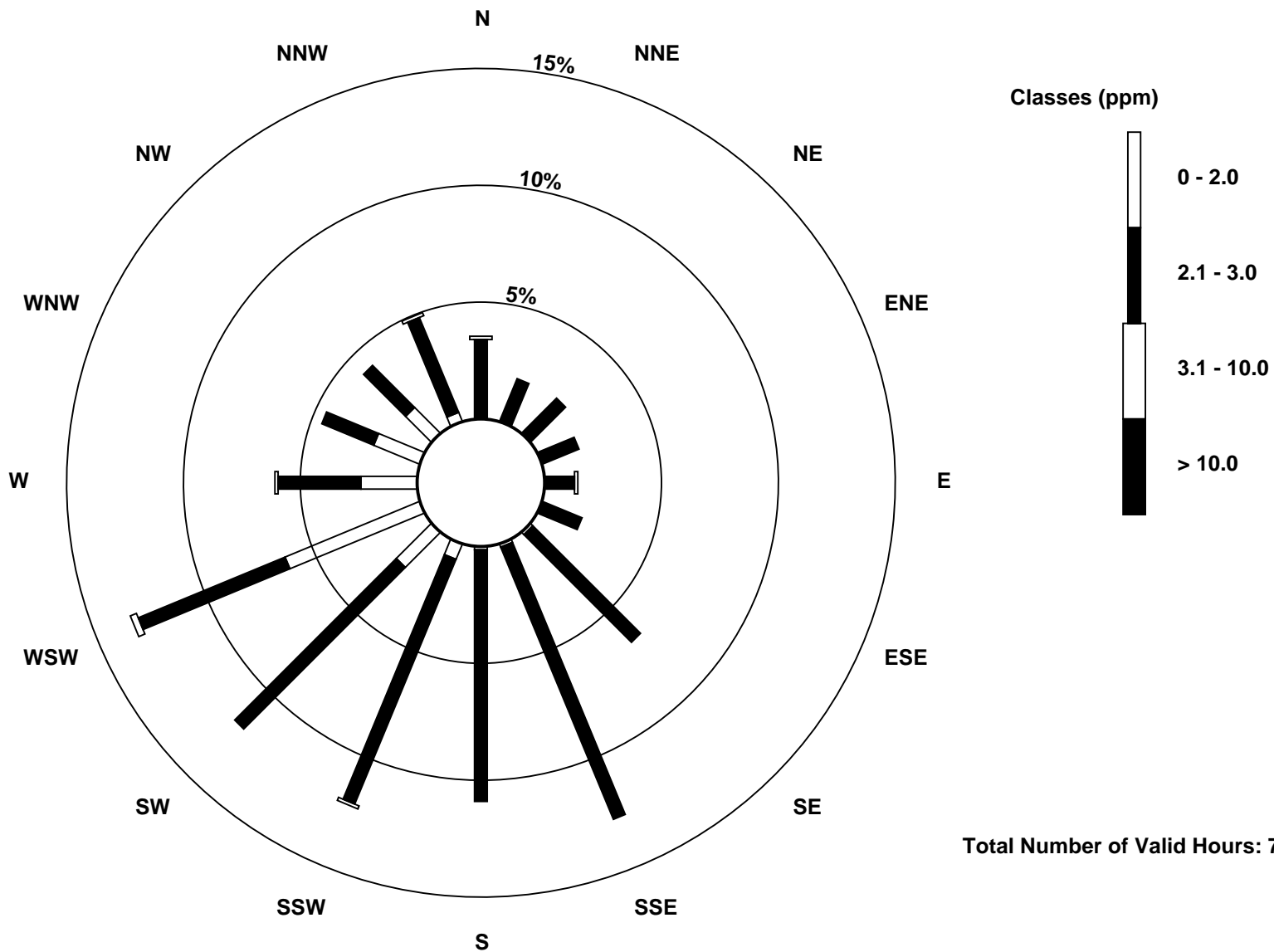
Total Number of Valid Hours: 706

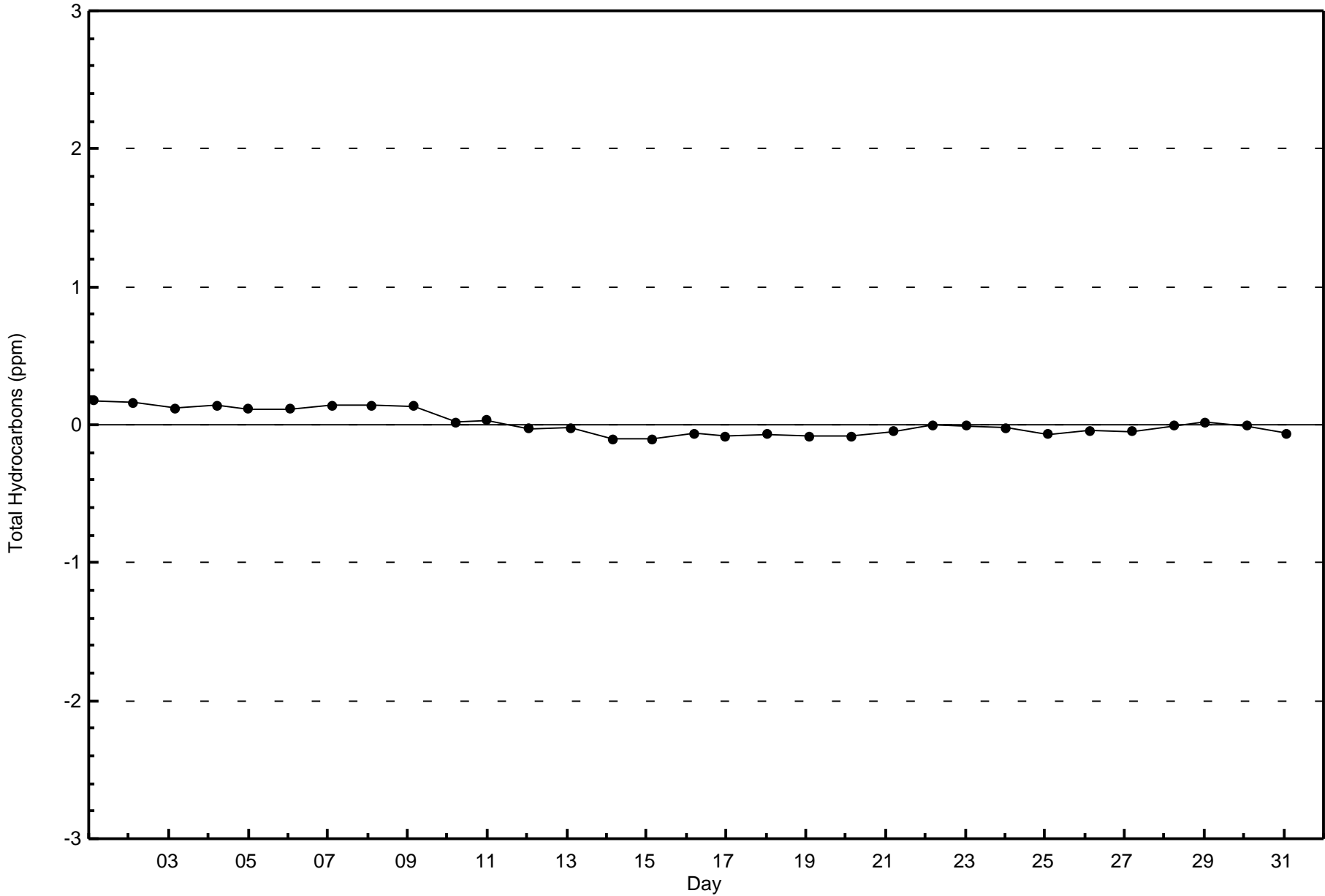
Total Number of Hours: 744

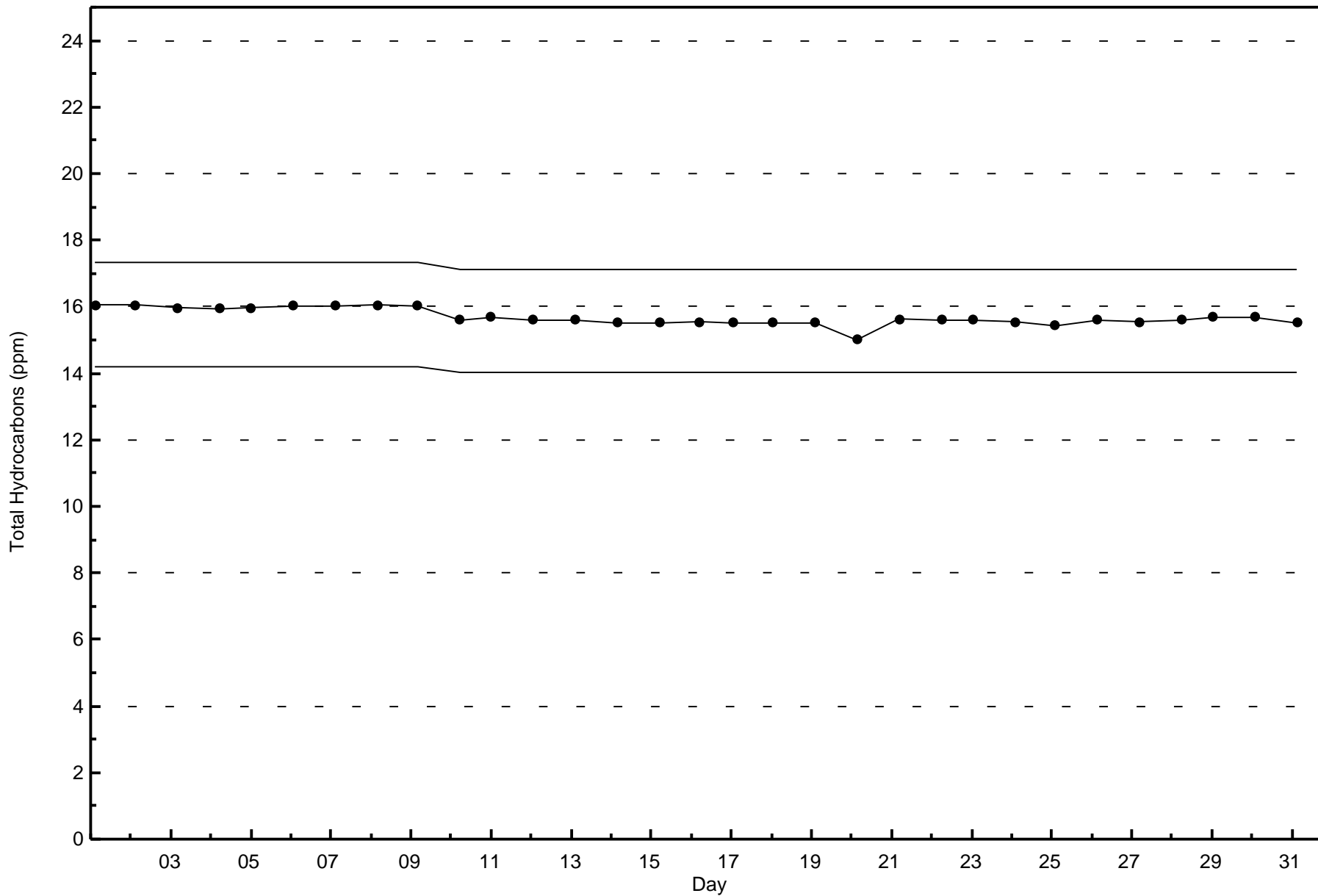


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Total Hydrocarbons (THC) - ppm
Barge Landing (AMS 9)









Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

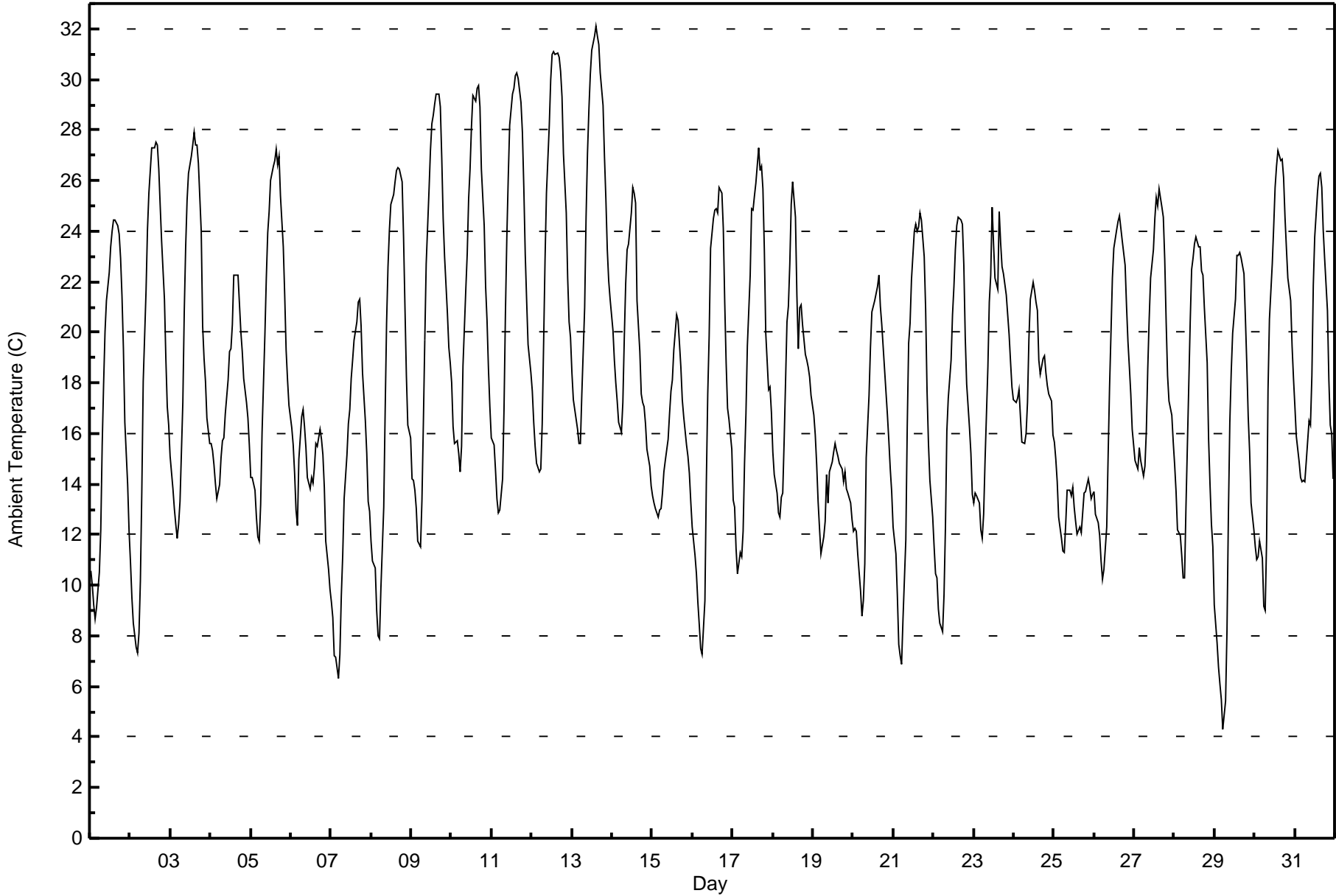
Barge Landing - August 2017

| Maximum Value: 32.1 C on Aug 13 15:00 Maximum Daily Average: 24.4 C on Aug 13 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: | 744 | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------------------|-------|------|---------------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Minimum Value: 4.3 C on Aug 29 06:00 Minimum Daily Average: 13.2 C on Aug 25 | | | | | | | | | | | | | | | | | | | | | | Hours of Data: | 744 | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 24.1 C at hour 16 Minimum Diurnal Average: 11.4 C at hour 6 | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 18.26 C Percentiles: P ₁ = 7.2 P ₁₀ = 11.3 Q ₁ = 13.8 Median = 17.6 Q ₃ = 22.9 P ₉₀ = 26.2 P ₉₉ = 31.0 | | | | | | | | | | | | | | | | | | | | | | Hours of Calibration: | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: | 100.0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 10.6 | 10.0 | 9.3 | 8.7 | 9.1 | 10.5 | 12.2 | 15.6 | 17.9 | 20.0 | 21.2 | 22.4 | 23.4 | 24.0 | 24.5 | 24.4 | 24.2 | 23.9 | 22.9 | 21.4 | 19.3 | 16.4 | 14.0 | 12.2 | 17.4 | 24.5 | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 10.9 | 9.5 | 8.5 | 7.5 | 7.3 | 8.1 | 10.2 | 13.7 | 18.1 | 21.6 | 24.1 | 25.5 | 26.4 | 27.3 | 27.3 | 27.5 | 27.4 | 26.5 | 25.0 | 23.6 | 21.3 | 19.0 | 17.1 | 16.3 | 18.7 | 27.5 | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 15.1 | 13.8 | 13.0 | 12.4 | 11.9 | 12.4 | 13.3 | 17.3 | 20.8 | 23.4 | 25.2 | 26.3 | 27.0 | 27.4 | 27.9 | 27.4 | 27.4 | 26.7 | 24.0 | 20.3 | 18.9 | 18.1 | 16.6 | 15.6 | 20.1 | 27.9 | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 15.6 | 15.3 | 14.8 | 14.0 | 13.4 | 14.0 | 15.0 | 15.7 | 15.8 | 16.8 | 18.1 | 19.2 | 19.3 | 20.3 | 22.2 | 22.2 | 22.3 | 21.1 | 20.0 | 19.3 | 18.2 | 17.2 | 16.6 | 15.5 | 17.6 | 22.3 | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 14.2 | 14.2 | 13.8 | 12.7 | 11.9 | 11.8 | 13.2 | 16.1 | 19.9 | 22.2 | 23.9 | 24.8 | 26.0 | 26.5 | 26.8 | 27.2 | 26.6 | 26.9 | 25.4 | 23.4 | 21.5 | 19.3 | 18.1 | 17.1 | 20.2 | 27.2 | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 16.2 | 15.6 | 14.4 | 13.0 | 12.4 | 15.0 | 16.7 | 16.9 | 16.3 | 15.5 | 14.3 | 13.8 | 14.3 | 14.0 | 14.7 | 15.6 | 15.5 | 16.2 | 15.8 | 15.1 | 13.9 | 11.7 | 10.6 | 9.9 | 14.5 | 16.9 | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 9.4 | 8.7 | 7.2 | 7.2 | 6.3 | 7.3 | 9.6 | 11.2 | 13.4 | 15.2 | 16.4 | 16.9 | 18.2 | 18.9 | 19.7 | 20.4 | 21.2 | 21.3 | 20.2 | 18.4 | 16.5 | 15.2 | 13.3 | 12.9 | 14.4 | 21.3 | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 11.8 | 11.0 | 10.7 | 9.0 | 8.0 | 7.9 | 9.9 | 13.1 | 16.9 | 20.3 | 22.6 | 24.1 | 25.0 | 25.5 | 26.0 | 26.4 | 26.5 | 26.5 | 25.9 | 23.8 | 21.0 | 18.3 | 16.3 | 15.8 | 18.4 | 26.5 | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 14.2 | 14.2 | 13.7 | 13.0 | 11.7 | 11.5 | 13.4 | 16.4 | 19.7 | 22.7 | 25.6 | 27.2 | 28.3 | 28.6 | 29.0 | 29.4 | 29.4 | 28.9 | 26.9 | 24.5 | 23.0 | 20.8 | 19.4 | 18.8 | 21.3 | 29.4 | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 18.0 | 16.3 | 15.6 | 15.7 | 15.2 | 14.5 | 15.5 | 18.7 | 21.7 | 23.1 | 25.3 | 26.5 | 28.1 | 29.4 | 29.1 | 29.7 | 29.7 | 28.9 | 26.4 | 24.2 | 21.8 | 20.5 | 18.6 | 17.0 | 22.1 | 29.7 | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 15.8 | 15.6 | 14.5 | 13.4 | 12.9 | 13.0 | 14.2 | 17.0 | 20.7 | 23.8 | 26.1 | 28.2 | 29.4 | 29.6 | 30.2 | 30.2 | 30.0 | 29.1 | 27.9 | 25.7 | 23.1 | 21.3 | 19.5 | 18.4 | 22.1 | 30.2 | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 17.7 | 16.5 | 15.5 | 14.8 | 14.5 | 14.6 | 16.4 | 19.6 | 22.9 | 25.5 | 28.2 | 30.0 | 31.0 | 31.1 | 31.0 | 31.0 | 30.9 | 30.3 | 29.3 | 27.1 | 24.7 | 22.1 | 20.4 | 19.8 | 23.5 | 31.1 | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 18.4 | 17.3 | 16.6 | 16.1 | 15.6 | 15.6 | 17.6 | 21.0 | 24.6 | 27.1 | 28.8 | 30.2 | 31.2 | 31.7 | 32.1 | 31.7 | 31.4 | 30.3 | 29.0 | 27.0 | 25.3 | 23.2 | 22.1 | 21.3 | 24.4 | 32.1 | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 20.1 | 18.9 | 18.0 | 17.3 | 16.4 | 16.0 | 17.2 | 19.8 | 21.9 | 23.3 | 23.5 | 24.7 | 25.7 | 25.5 | 25.1 | 21.2 | 19.3 | 17.6 | 17.2 | 17.0 | 16.4 | 15.4 | 14.7 | 13.9 | 19.4 | 25.7 | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 13.6 | 13.3 | 13.1 | 12.7 | 13.0 | 13.0 | 13.7 | 14.5 | 14.9 | 15.8 | 16.8 | 17.7 | 18.1 | 19.3 | 20.7 | 20.4 | 19.6 | 18.6 | 17.3 | 16.7 | 15.5 | 15.1 | 14.4 | 13.3 | 15.9 | 20.7 | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 12.3 | 11.2 | 10.4 | 9.3 | 8.5 | 7.5 | 7.3 | 9.4 | 14.1 | 17.6 | 19.8 | 23.3 | 24.5 | 24.8 | 24.9 | 24.7 | 25.7 | 25.5 | 24.1 | 21.2 | 18.8 | 17.0 | 16.5 | 15.4 | 17.2 | 25.7 | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 13.4 | 13.1 | 11.5 | 10.4 | 11.3 | 11.1 | 12.1 | 14.8 | 16.8 | 19.5 | 22.3 | 24.9 | 24.8 | 25.4 | 25.9 | 27.3 | 26.4 | 26.6 | 25.7 | 23.3 | 20.0 | 17.7 | 17.9 | 16.8 | 19.1 | 27.3 | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 15.3 | 14.4 | 13.6 | 12.9 | 12.7 | 13.5 | 13.6 | 15.7 | 20.4 | 21.1 | 22.7 | 25.1 | 26.0 | 24.5 | 21.5 | 19.4 | 21.0 | 21.1 | 20.3 | 19.1 | 18.9 | 18.6 | 18.3 | 17.5 | 18.6 | 26.0 | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 16.7 | 15.9 | 14.7 | 13.3 | 12.2 | 11.3 | 11.9 | 12.5 | 14.4 | 13.3 | 14.5 | 14.9 | 15.2 | 15.6 | 15.3 | 15.1 | 14.8 | 14.6 | 14.1 | 14.5 | 13.8 | 13.7 | 13.3 | 12.6 | 14.1 | 16.7 | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 12.2 | 12.2 | 12.2 | 11.3 | 9.8 | 8.8 | 9.4 | 10.9 | 15.1 | 17.5 | 19.4 | 20.8 | 21.1 | 21.3 | 21.8 | 22.3 | 21.0 | 20.3 | 19.4 | 18.5 | 16.7 | 15.7 | 14.6 | 13.7 | 16.1 | 22.3 | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 12.3 | 11.2 | 9.6 | 7.7 | 7.2 | 6.9 | 8.7 | 11.8 | 16.3 | 19.6 | 20.3 | 22.1 | 24.0 | 24.3 | 24.0 | 24.2 | 24.7 | 24.5 | 23.0 | 20.9 | 17.7 | 15.6 | 14.2 | 12.7 | 16.8 | 24.7 | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 11.5 | 10.4 | 10.3 | 9.1 | 8.5 | 8.1 | 9.6 | 12.3 | 16.1 | 17.4 | 18.9 | 20.7 | 21.8 | 23.3 | 24.2 | 24.5 | 24.4 | 24.3 | 22.7 | 19.8 | 18.0 | 16.2 | 15.2 | 13.6 | 16.7 | 24.5 | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 13.3 | 13.6 | 13.5 | 13.3 | 12.2 | 11.8 | 12.8 | 14.9 | 18.6 | 21.2 | 22.3 | 25.0 | 23.5 | 22.2 | 21.7 | 24.8 | 23.6 | 22.6 | 22.3 | 21.5 | 20.7 | 19.9 | 18.9 | 17.9 | 18.8 | 25.0 | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 17.3 | 17.2 | 17.4 | 17.7 | 16.6 | 15.7 | 15.6 | 16.0 | 17.2 | 19.7 | 21.3 | 22.0 | 21.6 | 21.2 | 20.9 | 18.9 | 18.4 | 18.9 | 19.1 | 18.4 | 17.9 | 17.6 | 17.3 | 15.9 | 18.3 | 22.0 | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 15.6 | 15.0 | 14.1 | 12.7 | 11.9 | 11.3 | 11.3 | 12.4 | 13.8 | 13.8 | 13.5 | 13.9 | 13.1 | 12.5 | 12.0 | 12.3 | 12.1 | 12.9 | 13.7 | 13.7 | 14.2 | 13.9 | 13.4 | 13.6 | 13.2 | 15.6 | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 13.7 | 12.8 | 12.5 | 12.0 | 10.9 | 10.2 | 10.6 | 12.3 | 15.2 | 17.8 | 20.0 | 22.1 | 23.3 | 24.0 | 24.4 | 24.6 | 24.1 | 23.6 | 22.7 | 21.0 | 19.6 | 18.6 | 17.6 | 16.1 | 17.9 | 24.6 | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 14.9 | 14.8 | 14.6 | 15.4 | 14.9 | 14.3 | 14.7 | 16.1 | 18.6 | 20.5 | 22.1 | 23.3 | 24.5 | 25.3 | 25.0 | 25.7 | 25.0 | 24.5 | 22.9 | 20.4 | 18.3 | 17.3 | 16.7 | 15.6 | 19.4 | 25.7 | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 14.8 | 13.7 | 12.2 | 12.0 | 11.2 | 10.3 | 10.3 | 13.1 | 17.9 | 20.4 | 22.5 | 23.0 | 23.5 | 23.7 | 23.4 | 23.4 | 22.4 | 22.3 | 21.0 | 18.8 | 15.8 | 14.0 | 12.4 | 11.5 | 17.2 | 23.7 | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 9.2 | 7.7 | 6.7 | 6.1 | 5.5 | 4.3 | 5.4 | 8.2 | 12.8 | 16.4 | 18.4 | 19.9 | 21.3 | 23.0 | 23.0 | 23.2 | 22.9 | 22.3 | 20.6 | 18.8 | 16.7 | 15.3 | 13.2 | 12.2 | 14.7 | 23.2 | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 11.5 | 11.0 | 11.1 | 11.8 | 11.1 | 9.2 | 9.0 | 11.8 | 17.8 | 20.5 | 22.7 | 24.1 | 25.7 | 26.6 | 27.2 | 26.8 | 26.8 | 26.1 | 24.5 | 23.3 | 22.1 | 21.3 | 19.5 | 18.2 | 19.2 | 27.2 | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 17.1 | 15.9 | 14.9 | 14.3 | 14.1 | 14.1 | 14.1 | 14.9 | 16.5 | 16.3 | 18.3 | 21.9 | 23.8 | 25.6 | 26.2 | 26.3 | 25.7 | 24.1 | 22.9 | 20.9 | 18.1 | 16.3 | 16.0 | 14.2 | 18.8 | 26.3 | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | 14.3 | 13.6 | 12.8 | 12.2 | 11.6 | 11.4 | 12.4 | 14.6 | 17.6 | 19.6 | 21.3 | 22.7 | 23.5 | 24.0 | 24.1 | 24.1 | 23.9 | 23.5 | 22.3 | 20.7 | 19.0 | 17.5 | 16.3 | 15.3 |
| | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | 20.1 | 18.9 | 18.0 | 17.7 | 16.6 | 16.0 | 17.6 | 21.0 | 24.6 | 27.1 | 28.8 | 30.2 | 31.2 | 31.7 | 32.1 | 31.7 | 31.4 | 30.3 | 29.3 | 27.1 | 25.3 | 23.2 | 22.1 | 21.3 |



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Barge Landing - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Barge Landing - August 2017**

| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 47 | 6.32 | 6.32 |
| 10 - 20 | 414 | 55.65 | 61.96 |
| > 20 | 283 | 38.04 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

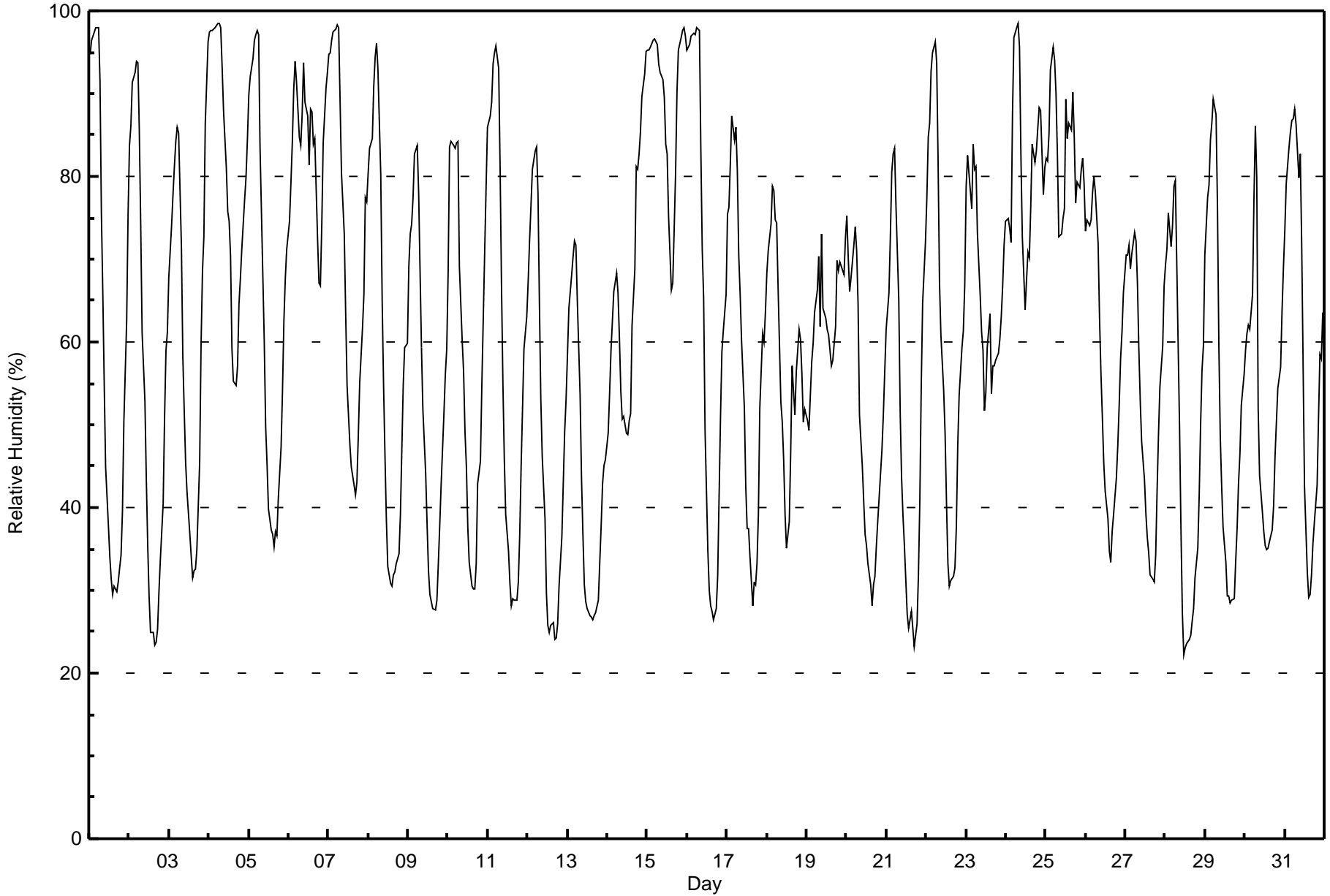
**Relative Humidity (RH) - %
Barge Landing - August 2017**

| Maximum Value: 99 % on Aug 24 08:00 | | | | | | | | | | | | | | | | | | Maximum Daily Average: 89.3 % on Aug 15 | | | | | | | | | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|------|---------------|---------------|------|------|------|------|------|------|------|------|------|---------------------------------|------|------|------|------|------|------|------|------|------|------|------|-----------------|--|
| Minimum Value: 22 % on Aug 28 12:00 | | | | | | | | | | | | | | | | | | Minimum Daily Average: 44.1 % on Aug 13 | | | | | | | | | | | | | | | | | | Hours of Data: 744 | | | | | | | | | | | | | |
| Maximum Diurnal Average: 86.3 % at hour 6 | | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 40.6 % at hour 16 | | | | | | | | | | | | | | | | | | Hours of Missing Data: 0 | | | | | | | | | | | | | |
| Monthly Average: 61.6 % | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 24 P ₁₀ = 31 Q ₁ = 42 Median = 62 O ₃ = 81 P ₉₀ = 93 P ₉₉ = 98 | | | | | | | | | | | | | | | | | | Hours of Calibration: 0 | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 95 | 96 | 97 | 97 | 98 | 98 | 92 | 76 | 66 | 55 | 45 | 38 | 34 | 31 | 30 | 30 | 30 | 31 | 33 | 34 | 40 | 50 | 63 | 75 | 59.7 | 98 | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 84 | 86 | 91 | 93 | 94 | 94 | 86 | 74 | 61 | 53 | 43 | 35 | 29 | 25 | 25 | 23 | 24 | 25 | 30 | 34 | 40 | 51 | 59 | 61 | 55.0 | 94 | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 68 | 74 | 78 | 81 | 84 | 86 | 85 | 71 | 58 | 52 | 45 | 42 | 37 | 34 | 31 | 32 | 32 | 35 | 45 | 60 | 68 | 73 | 86 | 96 | 60.7 | 96 | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 97 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 93 | 88 | 81 | 76 | 75 | 70 | 59 | 55 | 55 | 57 | 65 | 68 | 71 | 77 | 80 | 84 | 80.7 | 98 | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 90 | 92 | 94 | 96 | 97 | 98 | 97 | 84 | 68 | 60 | 50 | 45 | 40 | 37 | 37 | 35 | 37 | 37 | 41 | 47 | 54 | 62 | 68 | 71 | 64.1 | 98 | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 75 | 79 | 84 | 90 | 94 | 91 | 85 | 84 | 87 | 94 | 89 | 87 | 81 | 88 | 88 | 84 | 85 | 72 | 67 | 67 | 74 | 84 | 91 | 93 | 83.9 | 94 | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 95 | 95 | 96 | 98 | 98 | 98 | 98 | 89 | 80 | 73 | 64 | 55 | 51 | 48 | 45 | 43 | 41 | 43 | 49 | 55 | 62 | 66 | 77 | 77 | 70.6 | 98 | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 80 | 83 | 85 | 91 | 94 | 96 | 93 | 80 | 65 | 55 | 46 | 38 | 33 | 31 | 31 | 32 | 32 | 33 | 34 | 39 | 47 | 55 | 59 | 60 | 58.1 | 96 | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 69 | 73 | 74 | 77 | 83 | 84 | 78 | 68 | 59 | 52 | 44 | 38 | 32 | 29 | 29 | 28 | 28 | 29 | 33 | 38 | 43 | 51 | 56 | 59 | 52.3 | 84 | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 68 | 84 | 84 | 84 | 83 | 84 | 84 | 69 | 60 | 56 | 49 | 45 | 38 | 33 | 31 | 30 | 30 | 33 | 43 | 46 | 55 | 63 | 71 | 78 | 58.4 | 84 | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 86 | 87 | 89 | 94 | 95 | 96 | 93 | 81 | 67 | 55 | 46 | 39 | 35 | 31 | 28 | 29 | 29 | 29 | 31 | 37 | 45 | 52 | 59 | 63 | 58.1 | 96 | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 67 | 72 | 76 | 81 | 83 | 84 | 78 | 65 | 53 | 46 | 39 | 30 | 26 | 25 | 26 | 26 | 24 | 24 | 26 | 30 | 37 | 43 | 49 | 53 | 48.5 | 84 | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 59 | 64 | 68 | 70 | 72 | 72 | 65 | 54 | 43 | 37 | 31 | 29 | 28 | 27 | 27 | 27 | 27 | 29 | 33 | 38 | 43 | 45 | 46 | 46 | 44.1 | 72 | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 49 | 54 | 59 | 63 | 66 | 68 | 66 | 61 | 54 | 51 | 51 | 49 | 49 | 50 | 51 | 62 | 69 | 81 | 81 | 83 | 85 | 90 | 92 | 95 | 65.8 | 95 | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 95 | 95 | 96 | 96 | 97 | 96 | 96 | 94 | 93 | 92 | 89 | 84 | 83 | 75 | 66 | 67 | 74 | 80 | 90 | 95 | 97 | 98 | 98 | 97 | 89.3 | 98 | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 95 | 96 | 97 | 97 | 97 | 97 | 98 | 98 | 83 | 71 | 65 | 49 | 35 | 30 | 28 | 27 | 26 | 28 | 32 | 41 | 51 | 59 | 61 | 66 | 63.7 | 98 | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 75 | 76 | 82 | 87 | 84 | 86 | 81 | 71 | 66 | 60 | 52 | 43 | 37 | 37 | 34 | 28 | 31 | 31 | 33 | 39 | 52 | 61 | 60 | 64 | 57.1 | 87 | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 68 | 71 | 74 | 79 | 78 | 75 | 74 | 67 | 53 | 50 | 46 | 39 | 35 | 38 | 47 | 57 | 54 | 51 | 56 | 61 | 60 | 56 | 50 | 52 | 58.1 | 79 | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 51 | 49 | 54 | 58 | 60 | 63 | 66 | 70 | 62 | 73 | 64 | 63 | 62 | 61 | 59 | 57 | 58 | 62 | 70 | 69 | 70 | 69 | 68 | 72 | 62.9 | 73 | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 75 | 70 | 66 | 68 | 72 | 74 | 71 | 65 | 51 | 45 | 41 | 37 | 35 | 33 | 31 | 28 | 31 | 32 | 35 | 38 | 44 | 47 | 51 | 56 | 49.8 | 75 | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 62 | 66 | 73 | 81 | 83 | 83 | 76 | 65 | 52 | 44 | 39 | 35 | 27 | 25 | 26 | 27 | 25 | 23 | 26 | 32 | 41 | 55 | 65 | 72 | 50.1 | 83 | | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 77 | 85 | 86 | 93 | 95 | 96 | 94 | 82 | 67 | 61 | 54 | 49 | 41 | 33 | 30 | 31 | 32 | 33 | 38 | 47 | 54 | 59 | 61 | 67 | 61.1 | 96 | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 79 | 82 | 80 | 76 | 84 | 81 | 81 | 73 | 66 | 61 | 59 | 52 | 54 | 59 | 63 | 54 | 57 | 57 | 58 | 59 | 60 | 63 | 67 | 72 | 66.5 | 84 | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 75 | 75 | 74 | 72 | 87 | 97 | 98 | 99 | 96 | 83 | 73 | 64 | 68 | 71 | 70 | 76 | 84 | 82 | 83 | 86 | 88 | 88 | 78 | 81 | 81.0 | 99 | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 82 | 82 | 85 | 93 | 96 | 94 | 90 | 83 | 73 | 73 | 75 | 76 | 89 | 85 | 87 | 86 | 90 | 85 | 77 | 79 | 79 | 81 | 82 | 79 | 83.3 | 96 | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 73 | 75 | 74 | 75 | 78 | 80 | 78 | 72 | 63 | 56 | 51 | 45 | 42 | 39 | 35 | 33 | 37 | 39 | 44 | 47 | 52 | 58 | 61 | 66 | 57.3 | 80 | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 71 | 71 | 72 | 69 | 71 | 73 | 72 | 67 | 59 | 53 | 48 | 43 | 39 | 36 | 35 | 32 | 31 | 31 | 34 | 42 | 49 | 55 | 59 | 67 | 53.3 | 73 | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 69 | 71 | 76 | 71 | 74 | 79 | 80 | 70 | 50 | 37 | 27 | 22 | 23 | 23 | 24 | 25 | 26 | 28 | 31 | 35 | 42 | 50 | 57 | 60 | 47.9 | 80 | | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 71 | 77 | 79 | 84 | 86 | 89 | 87 | 76 | 60 | 49 | 43 | 38 | 33 | 29 | 29 | 28 | 29 | 29 | 34 | 37 | 43 | 46 | 52 | 56 | 53.6 | 89 | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 59 | 61 | 62 | 61 | 66 | 77 | 86 | 80 | 52 | 44 | 39 | 37 | 35 | 35 | 35 | 37 | 37 | 40 | 46 | 50 | 54 | 57 | 64 | 69 | 53.5 | 86 | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 74 | 79 | 84 | 85 | 87 | 87 | 88 | 86 | 80 | 83 | 72 | 57 | 43 | 32 | 29 | 29 | 32 | 36 | 38 | 43 | 51 | 58 | 58 | 64 | 61.4 | 88 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 75.2 | 78.0 | 80.2 | 82.5 | 85.0 | 86.3 | 84.4 | 76.4 | 65.8 | 60.0 | 53.6 | 47.7 | 44.1 | 42.1 | 40.8 | 40.6 | 41.8 | 42.7 | 46.2 | 50.7 | 56.3 | 61.9 | 66.1 | 70.0 | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | | | | | | | 97 | 98 | 98 | 98 | 98 | 98 | 98 | 99 | 96 | 94 | 89 | 87 | 89 | 88 | 88 | 86 | 90 | 85 | 90 | 95 | 97 | 98 | 98 | 97 | Diurnal Maximum | |



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Barge Landing - August 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Barge Landing - August 2017

| | | |
|--|--|--------------------------------|
| Maximum Speed: 20 km/h on Aug 25 16:00 | Maximum Daily Speed Average: 11.9 km/h on Aug 13 | Hours in Service: 744 |
| Minimum Speed Value: 0 km/h on Aug 7 05:00 | Minimum Daily Speed Average: 0.2 km/h on Aug 15 | Hours of Data: 737 |
| Maximum Diurnal Speed Average: 5.4 km/h at hour 15 | Minimum Diurnal Speed Average: 2.3 km/h at hour 7 | Hours of Missing Data: 7 |
| Monthly Average Velocity: 3.4 km/h 215.3 deg | Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 4 Median = 6 Q ₃ = 9 P ₉₀ = 12 P ₉₉ = 18 | Percent Operational Time: 99.3 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|-------|-------|-------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | WSW1 | SW2 | SSW2 | SE2 | SSW1 | SW1 | NW2 | NNW3 | NNW4 | N4 | NE6 | NE7 | NNE7 | N7 | NNE6 | NE6 | NE6 | NE6 | ENE6 | NE5 | NE3 | N0 | WSW1 | NNW0 | NNE2.7 | N7 |
| 2-Aug | WSW3 | AF | WSW2 | S2 | SSW3 | SW4 | SW3 | SW5 | SW5 | SW4 | SSW6 | S6 | SW7 | SW7 | SW7 | W8 | SW7 | SW7 | SW5 | SSW3 | SW3 | SSW3 | SE4 | S3 | SW4.3 | W8 |
| 3-Aug | SSE4 | SE2 | SE2 | SE3 | SSE4 | SSE4 | SSE4 | SSW5 | SW6 | SSW6 | S7 | S7 | SSE6 | S5 | SW6 | S4 | S3 | WSW4 | NNW6 | NNE5 | ESE4 | SE1 | E4 | NNW1 | S2.6 | S7 |
| 4-Aug | NNW0 | NW1 | W2 | WSW3 | AF | AF | NNW1 | N1 | ENE5 | ENE1 | NW3 | NNW5 | ENE2 | ESE5 | E7 | SE7 | SSE7 | SSE5 | SSW3 | SSW5 | S1 | NNW2 | E1 | SSE2 | SE1.0 | SSE7 |
| 5-Aug | SE2 | NNW4 | W1 | SW2 | SW1 | SSE2 | S1 | S3 | SW3 | W5 | SSW3 | S4 | S7 | S8 | SSE10 | S10 | SSW9 | SW7 | SSW8 | SSW6 | SSW5 | S5 | S5 | SSW3 | S4.0 | S10 |
| 6-Aug | S3 | NNW1 | S1 | S1 | NNW3 | NNE7 | NNE6 | NNE6 | N7 | N8 | N10 | N8 | NNE8 | N5 | NNW5 | N5 | N5 | NNE9 | NNE8 | N7 | N4 | NNW2 | NW1 | W2 | N4.3 | N10 |
| 7-Aug | NW1 | NW2 | AF | WSW2 | WSW0 | WSW2 | NNW2 | NNW4 | NNW5 | NNW5 | N5 | NNE2 | NW3 | NW5 | WNW2 | WNW4 | WSW5 | SW7 | SSW4 | SW4 | SW4 | WSW4 | SW4 | W2.3 | SW7 | |
| 8-Aug | S4 | SSW4 | SSW4 | S3 | SSE4 | SE4 | SSE4 | SW6 | SW7 | SW6 | SW7 | SW6 | SW5 | SSW5 | SW6 | SW7 | SSW7 | SSW7 | SSW7 | S6 | SSE5 | SE6 | SE5 | SSE4 | SSW4.6 | SSW7 |
| 9-Aug | S1 | S4 | SSW6 | SSW5 | S3 | S4 | S5 | S6 | SSW7 | S7 | SW6 | SW7 | SW8 | SW6 | WSW7 | SW7 | SW5 | S7 | S5 | S4 | SSE4 | S2 | S4 | SE2 | SSW4.6 | SW8 |
| 10-Aug | SE2 | WSW2 | SW4 | SSW2 | SW4 | SSE2 | ESE3 | SE4 | W2 | SSW3 | NNW2 | ENE3 | ENE3 | NE4 | NNE6 | NE6 | ENE6 | ESE6 | SSE6 | S4 | SSW4 | WSW4 | SW4 | SSW4 | SE1.3 | NNE6 |
| 11-Aug | S4 | SSW4 | S4 | SSE5 | SSE5 | SSE4 | SSE5 | S6 | SSW6 | SSW5 | SSW8 | SSW8 | SSW8 | S8 | S10 | S9 | SSE9 | SSE10 | SSE9 | SE10 | SE8 | SSE7 | SE5 | SSE5 | S6.2 | S10 |
| 12-Aug | SSE6 | SE7 | SE6 | SE7 | SSE6 | SE5 | SSE6 | SSE8 | S9 | SSE10 | SSE11 | S14 | S15 | S15 | S15 | S15 | S14 | S14 | SSW11 | S9 | S7 | SE7 | SSE7 | SSE8 | S9.2 | S15 |
| 13-Aug | SE7 | SE7 | SE8 | SE8 | SE8 | SE7 | SE8 | SSE9 | SSE10 | SSE15 | SSE19 | SSE18 | SSE18 | SSE17 | SSE14 | SSE16 | SSE16 | SSE18 | SSE15 | SSE12 | SSE11 | SE9 | SE10 | SE8 | SSE11.9 | SSE19 |
| 14-Aug | SE9 | SE8 | SSE7 | SSE4 | SSE5 | S3 | SSE2 | SSE7 | S9 | SE7 | S9 | S7 | SSW9 | SSW11 | SW11 | SW12 | SW10 | SW7 | SW6 | S5 | SSE5 | SSE6 | SE6 | SE6 | S6.0 | SW12 |
| 15-Aug | SE5 | SE4 | SSE1 | ESE3 | SE4 | S2 | NNW3 | NNW3 | NNW3 | N1 | WSW1 | W4 | W3 | NNW2 | ESE1 | E3 | E4 | E5 | E4 | W2 | WSW3 | NNW1 | W2 | W3 | ESE0.2 | SE5 |
| 16-Aug | NW3 | NNW4 | NW4 | NNW1 | W4 | WSW2 | SSW2 | S3 | S4 | SSW6 | SSW6 | SSW7 | SW8 | WSW9 | WSW9 | WSW6 | SW9 | WSW8 | WSW8 | SW6 | SSW4 | SSW4 | SSW4 | WSW3 | SW4.5 | WSW9 |
| 17-Aug | SSE1 | NW2 | SSW2 | S3 | SSW4 | SSW4 | SSW4 | SSW5 | SSW5 | SW7 | SW7 | SW7 | SW4 | S3 | SW3 | WNW7 | WNW6 | NW6 | WNW3 | WSW2 | S2 | S4 | SW4 | SW5 | SW3.1 | SW7 |
| 18-Aug | S4 | S4 | S4 | SW3 | SSW4 | SSW7 | SSW5 | SW8 | SSW9 | WSW11 | SW10 | WSW12 | WSW17 | WSW17 | SW17 | SW15 | SSW12 | SSW14 | SSW11 | SSW8 | SW11 | SW12 | SW10 | SW11 | SW9.4 | WSW17 |
| 19-Aug | WSW10 | WSW11 | WSW9 | WSW8 | WSW8 | WSW9 | WSW9 | SW9 | WSW15 | WSW12 | WSW17 | W17 | W17 | NNW16 | NNW19 | NNW18 | NW17 | NNW13 | WSW9 | WSW10 | WSW8 | W5 | W3 | WSW8 | W10.8 | NNW19 |
| 20-Aug | SW5 | WSW10 | WSW14 | WSW12 | WSW6 | SSW3 | SSW4 | SW5 | WSW9 | W13 | W14 | W14 | W13 | NNW16 | NNW15 | NW14 | NNW12 | NW13 | NW11 | NW9 | W7 | W10 | NNW7 | NNW4 | W9.0 | NNW16 |
| 21-Aug | WSW6 | SW4 | SW4 | S3 | SW3 | SSW3 | WSW6 | SW6 | SW7 | SW9 | WSW11 | WSW12 | WSW14 | WSW13 | W12 | WSW11 | WSW11 | NNW8 | NW7 | NW4 | N3 | NNW5 | N5 | N4 | WSW5.7 | WSW14 |
| 22-Aug | N4 | N4 | N4 | NNW1 | NNW2 | N1 | NNW3 | NNW4 | N5 | NNE7 | NNE6 | NE5 | NNE5 | E2 | NW5 | W4 | W6 | WSW6 | S1 | ENE5 | ENE4 | E3 | ENE3 | N2 | N2.2 | NNE7 |
| 23-Aug | NNW3 | N4 | NE1 | ESE1 | ENE1 | SSE2 | WSW2 | W2 | S5 | SSE9 | S10 | SSW11 | SSW11 | S8 | SSE8 | SSE14 | SSE11 | SSE11 | SSE10 | SSE10 | SSE9 | SSE8 | SSE7 | SSE6 | SSE5.7 | SSE14 |
| 24-Aug | SSE6 | SSE7 | SSE8 | SSE8 | SSW6 | ESE2 | N1 | SE4 | SE6 | SE7 | SE7 | SE8 | SSE2 | WSW1 | SE5 | SE11 | NNW3 | N4 | NNW3 | NE1 | SSE1 | S5 | SW9 | SW7 | SSE3.3 | SE11 |
| 25-Aug | SSW9 | SSW9 | SW8 | SSW7 | SSW8 | SSW9 | SSW9 | SSW11 | SW13 | C | C | SSW11 | SW12 | WSW20 | WSW19 | WSW19 | WSW19 | W19 | W15 | WSW10 | WSW12 | WSW7 | W4 | WSW8 | WSW10.9 | WSW20 |
| 26-Aug | WSW12 | WSW14 | WSW15 | WSW12 | SW6 | SSW5 | WSW9 | WSW11 | WSW10 | WSW9 | SW10 | SW10 | SW11 | WSW12 | WSW13 | WSW13 | WSW11 | WSW10 | WSW8 | WSW8 | SW4 | SW6 | SW5 | SSW4 | WSW9.2 | WSW15 |
| 27-Aug | SSW4 | SSW4 | WSW6 | WSW10 | WSW7 | WSW7 | WSW7 | WSW7 | WSW8 | W12 | W15 | WSW17 | W16 | W13 | W14 | WSW14 | W12 | NNW9 | NNW6 | W1 | NNW1 | AF | SW2 | NNW2 | WSW8.1 | WSW17 |
| 28-Aug | NNW4 | SW1 | NNW4 | W5 | WSW6 | SW3 | S2 | SSW4 | W5 | W8 | NNW9 | NNW13 | NNW12 | NNW12 | NW11 | NW12 | NW10 | NW8 | NW6 | NNW4 | NNW1 | NNW3 | NNW2 | W4 | NNW5.4 | NNW13 |
| 29-Aug | W3 | W4 | WSW4 | NNW2 | NNW2 | S2 | SE3 | S1 | SSW3 | W4 | NE2 | NE3 | SE1 | NE1 | E3 | E4 | ESE6 | SE7 | ESE5 | ESE3 | ESE5 | SE8 | SSE5 | SE5 | SE1.7 | SE8 |
| 30-Aug | SE5 | SE6 | SSE7 | SSE6 | SSE3 | SSE3 | NNW1 | NNW3 | SSE8 | SSE12 | SSE13 | SSE15 | SSE16 | SSE19 | S18 | SSE16 | SSE13 | SSE13 | SSE10 | S9 | SSW11 | SSW10 | SSW8 | S6 | SSE8.9 | SSE19 |
| 31-Aug | SSW5 | S5 | S4 | S5 | S5 | S4 | SSE5 | S6 | S8 | S6 | SSW8 | SSW8 | WSW11 | WSW14 | W16 | WSW14 | NW11 | NW9 | NW8 | NNW5 | WSW5 | WSW7 | WSW8 | SSW3 | WSW5.2 | W16 |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|-----------------|-----|-------|-------|-------|------|------|-----------------|
| SSW2.3SSW2.5SSW3.0SSW3.0SSW2.9SSW2.6SSW2.3SSW3.2 | SW4.1 | SW4.1 | SW4.4 | SW4.7 | SW5.2 | SW5.2 | SW5.4 | SW4.9 | SW4.3 | SW3.6 | SW3.1 | SSW2.6 | SSW2.9 | SSW2.9 | SSW2.7 | SSW2.6 | Diurnal Average | | | | | | | |
| WSW12 | WSW14 | WSW15 | WSW12 | WSW8 | SSW9 | SSW9 | WSW11 | WSW15 | SSE15 | SSE19 | SSE18 | SSE18 | WSW20 | WSW19 | WSW20 | WSW19 | W19 | W15 | SSE12 | WSW12 | WSW12 | SW10 | SW11 | Diurnal Maximum |

C - Calibration AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Barge Landing - August 2017

| | |
|--|--|
| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Aug 19 16:00 | Hours in Service: 744 Hours of Data: 737 Hours of Missing Data: 7 Hours of Calibration: 2 Percent Operational Time: 99.3 |
| Minimum Value: 1 km/h on Aug 8 05:00 | |
| Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 6 | |

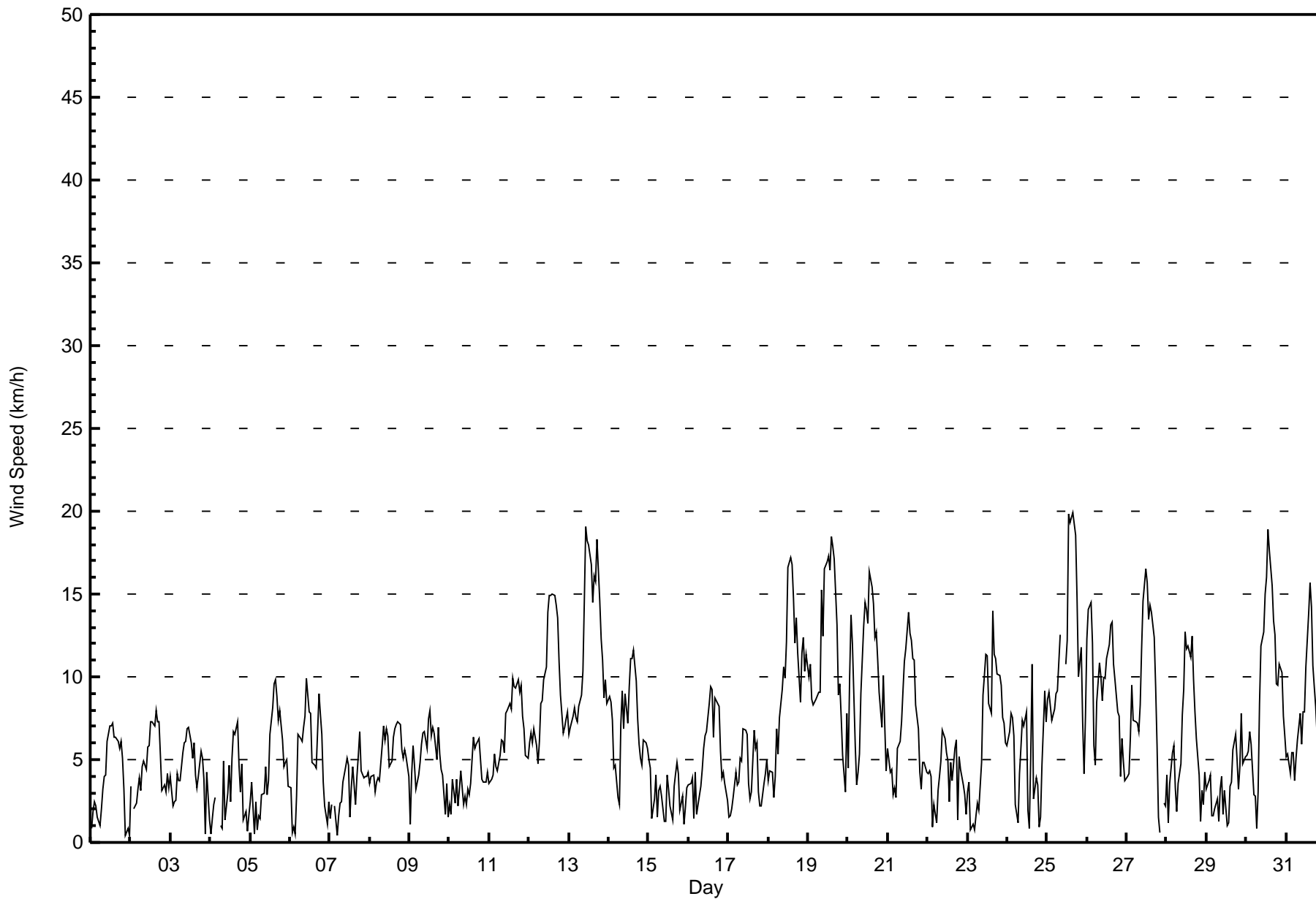
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
|-----------------|-------------------------------|----|----|---|----|----|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 3 |
| 2-Aug | 1 | AF | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 3 | 4 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 4 |
| 3-Aug | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 6 | 3 | 2 | 2 | 3 | 2 | 6 |
| 4-Aug | 1 | 2 | 1 | 3 | AF | AF | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 3 |
| 5-Aug | 2 | 1 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 4 | 3 | 3 | 2 | 1 | 1 | 1 | 2 | 4 |
| 6-Aug | 1 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 2 | 1 | 2 | 2 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 3 |
| 7-Aug | 1 | 1 | AF | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 |
| 8-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 3 |
| 9-Aug | 1 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 2 | 4 |
| 10-Aug | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 1 | 2 | 1 | 1 | 1 | 3 |
| 11-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 4 |
| 12-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 5 | 5 | 6 | 5 | 5 | 6 | 5 | 4 | 3 | 2 | 1 | 1 | 1 | 6 |
| 13-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 4 | 6 | 7 | 7 | 7 | 6 | 6 | 6 | 6 | 6 | 5 | 4 | 4 | 2 | 2 | 2 | 7 |
| 14-Aug | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 3 | 3 | 2 | 3 | 3 | 4 | 4 | 4 | 4 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 4 |
| 15-Aug | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 2 |
| 16-Aug | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 4 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 4 |
| 17-Aug | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 3 |
| 18-Aug | 1 | 1 | 1 | 1 | 3 | 2 | 2 | 3 | 3 | 4 | 4 | 4 | 5 | 6 | 6 | 6 | 5 | 5 | 4 | 3 | 4 | 3 | 4 | 4 | 6 |
| 19-Aug | 3 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 6 | 4 | 5 | 6 | 7 | 7 | 7 | 8 | 7 | 6 | 3 | 3 | 2 | 2 | 2 | 3 | 8 |
| 20-Aug | 3 | 4 | 4 | 4 | 3 | 2 | 2 | 2 | 3 | 4 | 5 | 5 | 6 | 7 | 6 | 5 | 5 | 4 | 4 | 4 | 2 | 3 | 4 | 3 | 7 |
| 21-Aug | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 4 | 4 | 5 | 4 | 5 | 4 | 4 | 3 | 3 | 1 | 2 | 1 | 1 | 1 | 5 |
| 22-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 2 |
| 23-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 4 | 3 | 4 | 5 | 4 | 3 | 3 | 5 | 4 | 4 | 3 | 3 | 3 | 2 | 2 | 1 | 5 |
| 24-Aug | 1 | 1 | 2 | 2 | 4 | 2 | 2 | 1 | 2 | 2 | 2 | 3 | 2 | 1 | 5 | 4 | 1 | 1 | 1 | 2 | 2 | 2 | 4 | 3 | 5 |
| 25-Aug | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 4 | 5 | C | C | 4 | 5 | 7 | 6 | 7 | 6 | 6 | 5 | 3 | 4 | 4 | 2 | 2 | 7 |
| 26-Aug | 4 | 4 | 4 | 4 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 5 | 4 | 5 | 4 | 4 | 3 | 2 | 2 | 2 | 2 | 1 | 5 |
| 27-Aug | 1 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 5 | 5 | 6 | 5 | 5 | 5 | 4 | 4 | 3 | 1 | 1 | AF | 2 | 2 | 6 |
| 28-Aug | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 3 | 4 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 2 | 2 | 1 | 1 | 2 | 1 | 5 |
| 29-Aug | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 1 | 2 | 2 | 2 | 1 | 3 |
| 30-Aug | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 3 | 4 | 5 | 5 | 5 | 6 | 6 | 6 | 5 | 4 | 3 | 3 | 4 | 4 | 3 | 2 | 6 |
| 31-Aug | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 5 | 5 | 6 | 5 | 5 | 4 | 3 | 2 | 1 | 2 | 2 | 2 | 6 |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |

C - Calibration AF - Analyzer Failure



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Barge Landing - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Barge Landing - August 2017**

| Wind Speed Ranges (km/h) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 5 | 357 | 48.44 | 48.44 |
| 6 - 11 | 287 | 38.94 | 87.38 |
| 12 - 19 | 91 | 12.35 | 99.73 |
| 20 - 28 | 2 | 0.27 | 100.00 |
| 29 - 38 | 0 | 0.00 | 100.00 |
| > 38 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 737

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Barge Landing - August 2017**

| Wind Speed Ranges (km/h) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-----------------------------|----------------|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 5 | 20 | 3 | 9 | 10 | 9 | 11 | 22 | 33 | 50 | 44 | 36 | 22 | 23 | 16 | 14 | 35 | 357 |
| 6 - 11 | 6 | 11 | 6 | 2 | 1 | 2 | 30 | 42 | 25 | 41 | 48 | 49 | 5 | 7 | 11 | 1 | 287 |
| 12 - 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 8 | 2 | 5 | 26 | 16 | 10 | 4 | 0 | 91 |
| 20 - 28 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 |
| 29 - 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 26 | 14 | 15 | 12 | 10 | 13 | 52 | 95 | 83 | 87 | 89 | 99 | 44 | 33 | 29 | 36 | 737 |

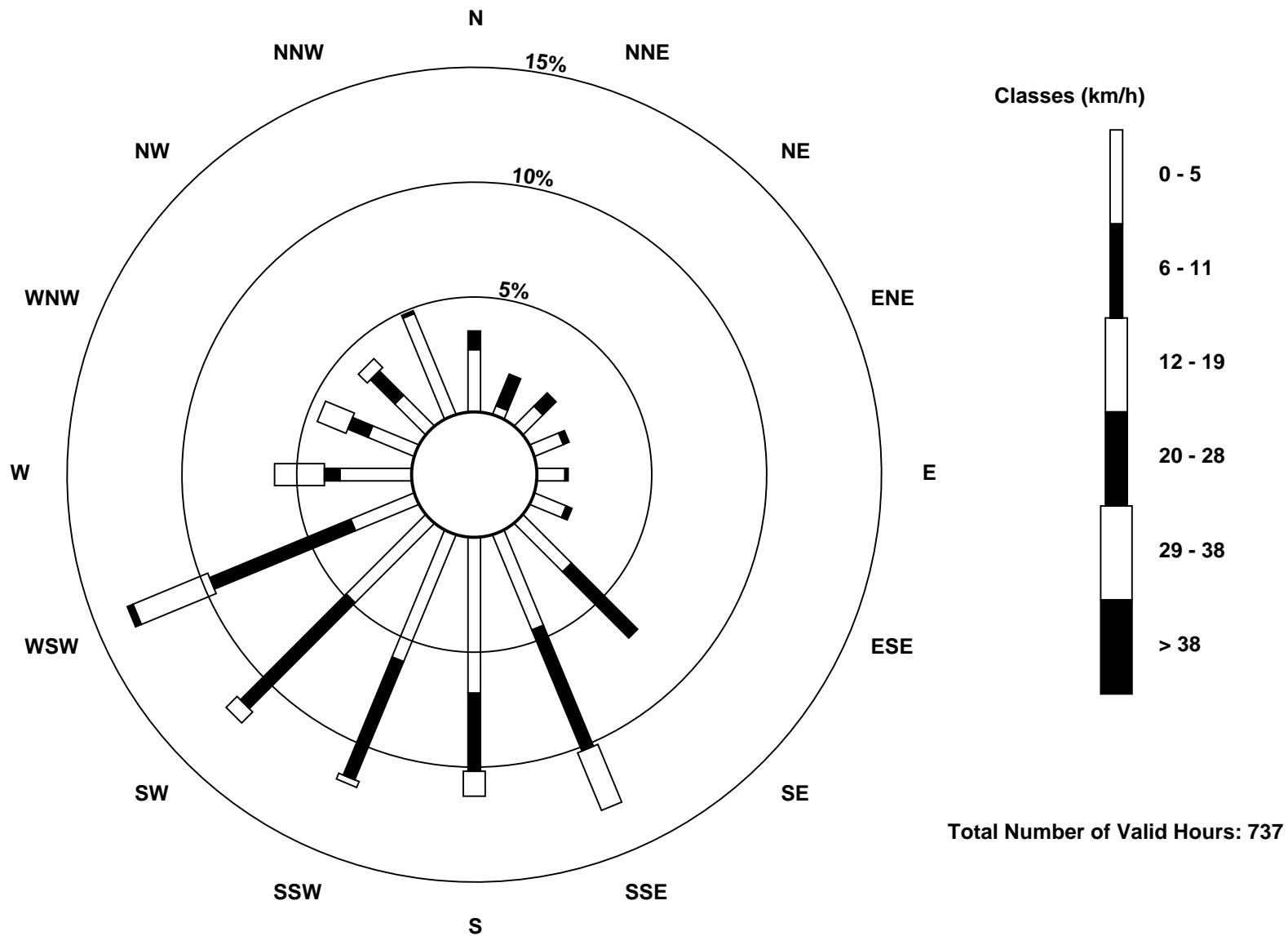
Total Number of Valid Hours: 737

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Wind Speed (WS) - km/h
Barge Landing (AMS 9)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Barge Landing - August 2017

| Direction of Maximum Speed: 251 deg on Aug 25 16:00 Direction of Maximum Daily Speed Average: 150.8 deg on Aug 13 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 737 Hours of Missing Data: 7 | | | |
|--|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|-----|-----|---------------|
| Direction of Minimum Speed: 245 deg on Aug 7 05:00 | | | | | | | | | | | Direction of Minimum Daily Speed Average: 0.2 deg on Aug 15 | | | | | | | | | | | Percent Operational Time: 99.3 | | | |
| Monthly Average Direction: 232.5 deg | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 251 | 226 | 209 | 146 | 213 | 233 | 306 | 340 | 348 | 11 | 45 | 39 | 25 | 10 | 16 | 42 | 48 | 55 | 60 | 50 | 42 | 359 | 248 | 345 | 30.0 |
| 2-Aug | 254 | AF | 241 | 172 | 196 | 233 | 214 | 216 | 220 | 233 | 207 | 171 | 220 | 225 | 224 | 260 | 229 | 225 | 226 | 208 | 217 | 194 | 144 | 185 | 217.4 |
| 3-Aug | 150 | 143 | 124 | 143 | 160 | 159 | 157 | 198 | 226 | 197 | 190 | 176 | 152 | 185 | 218 | 171 | 182 | 255 | 334 | 14 | 117 | 143 | 96 | 336 | 176.2 |
| 4-Aug | 329 | 306 | 275 | 252 | AF | AF | 330 | 353 | 66 | 60 | 324 | 341 | 70 | 109 | 96 | 142 | 154 | 164 | 198 | 194 | 173 | 340 | 86 | 148 | 130.4 |
| 5-Aug | 125 | 342 | 268 | 215 | 227 | 163 | 189 | 173 | 223 | 260 | 205 | 171 | 176 | 172 | 166 | 173 | 195 | 227 | 193 | 196 | 197 | 174 | 183 | 197 | 189.8 |
| 6-Aug | 189 | 287 | 190 | 190 | 345 | 29 | 29 | 18 | 1 | 6 | 4 | 6 | 13 | 2 | 346 | 351 | 10 | 30 | 25 | 5 | 358 | 338 | 313 | 275 | 7.6 |
| 7-Aug | 314 | 320 | AF | 239 | 245 | 246 | 294 | 304 | 328 | 328 | 339 | 357 | 14 | 304 | 310 | 285 | 285 | 238 | 229 | 212 | 215 | 227 | 245 | 228 | 276.7 |
| 8-Aug | 183 | 202 | 201 | 181 | 150 | 140 | 151 | 216 | 214 | 215 | 218 | 234 | 225 | 201 | 225 | 215 | 206 | 211 | 208 | 191 | 156 | 134 | 130 | 153 | 195.9 |
| 9-Aug | 169 | 187 | 204 | 197 | 178 | 181 | 185 | 186 | 193 | 189 | 217 | 235 | 216 | 222 | 240 | 225 | 228 | 188 | 169 | 174 | 163 | 183 | 180 | 133 | 199.9 |
| 10-Aug | 140 | 241 | 215 | 199 | 224 | 165 | 123 | 130 | 259 | 196 | 331 | 61 | 61 | 35 | 33 | 55 | 70 | 105 | 166 | 171 | 198 | 238 | 221 | 200 | 145.3 |
| 11-Aug | 177 | 213 | 170 | 149 | 158 | 162 | 147 | 182 | 194 | 208 | 212 | 209 | 202 | 186 | 169 | 172 | 158 | 153 | 153 | 144 | 145 | 147 | 142 | 161 | 170.4 |
| 12-Aug | 157 | 141 | 137 | 142 | 153 | 139 | 155 | 165 | 169 | 162 | 166 | 177 | 172 | 181 | 182 | 177 | 188 | 186 | 195 | 188 | 174 | 145 | 148 | 151 | 169.4 |
| 13-Aug | 134 | 138 | 141 | 140 | 136 | 140 | 145 | 150 | 153 | 153 | 152 | 152 | 153 | 162 | 163 | 148 | 155 | 149 | 156 | 160 | 156 | 145 | 145 | 143 | 150.8 |
| 14-Aug | 140 | 144 | 147 | 152 | 163 | 179 | 168 | 156 | 181 | 163 | 172 | 188 | 197 | 203 | 228 | 236 | 234 | 232 | 215 | 173 | 150 | 150 | 144 | 139 | 182.0 |
| 15-Aug | 143 | 129 | 153 | 114 | 139 | 174 | 329 | 337 | 328 | 356 | 239 | 263 | 273 | 348 | 104 | 79 | 89 | 80 | 92 | 275 | 258 | 282 | 262 | 280 | 109.8 |
| 16-Aug | 315 | 283 | 316 | 284 | 272 | 253 | 209 | 172 | 174 | 201 | 210 | 206 | 224 | 238 | 242 | 253 | 230 | 248 | 240 | 235 | 210 | 197 | 213 | 240 | 232.5 |
| 17-Aug | 159 | 308 | 192 | 171 | 203 | 210 | 215 | 210 | 213 | 223 | 226 | 233 | 230 | 181 | 235 | 287 | 296 | 310 | 300 | 238 | 183 | 171 | 215 | 225 | 230.5 |
| 18-Aug | 179 | 182 | 174 | 217 | 194 | 198 | 194 | 214 | 207 | 241 | 235 | 252 | 243 | 245 | 232 | 221 | 212 | 212 | 211 | 209 | 223 | 236 | 230 | 236 | 223.6 |
| 19-Aug | 244 | 255 | 256 | 250 | 252 | 244 | 242 | 225 | 257 | 248 | 255 | 264 | 272 | 297 | 289 | 290 | 306 | 284 | 252 | 256 | 249 | 271 | 260 | 240 | 265.2 |
| 20-Aug | 224 | 250 | 258 | 255 | 240 | 206 | 207 | 218 | 253 | 261 | 264 | 268 | 279 | 290 | 298 | 304 | 302 | 315 | 312 | 306 | 278 | 270 | 286 | 334 | 276.5 |
| 21-Aug | 258 | 231 | 216 | 189 | 214 | 209 | 238 | 234 | 232 | 232 | 246 | 239 | 246 | 252 | 261 | 252 | 252 | 299 | 315 | 314 | 350 | 343 | 349 | 356 | 256.5 |
| 22-Aug | 358 | 349 | 351 | 346 | 342 | 6 | 338 | 330 | 353 | 20 | 21 | 41 | 29 | 81 | 310 | 266 | 261 | 250 | 172 | 73 | 77 | 96 | 75 | 7 | 4.2 |
| 23-Aug | 331 | 1 | 36 | 104 | 62 | 159 | 258 | 264 | 181 | 167 | 175 | 198 | 202 | 187 | 159 | 166 | 159 | 156 | 154 | 152 | 152 | 150 | 151 | 154 | 167.6 |
| 24-Aug | 155 | 153 | 156 | 160 | 195 | 123 | 353 | 127 | 143 | 145 | 136 | 128 | 158 | 255 | 126 | 125 | 348 | 350 | 341 | 39 | 153 | 180 | 230 | 223 | 155.6 |
| 25-Aug | 204 | 206 | 218 | 199 | 194 | 211 | 205 | 207 | 215 | C | C | 211 | 226 | 254 | 247 | 251 | 253 | 260 | 262 | 249 | 246 | 246 | 277 | 250 | 235.6 |
| 26-Aug | 254 | 257 | 258 | 258 | 232 | 208 | 244 | 250 | 247 | 239 | 235 | 229 | 236 | 237 | 247 | 245 | 241 | 249 | 250 | 257 | 225 | 233 | 228 | 194 | 243.6 |
| 27-Aug | 195 | 206 | 237 | 246 | 244 | 240 | 246 | 249 | 243 | 262 | 259 | 258 | 261 | 264 | 261 | 257 | 265 | 282 | 286 | 265 | 329 | AF | 224 | 295 | 255.9 |
| 28-Aug | 337 | 222 | 292 | 270 | 255 | 236 | 183 | 195 | 264 | 268 | 293 | 303 | 302 | 303 | 312 | 324 | 310 | 324 | 324 | 328 | 292 | 288 | 301 | 271 | 297.1 |
| 29-Aug | 276 | 264 | 253 | 293 | 287 | 174 | 138 | 171 | 201 | 263 | 47 | 39 | 126 | 41 | 84 | 84 | 113 | 129 | 114 | 104 | 107 | 132 | 159 | 137 | 135.0 |
| 30-Aug | 145 | 141 | 154 | 152 | 156 | 168 | 335 | 347 | 162 | 158 | 167 | 166 | 164 | 155 | 173 | 168 | 162 | 158 | 163 | 185 | 198 | 196 | 198 | 184 | 167.6 |
| 31-Aug | 197 | 189 | 172 | 188 | 186 | 174 | 161 | 175 | 180 | 187 | 198 | 210 | 239 | 258 | 262 | 258 | 308 | 319 | 314 | 297 | 250 | 249 | 251 | 210 | 236.4 |
| 198.3 211.9 211.9 202.6 201.7 192.0 202.3 205.0 214.2 215.6 218.5 221.0 224.2 232.1 235.5 227.0 229.4 228.7 220.6 206.8 194.2 198.3 198.0 204.2 Diurnal Average | | | | | | | | | | | | | | | | | | | | | | | | | |
| C - Calibration AF - Analyzer Failure All monthly, daily, and diurnal averages have been calculated using vector methods | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

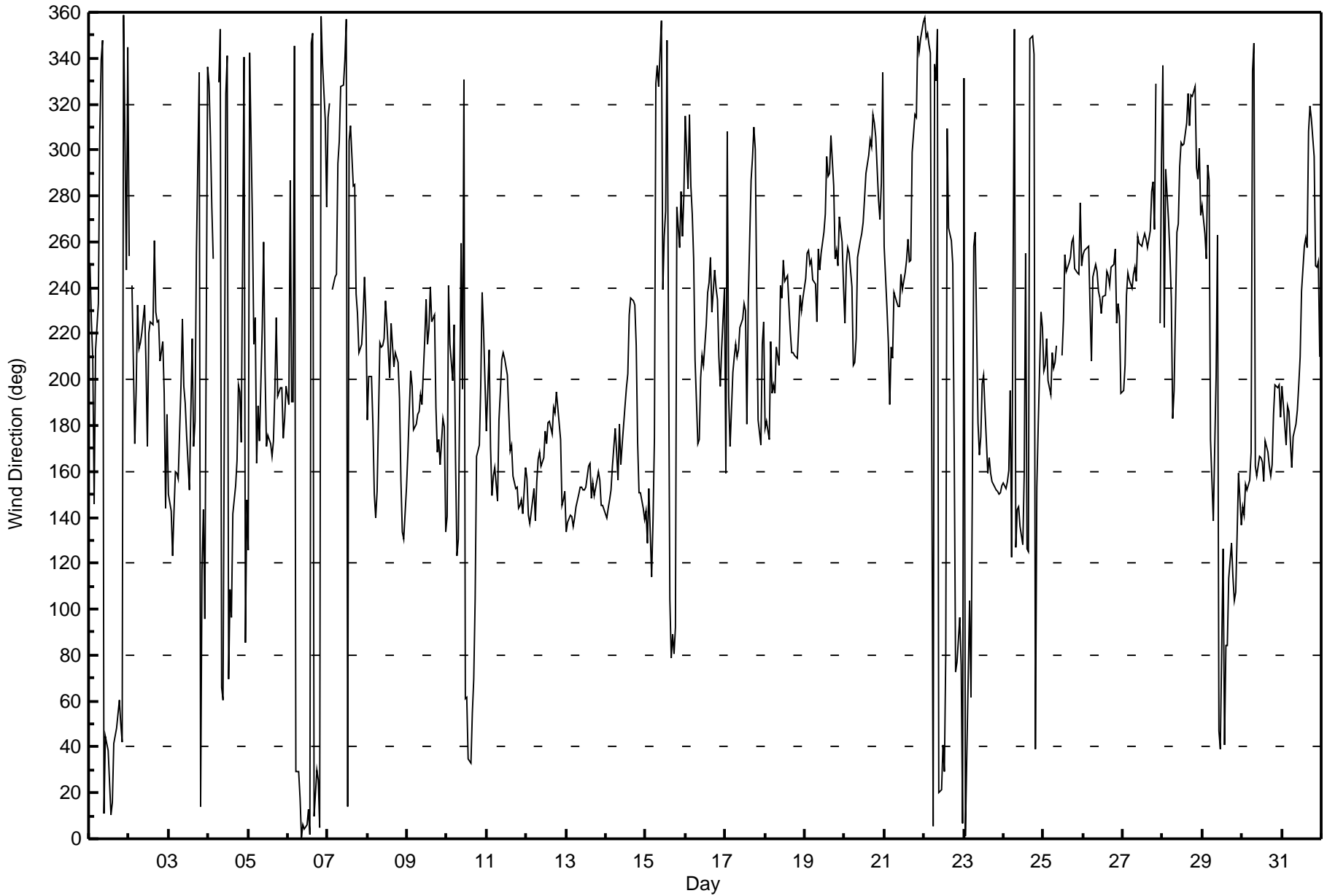
Wind Direction (WD) - deg
Barge Landing - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 101 deg on Aug 29 14:00 Minimum Value: 7 deg on Aug 8 23:00 Percentiles: P ₁ = 9 P ₁₀ = 18 Q ₁ = 23 Median = 29 Q ₃ = 39 P ₉₀ = 60 P ₉₉ = 86 | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 737 Hours of Missing Data: 7 Hours of Calibration: 2 Percent Operational Time: 99.3 | | | | | | |
|--|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|-----|----|----|----|----|--|----|----|----|----|-----------------------|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 69 | 31 | 39 | 41 | 45 | 63 | 33 | 34 | 44 | 46 | 39 | 39 | 38 | 39 | 47 | 43 | 35 | 33 | 29 | 23 | 18 | 23 | 61 | 70 | 70 |
| 2-Aug | 15 | AF | 42 | 40 | 26 | 18 | 31 | 35 | 37 | 57 | 52 | 61 | 50 | 54 | 53 | 40 | 44 | 30 | 25 | 22 | 21 | 31 | 15 | 24 | 61 |
| 3-Aug | 14 | 20 | 35 | 25 | 16 | 24 | 26 | 32 | 34 | 43 | 47 | 47 | 56 | 67 | 55 | 68 | 70 | 35 | 84 | 41 | 47 | 96 | 72 | 61 | 96 |
| 4-Aug | 58 | 28 | 37 | 45 | AF | AF | 43 | 57 | 33 | 65 | 32 | 27 | 44 | 31 | 42 | 34 | 32 | 31 | 23 | 20 | 61 | 22 | 82 | 74 | 82 |
| 5-Aug | 47 | 18 | 86 | 44 | 86 | 87 | 43 | 48 | 53 | 40 | 80 | 70 | 50 | 40 | 38 | 35 | 36 | 41 | 30 | 25 | 21 | 20 | 18 | 26 | 87 |
| 6-Aug | 21 | 79 | 75 | 68 | 20 | 26 | 24 | 23 | 25 | 24 | 24 | 25 | 25 | 27 | 23 | 24 | 32 | 23 | 25 | 23 | 20 | 17 | 25 | 34 | 79 |
| 7-Aug | 19 | 33 | AF | 45 | 86 | 31 | 30 | 27 | 26 | 35 | 33 | 45 | 90 | 80 | 60 | 85 | 55 | 43 | 29 | 23 | 18 | 17 | 16 | 22 | 90 |
| 8-Aug | 31 | 27 | 18 | 20 | 11 | 13 | 34 | 30 | 32 | 34 | 42 | 53 | 65 | 70 | 49 | 53 | 40 | 38 | 28 | 22 | 9 | 12 | 7 | 15 | 70 |
| 9-Aug | 75 | 34 | 24 | 25 | 15 | 21 | 25 | 29 | 33 | 40 | 49 | 36 | 46 | 65 | 48 | 49 | 68 | 34 | 23 | 18 | 12 | 59 | 28 | 80 | 80 |
| 10-Aug | 79 | 78 | 34 | 78 | 22 | 51 | 49 | 36 | 63 | 58 | 75 | 60 | 74 | 78 | 34 | 35 | 38 | 37 | 32 | 28 | 36 | 22 | 19 | 36 | 79 |
| 11-Aug | 30 | 28 | 23 | 12 | 13 | 19 | 24 | 27 | 38 | 45 | 36 | 41 | 42 | 48 | 38 | 37 | 30 | 24 | 21 | 14 | 11 | 8 | 7 | 16 | 48 |
| 12-Aug | 13 | 8 | 8 | 8 | 15 | 14 | 26 | 25 | 30 | 29 | 31 | 30 | 30 | 31 | 33 | 31 | 33 | 31 | 29 | 23 | 22 | 11 | 12 | 11 | 33 |
| 13-Aug | 9 | 9 | 10 | 10 | 9 | 10 | 17 | 23 | 28 | 25 | 23 | 27 | 25 | 30 | 31 | 24 | 27 | 20 | 22 | 22 | 19 | 14 | 13 | 15 | 31 |
| 14-Aug | 13 | 13 | 14 | 17 | 22 | 31 | 37 | 28 | 32 | 34 | 35 | 41 | 39 | 39 | 31 | 23 | 25 | 25 | 32 | 28 | 21 | 16 | 14 | 12 | 41 |
| 15-Aug | 14 | 12 | 60 | 74 | 19 | 59 | 25 | 24 | 33 | 56 | 89 | 34 | 49 | 70 | 94 | 36 | 23 | 21 | 23 | 81 | 31 | 33 | 80 | 27 | 94 |
| 16-Aug | 31 | 27 | 21 | 58 | 28 | 36 | 44 | 39 | 41 | 36 | 37 | 42 | 41 | 34 | 36 | 43 | 33 | 28 | 25 | 20 | 19 | 18 | 22 | 23 | 58 |
| 17-Aug | 57 | 74 | 42 | 43 | 26 | 25 | 26 | 30 | 27 | 29 | 31 | 40 | 65 | 76 | 68 | 40 | 36 | 33 | 44 | 28 | 63 | 30 | 27 | 30 | 76 |
| 18-Aug | 23 | 32 | 28 | 32 | 70 | 24 | 22 | 28 | 30 | 28 | 29 | 27 | 26 | 27 | 30 | 28 | 30 | 28 | 29 | 29 | 26 | 23 | 26 | 23 | 70 |
| 19-Aug | 21 | 24 | 23 | 23 | 24 | 21 | 23 | 28 | 27 | 23 | 23 | 29 | 33 | 34 | 32 | 33 | 31 | 35 | 23 | 22 | 18 | 38 | 42 | 24 | 42 |
| 20-Aug | 43 | 26 | 23 | 24 | 56 | 52 | 33 | 32 | 31 | 26 | 27 | 35 | 35 | 34 | 35 | 35 | 32 | 26 | 29 | 31 | 31 | 29 | 48 | 31 | 56 |
| 21-Aug | 30 | 26 | 25 | 42 | 39 | 38 | 22 | 23 | 25 | 25 | 21 | 24 | 28 | 31 | 33 | 28 | 26 | 35 | 25 | 24 | 20 | 16 | 16 | 18 | 42 |
| 22-Aug | 12 | 14 | 13 | 41 | 24 | 46 | 27 | 29 | 35 | 28 | 30 | 42 | 54 | 76 | 58 | 70 | 37 | 25 | 70 | 20 | 22 | 35 | 50 | 48 | 76 |
| 23-Aug | 32 | 18 | 62 | 71 | 48 | 60 | 31 | 48 | 56 | 30 | 27 | 35 | 31 | 33 | 25 | 29 | 25 | 21 | 20 | 19 | 19 | 17 | 14 | 14 | 71 |
| 24-Aug | 15 | 14 | 18 | 23 | 51 | 34 | 58 | 15 | 26 | 24 | 25 | 22 | 64 | 85 | 74 | 19 | 46 | 20 | 19 | 86 | 76 | 35 | 28 | 26 | 86 |
| 25-Aug | 31 | 27 | 28 | 25 | 27 | 28 | 27 | 29 | 30 | C | C | 31 | 28 | 23 | 23 | 22 | 21 | 21 | 24 | 23 | 24 | 40 | 37 | 24 | 40 |
| 26-Aug | 21 | 21 | 21 | 27 | 46 | 36 | 24 | 19 | 20 | 28 | 29 | 31 | 30 | 28 | 25 | 24 | 28 | 22 | 28 | 20 | 27 | 24 | 28 | 21 | 46 |
| 27-Aug | 18 | 19 | 22 | 27 | 33 | 27 | 32 | 39 | 28 | 28 | 25 | 22 | 28 | 30 | 28 | 25 | 24 | 36 | 30 | 41 | 21 | AF | 40 | 46 | 46 |
| 28-Aug | 15 | 86 | 41 | 24 | 23 | 37 | 51 | 32 | 43 | 31 | 37 | 35 | 37 | 37 | 38 | 27 | 31 | 27 | 21 | 21 | 30 | 18 | 25 | 19 | 86 |
| 29-Aug | 33 | 48 | 29 | 31 | 41 | 60 | 28 | 80 | 49 | 41 | 77 | 59 | 97 | 101 | 62 | 57 | 31 | 23 | 16 | 14 | 16 | 16 | 26 | 12 | 101 |
| 30-Aug | 10 | 10 | 14 | 13 | 39 | 46 | 87 | 55 | 24 | 22 | 28 | 26 | 26 | 23 | 26 | 26 | 24 | 21 | 22 | 25 | 26 | 28 | 24 | 23 | 87 |
| 31-Aug | 21 | 22 | 21 | 19 | 23 | 73 | 32 | 30 | 35 | 38 | 26 | 30 | 29 | 27 | 28 | 26 | 35 | 27 | 30 | 31 | 15 | 18 | 18 | 49 | 73 |
| 79 86 86 78 86 87 87 80 63 65 89 70 97 101 94 85 70 43 84 86 76 96 82 80 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | |
| C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | AF - Analyzer Failure | |



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Barge Landing - August 2017





Wood Buffalo Environmental Association

TRS Calibration Summary

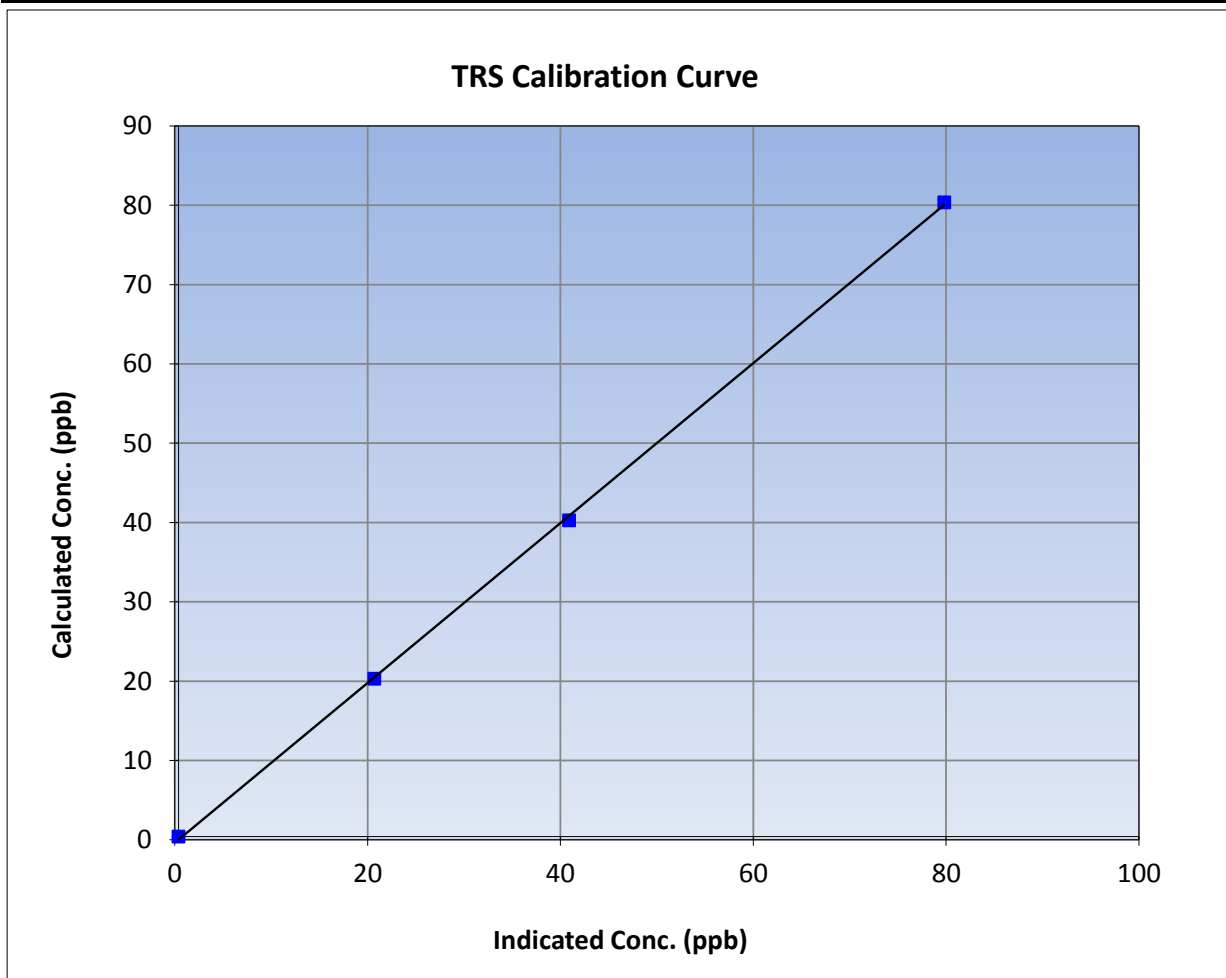
Version-03-2017

Station Information

| | | | |
|------------------|----------------|----------------------|--------------|
| Calibration Date | August 9, 2017 | Previous Calibration | July 4, 2017 |
| Station Name | Barge Landing | Station Number | AMS 09 |
| Start Time (MST) | 9:08 | End Time (MST) | 12:01 |
| Analyzer make | Thermo 43i-TLE | Analyzer serial # | 1331259320 |

Calibration Data

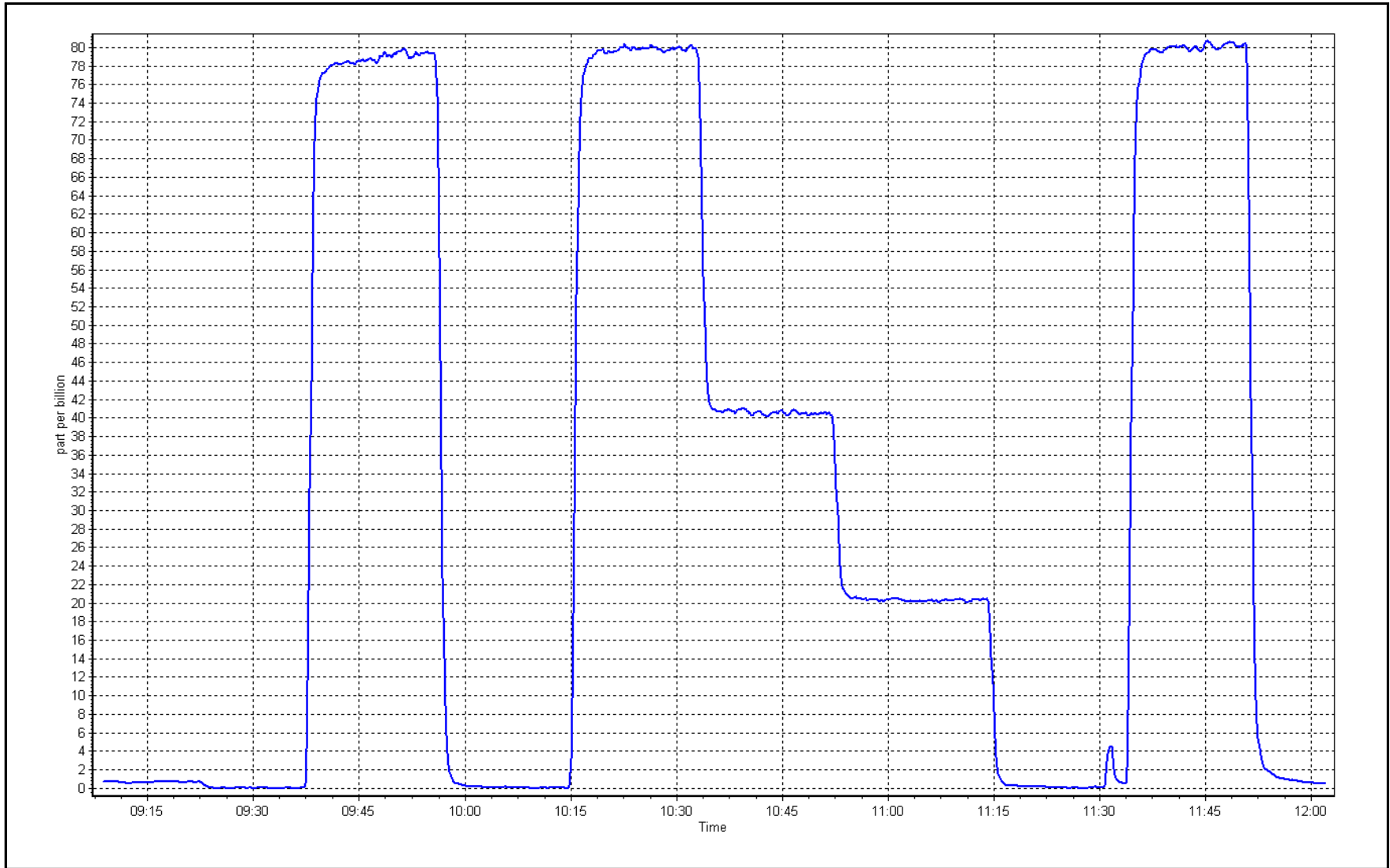
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | 0.999836 | ≥0.995 |
| 80.0 | 79.4 | 1.0073 | | | |
| 39.9 | 40.5 | 0.9851 | Slope | 1.008137 | 0.90 - 1.10 |
| 19.9 | 20.3 | 0.9808 | | | |
| | | | Intercept | -0.389123 | +/-3 |



TRS Calibration Plot

Date: August 9, 2017

Location: Barge Landing





Wood Buffalo Environmental Association

THC Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|----------------|-----------------|--------------|
| Station Name: | Barge Landing | Station number: | AMS 09 |
| Calibration Date: | August 9, 2017 | Last Cal Date: | July 4, 2017 |
| Start time (MST): | 11:50 | End time (MST): | 14:03 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|-----------------------|------------------|---------------------|------------------|
| Gas Cert Reference | EY0000675 | Cal Gas Expiry Date | November 4, 2019 |
| CH4 Cal Gas Conc. | <u>511.0</u> ppm | CH4 Equiv Conc. | 1055.5 ppm |
| C3H8 Cal Gas Conc. | <u>198.0</u> ppm | Station temp. | 27 Deg C |
| Calibrator Make/Model | Sabio 4010 | Serial Number | 11071107 |
| ZAG Make/Model | API 701 | Serial Number | 4888 |

Analyzer Information

| | | | |
|----------------------|---------------|---------------------|----------------------------|
| Analyzer make: | Thermo 51i-LT | Analyzer serial #: | 1327059296 |
| | <u>Start</u> | <u>Finish</u> | <u>Start</u> <u>Finish</u> |
| Analyzer Range | 0 - 25 ppm | Bias voltage supply | -300 -301 |
| Calculated slope | 1.000132 | Sample pressure | 9.2 9.2 |
| Calculated intercept | -0.007663 | Fuel pressure | 24.1 24.1 |
| Analyzer Background | 6.02 | Air pressure | 34.7 34.7 |
| Analyzer Coefficient | 4.600 | Flame temperature | 160.7 160.7 |

THC Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5007 | 0.0 | 0.00 | 0.14 | ---- |
| as found span | 4931 | 74.3 | 15.67 | 15.97 | 0.981 |
| calibrator zero | 5007 | 0.0 | 0.00 | -0.01 | ---- |
| high point | 4931 | 74.3 | 15.67 | 15.69 | 0.998 |
| second point | 4958 | 39.8 | 8.41 | 8.38 | 1.003 |
| third point | 4982 | 14.9 | 3.15 | 3.16 | 0.996 |
| as left zero | 5007 | 0.0 | 0.00 | 0.01 | ---- |
| as left span | 4928 | 74.3 | 15.68 | 15.63 | 1.003 |
| Average Correction Factor | | | | | 0.999 |
| Corrected As found | 15.83 | Previous response | 15.67 | *% change | -1.0% |

* = > +/-5% change initiates investigation

Notes: Changed inlet filter after as founds. Replaced the hydrogen cylinder. Adjusted the zero and the span.

Calibration Performed By: Jayme Marcoux



Wood Buffalo Environmental Association

THC Calibration Summary

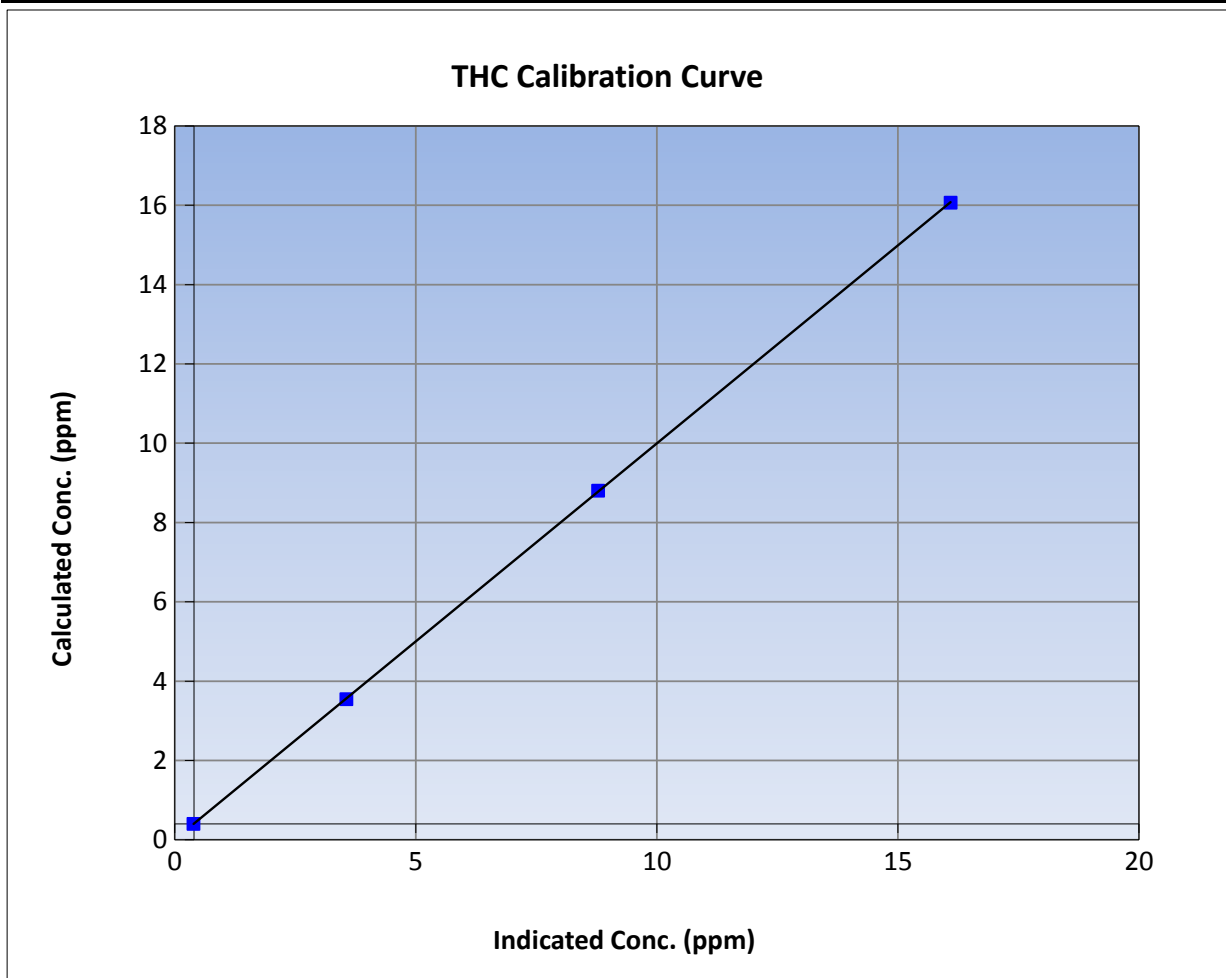
Version-03-2017

Station Information

| | | | |
|------------------|----------------|----------------------|--------------|
| Calibration Date | August 9, 2017 | Previous Calibration | July 4, 2017 |
| Station Name | Barge Landing | Station Number | AMS 09 |
| Start Time (MST) | 11:50 | End Time (MST) | 14:03 |
| Analyzer make | Thermo 51i-LT | Analyzer serial # | 1327059296 |

Calibration Data

| Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (lc) | Correction factor (Cc/lc) | Statistical Evaluation | <u>Limits</u> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | 0.999992 | |
| 15.7 | 15.7 | 0.9984 | | | ≥0.995 |
| 8.4 | 8.4 | 1.0029 | Slope | 0.998574 | |
| 3.1 | 3.2 | 0.9963 | | | 0.90 - 1.10 |
| | | | Intercept | 0.008941 | +/-1.5 |



THC Calibration Plot

Date: August 9, 2017

Location: Barge Landing





Wood Buffalo Environmental Association

Wind Speed/Direction Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|-----------------|
| Station Name: | Barge Landing | Station Number: | AMS 09 |
| Calibration Date: | August 25, 2017 | Prev Cal Date: | August 23, 2016 |
| Start Time (MST): | 9:25 | End Time (MST): | 10:18 |
| Barometric Press: | NA | Station Temp: | 23 Deg C |
| Reason: | Routine | | |

Wind Speed Information

| | | | |
|--------------------|----------------|----------------|--------|
| Sensor make/model: | Met One 010C-1 | Serial Number: | K13090 |
| WS Calibrator: | MetOne 053 | Serial Number: | B4128 |

| Shaft RPM | Actual Speed (K/hr) (Cv) | Indicated Speed (K/hr) (Iv) | Correction factor (Cv/Iv) <i>Limit = 0.95-1.05</i> |
|----------------------------------|--------------------------|-----------------------------|---|
| 0 | 0.0 | 0.0 | n/a |
| 200 | 20.2 | 20.2 | 1.0006 |
| 400 | 39.4 | 39.4 | 0.9990 |
| 600 | 58.6 | 58.5 | 1.0003 |
| 800 | 77.8 | 77.8 | 0.9994 |
| Average Correction Factor | | | 0.9998 |

| | <u>Start</u> | <u>Finish</u> | <u>Limits</u> |
|--------------------------------|--------------|---------------|--------------------|
| Correl Coeff (r ²) | | 1.000000 | <i>≥0.995</i> |
| Calculated slope | 0.998909 | 0.999522 | <i>0.90 - 1.10</i> |
| Calculated intercept | 0.030357 | 0.006347 | <i>+/- 2</i> |

Wind Direction Information

| | | | |
|--|----------------|---|-----------|
| Sensor make/model: | Met One 020C-1 | Serial Number: | E4852 |
| As Found Declination (deg west of North) | <u>12</u> | As Left Declination (deg west of North) | <u>14</u> |

| Physical Direction (Degrees) (Cv) | Indicated Direction (Degrees) (Iv) | Correction factor (Cv/Iv) <i>Limit = 0.95-1.05</i> |
|-----------------------------------|------------------------------------|---|
| 0 | 1.0 | n/a |
| 90 | 89.2 | 1.0090 |
| 180 | 179.9 | 1.0006 |
| 270 | 268.3 | 1.0063 |
| 357 | 356.8 | 1.0006 |
| Average Correction Factor | | 1.0041 |

| | <u>Start</u> | <u>Finish</u> | <u>Limits</u> |
|--------------------------------|--------------|---------------|--------------------|
| Correl Coeff (r ²) | | 0.999982 | <i>≥0.995</i> |
| Calculated slope | 1.003371 | 1.003722 | <i>0.90 - 1.10</i> |
| Calculated intercept | -0.605386 | -0.308482 | <i>+/- 7</i> |

Notes: Bearings were good. Adjusted declination.

Calibration Performed By: Jayme Marcoux



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 11
LOWER CAMP
AUGUST 2017**

Operations, Data Collection,
QA/QC, Data Validation and Reporting by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

September 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
AUGUST 2017

MONTHLY SUMMARY for
AMD SECTION III.B.1(c)

| Parameter | Hours of Data | Hours of Calibration | Hours without Data | Operational Time | Maximum 1-Hour Value | 1-Hour Exceedances | Maximum 24-Hour Value | 24-Hour Exceedances |
|-----------------------------------|---------------|----------------------|--------------------|------------------|----------------------|--------------------|-----------------------|---------------------|
| SO2 (ppb) Average | 708 | 34 | 36 | 99.73 | 94 | 0 | 12 | 0 |
| H2S (ppb) Average | 706 | 35 | 38 | 99.6 | 10 | 0 | 2 | 0 |
| THC (ppm) Average | 708 | 34 | 36 | 99.73 | 4.5 | - | 2.7 | - |
| Temperature (C) Average | 744 | 0 | 0 | 100 | 31.4 | - | 24.9 | - |
| Relative Humidity (%) Average | 744 | 0 | 0 | 100 | 99 | - | 87 | - |
| Wind Speed 10 m (km/h) Average | 744 | 0 | 0 | 100 | 32 | - | 20 | - |
| Wind Direction 10 m (deg) Average | 744 | 0 | 0 | 100 | - | - | - | - |

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
AUGUST 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

| Parameter | Number | Mean | StnDev | Total | Percentile | | | | | | |
|-----------------------------------|--------|-------|--------|-------|------------|------|------|--------|------|------|------|
| | | | | | Min | P10 | Q1 | Median | Q3 | P90 | Max |
| SO2 (ppb) Average | 708 | 4.8 | 10 | - | 0 | 0 | 0 | 1 | 4 | 13 | 94 |
| H2S (ppb) Average | 706 | 1 | 1 | - | 0 | 0 | 0 | 0 | 1 | 2 | 10 |
| THC (ppm) Average | 708 | 2.41 | 0.3 | - | 2 | 2.1 | 2.2 | 2.4 | 2.5 | 2.7 | 4.5 |
| Temperature 2 m (C) Average | 744 | 18.73 | 5.1 | - | 6 | 12.6 | 14.9 | 18.3 | 22.6 | 25.8 | 31.4 |
| Relative Humidity (%) Average | 744 | 63 | 21 | - | 24 | 33 | 46 | 65 | 80 | 92 | 99 |
| Wind Speed 10 m (km/h) Average | 744 | 9.3 | 6 | - | 0 | 2 | 5 | 8 | 13 | 19 | 32 |
| Wind Direction 10 m (deg) Average | 744 | - | - | - | - | - | - | - | - | - | - |

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
AUGUST 2017

OPERATIONAL NOTES

| Parameter | Period Start | Period End | Duration (Hours) | Notes |
|-----------|-------------------|-------------------|------------------|---------------------------------------|
| H2S | 09 Aug 2017 12:00 | 09 Aug 2017 12:00 | 1 | Maintenance - sample manifold cleaned |
| H2S | 28 Aug 2017 14:00 | 28 Aug 2017 15:00 | 2 | Maintenance - WBEA internal audit |
| SO2 | 29 Aug 2017 11:00 | 29 Aug 2017 12:00 | 2 | Maintenance - WBEA internal audit |
| THC | 29 Aug 2017 12:00 | 29 Aug 2017 13:00 | 2 | Maintenance - WBEA internal audit |



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

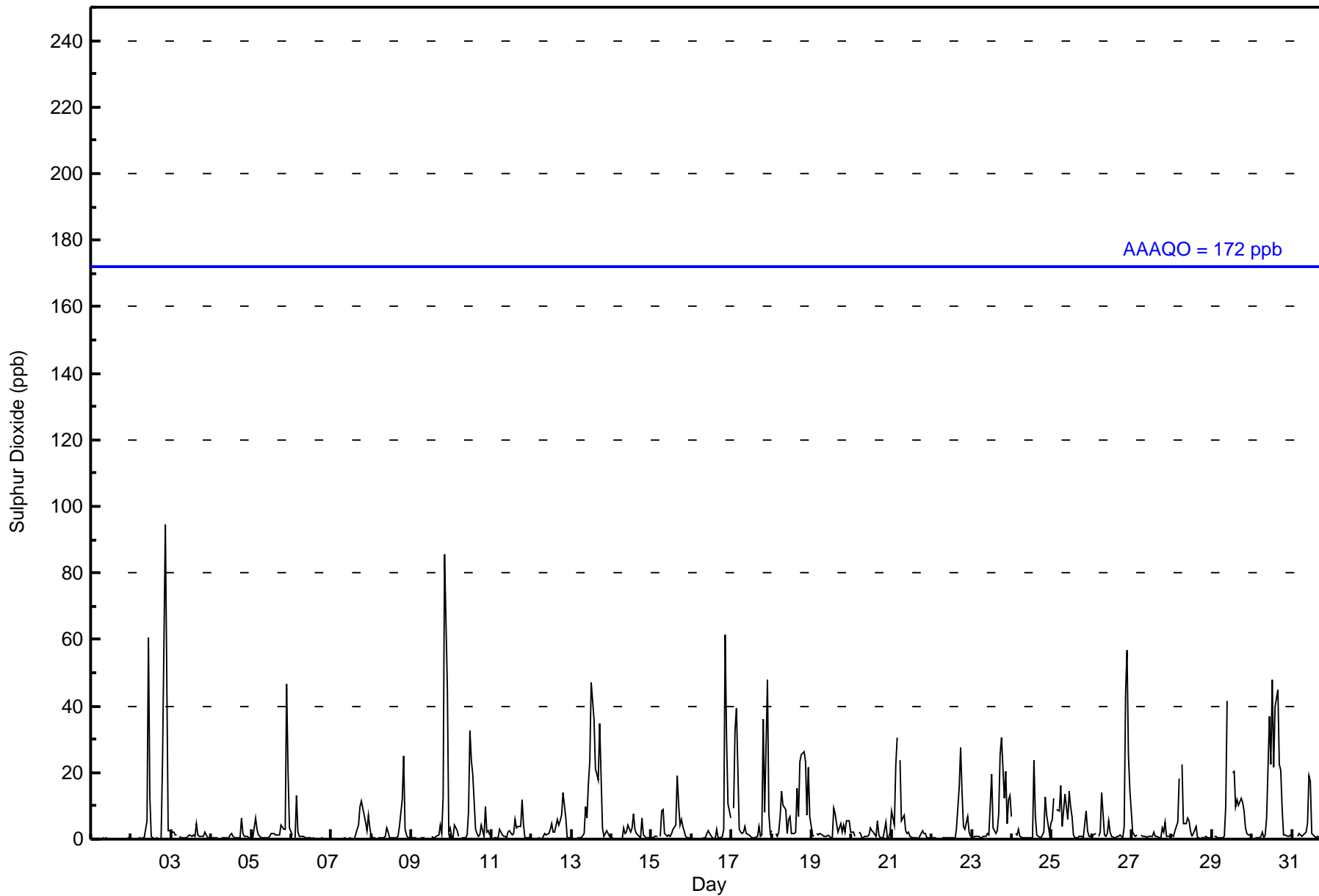
Lower Camp - August 2017

| Number of Exceedences (AAAQO): | | 1-hr: 0 24-hr: 0 | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|--|----|--------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|------|---------------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|-----|-----|-----------------|
| Maximum Value: 94 ppb on Aug 2 21:00 | | Maximum Daily Average: 12.4 ppb on Aug 30 | | Hours of Data: 708 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum Value: 0 ppb on Aug 16 04:00 | | Minimum Daily Average: 0.2 ppb on Aug 1 | | Hours of Missing Data: 36 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 13.5 ppb at hour 21 | | Minimum Diurnal Average: 1.6 ppb at hour 1 | | Hours of Calibration: 34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 4.8 ppb | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 4 P ₉₀ = 13 P ₉₉ = 47 | | Percent Operational Time: 99.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 5 | 60 | 13 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 24 | 94 | 49 | 2 | 2 | 11.1 | 94 | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 2 | 2 | 1 | 1 | Z | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 5 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 0 | 1.2 | 5 | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 6 | 2 | 1 | 1 | 1 | 0 | 0.9 | 6 | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | Z | 0 | 7 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 4 | 3 | 3 | 47 | 20 | 3 | 4.6 | 47 | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 1 | Z | 1 | 13 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.0 | 13 | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 4 | 10 | 12 | 9 | 5 | 2 | 7 | 3 | 2.5 | 12 | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 1 | 1 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 4 | 2 | 0 | 0 | 0 | 0 | 1 | 4 | 12 | 25 | 3 | 1 | 1 | 0 | 2.5 | 25 | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 0 | 0 | 1 | 1 | Z | 0 | 0 | 1 | 1 | C | C | C | 1 | 0 | 0 | 1 | 1 | 4 | 2 | 13 | 86 | 45 | 2 | 3 | 8.1 | 86 | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 1 | 1 | 4 | 3 | 1 | Z | 0 | 0 | 1 | 1 | 8 | 33 | 24 | 19 | 3 | 2 | 1 | 1 | 4 | 1 | 10 | 2 | 3 | 1 | 5.4 | 33 | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | Z | 0 | 0 | 0 | 1 | 3 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 2 | 6 | 4 | 4 | 4 | 12 | 4 | 1 | 0 | 0 | 2.2 | 12 | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 3 | 5 | 2 | 2 | 6 | 4 | 5 | 7 | 14 | 6 | 0 | 0 | 2.7 | 14 | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 0 | 0 | Z | 0 | 0 | 1 | 1 | 2 | 10 | 6 | 17 | 23 | 47 | 36 | 21 | 19 | 18 | 35 | 3 | 1 | 2 | 2 | 1 | 10.8 | 47 | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 3 | 2 | 2 | 4 | 2 | 4 | 8 | 3 | 1 | 1 | 0 | 6 | 1 | 1 | 0 | 0 | 1.8 | 8 | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 0 | 0 | 1 | 1 | Z | 1 | 8 | 9 | 2 | 1 | 1 | 1 | 2 | 3 | 4 | 19 | 11 | 4 | 6 | 4 | 1 | 0 | 0 | 3.5 | 19 | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 2 | 2 | 0 | 0 | 3 | 0 | 0 | 1 | 3 | 61 | 30 | 11 | 6 | 5.4 | 61 | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | Z | 9 | 33 | 40 | 3 | 2 | 2 | 2 | 4 | 2 | 1 | 1 | 0 | 0 | 1 | 1 | 4 | 1 | 1 | 36 | 8 | 48 | 7 | 2 | 9.0 | 48 | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 3 | Z | 2 | 1 | 2 | 7 | 15 | 10 | 9 | 2 | 6 | 7 | 2 | 2 | 2 | 15 | 7 | 23 | 25 | 26 | 23 | 7 | 22 | 7 | 9.7 | 26 | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 1 | 1 | Z | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 9 | 8 | 5 | 2 | 5 | 2 | 4 | 2 | 6 | 6 | 2 | 2.7 | 9 | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 2 | 2 | 1 | Z | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 3 | 2 | 2 | 1 | 5 | 1 | 1 | 1 | 0 | 5 | 1 | 0 | 2 | 1.6 | 5 | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 8 | 4 | 22 | 31 | Z | 24 | 5 | 7 | 3 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 2 | 2 | 0 | 1 | 0 | 5.2 | 31 | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 16 | 28 | 14 | 4 | 3 | 7 | 2 | 1 | 3.5 | 28 | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 10 | 19 | 3 | 2 | 3 | 7 | 25 | 30 | 12 | 20 | 5 | 12 | 13 | 7.5 | 30 | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 7 | Z | 2 | 1 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 7 | 1 | 1 | 1 | 1 | 2 | 13 | 7 | 2 | 5 | 3.4 | 24 | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 6 | 12 | Z | 9 | 9 | 16 | 4 | 9 | 13 | 6 | 14 | 10 | 7 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 8 | 3 | 1 | 1 | 5.8 | 16 | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 1 | 1 | 2 | Z | 1 | 2 | 14 | 1 | 1 | 2 | 6 | 2 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 4 | 44 | 57 | 25 | 15 | 7.9 | 57 | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 2 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 3 | 2 | 5 | 1 | 1 | 1 | 1 | 1.3 | 5 | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 1 | 1 | 3 | 5 | 18 | Z | 22 | 5 | 5 | 6 | 5 | 3 | 1 | 2 | 4 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 3.6 | 22 | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | Z | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 10 | 42 | M | M | 20 | 20 | 10 | 12 | 10 | 12 | 11 | 9 | 3 | 2 | 1 | 1 | 7.9 | 42 | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 1 | Z | 1 | 0 | 0 | 1 | 2 | 1 | 1 | 6 | 37 | 23 | 48 | 21 | 40 | 45 | 23 | 21 | 9 | 1 | 1 | 1 | 1 | 1 | 12.4 | 48 | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 1 | 1 | Z | 1 | 2 | 1 | 1 | 1 | 2 | 5 | 19 | 17 | 2 | 1 | 1 | 1 | 0 | 1 | 2 | 2 | 4 | 4 | 3 | 2 | 3.2 | 19 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 1.6 | 1.6 | 3.3 | 4.4 | 1.9 | 2.6 | 2.7 | 1.9 | 2.3 | 3.4 | 6.8 | 5.6 | 6.2 | 5.3 | 3.9 | 5.1 | 3.9 | 6.2 | 5.9 | 6.8 | 13.5 | 10.7 | 4.3 | 2.5 | Diurnal Average |
| | | | | | | | | | | | | | | | | | | | | | | | | 8 | 12 | 33 | 40 | 18 | 24 | 22 | 10 | 13 | 42 | 60 | 33 | 48 | 36 | 40 | 45 | 23 | 35 | 30 | 36 | 94 | 57 | 25 | 15 | Diurnal Maximum |
| Z - zerospan C - Calibration M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Lower Camp - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Lower Camp - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 10 | 623 | 87.99 | 87.99 |
| 11 - 20 | 39 | 5.51 | 93.50 |
| 21 - 60 | 43 | 6.07 | 99.58 |
| 61 - 110 | 3 | 0.42 | 100.00 |
| 111 - 172 | 0 | 0.00 | 100.00 |
| > 172 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



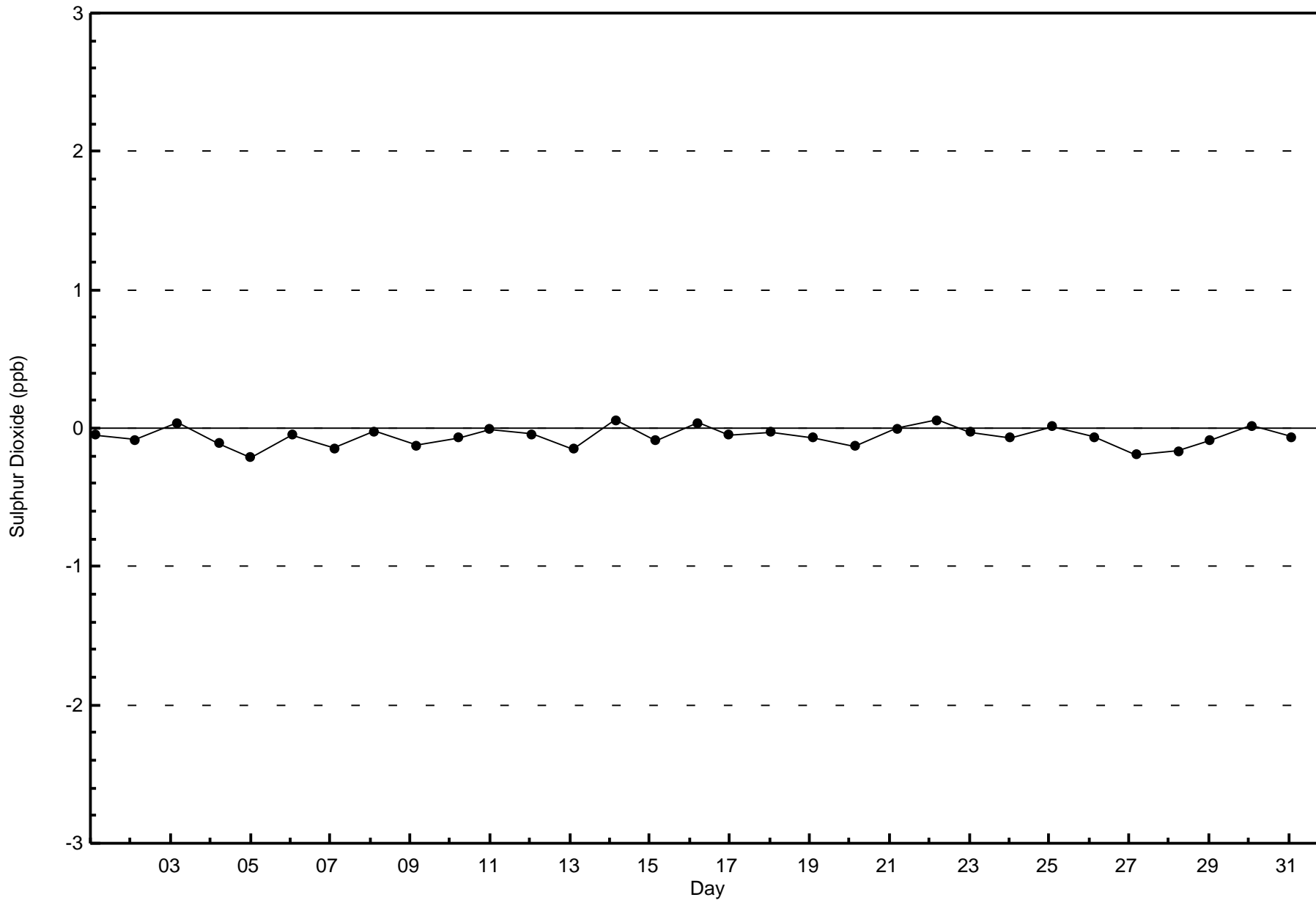
**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Lower Camp - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 10 | 23 | 13 | 12 | 11 | 12 | 56 | 146 | 34 | 23 | 8 | 22 | 94 | 77 | 35 | 33 | 24 | 623 |
| 11 - 20 | 3 | 2 | 2 | 0 | 1 | 1 | 8 | 3 | 3 | 8 | 4 | 1 | 1 | 0 | 1 | 1 | 39 |
| 21 - 60 | 1 | 0 | 1 | 0 | 1 | 0 | 16 | 4 | 3 | 7 | 6 | 2 | 0 | 0 | 0 | 2 | 43 |
| 61 - 110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 3 |
| 111 - 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 27 | 15 | 15 | 11 | 14 | 57 | 170 | 41 | 29 | 25 | 33 | 97 | 78 | 35 | 34 | 27 | 708 |

Total Number of Valid Hours: 708

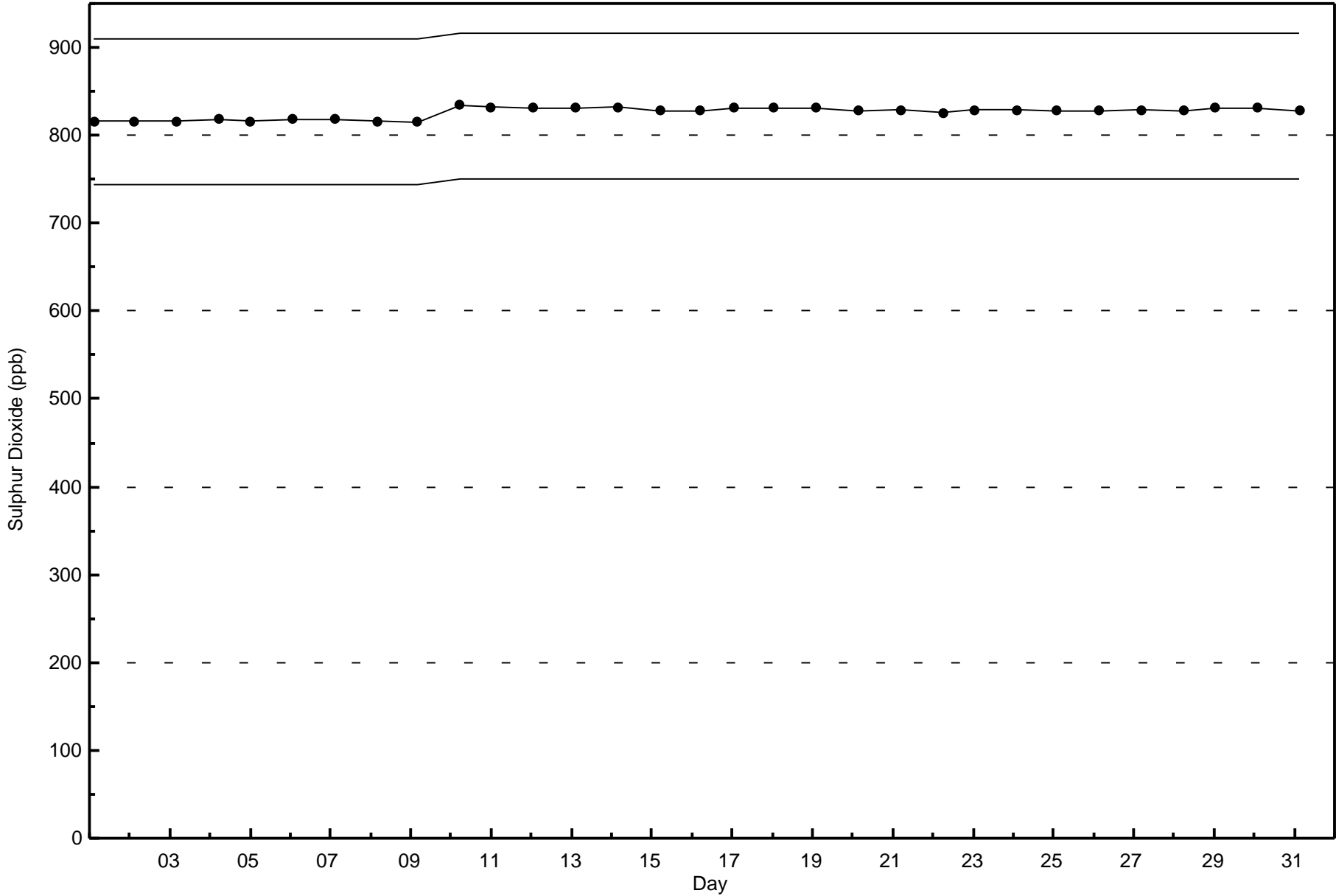
Total Number of Hours: 744





Wood Buffalo Environmental Association
Span Responses

Sulphur Dioxide (SO₂) - ppb
Lower Camp - August 2017





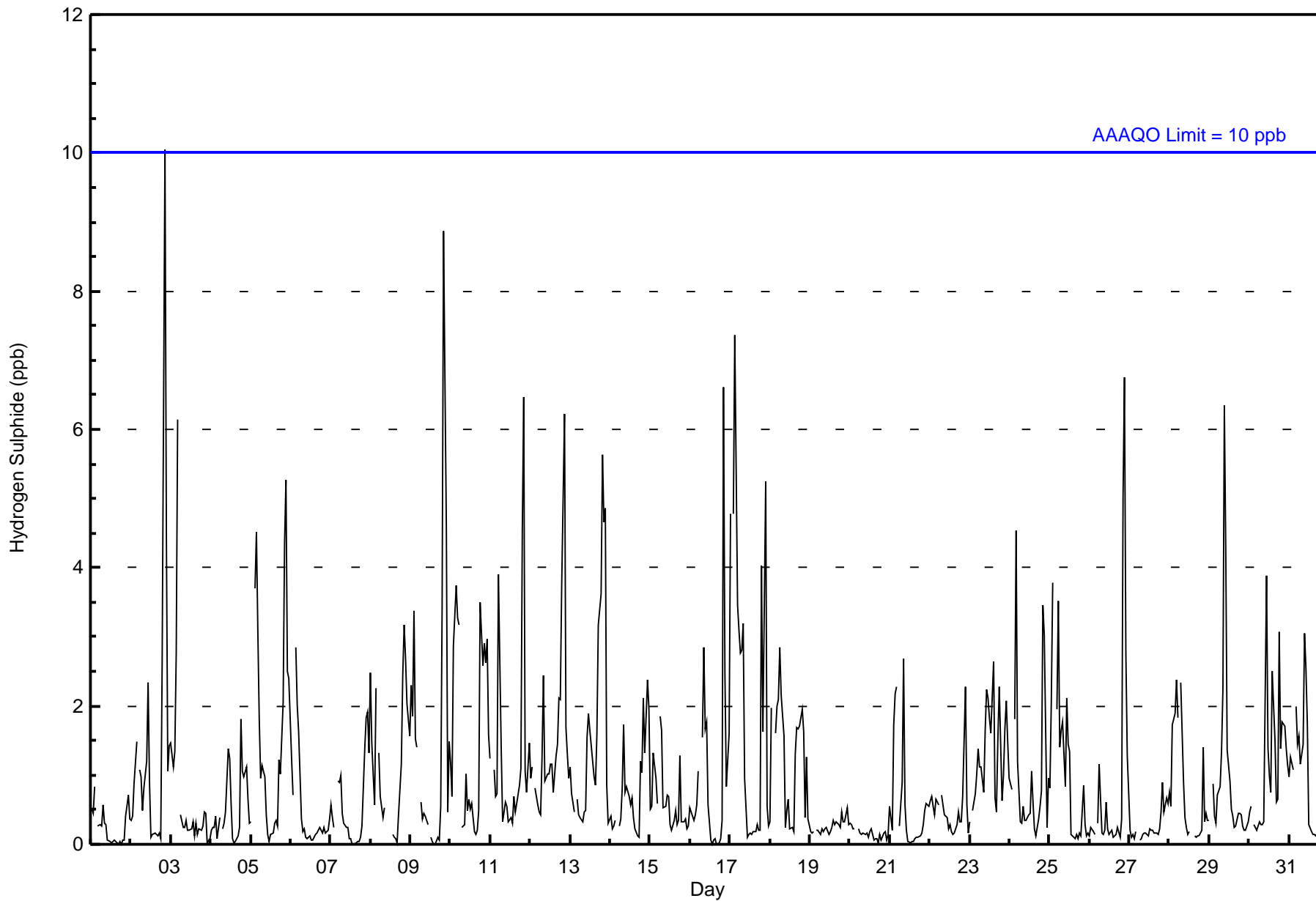
Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H₂S) - ppb

Lower Camp - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 ppb on Aug 2 21:00 Maximum Daily Average: 2.0 ppb on Aug 17 | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 706 | | | | | | | | | |
|---|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|---|----|----|----|----|----|----|-----------------|---------------|---------------|
| Minimum Value: 0 ppb on Aug 1 17:00 Minimum Daily Average: 0.2 ppb on Aug 20 Maximum Diurnal Average: 2.5 ppb at hour 21 Minimum Diurnal Average: 0.3 ppb at hour 16 Monthly Average: 1.0 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 O ₃ = 1 P ₉₀ = 2 P ₉₉ = 6 | | | | | | | | | | | | | | | | | Hours of Missing Data: 38 Hours of Calibration: 35 Percent Operational Time: 99.6 | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 1 | 0 | 1 | Z | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0.2 | 1 |
| 2-Aug | 0 | 0 | 1 | 1 | Z | 1 | 1 | 0 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 10 | 4 | 1 | 1 | 1.4 | 10 |
| 3-Aug | 1 | 1 | 1 | 3 | 6 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.8 | 6 |
| 4-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 1 | 1 | 0 | 0.5 | 2 |
| 5-Aug | 0 | Z | 4 | 5 | 3 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 4 | 5 | 3 | 2 | 1.6 | 5 |
| 6-Aug | 1 | 1 | Z | 3 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 3 |
| 7-Aug | 1 | 0 | 0 | Z | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 2 | 1 | 0.5 | 2 |
| 8-Aug | 2 | 1 | 1 | 2 | Z | 1 | 1 | 0 | 1 | C | C | C | C | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 3 | 3 | 2 | 2 | 1.2 | 3 |
| 9-Aug | 2 | 2 | 3 | 2 | 1 | Z | 1 | 0 | 0 | 0 | 0 | M | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 9 | 5 | 0 | 1 | 1.5 | 9 |
| 10-Aug | 1 | 1 | 3 | 4 | 3 | 3 | Z | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 3 | 3 | 3 | 3 | 3 | 2 | 1.6 | 4 |
| 11-Aug | 1 | Z | 1 | 1 | 1 | 4 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 5 | 6 | 1 | 1 | 1 | 1.3 | 6 |
| 12-Aug | 1 | 1 | Z | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 4 | 6 | 2 | 1 | 1 | 1.5 | 6 |
| 13-Aug | 1 | 1 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 3 | 4 | 6 | 5 | 5 | 1 | 0 | 1.6 | 6 |
| 14-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 2 | 2 | 0.8 | 2 |
| 15-Aug | 1 | 1 | 1 | 1 | 1 | Z | 2 | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0.6 | 2 |
| 16-Aug | 1 | 0 | 0 | 0 | 1 | 1 | Z | 2 | 3 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 2 | 1 | 2 | 1.0 | 7 |
| 17-Aug | 5 | Z | 5 | 7 | 3 | 3 | 3 | 3 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 2 | 5 | 1 | 0 | 2.0 | 7 |
| 18-Aug | 0 | 2 | Z | 2 | 2 | 2 | 3 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 2 | 2 | 2 | 2 | 2 | 0 | 1 | 0 | 1.2 | 3 |
| 19-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0.3 | 1 |
| 20-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 21-Aug | 1 | 0 | 2 | 2 | 2 | Z | 0 | 1 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.6 | 3 |
| 22-Aug | 1 | 1 | 1 | 0 | 1 | 1 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 0.5 | 2 |
| 23-Aug | 0 | Z | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 1 | 0 | 2 | 2 | 1 | 1 | 2 | 2 | 1 | 1.3 | 3 |
| 24-Aug | 1 | 1 | Z | 2 | 5 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 3 | 3 | 0 | 1 | 1.0 | 5 |
| 25-Aug | 1 | 2 | 4 | Z | 2 | 4 | 1 | 2 | 2 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1.1 | 4 |
| 26-Aug | 0 | 0 | 0 | 0 | Z | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 7 | 3 | 1 | 0.9 | 7 |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0.3 | 1 |
| 28-Aug | 1 | 1 | 2 | 2 | 2 | 2 | Z | 2 | 1 | 0 | 0 | 0 | 0 | M | M | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0.8 | 2 |
| 29-Aug | 0 | Z | 1 | 0 | 0 | 1 | 1 | 1 | 2 | 6 | 4 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.0 | 6 |
| 30-Aug | 0 | 1 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 1 | 1 | 3 | 2 | 1 | 1 | 3 | 1 | 2 | 2 | 1 | 1 | 1.1 | 4 |
| 31-Aug | 1 | 1 | 1 | Z | 2 | 1 | 2 | 1 | 1 | 3 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.9 | 3 |
| 0.9 0.7 1.3 1.6 1.6 1.3 0.9 0.8 1.0 0.8 1.0 0.6 0.4 0.4 0.4 0.3 0.3 0.5 0.9 1.4 2.5 1.9 1.0 0.8 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| 5 2 5 7 6 4 3 3 3 3 6 4 2 2 2 3 2 2 3 4 6 10 7 3 2 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| Z - zerospan C - Calibration M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | |





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Lower Camp - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2 | 639 | 90.51 | 90.51 |
| 3 - 4 | 46 | 6.52 | 97.03 |
| 5 - 7 | 19 | 2.69 | 99.72 |
| 8 - 11 | 2 | 0.28 | 100.00 |
| > 11 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Lower Camp - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2 | 27 | 16 | 14 | 12 | 14 | 51 | 151 | 26 | 19 | 16 | 29 | 93 | 78 | 33 | 35 | 25 | 639 |
| 3 - 4 | 0 | 1 | 0 | 0 | 1 | 3 | 19 | 7 | 5 | 4 | 3 | 1 | 1 | 0 | 0 | 1 | 46 |
| 5 - 7 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 7 | 3 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 19 |
| 8 - 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| > 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 27 | 17 | 15 | 12 | 15 | 55 | 171 | 40 | 27 | 26 | 34 | 94 | 79 | 33 | 35 | 26 | 706 |

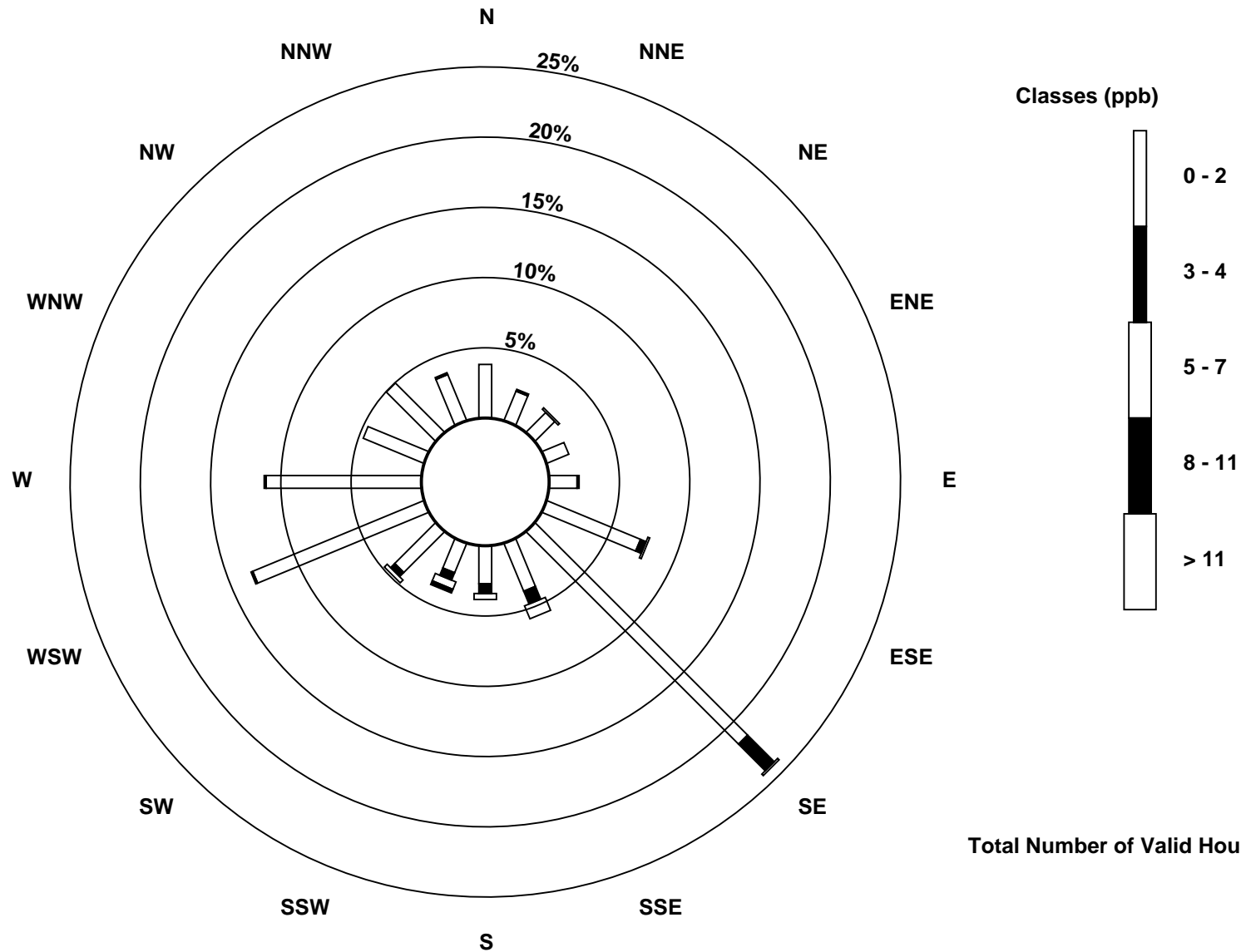
Total Number of Valid Hours: 706

Total Number of Hours: 744

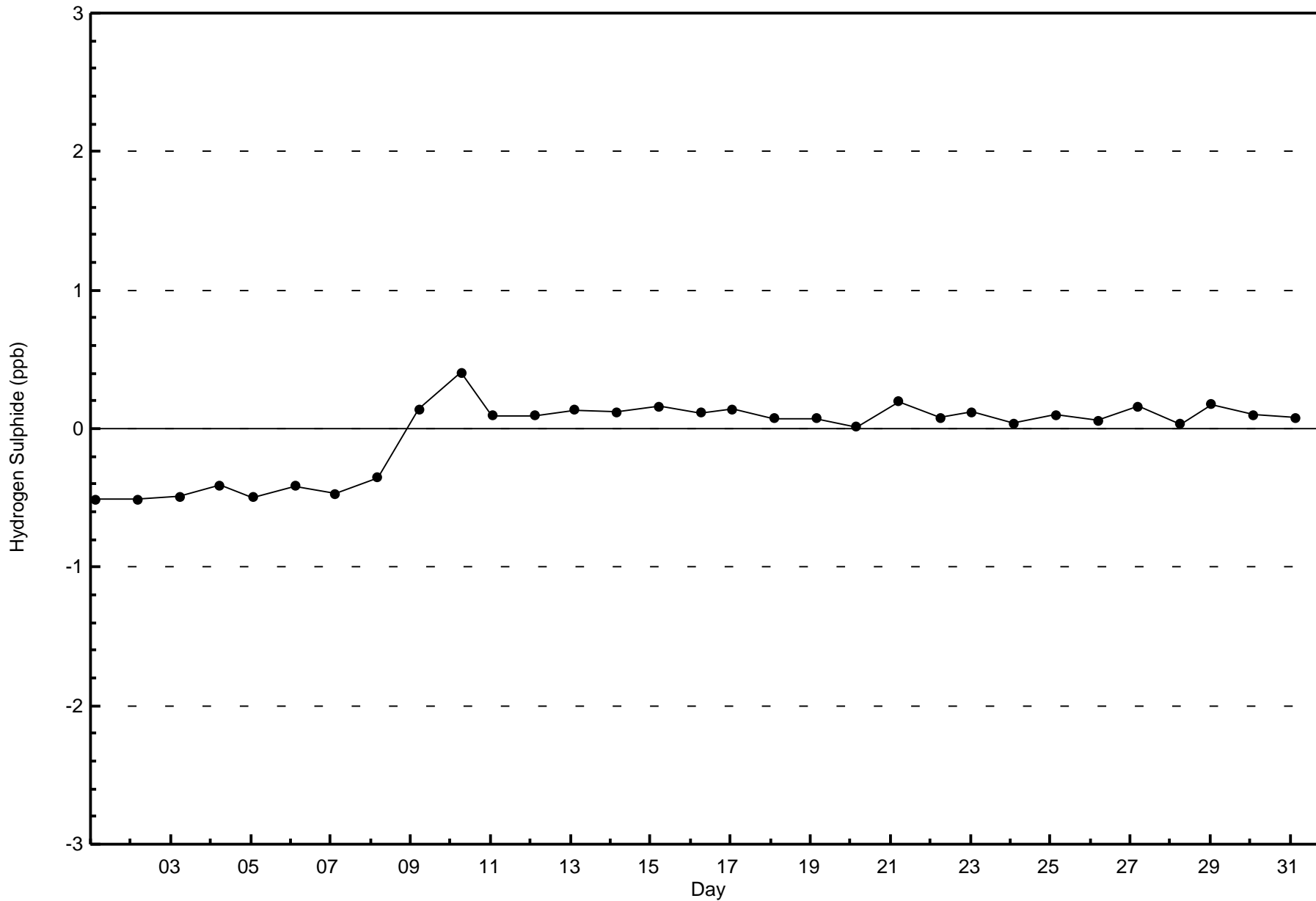


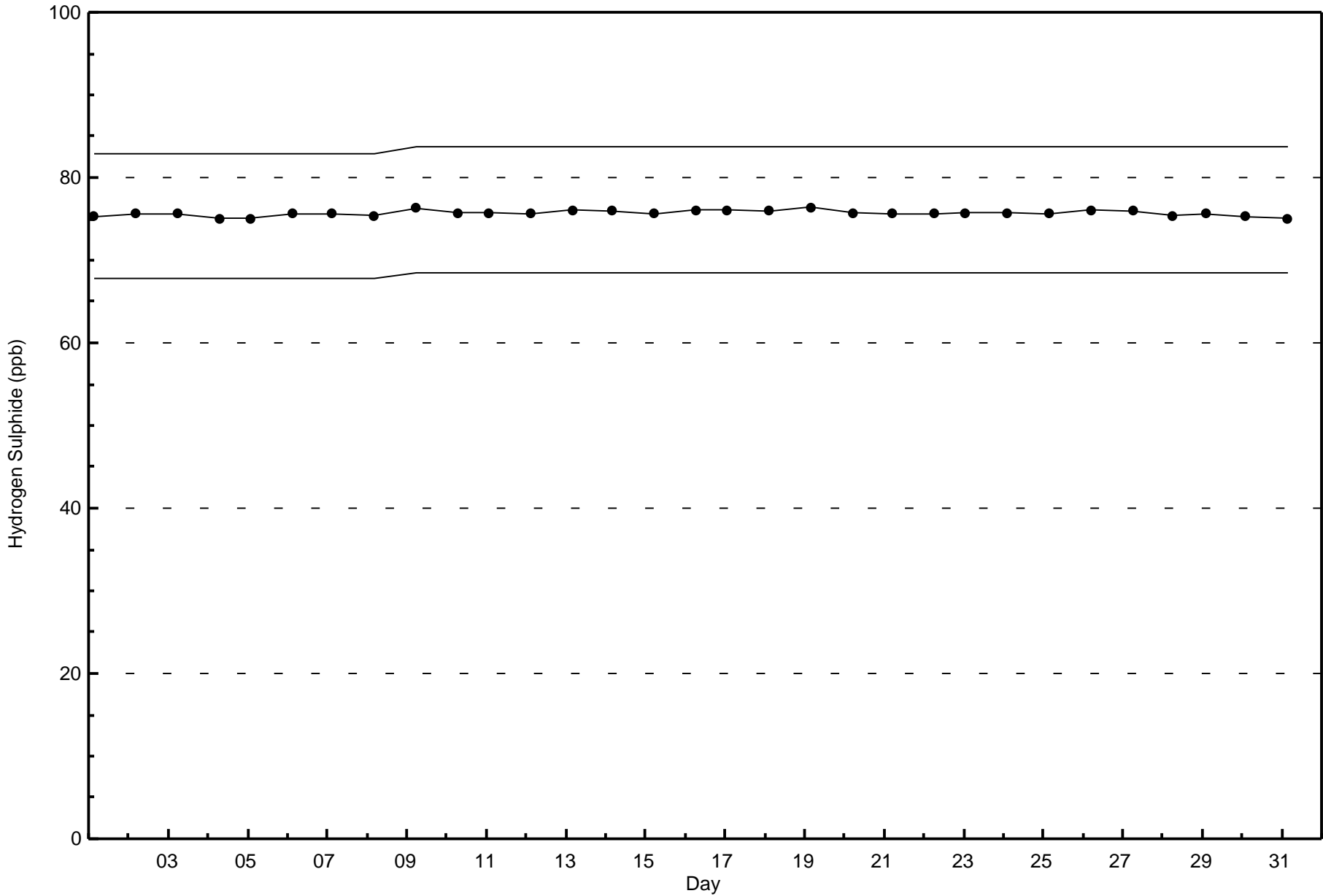
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Hydrogen Sulphide (H₂S) - ppb
Lower Camp (AMS 11)



Total Number of Valid Hours: 706





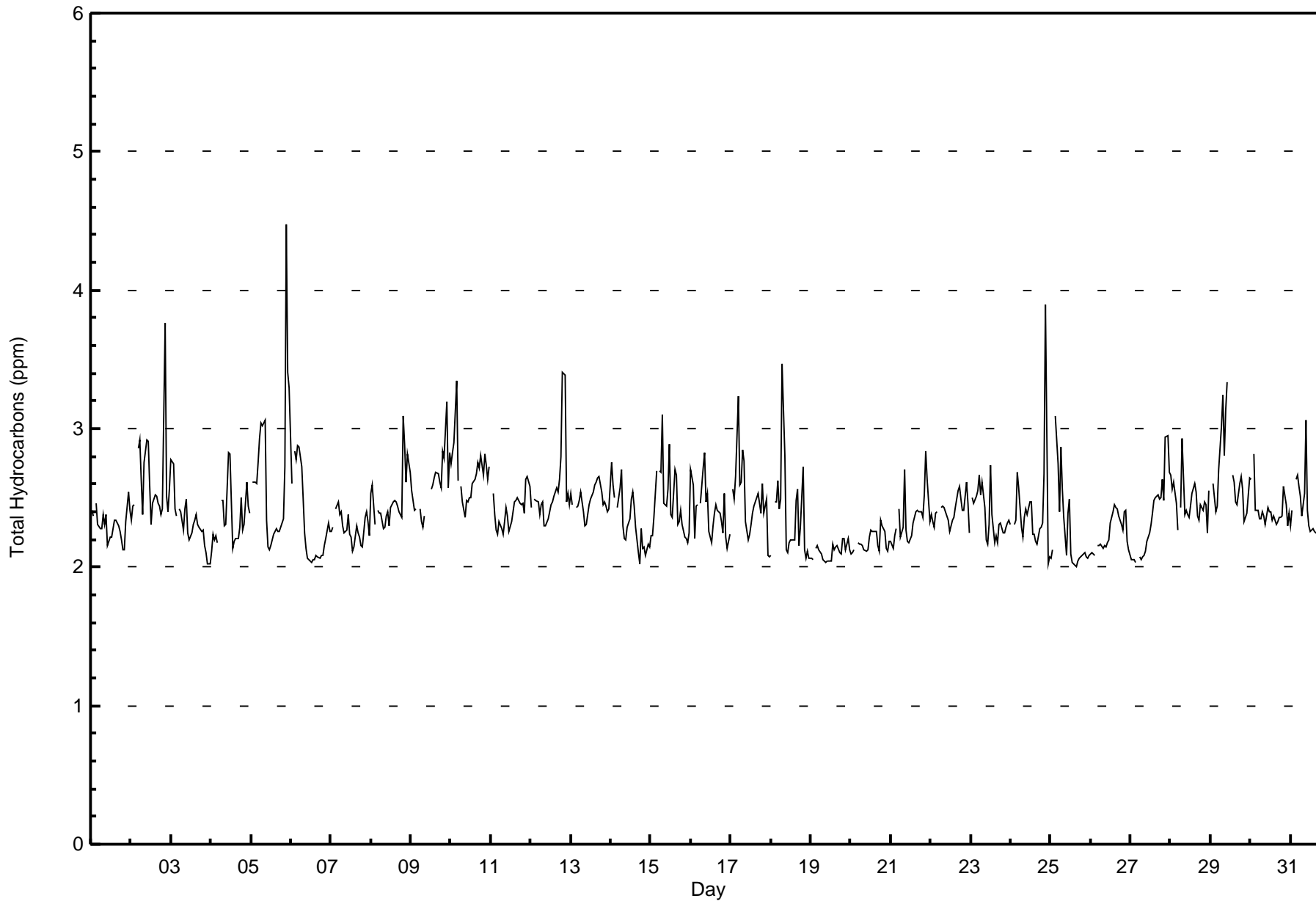


| Maximum Value: 4.5 ppm on Aug 5 22:00 | | | | | | | | | | | | | | | | | | | | Maximum Daily Average: 2.7 ppm on Aug 10 | | | | | Hours in Service: 744 | | | | |
|--|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|-----|-----|-----|-----------------|---------------------------|---------------|--|--|--|
| Minimum Value: 2.0 ppm on Aug 25 16:00 | | | | | | | | | | | | | | | | | | | | Minimum Daily Average: 2.1 ppm on Aug 19 | | | | | Hours of Data: 708 | | | | |
| Maximum Diurnal Average: 2.5 ppm at hour 22 | | | | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 2.3 ppm at hour 13 | | | | | Hours of Missing Data: 36 | | | | |
| Monthly Average: 2.41 ppm | | | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 2.0 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.4 Q ₃ = 2.5 P ₉₀ = 2.7 P ₉₉ = 3.4 | | | | | Hours of Calibration: 34 | | | | |
| | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 99.7 | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | |
| 1-Aug | 2.4 | 2.4 | Z | 2.5 | 2.3 | 2.3 | 2.3 | 2.4 | 2.3 | 2.4 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.1 | 2.1 | 2.3 | 2.5 | 2.4 | 2.3 | 2.5 | | | |
| 2-Aug | 2.3 | 2.4 | 2.4 | Z | 2.9 | 2.9 | 2.6 | 2.4 | 2.8 | 2.9 | 2.9 | 2.6 | 2.3 | 2.5 | 2.5 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 3.8 | 2.5 | 2.4 | 2.6 | 2.6 | 3.8 | | | |
| 3-Aug | 2.8 | 2.7 | 2.4 | 2.4 | Z | 2.4 | 2.4 | 2.3 | 2.4 | 2.5 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.4 | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.1 | 2.0 | 2.0 | 2.3 | 2.8 | | | |
| 4-Aug | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | Z | 2.5 | 2.5 | 2.3 | 2.3 | 2.8 | 2.8 | 2.5 | 2.1 | 2.2 | 2.2 | 2.2 | 2.3 | 2.5 | 2.3 | 2.3 | 2.6 | 2.4 | 2.4 | 2.4 | 2.8 | | | |
| 5-Aug | Z | 2.6 | 2.6 | 2.6 | 2.8 | 2.9 | 3.0 | 3.0 | 3.1 | 2.3 | 2.1 | 2.1 | 2.2 | 2.2 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.7 | 4.5 | 3.4 | 3.3 | 2.7 | 4.5 | | | |
| 6-Aug | 2.6 | Z | 2.8 | 2.8 | 2.9 | 2.9 | 2.7 | 2.5 | 2.3 | 2.1 | 2.1 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.3 | 2.3 | 2.3 | 2.9 | | | |
| 7-Aug | 2.3 | 2.3 | Z | 2.4 | 2.5 | 2.4 | 2.4 | 2.3 | 2.2 | 2.3 | 2.4 | 2.2 | 2.2 | 2.1 | 2.1 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.4 | 2.4 | 2.3 | 2.2 | 2.3 | 2.5 | | | |
| 8-Aug | 2.5 | 2.6 | 2.3 | Z | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.4 | 2.4 | 2.3 | 2.4 | 2.5 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 3.1 | 2.9 | 2.6 | 2.8 | 2.7 | 2.5 | 3.1 | | | |
| 9-Aug | 2.6 | 2.5 | 2.4 | 2.4 | Z | 2.4 | 2.3 | 2.3 | 2.4 | C | C | C | 2.6 | 2.6 | 2.6 | 2.7 | 2.7 | 2.6 | 2.6 | 2.8 | 2.8 | 3.2 | 2.6 | 2.8 | 2.6 | 3.2 | | | |
| 10-Aug | 2.7 | 2.8 | 2.9 | 3.3 | 2.6 | Z | 2.6 | 2.5 | 2.4 | 2.5 | 2.5 | 2.5 | 2.5 | 2.6 | 2.6 | 2.7 | 2.8 | 2.7 | 2.8 | 2.7 | 2.8 | 2.7 | 2.6 | 2.7 | 2.7 | 3.3 | | | |
| 11-Aug | Z | 2.5 | 2.4 | 2.3 | 2.2 | 2.3 | 2.3 | 2.2 | 2.3 | 2.4 | 2.4 | 2.3 | 2.3 | 2.4 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.4 | 2.6 | 2.7 | 2.6 | 2.4 | 2.7 | | | |
| 12-Aug | 2.4 | Z | 2.5 | 2.5 | 2.5 | 2.4 | 2.4 | 2.5 | 2.3 | 2.3 | 2.3 | 2.4 | 2.5 | 2.5 | 2.5 | 2.6 | 2.5 | 2.6 | 2.8 | 3.4 | 3.4 | 2.5 | 2.5 | 2.4 | 2.6 | 3.4 | | | |
| 13-Aug | 2.5 | 2.5 | Z | 2.4 | 2.4 | 2.5 | 2.5 | 2.4 | 2.3 | 2.3 | 2.4 | 2.4 | 2.5 | 2.5 | 2.6 | 2.6 | 2.6 | 2.7 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 2.5 | 2.7 | | | | |
| 14-Aug | 2.8 | 2.6 | 2.5 | Z | 2.4 | 2.6 | 2.7 | 2.3 | 2.2 | 2.2 | 2.3 | 2.3 | 2.5 | 2.5 | 2.4 | 2.3 | 2.1 | 2.0 | 2.3 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.3 | 2.8 | | | |
| 15-Aug | 2.2 | 2.2 | 2.4 | 2.7 | Z | 2.7 | 2.7 | 3.1 | 2.5 | 2.4 | 2.6 | 2.9 | 2.4 | 2.4 | 2.7 | 2.7 | 2.3 | 2.3 | 2.4 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.5 | 3.1 | | | |
| 16-Aug | 2.7 | 2.6 | 2.2 | 2.4 | 2.5 | Z | 2.5 | 2.7 | 2.8 | 2.5 | 2.5 | 2.3 | 2.2 | 2.3 | 2.4 | 2.5 | 2.4 | 2.4 | 2.3 | 2.2 | 2.5 | 2.2 | 2.1 | 2.2 | 2.4 | 2.8 | | | |
| 17-Aug | Z | 2.6 | 2.5 | 2.7 | 3.2 | 2.6 | 2.6 | 2.8 | 2.8 | 2.3 | 2.2 | 2.2 | 2.3 | 2.4 | 2.4 | 2.5 | 2.5 | 2.5 | 2.4 | 2.6 | 2.4 | 2.5 | 2.1 | 2.1 | 2.5 | 3.2 | | | |
| 18-Aug | 2.1 | Z | 2.5 | 2.5 | 2.6 | 2.4 | 2.5 | 3.5 | 2.8 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.5 | 2.6 | 2.2 | 2.3 | 2.7 | 2.1 | 2.1 | 2.1 | 2.1 | 2.4 | 3.5 | | | |
| 19-Aug | 2.1 | 2.1 | Z | 2.1 | 2.2 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.2 | 2.1 | 2.1 | 2.2 | 2.1 | 2.1 | 2.2 | 2.2 | 2.1 | 2.2 | 2.1 | 2.1 | 2.2 | | | |
| 20-Aug | 2.1 | 2.1 | 2.1 | Z | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.2 | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.1 | 2.3 | 2.3 | 2.3 | 2.1 | 2.1 | 2.2 | 2.2 | 2.3 | | | |
| 21-Aug | 2.2 | 2.1 | 2.2 | 2.3 | Z | 2.4 | 2.2 | 2.3 | 2.7 | 2.3 | 2.2 | 2.2 | 2.2 | 2.3 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.5 | 2.8 | 2.6 | 2.3 | 2.4 | 2.8 | | | |
| 22-Aug | 2.4 | 2.3 | 2.3 | 2.4 | 2.4 | Z | 2.4 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.3 | 2.4 | 2.4 | 2.6 | 2.6 | 2.5 | 2.4 | 2.4 | 2.6 | 2.5 | 2.2 | 2.4 | 2.6 | | | |
| 23-Aug | Z | 2.5 | 2.5 | 2.5 | 2.6 | 2.7 | 2.5 | 2.6 | 2.4 | 2.2 | 2.2 | 2.3 | 2.7 | 2.4 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.2 | 2.2 | 2.3 | 2.3 | 2.4 | 2.7 | | | |
| 24-Aug | 2.3 | Z | 2.3 | 2.3 | 2.7 | 2.6 | 2.3 | 2.2 | 2.4 | 2.4 | 2.4 | 2.5 | 2.5 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.7 | 3.9 | 2.0 | 2.1 | 2.4 | 3.9 | | | |
| 25-Aug | 2.1 | 2.1 | Z | 3.1 | 2.7 | 2.4 | 2.9 | 2.6 | 2.4 | 2.1 | 2.4 | 2.5 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.3 | 3.1 | | | |
| 26-Aug | 2.1 | 2.1 | 2.1 | Z | 2.2 | 2.2 | 2.2 | 2.1 | 2.2 | 2.1 | 2.2 | 2.2 | 2.3 | 2.4 | 2.5 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.4 | 2.4 | 2.2 | 2.1 | 2.2 | 2.5 | | | |
| 27-Aug | 2.1 | 2.1 | 2.0 | 2.0 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.3 | 2.4 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.6 | 2.5 | 2.9 | 2.9 | 2.7 | 2.3 | 2.9 | | | |
| 28-Aug | 2.7 | 2.6 | 2.6 | 2.5 | 2.3 | Z | 2.4 | 2.9 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.5 | 2.6 | 2.5 | 2.4 | 2.3 | 2.4 | 2.4 | 2.5 | 2.5 | 2.2 | 2.6 | 2.5 | 2.9 | | | |
| 29-Aug | Z | 2.6 | 2.5 | 2.4 | 2.4 | 2.7 | 3.0 | 3.2 | 2.8 | 3.1 | 3.3 | M | M | 2.7 | 2.6 | 2.5 | 2.5 | 2.6 | 2.7 | 2.6 | 2.3 | 2.4 | 2.4 | 2.6 | 2.7 | 3.3 | | | |
| 30-Aug | 2.6 | Z | 2.8 | 2.4 | 2.4 | 2.3 | 2.3 | 2.4 | 2.4 | 2.3 | 2.4 | 2.4 | 2.4 | 2.3 | 2.4 | 2.3 | 2.3 | 2.4 | 2.4 | 2.4 | 2.6 | 2.5 | 2.3 | 2.4 | 2.4 | 2.8 | | | |
| 31-Aug | 2.3 | 2.4 | Z | 2.6 | 2.7 | 2.6 | 2.5 | 2.4 | 2.5 | 3.1 | 2.4 | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.3 | 2.3 | 2.3 | 2.5 | 2.3 | 2.2 | 2.2 | 2.2 | 2.4 | 3.1 | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | |
| Z - zerospan C - Calibration M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Lower Camp - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Lower Camp - August 2017

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2.0 | 17 | 2.40 | 2.40 |
| 2.1 - 3.0 | 672 | 94.92 | 97.32 |
| 3.1 - 10.0 | 19 | 2.68 | 100.00 |
| > 10.0 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Lower Camp - August 2017**

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2.0 | 2 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 10 | 2 | 0 | 0 | 0 | 17 |
| 2.1 - 3.0 | 24 | 15 | 14 | 10 | 13 | 55 | 166 | 39 | 25 | 23 | 30 | 87 | 75 | 35 | 34 | 27 | 672 |
| 3.1 - 10.0 | 0 | 1 | 1 | 0 | 1 | 1 | 4 | 2 | 4 | 2 | 2 | 0 | 1 | 0 | 0 | 0 | 19 |
| > 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 26 | 16 | 15 | 11 | 14 | 57 | 170 | 41 | 29 | 25 | 33 | 97 | 78 | 35 | 34 | 27 | 708 |

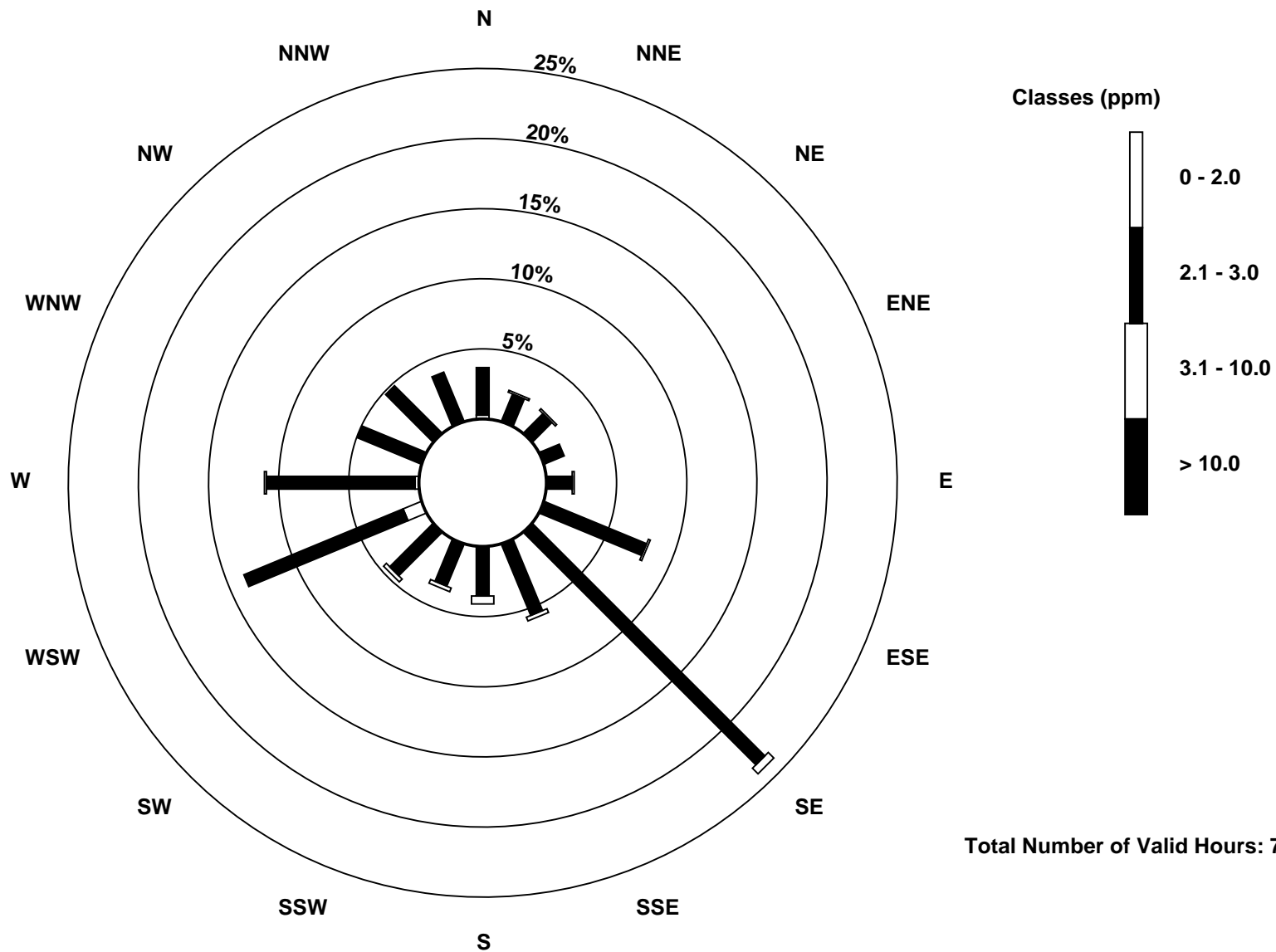
Total Number of Valid Hours: 708

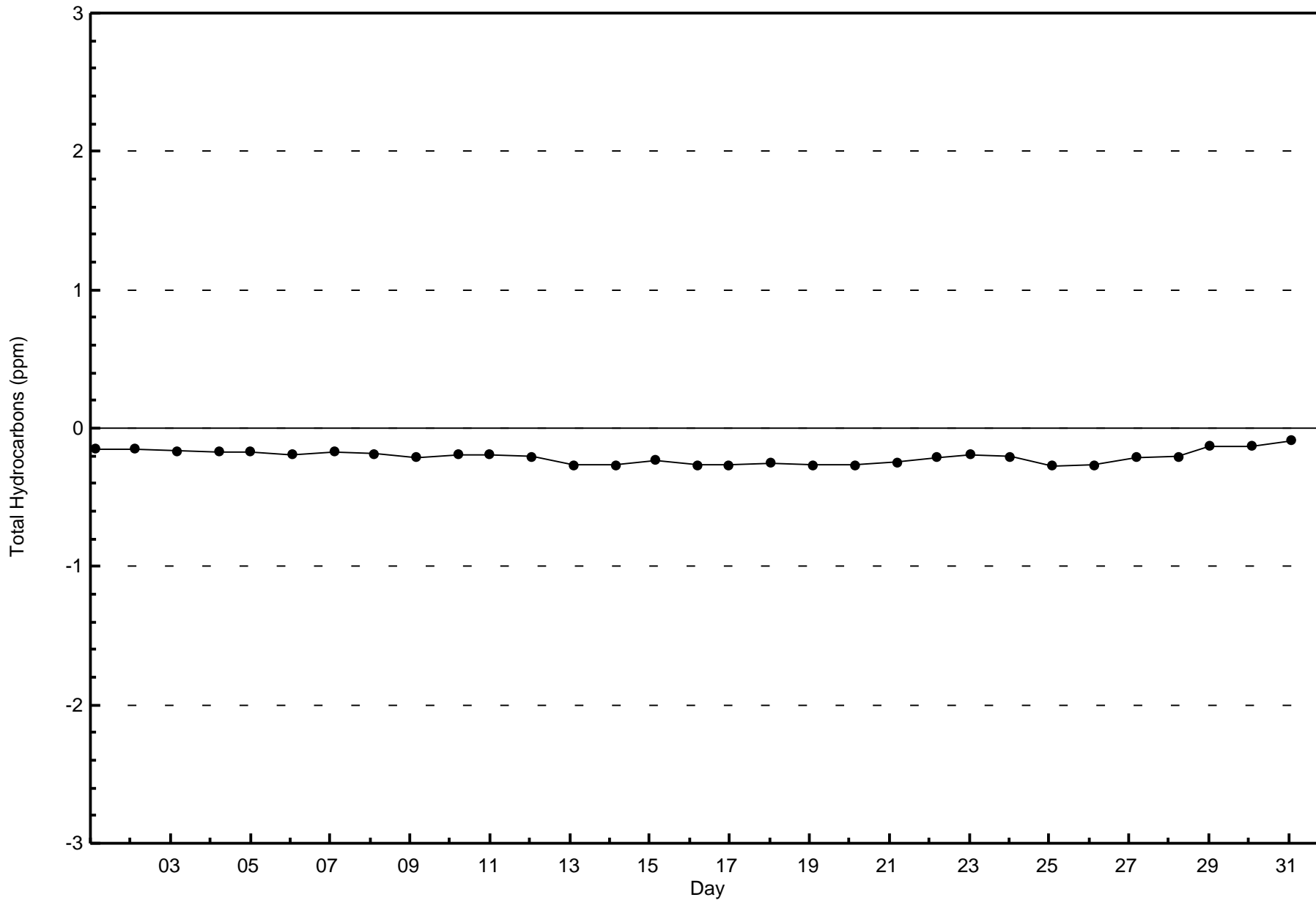
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Total Hydrocarbons (THC) - ppm
Lower Camp (AMS 11)

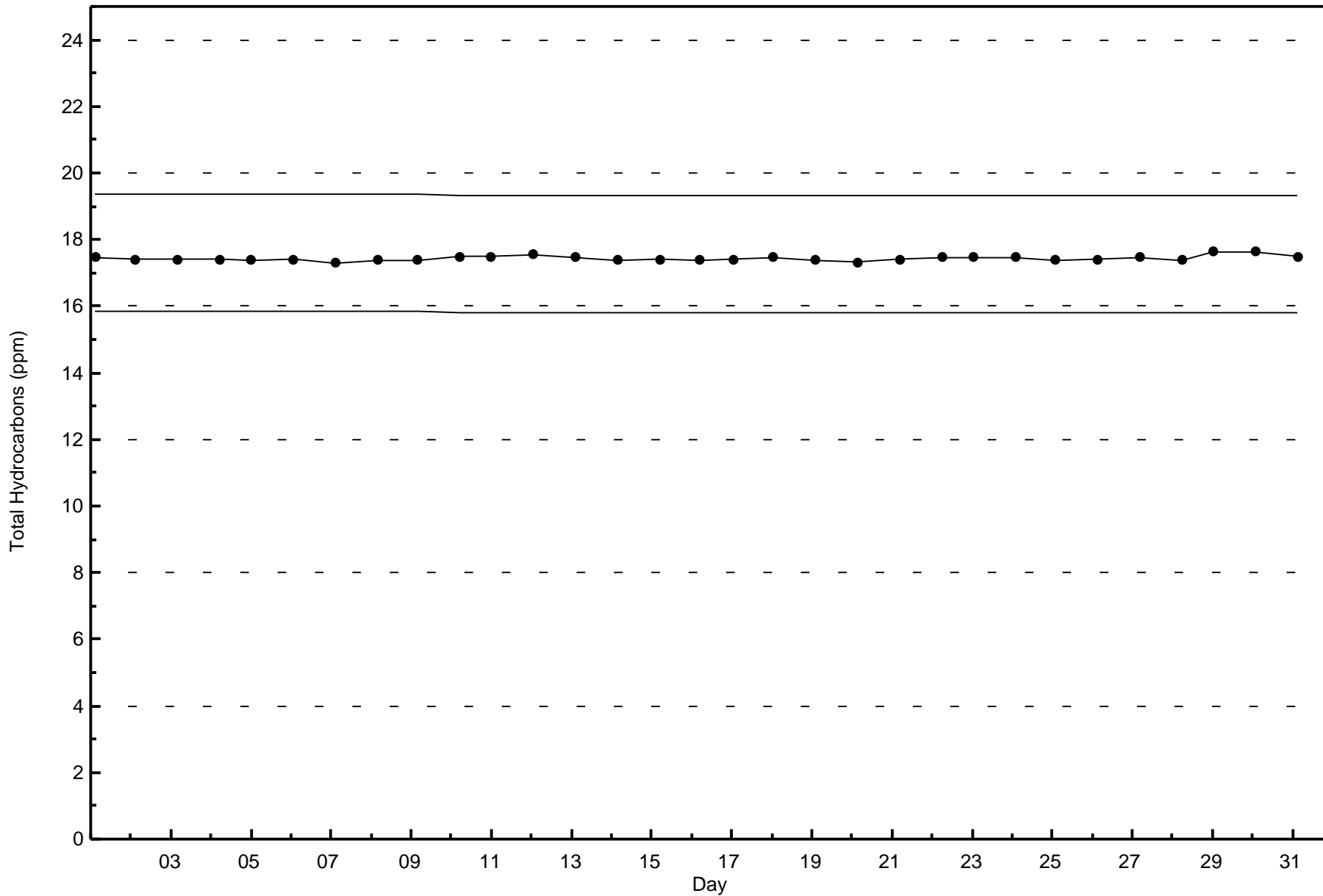






Wood Buffalo Environmental Association
Span Responses

Total Hydrocarbons (THC) - ppm
Lower Camp - August 2017





Wood Buffalo Environmental Association
Summary of Hour Averages

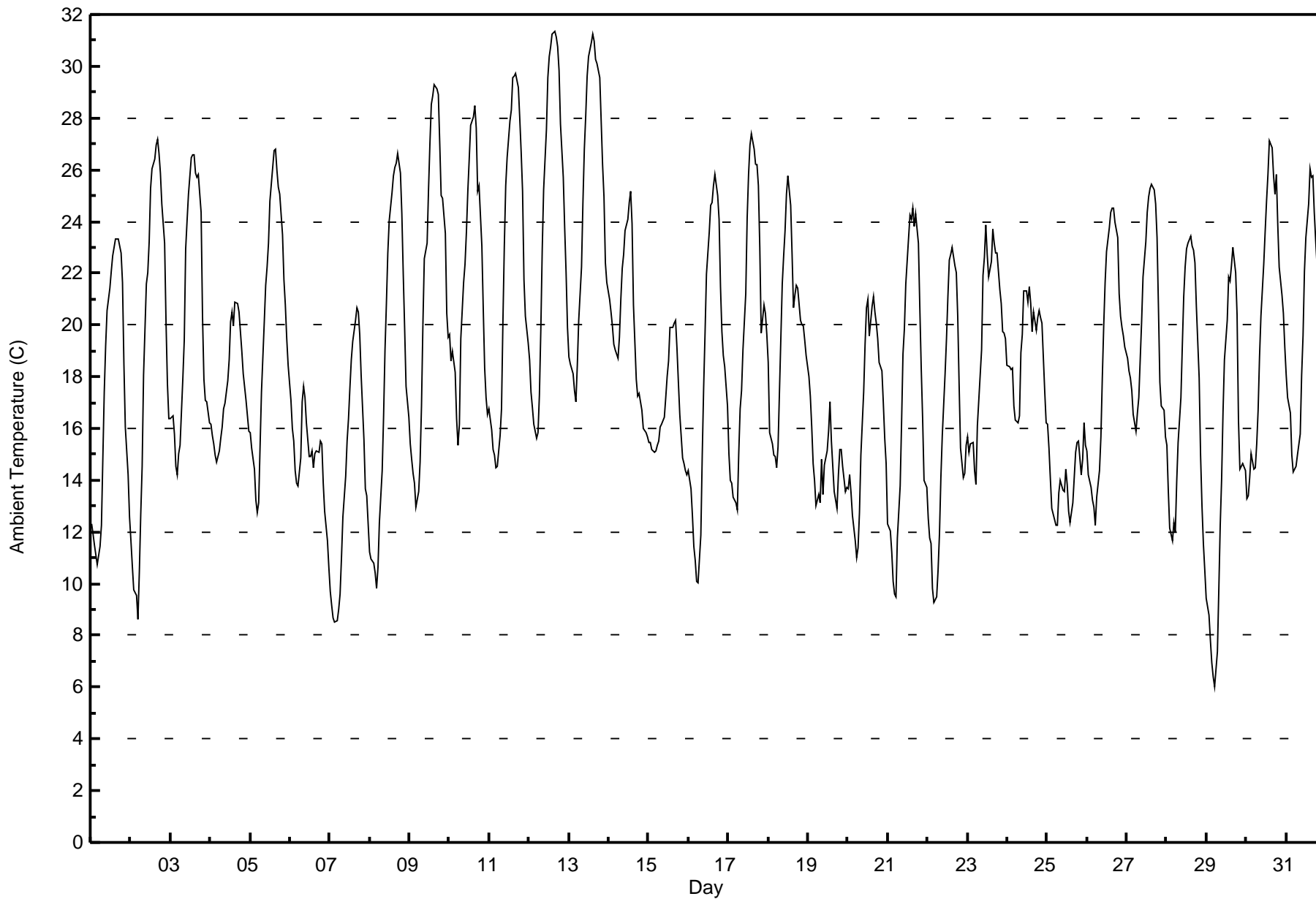
Ambient Temperature (AT) - C
Lower Camp - August 2017

| Maximum Value: 31.4 C on Aug 12 16:00 Maximum Daily Average: 24.9 C on Aug 13 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: | 744 | | | |
|--|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------------------|-------|------|---------------|---------------|
| Minimum Value: 6.0 C on Aug 29 06:00 Minimum Daily Average: 14.1 C on Aug 25 | | | | | | | | | | | | | | | | | | | | | | Hours of Data: | 744 | | | |
| Maximum Diurnal Average: 23.8 C at hour 15 Minimum Diurnal Average: 13.2 C at hour 5 | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: | 0 | | | |
| Monthly Average: 18.73 C Percentiles: P ₁ = 8.6 P ₁₀ = 12.6 Q ₁ = 14.9 Median = 18.3 Q ₃ = 22.6 P ₉₀ = 25.8 P ₉₉ = 30.7 | | | | | | | | | | | | | | | | | | | | | | Hours of Calibration: | 0 | | | |
| | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: | 100.0 | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 12.3 | 11.9 | 11.5 | 11.1 | 10.8 | 11.4 | 12.3 | 14.9 | 17.4 | 19.2 | 20.5 | 21.4 | 22.1 | 22.7 | 23.0 | 23.3 | 23.3 | 23.0 | 22.8 | 21.7 | 18.5 | 16.1 | 14.2 | 12.6 | 17.4 | 23.3 |
| 2-Aug | 11.6 | 10.7 | 9.8 | 9.5 | 8.6 | 10.5 | 12.7 | 14.5 | 18.1 | 21.6 | 22.0 | 23.2 | 25.3 | 26.0 | 26.4 | 26.9 | 27.2 | 26.6 | 25.9 | 24.7 | 23.1 | 20.1 | 17.7 | 16.4 | 19.1 | 27.2 |
| 3-Aug | 16.4 | 16.5 | 15.8 | 14.6 | 14.2 | 15.0 | 15.3 | 17.9 | 19.4 | 22.9 | 24.0 | 25.1 | 26.4 | 26.6 | 26.6 | 25.9 | 25.7 | 25.8 | 24.4 | 20.3 | 17.9 | 17.1 | 17.0 | 16.2 | 20.3 | 26.6 |
| 4-Aug | 16.2 | 15.7 | 15.4 | 15.0 | 14.7 | 15.1 | 15.6 | 16.1 | 16.7 | 17.0 | 17.9 | 18.7 | 20.1 | 20.5 | 20.0 | 20.9 | 20.8 | 20.5 | 19.8 | 19.0 | 18.1 | 17.1 | 16.5 | 15.9 | 17.6 | 20.9 |
| 5-Aug | 15.9 | 15.3 | 14.4 | 13.3 | 12.8 | 13.1 | 15.3 | 17.4 | 20.1 | 21.5 | 22.2 | 23.2 | 24.8 | 26.1 | 26.7 | 26.8 | 26.0 | 25.3 | 25.1 | 23.5 | 21.7 | 20.8 | 19.5 | 18.4 | 20.4 | 26.8 |
| 6-Aug | 17.1 | 16.0 | 15.5 | 14.4 | 13.9 | 13.8 | 14.9 | 17.0 | 17.6 | 17.2 | 16.2 | 14.9 | 14.9 | 15.2 | 14.5 | 15.0 | 15.1 | 15.1 | 15.5 | 15.4 | 13.9 | 12.8 | 11.7 | 10.6 | 14.9 | 17.6 |
| 7-Aug | 9.7 | 9.2 | 8.7 | 8.5 | 8.6 | 9.0 | 9.6 | 11.0 | 12.6 | 14.1 | 15.5 | 16.4 | 17.6 | 18.6 | 19.4 | 20.2 | 20.6 | 20.5 | 19.7 | 18.1 | 15.6 | 13.7 | 13.4 | 12.3 | 14.3 | 20.6 |
| 8-Aug | 11.3 | 11.0 | 10.8 | 10.4 | 9.8 | 10.6 | 12.3 | 14.4 | 16.5 | 19.1 | 20.8 | 22.8 | 24.0 | 25.1 | 25.8 | 26.1 | 26.3 | 26.6 | 25.9 | 24.3 | 22.0 | 19.9 | 17.6 | 16.4 | 18.7 | 26.6 |
| 9-Aug | 15.4 | 14.8 | 14.3 | 13.9 | 12.9 | 13.5 | 14.7 | 16.9 | 20.0 | 22.5 | 23.1 | 25.2 | 27.0 | 28.5 | 28.8 | 29.3 | 29.1 | 28.9 | 27.0 | 25.0 | 24.9 | 23.5 | 20.5 | 19.5 | 21.6 | 29.3 |
| 10-Aug | 19.6 | 18.6 | 19.0 | 18.1 | 16.4 | 15.3 | 16.2 | 19.5 | 21.6 | 22.3 | 23.6 | 25.1 | 26.4 | 27.7 | 28.0 | 28.5 | 27.6 | 25.1 | 25.4 | 23.0 | 20.6 | 18.4 | 17.2 | 16.6 | 21.7 | 28.5 |
| 11-Aug | 16.8 | 15.9 | 15.2 | 15.0 | 14.5 | 14.5 | 15.7 | 16.8 | 20.1 | 23.0 | 25.4 | 26.5 | 27.9 | 28.3 | 29.6 | 29.6 | 29.7 | 29.2 | 28.0 | 26.7 | 25.2 | 21.8 | 20.4 | 19.3 | 22.3 | 29.7 |
| 12-Aug | 18.7 | 17.4 | 16.8 | 16.2 | 15.6 | 15.8 | 17.3 | 19.8 | 22.9 | 25.2 | 27.5 | 29.6 | 30.4 | 30.8 | 31.2 | 31.4 | 31.1 | 30.7 | 29.8 | 27.8 | 25.7 | 23.8 | 22.0 | 19.9 | 24.1 | 31.4 |
| 13-Aug | 18.8 | 18.5 | 18.1 | 17.5 | 17.0 | 18.4 | 20.2 | 22.3 | 24.7 | 26.8 | 28.1 | 29.6 | 30.3 | 30.9 | 31.2 | 31.0 | 30.3 | 30.1 | 29.6 | 27.9 | 26.2 | 24.9 | 22.4 | 21.7 | 24.9 | 31.2 |
| 14-Aug | 21.0 | 20.5 | 20.0 | 19.3 | 19.0 | 18.7 | 19.5 | 21.0 | 22.2 | 22.7 | 23.6 | 24.1 | 24.7 | 25.1 | 23.9 | 20.8 | 17.9 | 17.2 | 17.3 | 17.0 | 16.7 | 16.0 | 15.9 | 15.7 | 20.0 | 25.1 |
| 15-Aug | 15.5 | 15.4 | 15.2 | 15.1 | 15.2 | 15.3 | 15.5 | 16.1 | 16.2 | 16.4 | 17.2 | 18.0 | 18.6 | 19.9 | 19.9 | 20.1 | 20.2 | 19.1 | 17.8 | 16.6 | 14.9 | 14.7 | 14.4 | 14.2 | 16.7 | 20.2 |
| 16-Aug | 14.4 | 13.7 | 12.7 | 11.4 | 10.9 | 10.1 | 10.0 | 11.9 | 15.0 | 17.6 | 19.7 | 21.9 | 23.6 | 24.6 | 24.7 | 25.4 | 25.8 | 25.0 | 24.1 | 21.5 | 19.7 | 18.8 | 18.4 | 16.9 | 18.2 | 25.8 |
| 17-Aug | 15.0 | 14.0 | 13.9 | 13.4 | 13.1 | 12.9 | 15.0 | 16.8 | 17.4 | 19.0 | 21.2 | 24.1 | 25.8 | 27.0 | 27.4 | 26.8 | 26.2 | 26.2 | 25.4 | 23.0 | 19.7 | 20.8 | 20.4 | 19.7 | 20.2 | 27.4 |
| 18-Aug | 18.5 | 15.9 | 15.4 | 15.0 | 14.9 | 14.5 | 15.3 | 17.4 | 21.6 | 22.6 | 23.7 | 25.0 | 25.8 | 24.6 | 22.7 | 20.7 | 21.2 | 21.5 | 21.4 | 20.2 | 20.0 | 20.0 | 19.4 | 18.8 | 19.8 | 25.8 |
| 19-Aug | 18.0 | 17.3 | 16.0 | 14.7 | 14.0 | 13.0 | 13.4 | 13.1 | 14.8 | 13.5 | 14.6 | 15.1 | 15.9 | 17.1 | 15.5 | 14.5 | 13.6 | 12.9 | 14.2 | 15.2 | 15.2 | 14.5 | 13.6 | 13.7 | 14.7 | 18.0 |
| 20-Aug | 13.7 | 14.2 | 13.5 | 12.6 | 11.6 | 11.0 | 11.4 | 12.8 | 15.0 | 17.4 | 19.3 | 20.6 | 21.0 | 19.6 | 20.7 | 21.1 | 20.5 | 20.1 | 19.5 | 18.6 | 18.2 | 17.0 | 15.6 | 14.7 | 16.6 | 21.1 |
| 21-Aug | 12.3 | 12.0 | 11.2 | 10.1 | 9.6 | 9.5 | 11.8 | 13.8 | 16.2 | 18.9 | 19.9 | 21.6 | 23.4 | 24.2 | 24.1 | 24.5 | 23.8 | 24.3 | 23.2 | 20.7 | 18.4 | 16.4 | 14.0 | 13.7 | 17.4 | 24.5 |
| 22-Aug | 12.5 | 11.8 | 11.6 | 9.8 | 9.3 | 9.5 | 10.5 | 11.9 | 14.1 | 15.7 | 18.1 | 19.5 | 21.1 | 22.5 | 22.8 | 23.0 | 22.3 | 22.0 | 20.4 | 17.7 | 15.3 | 14.1 | 14.2 | 15.4 | 16.0 | 23.0 |
| 23-Aug | 15.7 | 15.1 | 15.4 | 15.5 | 14.4 | 13.8 | 16.1 | 17.1 | 19.0 | 21.9 | 22.6 | 23.9 | 22.7 | 21.8 | 22.5 | 23.7 | 23.1 | 22.8 | 22.8 | 21.4 | 20.8 | 19.7 | 19.7 | 19.4 | 19.6 | 23.9 |
| 24-Aug | 18.5 | 18.4 | 18.3 | 18.3 | 16.8 | 16.3 | 16.2 | 16.5 | 18.9 | 19.6 | 21.3 | 21.3 | 20.9 | 21.5 | 20.8 | 19.7 | 20.5 | 19.8 | 20.3 | 20.5 | 20.3 | 20.0 | 17.4 | 16.2 | 19.1 | 21.5 |
| 25-Aug | 16.2 | 15.2 | 14.1 | 12.9 | 12.5 | 12.3 | 12.2 | 13.5 | 14.0 | 13.6 | 13.6 | 14.4 | 13.8 | 12.8 | 12.4 | 13.1 | 14.1 | 15.1 | 15.5 | 15.5 | 14.2 | 14.8 | 16.2 | 15.4 | 14.1 | 16.2 |
| 26-Aug | 15.1 | 14.2 | 13.7 | 13.2 | 13.0 | 12.3 | 13.3 | 14.4 | 15.7 | 17.9 | 19.9 | 21.6 | 22.8 | 23.7 | 24.3 | 24.5 | 24.5 | 23.9 | 23.4 | 21.2 | 20.3 | 19.9 | 19.6 | 19.1 | 18.8 | 24.5 |
| 27-Aug | 18.7 | 18.2 | 17.9 | 17.5 | 16.5 | 15.9 | 16.6 | 17.2 | 18.7 | 20.1 | 21.9 | 23.2 | 24.4 | 24.9 | 25.3 | 25.4 | 25.2 | 24.7 | 23.4 | 20.7 | 17.8 | 16.8 | 16.7 | 15.7 | 20.1 | 25.4 |
| 28-Aug | 15.3 | 13.6 | 12.2 | 11.6 | 12.4 | 12.0 | 13.9 | 15.4 | 17.2 | 19.2 | 21.1 | 22.2 | 22.9 | 23.1 | 23.4 | 23.0 | 22.9 | 22.4 | 20.7 | 17.9 | 15.0 | 13.0 | 11.6 | 10.5 | 17.2 | 23.4 |
| 29-Aug | 9.4 | 8.8 | 7.8 | 6.9 | 6.4 | 6.0 | 7.4 | 9.8 | 12.3 | 14.1 | 16.6 | 18.6 | 20.2 | 21.9 | 21.7 | 22.3 | 23.0 | 22.0 | 20.4 | 16.3 | 14.4 | 14.5 | 14.6 | 14.3 | 14.6 | 23.0 |
| 30-Aug | 13.3 | 13.4 | 14.1 | 15.0 | 14.4 | 14.5 | 15.4 | 16.7 | 18.7 | 20.3 | 22.4 | 23.6 | 24.8 | 25.8 | 27.1 | 26.8 | 25.8 | 25.0 | 25.8 | 23.8 | 22.2 | 21.1 | 20.5 | 19.1 | 20.4 | 27.1 |
| 31-Aug | 18.1 | 17.2 | 16.6 | 15.0 | 14.3 | 14.4 | 14.5 | 15.0 | 15.8 | 18.0 | 19.6 | 22.1 | 23.4 | 24.7 | 26.0 | 25.7 | 25.8 | 24.4 | 23.3 | 21.3 | 19.5 | 18.3 | 17.6 | 16.9 | 19.5 | 26.0 |
| | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | |
| | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Lower Camp - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Lower Camp - August 2017**

| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 24 | 3.23 | 3.23 |
| 10 - 20 | 427 | 57.39 | 60.62 |
| > 20 | 293 | 39.38 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

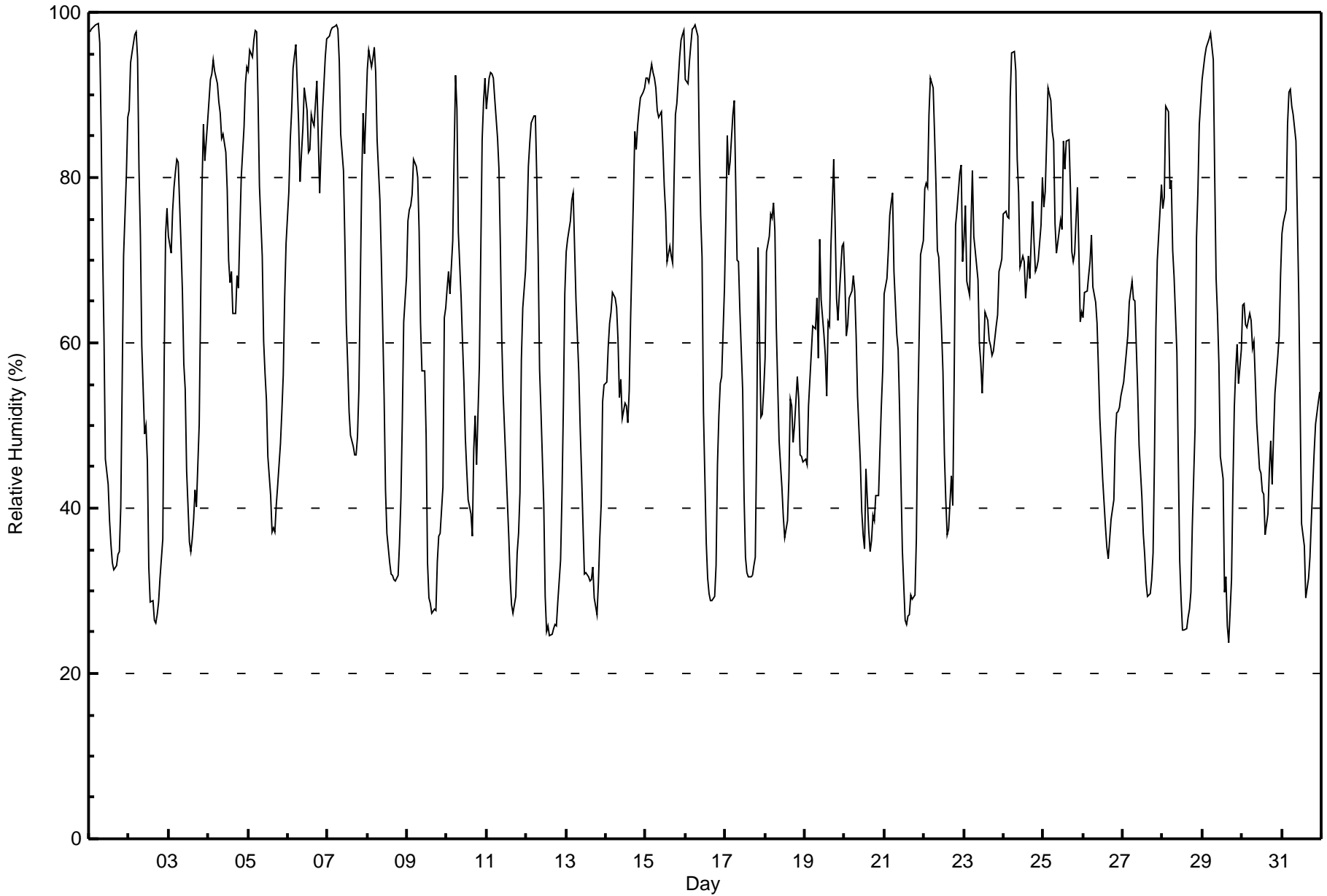
Lower Camp - August 2017

| Maximum Value: 99 % on Aug 1 06:00 Maximum Daily Average: 87.2 % on Aug 6 | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|----|----|----|----|----|----|---------------|---------------|
| Minimum Value: 24 % on Aug 29 17:00 Minimum Daily Average: 48.4 % on Aug 13 Maximum Diurnal Average: 84.7 % at hour 6 Minimum Diurnal Average: 42.7 % at hour 16 Monthly Average: 63.0 % Percentiles: P ₁ = 25 P ₁₀ = 33 Q ₁ = 46 Median = 65 Q ₃ = 80 P ₉₀ = 92 P ₉₉ = 98 | | | | | | | | | | | | | | | | | | Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 98 | 98 | 98 | 98 | 98 | 99 | 96 | 86 | 72 | 61 | 46 | 43 | 39 | 36 | 33 | 33 | 33 | 34 | 35 | 40 | 55 | 71 | 80 | 87 | 65.3 | 99 |
| 2-Aug | 88 | 94 | 95 | 97 | 98 | 94 | 81 | 73 | 60 | 49 | 50 | 46 | 33 | 29 | 29 | 26 | 26 | 27 | 29 | 31 | 36 | 58 | 73 | 76 | 58.3 | 98 |
| 3-Aug | 73 | 71 | 76 | 79 | 81 | 82 | 82 | 72 | 66 | 57 | 54 | 45 | 36 | 35 | 36 | 39 | 42 | 40 | 50 | 65 | 79 | 86 | 82 | 87 | 63.1 | 87 |
| 4-Aug | 89 | 92 | 93 | 94 | 93 | 91 | 89 | 88 | 85 | 85 | 83 | 79 | 70 | 67 | 69 | 64 | 63 | 68 | 67 | 74 | 80 | 86 | 91 | 93 | 81.4 | 94 |
| 5-Aug | 93 | 95 | 95 | 97 | 98 | 98 | 90 | 79 | 71 | 60 | 56 | 53 | 46 | 42 | 37 | 38 | 37 | 40 | 43 | 48 | 52 | 56 | 65 | 72 | 65.0 | 98 |
| 6-Aug | 78 | 85 | 88 | 93 | 95 | 96 | 86 | 79 | 83 | 86 | 91 | 88 | 83 | 83 | 88 | 87 | 86 | 92 | 85 | 78 | 83 | 88 | 95 | 97 | 87.2 | 97 |
| 7-Aug | 97 | 97 | 98 | 98 | 98 | 98 | 98 | 94 | 85 | 81 | 72 | 62 | 57 | 52 | 49 | 47 | 46 | 46 | 49 | 54 | 79 | 88 | 83 | 88 | 75.8 | 98 |
| 8-Aug | 93 | 95 | 93 | 94 | 96 | 93 | 85 | 77 | 70 | 62 | 54 | 42 | 37 | 33 | 32 | 32 | 31 | 31 | 32 | 36 | 41 | 51 | 63 | 68 | 60.1 | 96 |
| 9-Aug | 75 | 76 | 77 | 78 | 82 | 81 | 80 | 74 | 62 | 57 | 57 | 49 | 33 | 29 | 28 | 27 | 28 | 28 | 34 | 37 | 37 | 43 | 63 | 64 | 54.1 | 82 |
| 10-Aug | 67 | 69 | 66 | 72 | 83 | 92 | 88 | 73 | 65 | 60 | 55 | 48 | 45 | 41 | 39 | 37 | 47 | 51 | 45 | 57 | 71 | 85 | 89 | 92 | 64.1 | 92 |
| 11-Aug | 88 | 92 | 93 | 93 | 92 | 89 | 85 | 81 | 72 | 61 | 54 | 50 | 41 | 37 | 32 | 28 | 27 | 29 | 35 | 37 | 42 | 58 | 64 | 69 | 60.3 | 93 |
| 12-Aug | 74 | 81 | 84 | 87 | 87 | 87 | 80 | 70 | 57 | 52 | 40 | 29 | 25 | 26 | 25 | 25 | 25 | 26 | 26 | 29 | 34 | 42 | 52 | 66 | 51.2 | 87 |
| 13-Aug | 71 | 73 | 75 | 77 | 78 | 72 | 65 | 56 | 50 | 44 | 38 | 32 | 32 | 32 | 31 | 31 | 33 | 29 | 27 | 31 | 36 | 41 | 53 | 55 | 48.4 | 78 |
| 14-Aug | 55 | 59 | 62 | 64 | 66 | 65 | 64 | 60 | 53 | 56 | 51 | 53 | 52 | 50 | 54 | 63 | 78 | 86 | 83 | 86 | 88 | 90 | 90 | 91 | 67.6 | 91 |
| 15-Aug | 92 | 92 | 92 | 94 | 93 | 92 | 91 | 88 | 87 | 88 | 84 | 79 | 76 | 70 | 72 | 71 | 70 | 80 | 88 | 89 | 95 | 97 | 97 | 98 | 86.3 | 98 |
| 16-Aug | 92 | 91 | 94 | 96 | 98 | 98 | 98 | 97 | 84 | 75 | 70 | 52 | 36 | 32 | 30 | 29 | 29 | 29 | 33 | 45 | 51 | 55 | 56 | 67 | 64.1 | 98 |
| 17-Aug | 75 | 85 | 80 | 82 | 88 | 89 | 80 | 70 | 70 | 64 | 54 | 41 | 34 | 32 | 32 | 32 | 32 | 33 | 34 | 48 | 72 | 51 | 51 | 54 | 57.6 | 89 |
| 18-Aug | 58 | 71 | 73 | 76 | 75 | 77 | 74 | 62 | 48 | 45 | 43 | 39 | 36 | 38 | 44 | 53 | 52 | 48 | 50 | 56 | 53 | 46 | 46 | 46 | 54.6 | 77 |
| 19-Aug | 46 | 45 | 52 | 56 | 59 | 62 | 62 | 65 | 58 | 73 | 65 | 61 | 59 | 54 | 62 | 62 | 72 | 82 | 74 | 65 | 63 | 66 | 72 | 72 | 62.8 | 82 |
| 20-Aug | 67 | 61 | 62 | 65 | 66 | 68 | 66 | 61 | 53 | 46 | 40 | 37 | 35 | 45 | 37 | 35 | 36 | 39 | 39 | 42 | 42 | 47 | 52 | 57 | 49.9 | 68 |
| 21-Aug | 66 | 68 | 71 | 75 | 77 | 78 | 69 | 61 | 59 | 52 | 43 | 35 | 26 | 26 | 27 | 27 | 29 | 29 | 30 | 36 | 51 | 61 | 71 | 72 | 51.7 | 78 |
| 22-Aug | 79 | 79 | 79 | 88 | 92 | 91 | 85 | 79 | 71 | 70 | 62 | 56 | 47 | 41 | 37 | 37 | 44 | 40 | 56 | 74 | 76 | 81 | 82 | 70 | 67.3 | 92 |
| 23-Aug | 73 | 77 | 67 | 66 | 74 | 81 | 73 | 71 | 68 | 60 | 58 | 54 | 59 | 64 | 63 | 60 | 60 | 58 | 59 | 62 | 63 | 69 | 69 | 70 | 65.7 | 81 |
| 24-Aug | 76 | 76 | 75 | 75 | 90 | 95 | 95 | 93 | 82 | 78 | 69 | 70 | 70 | 65 | 68 | 70 | 68 | 77 | 72 | 69 | 69 | 70 | 74 | 80 | 76.1 | 95 |
| 25-Aug | 76 | 78 | 84 | 91 | 89 | 86 | 84 | 74 | 71 | 74 | 75 | 74 | 84 | 81 | 84 | 85 | 79 | 71 | 70 | 71 | 79 | 71 | 63 | 64 | 77.4 | 91 |
| 26-Aug | 63 | 66 | 66 | 68 | 70 | 73 | 67 | 65 | 62 | 57 | 51 | 47 | 44 | 38 | 35 | 34 | 36 | 39 | 41 | 48 | 52 | 52 | 52 | 54 | 53.3 | 73 |
| 27-Aug | 55 | 57 | 59 | 61 | 65 | 68 | 65 | 65 | 60 | 54 | 48 | 41 | 37 | 34 | 31 | 29 | 30 | 31 | 35 | 46 | 62 | 70 | 76 | 79 | 52.4 | 79 |
| 28-Aug | 76 | 78 | 89 | 88 | 79 | 80 | 71 | 68 | 59 | 46 | 34 | 29 | 25 | 25 | 25 | 27 | 28 | 30 | 38 | 50 | 73 | 78 | 86 | 89 | 57.1 | 89 |
| 29-Aug | 92 | 95 | 96 | 96 | 97 | 97 | 94 | 80 | 68 | 63 | 57 | 46 | 44 | 30 | 32 | 26 | 24 | 31 | 43 | 52 | 57 | 60 | 55 | 59 | 62.2 | 97 |
| 30-Aug | 65 | 65 | 62 | 62 | 64 | 63 | 59 | 60 | 55 | 50 | 45 | 44 | 42 | 42 | 37 | 39 | 45 | 48 | 43 | 49 | 54 | 58 | 61 | 68 | 53.3 | 68 |
| 31-Aug | 73 | 75 | 76 | 86 | 90 | 91 | 89 | 88 | 84 | 75 | 66 | 52 | 38 | 35 | 29 | 30 | 32 | 34 | 39 | 47 | 50 | 52 | 53 | 54 | 59.9 | 91 |
| 76.2 78.6 79.7 82.1 84.2 84.7 80.4 74.6 67.4 62.6 56.9 50.9 45.8 43.3 42.8 42.7 44.1 46.1 47.7 53.3 60.5 65.3 69.7 72.8 | | | | | | | | | | | | | | | | | | Diurnal Average | | | | | | | | |
| 98 98 98 98 98 99 98 97 87 88 91 88 84 83 88 87 86 92 88 89 95 97 97 97 98 | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Lower Camp - August 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Lower Camp - August 2017

| | | |
|--|---|---------------------------------|
| Maximum Speed: 32 km/h on Aug 19 14:00 | Maximum Daily Speed Average: 19.3 km/h on Aug 19 | Hours in Service: 744 |
| Minimum Speed Value: 0 km/h on Aug 29 01:00 | Minimum Daily Speed Average: 0.7 km/h on Aug 15 | Hours of Data: 744 |
| Maximum Diurnal Speed Average: 7.0 km/h at hour 14 | Minimum Diurnal Speed Average: 2.5 km/h at hour 1 | Hours of Missing Data: 0 |
| Monthly Average Velocity: 3.5 km/h 213.9 deg | Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 5 Median = 8 Q ₃ = 13 P ₉₀ = 19 P ₉₉ = 28 | Percent Operational Time: 100.0 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | WNW1 | NE1 | W2 | SSE1 | ENE2 | NE2 | NNE3 | NNW3 | NNW7 | NW8 | N11 | N10 | N11 | NNW12 | N12 | NNW9 | N10 | N10 | N8 | N6 | NW3 | NW2 | WNW2 | NNE1 | N5.2 | NNW12 |
| 2-Aug | NW1 | ENE1 | E1 | E1 | ESE1 | ESE3 | ESE8 | SE9 | SE6 | SE5 | E4 | NE5 | W9 | WNW12 | WNW13 | W10 | W10 | W11 | WSW11 | SSW5 | SSW6 | WSW2 | NE3 | ESE2 | WSW1.8 | WNW13 |
| 3-Aug | SE3 | SE5 | SE6 | SE7 | SE6 | SE10 | ESE12 | ESE12 | SE7 | SE11 | SE7 | SE7 | SE4 | SE4 | NE5 | ESE8 | SSE4 | E1 | NW9 | SE5 | ESE10 | ENE3 | ESE3 | SE5.5 | ESE12 | |
| 4-Aug | NNW2 | NW3 | WSW3 | ESE3 | ENE2 | NW3 | NW6 | NW0 | NNE3 | N3 | NW4 | NNE3 | ESE5 | E10 | ESE10 | SE7 | ESE6 | ESE3 | S3 | SSE4 | SW1 | SW1 | NW2 | SE2 | E1.2 | ESE10 |
| 5-Aug | NW5 | WSW1 | SE1 | ESE2 | E1 | ESE2 | E4 | SE6 | SE8 | SE6 | ESE11 | ESE11 | SE10 | SE8 | SSE9 | SSE9 | S8 | S9 | S8 | S6 | S5 | SSW5 | SE1 | ESE3 | SE4.8 | ESE11 |
| 6-Aug | ESE4 | SE5 | N0 | SSE3 | WNW2 | NNW3 | NE3 | E2 | NNW8 | N12 | N15 | N16 | N17 | NNE14 | N10 | N7 | N7 | NW3 | NNE5 | N6 | NW5 | WNW4 | WNW4 | WNW6 | N5.1 | N17 |
| 7-Aug | W4 | W2 | NE1 | WNW1 | WNW3 | WNW3 | WNW5 | WNW5 | NW7 | NW7 | NNW8 | NNW7 | NW8 | WNW9 | WNW7 | W10 | W12 | W10 | W8 | WSW5 | ENE2 | NNE1 | S0 | SE3 | WNW4.3 | W12 |
| 8-Aug | SE4 | SE5 | SE8 | SE6 | SE6 | SE8 | SE10 | SE9 | SE9 | SE8 | W2 | W11 | W12 | W10 | W10 | WSW8 | W7 | SW8 | SSW8 | S5 | SSE6 | SE6 | SE7 | ESE4 | S3.6 | W12 |
| 9-Aug | SE5 | SE6 | SE8 | SE7 | SE6 | SE8 | SE10 | SE10 | SE9 | SE9 | SE10 | ESE5 | ENE1 | W9 | W9 | W7 | W7 | W2 | SE4 | S5 | SSW7 | SW4 | NNW1 | ESE5 | SSE3.6 | SE10 |
| 10-Aug | ESE3 | ESE6 | SE6 | SE4 | ESE3 | W2 | SE5 | SE11 | SE8 | NNE2 | NNW5 | NNW5 | N4 | NNW7 | N9 | NE5 | SE12 | SE12 | S6 | SE4 | NNW0 | SE3 | ESE0 | SE5 | ESE2.6 | SE12 |
| 11-Aug | SE4 | SE5 | SE7 | SE7 | SE6 | SSE5 | SE10 | ESE15 | SE10 | SE8 | ESE9 | SE10 | SE10 | SE11 | SE10 | SE9 | SSE9 | SSE8 | SSE9 | SSE8 | S8 | SE6 | SE7 | SE7 | SE8.1 | ESE15 |
| 12-Aug | SE9 | SE8 | SE9 | SE8 | SE9 | SE10 | ESE11 | SE9 | SE10 | SE11 | SE11 | S12 | SSE13 | SSE14 | S13 | S12 | SSE11 | S11 | S10 | S7 | S7 | SSE6 | SE7 | SE8 | SSE9.4 | SSE14 |
| 13-Aug | SE8 | SE7 | SE7 | SE7 | SE8 | ESE14 | ESE18 | SE16 | SE12 | SE17 | SE24 | SE19 | SE19 | SE19 | SE17 | SE20 | SE21 | SE18 | SSE15 | SSE13 | SSE10 | SSE10 | SE8 | SE9 | SE13.7 | SE24 |
| 14-Aug | ESE13 | ESE14 | ESE15 | ESE15 | ESE13 | ESE15 | ESE16 | SE13 | SSE8 | SE9 | S8 | SSE5 | SSW5 | SSW10 | WSW16 | WSW20 | WSW16 | WSW8 | SSW5 | SE6 | SE7 | SE8 | SE7 | SE8 | SSE6.9 | WSW20 |
| 15-Aug | SE8 | SE7 | SE5 | ESE8 | ESE3 | SSE3 | SW3 | W5 | WNW4 | NNE4 | NW4 | W9 | WSW8 | W5 | NNE5 | NNE5 | NE5 | NNE4 | WSW7 | W14 | NNW3 | ESE3 | ESE2 | SW1 | WSW0.7 | W14 |
| 16-Aug | NNW4 | NNW3 | NNW5 | WNW3 | NW2 | ENE0 | ESE3 | SE5 | SE8 | SE8 | SE7 | WSW6 | WSW10 | WSW11 | W8 | W7 | W10 | WSW13 | WSW10 | WSW9 | SW8 | WSW9 | WSW6 | S3 | WSW3.8 | WSW13 |
| 17-Aug | SSE2 | SSE4 | S4 | SSE3 | SE5 | SE4 | SE5 | SE5 | SE5 | SW4 | W10 | WSW9 | WSW9 | WSW11 | WSW13 | W10 | W13 | WSW14 | WSW12 | SW3 | NE3 | SSW8 | WSW14 | WSW16 | WSW5.7 | WSW16 |
| 18-Aug | WSW11 | SE6 | SE6 | SE7 | SE7 | SE7 | ESE7 | SSE6 | SSW11 | WSW15 | SW15 | SW17 | WSW23 | WSW26 | WSW23 | SSW16 | S12 | SW16 | SSW12 | SSW10 | SW16 | SW19 | SW16 | SW17 | SW11.1 | WSW26 |
| 19-Aug | SW19 | WSW22 | W20 | WSW16 | W19 | WSW17 | WSW17 | WSW16 | WSW22 | WSW24 | WSW26 | W28 | W28 | W32 | W28 | WNW30 | WNW23 | W15 | W13 | W14 | W15 | W13 | WSW7 | WSW13 | W19.3 | W32 |
| 20-Aug | WSW10 | WSW17 | W19 | W20 | WSW18 | W15 | W14 | W16 | WSW17 | WSW20 | W23 | W22 | W21 | W22 | WNW23 | W28 | WSW30 | W23 | WNW18 | WNW15 | WNW19 | W17 | W19 | W8 | W18.5 | WSW30 |
| 21-Aug | WSW4 | WSW8 | SSE2 | SSE5 | SSE5 | S4 | SW5 | SSW5 | SE6 | SE7 | WSW11 | WSW17 | WSW19 | WSW19 | WSW18 | WSW15 | W12 | WSW13 | W13 | W10 | W6 | NW6 | NNW4 | NNW5 | WSW7.0 | WSW19 |
| 22-Aug | NW4 | NW5 | NNW4 | NE1 | NW3 | NNW2 | NNW3 | NW4 | WNW3 | N4 | NW4 | NW6 | NW5 | WNW4 | NW5 | W5 | N3 | NNW4 | NNE3 | N1 | NW1 | WNW1 | NE1 | ENE3 | NNW2.8 | NW6 |
| 23-Aug | N4 | NNW3 | ESE9 | SE6 | SE5 | SE6 | SE8 | SE9 | SE6 | SE11 | SSE9 | S10 | SSW8 | SSE5 | SSE9 | SE10 | SE15 | SE13 | SE14 | SE15 | SE14 | SE10 | SE9 | SE11 | SE8.2 | SE15 |
| 24-Aug | SE8 | SE9 | SE13 | SE11 | SSE8 | ESE8 | ESE5 | NNE2 | ESE8 | ESE11 | SE12 | SE6 | ESE10 | SE9 | ESE14 | ESE20 | ESE9 | NNW6 | E6 | SE7 | S4 | SW8 | WSW16 | SW8 | SE6.4 | ESE20 |
| 25-Aug | SW11 | SW9 | SSW8 | S7 | S7 | SSW8 | S7 | S9 | SSW11 | SW13 | SSW12 | SSW11 | SW20 | WSW30 | SW28 | WSW29 | WSW28 | WSW27 | WSW20 | WSW17 | SW5 | WSW12 | WSW22 | WSW14 | SW14.0 | WSW30 |
| 26-Aug | W19 | WSW19 | WSW22 | WSW22 | WSW22 | WSW9 | SSW5 | WSW9 | WSW14 | WSW9 | SW8 | WSW10 | W15 | W19 | WSW19 | WSW20 | WSW16 | WSW16 | SW15 | SW9 | SSW8 | SSW10 | SW11 | SW9 | WSW13.5 | WSW22 |
| 27-Aug | WSW12 | WSW14 | WSW16 | WSW19 | WSW20 | WSW16 | WSW12 | W15 | WSW16 | W20 | WSW21 | WSW24 | WSW25 | W22 | W21 | W21 | W21 | W18 | W15 | WNW4 | E2 | NW3 | N1 | E3 | W14.3 | WSW25 |
| 28-Aug | WNW6 | W3 | ESE2 | WSW3 | SW4 | SW2 | SSE3 | SE5 | SSW2 | W6 | NW10 | NNW14 | NNW15 | NNW19 | NNW18 | NNW18 | NW16 | NW13 | NW8 | NW4 | NNW2 | N1 | NNW1 | NNW1 | WNW6.1 | WNW19 |
| 29-Aug | WNW0 | NE1 | NNE1 | E2 | ENE2 | ENE1 | NE2 | E5 | ENE3 | NE3 | NNE5 | NNE5 | N5 | NW4 | NE6 | N4 | ESE3 | SE7 | E1 | WNW2 | S0 | SE3 | E4 | ENE3 | ENE1.9 | SE7 |
| 30-Aug | ESE7 | SE11 | ESE18 | ESE19 | SE14 | SE18 | SE21 | SE22 | SE22 | SE21 | SE21 | SE22 | SE24 | SE24 | SE16 | SE21 | SE18 | SE10 | SSE11 | SSE8 | SSE6 | SSE8 | SSE9 | SSE8 | SE15.6 | SE24 |
| 31-Aug | SE8 | SSE7 | SSE6 | SE4 | SE5 | SE9 | SE9 | SE11 | SE10 | SE6 | SSW7 | SW8 | WSW16 | WSW18 | W21 | WSW22 | W22 | W22 | W20 | W17 | WSW14 | W13 | WSW16 | W17 | SW8.3 | W22 |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|--------|-------|-------|-------|-------|--------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|--------|--------|-------|--------|-----------------|
| SSW2.5 | S3.1 | S3.2 | S3.5 | S3.1 | SSE3.3 | SE4.3 | SE4.7 | SE3.9 | S3.0 | SSW2.9 | WSW4.1 | WSW5.7 | WSW7.0 | WSW6.7 | WSW6.1 | WSW5.7 | WSW5.9 | SW5.2 | SW3.9 | SSW3.3 | SSW3.8 | SW3.6 | SSW2.9 | Diurnal Average |
| W19 | WSW22 | WSW22 | WSW22 | WSW22 | SE18 | SE21 | SE22 | WSW22 | WSW24 | WSW26 | W28 | W28 | W32 | W28 | WNW30 | WSW30 | WSW27 | WSW20 | WSW17 | WNW19 | SW19 | WSW22 | SW17 | Diurnal Maximum |

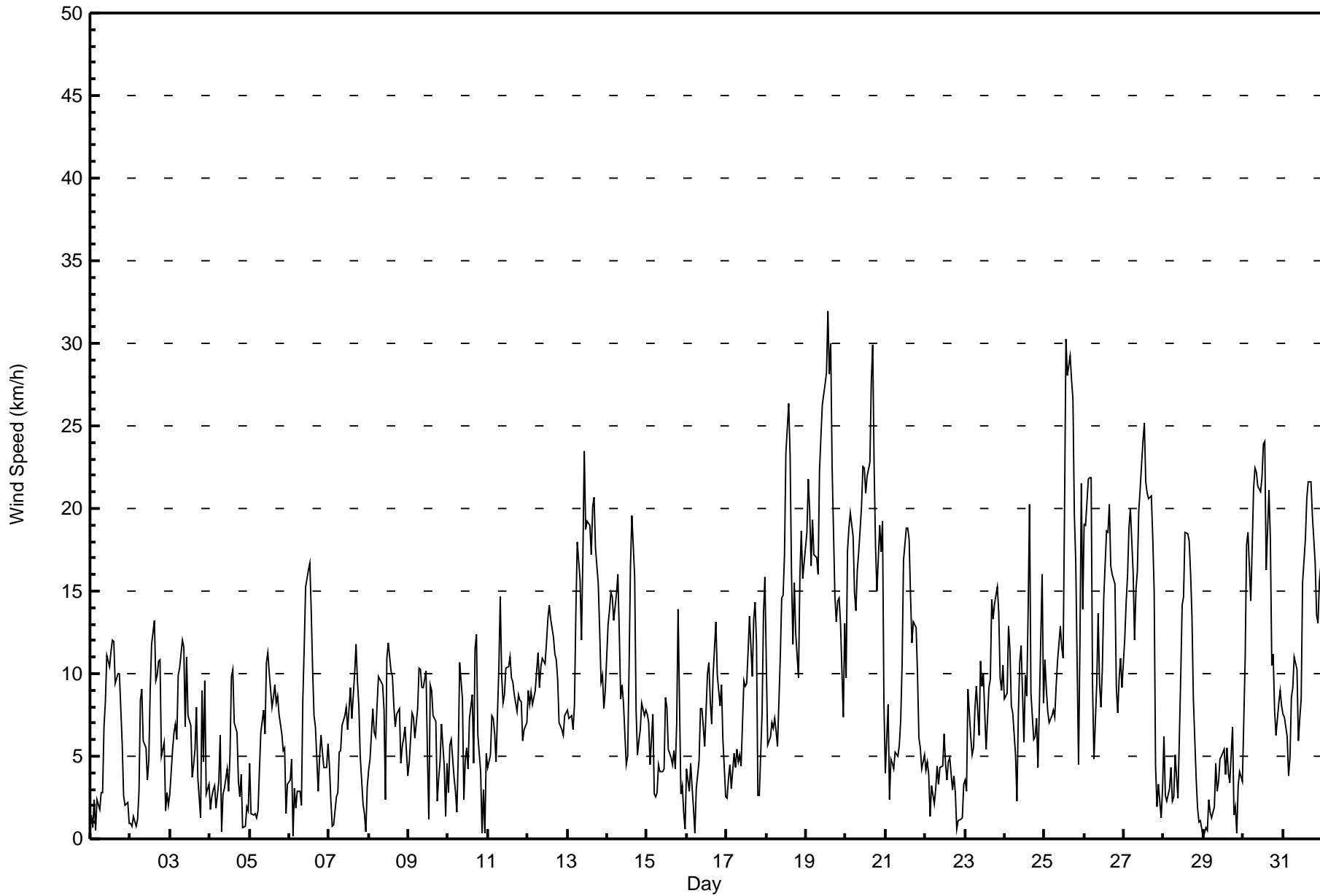
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Lower Camp - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Aug 25 13:00 Minimum Value: 1 km/h on Aug 7 00:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 7 | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | |
|--|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 1 | 1 | 2 | 1 | 2 | 2 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 4 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 4 |
| 2-Aug | 1 | 2 | 2 | 1 | 1 | 2 | 3 | 2 | 2 | 1 | 1 | 2 | 5 | 4 | 4 | 4 | 3 | 2 | 3 | 2 | 2 | 2 | 1 | 1 | 5 |
| 3-Aug | 1 | 2 | 1 | 2 | 2 | 4 | 3 | 3 | 3 | 2 | 3 | 4 | 3 | 3 | 3 | 2 | 2 | 2 | 6 | 3 | 4 | 2 | 3 | 6 | |
| 4-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 6 | 3 | 2 | 2 | 1 | 1 | 2 | 2 | 1 | 2 | 2 | 6 |
| 5-Aug | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 3 | 3 | 4 | 4 | 3 | 3 | 2 | 1 | 2 | 2 | 4 | |
| 6-Aug | 1 | 1 | 2 | 2 | 2 | 1 | 2 | 1 | 4 | 2 | 3 | 4 | 4 | 3 | 3 | 2 | 2 | 1 | 3 | 2 | 1 | 1 | 2 | 1 | 4 |
| 7-Aug | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 3 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 4 |
| 8-Aug | 1 | 2 | 2 | 3 | 2 | 3 | 2 | 2 | 3 | 2 | 4 | 3 | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 1 | 2 | 1 | 2 | 1 | 4 |
| 9-Aug | 1 | 2 | 2 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 2 | 2 | 3 |
| 10-Aug | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 1 | 1 | 2 | 1 | 2 | 3 | 3 | 4 | 5 | 3 | 1 | 1 | 2 | 1 | 1 | 5 |
| 11-Aug | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 3 | 4 | 3 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 2 | 4 |
| 12-Aug | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 5 | 5 | 6 | 5 | 5 | 5 | 4 | 4 | 2 | 2 | 2 | 2 | 2 | 6 |
| 13-Aug | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 4 | 3 | 6 | 6 | 6 | 7 | 6 | 6 | 6 | 6 | 6 | 5 | 5 | 4 | 4 | 3 | 3 | 7 |
| 14-Aug | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 4 | 3 | 4 | 3 | 4 | 4 | 4 | 6 | 4 | 5 | 3 | 2 | 2 | 3 | 3 | 3 | 2 | 6 |
| 15-Aug | 2 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 3 | 4 | 4 | 1 | 2 | 1 | 4 |
| 16-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 4 | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 2 | 4 |
| 17-Aug | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 3 | 2 | 3 | 3 | 4 | 5 | 5 | 3 | 3 | 3 | 1 | 1 | 3 | 3 | 3 | 5 |
| 18-Aug | 5 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 6 | 5 | 4 | 6 | 6 | 6 | 6 | 7 | 4 | 5 | 5 | 3 | 5 | 5 | 5 | 4 | 7 |
| 19-Aug | 4 | 5 | 4 | 3 | 4 | 3 | 3 | 3 | 5 | 6 | 6 | 6 | 6 | 8 | 7 | 8 | 6 | 4 | 4 | 4 | 3 | 5 | 2 | 4 | 8 |
| 20-Aug | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 4 | 4 | 5 | 5 | 6 | 7 | 6 | 7 | 6 | 6 | 4 | 3 | 5 | 4 | 4 | 5 | 7 |
| 21-Aug | 2 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 5 | 4 | 4 | 5 | 5 | 3 | 4 | 4 | 3 | 2 | 3 | 2 | 1 | 1 | 5 |
| 22-Aug | 1 | 2 | 2 | 1 | 1 | 2 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 2 | 2 |
| 23-Aug | 1 | 2 | 5 | 4 | 2 | 2 | 2 | 3 | 4 | 3 | 3 | 4 | 3 | 2 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 5 |
| 24-Aug | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 3 | 5 | 3 | 4 | 2 | 5 | 3 | 6 | 6 | 3 | 2 | 3 | 4 | 3 | 8 | 7 | 4 | 8 |
| 25-Aug | 5 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 9 | 6 | 7 | 6 | 6 | 7 | 5 | 7 | 3 | 5 | 5 | 4 | 9 |
| 26-Aug | 4 | 4 | 4 | 4 | 4 | 6 | 2 | 4 | 3 | 3 | 3 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 2 | 3 | 3 | 3 | 3 | 6 |
| 27-Aug | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 3 | 1 | 1 | 1 | 1 | 5 |
| 28-Aug | 3 | 2 | 2 | 3 | 2 | 2 | 1 | 1 | 2 | 2 | 5 | 4 | 4 | 5 | 5 | 4 | 5 | 4 | 2 | 2 | 1 | 1 | 1 | 1 | 5 |
| 29-Aug | 2 | 1 | 2 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 2 |
| 30-Aug | 3 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 5 | 4 | 4 | 3 | 2 | 3 | 3 | 2 | 6 |
| 31-Aug | 3 | 2 | 2 | 2 | 1 | 3 | 4 | 4 | 5 | 4 | 3 | 3 | 4 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 3 | 3 | 3 | 3 | 5 |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Lower Camp - August 2017

| Wind Speed Ranges (km/h) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 5 | 247 | 33.20 | 33.20 |
| 6 - 11 | 286 | 38.44 | 71.64 |
| 12 - 19 | 147 | 19.76 | 91.40 |
| 20 - 28 | 59 | 7.93 | 99.33 |
| 29 - 38 | 5 | 0.67 | 100.00 |
| > 38 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Lower Camp - August 2017**

| Wind Speed Ranges (km/h) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------------|-----------------------|------------|-----------|------------|-----------|------------|------------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 5 | 11 | 16 | 15 | 12 | 13 | 25 | 32 | 16 | 10 | 7 | 11 | 6 | 10 | 18 | 25 | 20 | 247 |
| 6 - 11 | 12 | 0 | 1 | 0 | 2 | 19 | 116 | 24 | 15 | 16 | 11 | 25 | 24 | 5 | 9 | 7 | 286 |
| 12 - 19 | 5 | 1 | 0 | 0 | 0 | 15 | 22 | 4 | 4 | 3 | 10 | 43 | 27 | 10 | 2 | 1 | 147 |
| 20 - 28 | 0 | 0 | 0 | 0 | 0 | 1 | 12 | 0 | 0 | 0 | 2 | 22 | 20 | 2 | 0 | 0 | 59 |
| 29 - 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 1 | 0 | 0 | 5 |
| > 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 28 | 17 | 16 | 12 | 15 | 60 | 182 | 44 | 29 | 26 | 34 | 99 | 82 | 36 | 36 | 28 | 744 |

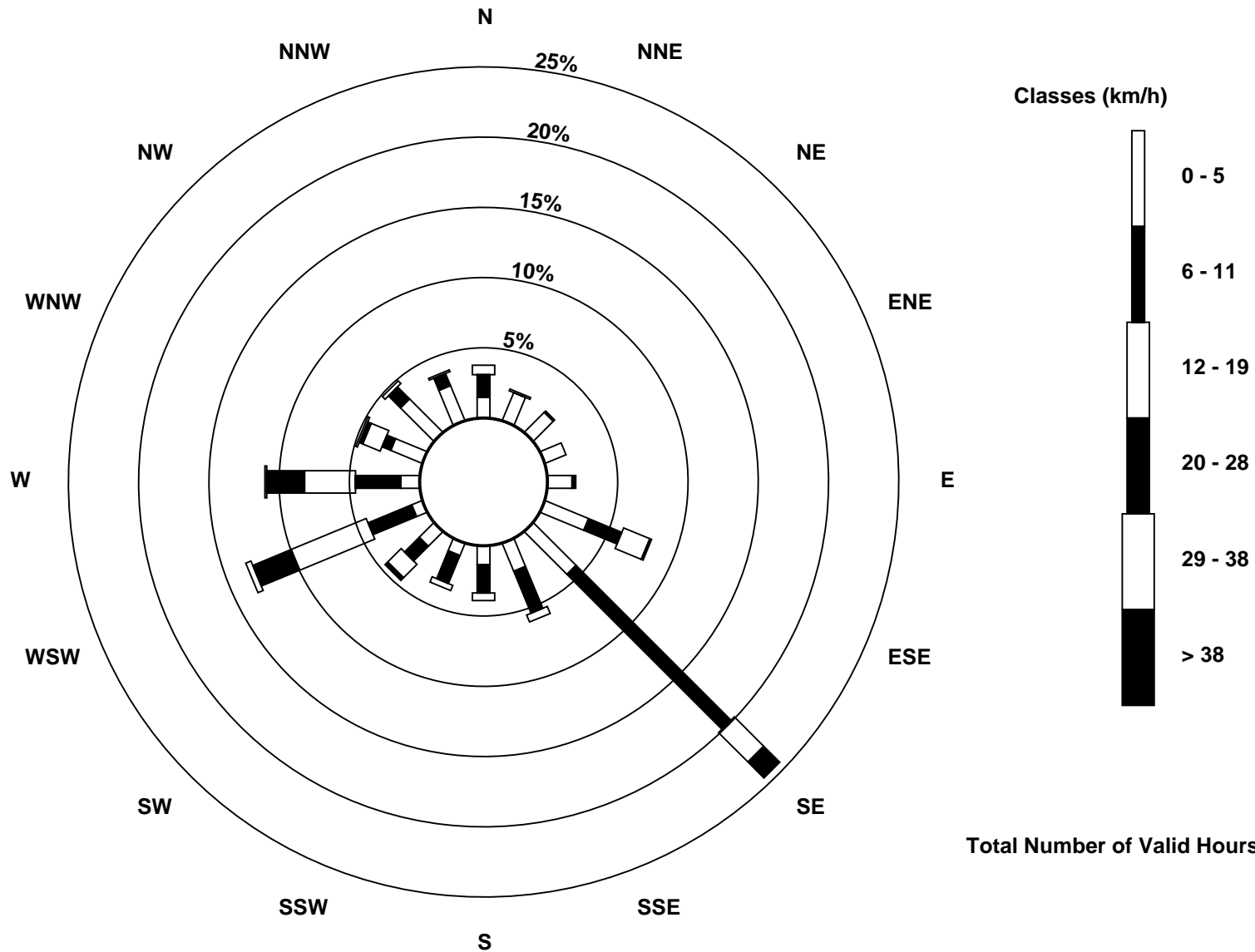
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Wind Speed (WS) - km/h
Lower Camp (AMS 11)



Total Number of Valid Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Lower Camp - August 2017

| | | |
|---|--|---------------------------------|
| Direction of Maximum Speed: 275 deg on Aug 19 14:00 | | Hours in Service: 744 |
| Direction of Maximum Daily Speed Average: 263.9 deg on Aug 19 | | Hours of Data: 744 |
| Direction of Minimum Speed: 284 deg on Aug 29 01:00 | | Hours of Missing Data: 0 |
| Direction of Minimum Daily Speed Average: 0.7 deg on Aug 15 | | Percent Operational Time: 100.0 |
| Monthly Average Direction: 242.2 deg | | |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average |
|--------|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 288 | 38 | 281 | 152 | 62 | 44 | 28 | 341 | 335 | 324 | 9 | 357 | 4 | 345 | 356 | 348 | 356 | 11 | 2 | 359 | 306 | 315 | 301 | 25 | 353.5 |
| 2-Aug | 319 | 61 | 91 | 91 | 116 | 114 | 119 | 124 | 135 | 137 | 95 | 34 | 271 | 297 | 294 | 271 | 272 | 268 | 247 | 207 | 211 | 244 | 50 | 121 | 246.9 |
| 3-Aug | 136 | 144 | 143 | 138 | 136 | 125 | 126 | 123 | 115 | 130 | 125 | 136 | 144 | 134 | 132 | 41 | 118 | 154 | 88 | 316 | 141 | 110 | 59 | 113 | 124.4 |
| 4-Aug | 331 | 320 | 258 | 104 | 71 | 310 | 322 | 319 | 12 | 3 | 307 | 32 | 118 | 91 | 113 | 125 | 122 | 120 | 184 | 147 | 218 | 227 | 304 | 145 | 93.8 |
| 5-Aug | 322 | 252 | 137 | 105 | 84 | 102 | 100 | 127 | 131 | 130 | 122 | 116 | 126 | 146 | 167 | 152 | 174 | 170 | 177 | 175 | 173 | 197 | 152 | 123 | 145.9 |
| 6-Aug | 122 | 139 | 359 | 166 | 285 | 336 | 56 | 98 | 340 | 353 | 6 | 360 | 9 | 20 | 356 | 349 | 353 | 322 | 18 | 3 | 305 | 295 | 293 | 286 | 356.3 |
| 7-Aug | 272 | 273 | 41 | 293 | 292 | 313 | 295 | 294 | 325 | 324 | 345 | 332 | 307 | 295 | 303 | 275 | 265 | 260 | 261 | 251 | 59 | 30 | 187 | 145 | 293.5 |
| 8-Aug | 124 | 131 | 139 | 140 | 137 | 126 | 129 | 131 | 131 | 128 | 259 | 276 | 274 | 263 | 259 | 256 | 264 | 235 | 213 | 182 | 162 | 146 | 139 | 123 | 181.4 |
| 9-Aug | 127 | 137 | 137 | 135 | 126 | 125 | 124 | 129 | 134 | 130 | 125 | 104 | 71 | 271 | 269 | 262 | 272 | 262 | 134 | 177 | 201 | 222 | 347 | 120 | 152.3 |
| 10-Aug | 106 | 116 | 136 | 127 | 121 | 276 | 130 | 127 | 127 | 24 | 342 | 330 | 349 | 331 | 350 | 56 | 130 | 132 | 170 | 140 | 342 | 127 | 106 | 128 | 111.4 |
| 11-Aug | 136 | 141 | 136 | 141 | 144 | 150 | 127 | 117 | 127 | 129 | 122 | 124 | 132 | 136 | 145 | 144 | 152 | 153 | 147 | 163 | 171 | 139 | 138 | 140 | 138.4 |
| 12-Aug | 140 | 137 | 135 | 136 | 133 | 127 | 123 | 133 | 140 | 135 | 144 | 169 | 163 | 167 | 171 | 174 | 166 | 172 | 177 | 185 | 173 | 155 | 145 | 139 | 152.5 |
| 13-Aug | 134 | 139 | 135 | 138 | 135 | 123 | 121 | 126 | 134 | 130 | 132 | 142 | 138 | 138 | 139 | 133 | 134 | 142 | 158 | 165 | 157 | 153 | 142 | 133 | 137.4 |
| 14-Aug | 118 | 117 | 110 | 111 | 121 | 110 | 118 | 138 | 150 | 138 | 186 | 156 | 210 | 208 | 243 | 249 | 242 | 237 | 209 | 140 | 140 | 144 | 141 | 138 | 154.9 |
| 15-Aug | 138 | 144 | 131 | 115 | 110 | 162 | 223 | 278 | 289 | 28 | 314 | 266 | 256 | 269 | 26 | 33 | 42 | 27 | 241 | 265 | 345 | 106 | 104 | 229 | 254.0 |
| 16-Aug | 327 | 335 | 335 | 300 | 319 | 68 | 119 | 124 | 130 | 132 | 127 | 258 | 248 | 256 | 277 | 278 | 262 | 258 | 248 | 240 | 223 | 239 | 247 | 171 | 245.3 |
| 17-Aug | 154 | 150 | 187 | 164 | 140 | 137 | 135 | 146 | 137 | 217 | 270 | 253 | 252 | 245 | 246 | 271 | 272 | 248 | 244 | 232 | 34 | 212 | 253 | 255 | 236.6 |
| 18-Aug | 256 | 136 | 144 | 136 | 144 | 144 | 105 | 163 | 212 | 241 | 228 | 229 | 242 | 249 | 245 | 207 | 182 | 215 | 206 | 196 | 217 | 228 | 216 | 226 | 217.0 |
| 19-Aug | 235 | 244 | 265 | 257 | 262 | 257 | 253 | 241 | 253 | 248 | 252 | 267 | 265 | 275 | 281 | 292 | 283 | 274 | 267 | 279 | 281 | 264 | 254 | 252 | 263.9 |
| 20-Aug | 249 | 257 | 259 | 263 | 257 | 261 | 262 | 261 | 257 | 257 | 267 | 270 | 279 | 274 | 288 | 271 | 255 | 260 | 296 | 297 | 285 | 263 | 261 | 278 | 267.7 |
| 21-Aug | 251 | 251 | 156 | 147 | 148 | 184 | 216 | 210 | 128 | 134 | 247 | 249 | 249 | 249 | 257 | 257 | 271 | 258 | 277 | 272 | 275 | 304 | 295 | 328 | 250.0 |
| 22-Aug | 325 | 324 | 345 | 53 | 306 | 348 | 329 | 317 | 296 | 3 | 310 | 316 | 315 | 300 | 312 | 281 | 10 | 345 | 19 | 9 | 305 | 285 | 37 | 61 | 328.0 |
| 23-Aug | 2 | 337 | 122 | 129 | 141 | 144 | 138 | 127 | 128 | 137 | 154 | 185 | 199 | 154 | 150 | 141 | 137 | 140 | 137 | 134 | 135 | 132 | 141 | 142 | 140.9 |
| 24-Aug | 139 | 135 | 131 | 141 | 156 | 117 | 102 | 29 | 120 | 113 | 126 | 128 | 114 | 131 | 117 | 112 | 104 | 338 | 81 | 141 | 188 | 218 | 248 | 224 | 133.0 |
| 25-Aug | 225 | 217 | 209 | 190 | 190 | 195 | 173 | 191 | 207 | 222 | 201 | 196 | 229 | 244 | 234 | 240 | 248 | 253 | 255 | 256 | 226 | 242 | 249 | 255 | 232.4 |
| 26-Aug | 261 | 257 | 254 | 255 | 258 | 239 | 204 | 238 | 248 | 252 | 226 | 247 | 261 | 260 | 258 | 248 | 249 | 248 | 236 | 232 | 203 | 206 | 225 | 226 | 246.6 |
| 27-Aug | 239 | 239 | 251 | 252 | 256 | 251 | 248 | 263 | 256 | 260 | 256 | 253 | 256 | 262 | 271 | 267 | 269 | 271 | 277 | 291 | 96 | 316 | 4 | 90 | 259.3 |
| 28-Aug | 303 | 275 | 106 | 254 | 236 | 221 | 165 | 130 | 208 | 276 | 306 | 290 | 294 | 298 | 294 | 303 | 313 | 315 | 311 | 309 | 331 | 350 | 347 | 339 | 296.7 |
| 29-Aug | 284 | 50 | 26 | 90 | 70 | 75 | 56 | 97 | 68 | 44 | 33 | 18 | 2 | 321 | 39 | 4 | 120 | 128 | 95 | 299 | 169 | 138 | 96 | 75 | 58.8 |
| 30-Aug | 112 | 124 | 112 | 121 | 128 | 131 | 132 | 125 | 128 | 131 | 133 | 132 | 132 | 131 | 145 | 137 | 131 | 139 | 160 | 162 | 155 | 152 | 152 | 147 | 133.1 |
| 31-Aug | 144 | 148 | 150 | 135 | 133 | 133 | 135 | 132 | 131 | 134 | 207 | 217 | 246 | 243 | 262 | 257 | 261 | 266 | 263 | 259 | 257 | 259 | 258 | 259 | 236.0 |

204.7 190.8 172.6 170.2 183.6 159.7 142.8 151.3 166.7 178.2 202.6 237.4 243.0 249.8 254.4 246.5 238.5 239.6 234.0 229.4 213.1 211.0 224.4 202.5
 Diurnal Average

All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

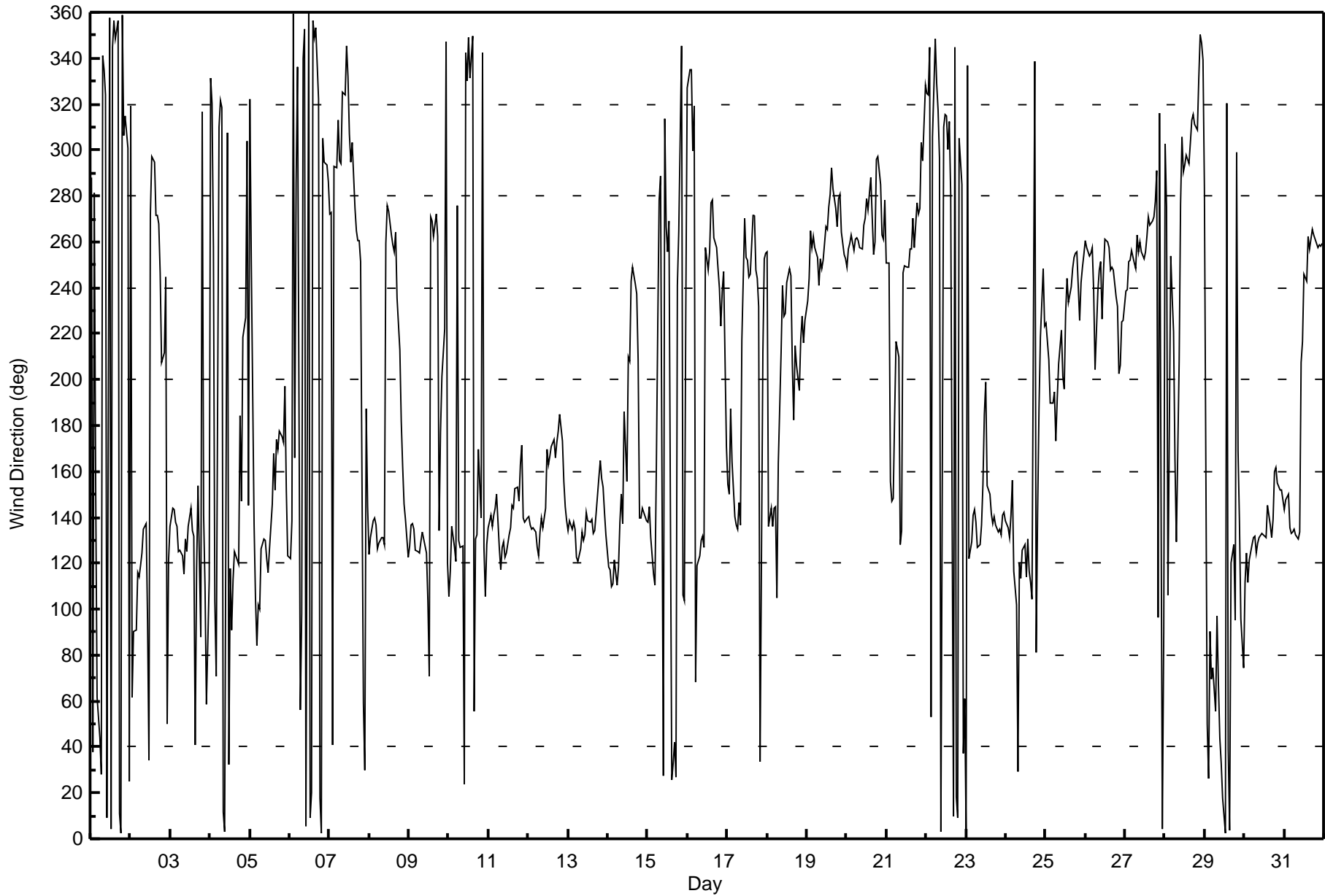
Wind Direction (WD) - deg
Lower Camp - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 99 deg on Aug 10 21:00 Minimum Value: 8 deg on Aug 14 06:00 Percentiles: P ₁ = 11 P ₁₀ = 14 Q ₁ = 19 Median = 27 Q ₃ = 41 P ₉₀ = 63 P ₉₉ = 91 | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 79 | 78 | 53 | 87 | 62 | 70 | 32 | 46 | 27 | 24 | 22 | 29 | 30 | 26 | 28 | 34 | 34 | 24 | 27 | 29 | 35 | 25 | 27 | 65 | 87 |
| 2-Aug | 59 | 62 | 82 | 43 | 51 | 29 | 19 | 17 | 21 | 23 | 41 | 26 | 69 | 24 | 20 | 37 | 25 | 18 | 14 | 26 | 18 | 89 | 63 | 62 | 89 |
| 3-Aug | 66 | 29 | 24 | 20 | 23 | 28 | 26 | 16 | 14 | 26 | 17 | 42 | 55 | 73 | 70 | 51 | 22 | 43 | 69 | 62 | 61 | 25 | 84 | 73 | 84 |
| 4-Aug | 88 | 49 | 50 | 48 | 68 | 43 | 24 | 85 | 53 | 52 | 17 | 62 | 33 | 46 | 18 | 26 | 16 | 22 | 63 | 39 | 84 | 89 | 76 | 84 | 89 |
| 5-Aug | 29 | 84 | 73 | 57 | 63 | 67 | 33 | 22 | 22 | 24 | 17 | 17 | 31 | 37 | 45 | 38 | 38 | 36 | 37 | 29 | 25 | 23 | 85 | 57 | 85 |
| 6-Aug | 50 | 24 | 92 | 65 | 90 | 59 | 54 | 49 | 33 | 19 | 17 | 21 | 18 | 20 | 21 | 24 | 23 | 44 | 54 | 27 | 21 | 22 | 16 | 9 | 92 |
| 7-Aug | 16 | 70 | 71 | 73 | 54 | 54 | 21 | 25 | 19 | 21 | 24 | 33 | 25 | 27 | 38 | 32 | 18 | 19 | 18 | 35 | 47 | 76 | 92 | 54 | 92 |
| 8-Aug | 22 | 21 | 24 | 42 | 29 | 28 | 21 | 23 | 25 | 23 | 98 | 24 | 22 | 24 | 27 | 58 | 59 | 36 | 28 | 25 | 24 | 17 | 23 | 23 | 98 |
| 9-Aug | 20 | 27 | 34 | 32 | 29 | 24 | 18 | 21 | 21 | 23 | 16 | 56 | 94 | 34 | 28 | 39 | 43 | 97 | 51 | 31 | 21 | 70 | 91 | 42 | 97 |
| 10-Aug | 77 | 32 | 52 | 72 | 85 | 76 | 21 | 21 | 24 | 56 | 39 | 37 | 36 | 28 | 25 | 62 | 24 | 26 | 40 | 23 | 99 | 72 | 89 | 19 | 99 |
| 11-Aug | 22 | 24 | 22 | 30 | 31 | 30 | 23 | 12 | 28 | 22 | 20 | 23 | 26 | 31 | 33 | 31 | 33 | 34 | 32 | 31 | 28 | 18 | 16 | 19 | 34 |
| 12-Aug | 19 | 21 | 21 | 26 | 28 | 23 | 18 | 34 | 31 | 29 | 32 | 41 | 37 | 35 | 37 | 39 | 39 | 35 | 34 | 27 | 25 | 28 | 21 | 25 | 41 |
| 13-Aug | 25 | 39 | 40 | 42 | 39 | 19 | 12 | 20 | 28 | 22 | 18 | 27 | 27 | 26 | 28 | 23 | 21 | 26 | 31 | 32 | 33 | 32 | 33 | 28 | 42 |
| 14-Aug | 17 | 11 | 10 | 11 | 17 | 8 | 12 | 30 | 34 | 37 | 47 | 89 | 76 | 39 | 23 | 14 | 13 | 19 | 39 | 26 | 29 | 26 | 34 | 31 | 89 |
| 15-Aug | 29 | 35 | 54 | 31 | 89 | 68 | 76 | 53 | 34 | 40 | 37 | 18 | 18 | 55 | 19 | 22 | 18 | 35 | 28 | 23 | 82 | 46 | 64 | 82 | 89 |
| 16-Aug | 34 | 45 | 30 | 38 | 62 | 97 | 35 | 32 | 21 | 23 | 27 | 65 | 30 | 23 | 25 | 37 | 23 | 14 | 12 | 13 | 17 | 13 | 30 | 58 | 97 |
| 17-Aug | 57 | 37 | 27 | 38 | 26 | 26 | 35 | 46 | 25 | 63 | 15 | 24 | 29 | 28 | 24 | 42 | 22 | 13 | 11 | 71 | 19 | 58 | 18 | 13 | 71 |
| 18-Aug | 36 | 20 | 21 | 23 | 25 | 25 | 36 | 72 | 40 | 19 | 19 | 29 | 17 | 14 | 19 | 33 | 33 | 23 | 28 | 29 | 21 | 17 | 20 | 16 | 72 |
| 19-Aug | 14 | 14 | 12 | 13 | 13 | 13 | 14 | 15 | 15 | 15 | 14 | 12 | 15 | 13 | 15 | 13 | 17 | 16 | 15 | 15 | 17 | 17 | 28 | 17 | 28 |
| 20-Aug | 19 | 13 | 12 | 12 | 13 | 16 | 15 | 14 | 15 | 15 | 14 | 17 | 16 | 20 | 17 | 17 | 13 | 14 | 12 | 11 | 14 | 12 | 13 | 46 | 46 |
| 21-Aug | 46 | 18 | 76 | 19 | 21 | 39 | 32 | 52 | 31 | 20 | 53 | 14 | 17 | 17 | 15 | 17 | 16 | 20 | 18 | 16 | 46 | 29 | 22 | 18 | 76 |
| 22-Aug | 20 | 16 | 41 | 72 | 31 | 66 | 37 | 43 | 42 | 34 | 43 | 30 | 33 | 64 | 51 | 34 | 51 | 18 | 20 | 53 | 80 | 82 | 80 | 43 | 82 |
| 23-Aug | 38 | 62 | 49 | 42 | 37 | 37 | 35 | 23 | 41 | 29 | 33 | 37 | 34 | 32 | 35 | 28 | 26 | 26 | 25 | 21 | 24 | 33 | 31 | 30 | 62 |
| 24-Aug | 42 | 38 | 25 | 30 | 39 | 39 | 53 | 66 | 34 | 17 | 23 | 21 | 22 | 28 | 20 | 15 | 23 | 43 | 52 | 40 | 35 | 39 | 15 | 31 | 66 |
| 25-Aug | 25 | 24 | 27 | 29 | 30 | 29 | 27 | 31 | 31 | 22 | 29 | 31 | 26 | 13 | 14 | 13 | 14 | 14 | 14 | 15 | 54 | 21 | 14 | 18 | 54 |
| 26-Aug | 13 | 13 | 12 | 12 | 12 | 48 | 40 | 25 | 15 | 24 | 36 | 33 | 18 | 15 | 16 | 16 | 19 | 15 | 14 | 14 | 25 | 26 | 23 | 18 | 48 |
| 27-Aug | 15 | 14 | 15 | 13 | 12 | 15 | 17 | 15 | 15 | 14 | 14 | 14 | 14 | 18 | 15 | 15 | 14 | 14 | 13 | 71 | 39 | 47 | 46 | 41 | 71 |
| 28-Aug | 43 | 56 | 66 | 75 | 44 | 72 | 60 | 34 | 82 | 41 | 54 | 17 | 19 | 20 | 19 | 17 | 17 | 15 | 13 | 32 | 29 | 60 | 49 | 55 | 82 |
| 29-Aug | 86 | 87 | 76 | 62 | 48 | 55 | 60 | 26 | 36 | 20 | 21 | 12 | 35 | 54 | 19 | 46 | 53 | 18 | 68 | 24 | 94 | 54 | 53 | 59 | 94 |
| 30-Aug | 31 | 30 | 9 | 14 | 20 | 19 | 18 | 14 | 16 | 16 | 20 | 19 | 19 | 17 | 28 | 22 | 19 | 27 | 31 | 28 | 26 | 23 | 26 | 27 | 31 |
| 31-Aug | 36 | 20 | 32 | 44 | 24 | 26 | 28 | 34 | 42 | 43 | 37 | 35 | 18 | 16 | 15 | 16 | 13 | 14 | 14 | 12 | 12 | 14 | 13 | 12 | 44 |
| 88 87 92 87 90 97 76 85 82 63 98 89 94 73 70 62 59 97 69 71 99 89 92 84 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Lower Camp - August 2017





Wood Buffalo Environmental Association

SO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|----------------|-----------------|--------------|
| Station Name: | Lower Camp | Station number: | AMS 11 |
| Calibration Date: | August 9, 2017 | Last Cal Date: | July 5, 2017 |
| Start time (MST): | 9:14 | End time (MST): | 12:10 |
| Reason: | Routine | | |

Calibration Standards

| | | | | |
|-----------------------|-----------------|-----|------------------|-------------------|
| Cal Gas Concentration | <u>49.5</u> | ppm | Cal Gas Exp Date | February 16, 2019 |
| Cal Gas Cylinder # | <u>LL101792</u> | | | |
| Calibrator Make/Model | Sabio 4010 | | Serial Number | 11051107 |
| ZAG Make/Model | API 701 | | Serial Number | 3411 |

Analyzer Information

Analyzer make: TEI 43i

Analyzer serial #: 100841398

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|----------------------|--------------|---------------|--------------|--------------|---------------|
| Analyzer Range | 0 - 1000 ppb | | PMT voltage | -675.3 | -674.9 |
| Calculated slope | 0.999905 | 0.998699 | Lamp voltage | 794 | 793 |
| Calculated intercept | 0.633925 | 0.451561 | Pressure | 717.2 | 712.0 |
| Analyzer Background | 11.8 | 11.9 | Flow | 0.634 | 0.636 |
| Analyzer Coefficient | 1.034 | 1.049 | Intensity | 90 | 91 |

SO₂ Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|-----------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5002 | 0.0 | 0.0 | 0.0 | ---- |
| as found span | 4916 | 83.8 | 829.7 | 819.9 | 1.012 |
| calibrator zero | 5005 | 0.0 | 0.0 | 0.0 | ---- |
| high point | 4916 | 83.8 | 829.7 | 830.4 | 0.999 |
| second point | 4961 | 42.4 | 419.5 | 419.7 | 1.000 |
| third point | 4980 | 21.2 | 209.8 | 209.0 | 1.004 |
| as left zero | 5004 | 0.0 | 0.0 | 0.1 | ---- |
| as left span | 4915 | 83.8 | 829.8 | 825.1 | 1.006 |

| Average Correction Factor | | | | 1.001 |
|---------------------------|--------|-------------------|--------|----------------|
| Corrected As found | 819.87 | Previous response | 829.10 | *% change 1.1% |

* = > +/-5% change initiates investigation

Notes:

Span adjusted after as founds.

Calibration Performed By:

Aswin Sasi Kumar



Wood Buffalo Environmental Association

SO₂ Calibration Summary

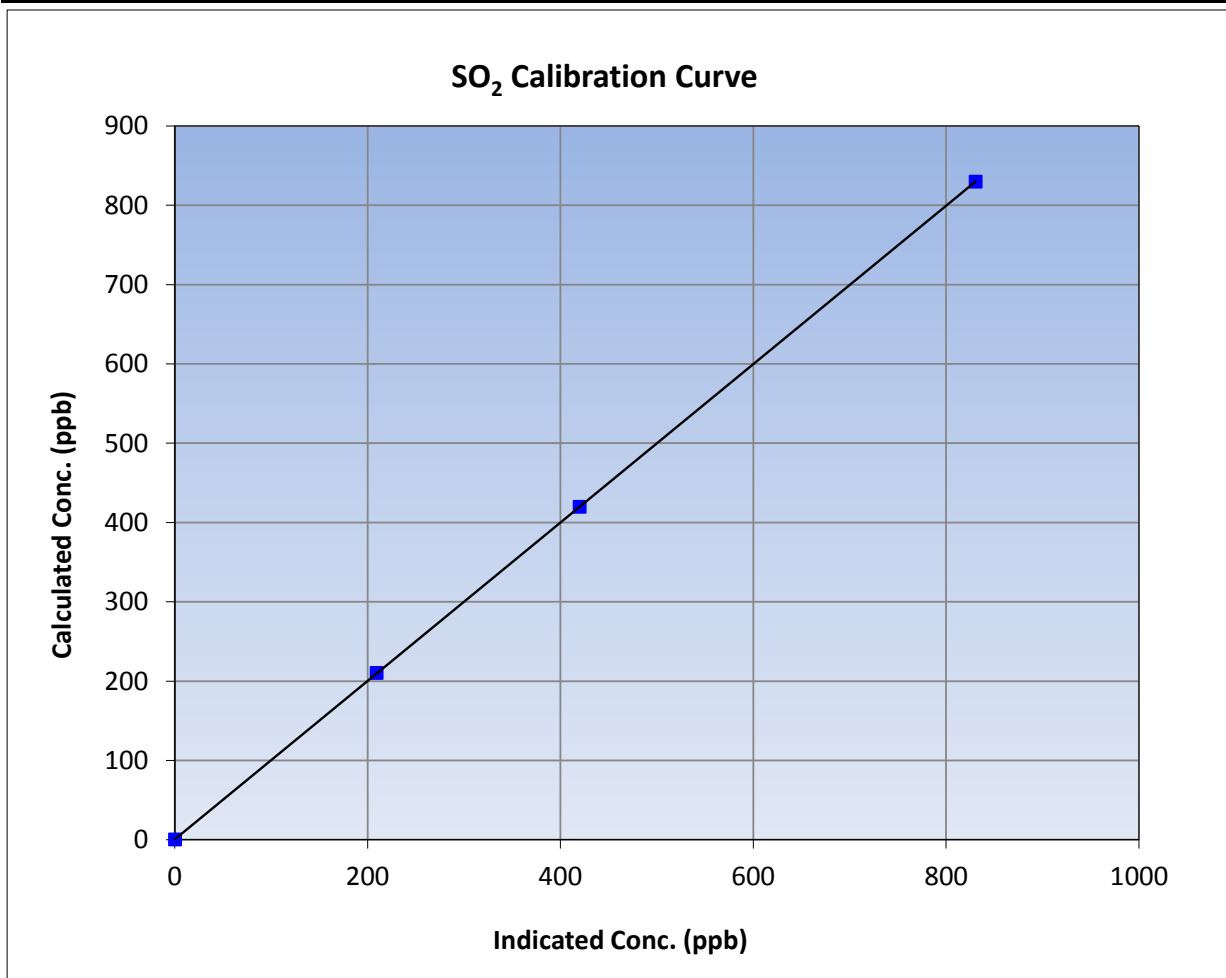
Version-03-2017

Station Information

| | | | |
|------------------|----------------|----------------------|--------------|
| Calibration Date | August 9, 2017 | Previous Calibration | July 5, 2017 |
| Station Name | Lower Camp | Station Number | AMS 11 |
| Start Time (MST) | 9:14 | End Time (MST) | 12:10 |
| Analyzer make | TEI 43i | Analyzer serial # | 100841398 |

Calibration Data

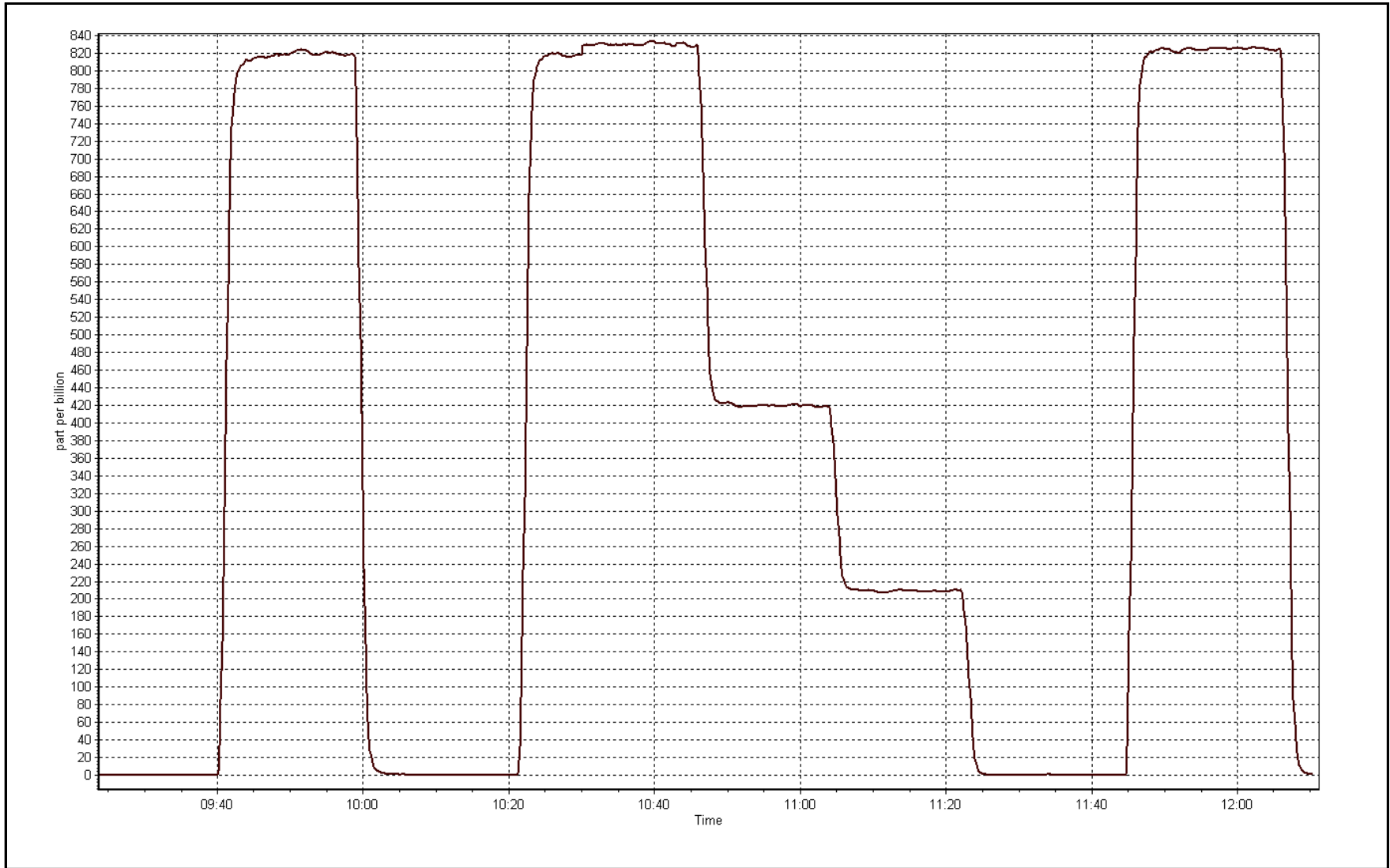
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | 0.999998 | ≥0.995 |
| 829.7 | 830.4 | 0.9991 | | | |
| 419.5 | 419.7 | 0.9996 | Slope | 0.998699 | 0.90 - 1.10 |
| 209.8 | 209.0 | 1.0040 | | | |
| | | | Intercept | 0.451561 | +/-30 |



SO2 Calibration Plot

Date: August 9, 2017

Location: Lower Camp





Wood Buffalo Environmental Association

H₂S Calibration Report

Version-06-2017

Station Information

Station Name: Lower Camp Station number: AMS 11
 Calibration Date: August 8, 2017 Last Cal Date: July 4, 2017
 Start time (MST): 9:38 End time (MST): 12:21
 Reason: Routine

Calibration Standards

Cal Gas Concentration 5.15 ppm Cal Gas Exp Date September 9, 2017
 Cal Gas Cylinder # ALM061435
 Calibrator Make/Model Sabio 4010 Serial Number 11051107
 ZAG Make/Model API 701 Serial Number 3411

Analyzer Information

Analyzer make: Thermo 450i Analyzer serial #: 1410661328

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|----------------------|--------------|---------------|--------------|--------------|---------------|
| Analyzer Range | 0 - 100 ppb | | PMT voltage | -660 | -660 |
| Calculated slope | 1.000728 | 0.995389 | Lamp voltage | 834 | 835 |
| Calculated intercept | 0.319948 | -0.156271 | Pressure | 537.0 | 532.5 |
| Analyzer Background | 12.8 | 11.6 | Flow | 0.978 | 0.969 |
| Analyzer Coefficient | 1.186 | 1.186 | Intensity | 108 | 107 |

H₂S Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|-----------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5002 | 0.0 | 0.0 | -0.6 | ---- |
| as found span | 4927 | 72.8 | 75.0 | 75.4 | 0.994 |
| calibrator zero | 5002 | 0.0 | 0.0 | 0.1 | ---- |
| high point | 4927 | 72.8 | 75.0 | 75.4 | 0.995 |
| second point | 4961 | 38.8 | 40.0 | 40.5 | 0.988 |
| third point | 4980 | 19.4 | 20.0 | 20.3 | 0.987 |
| as left zero | 4994 | 0.0 | 0.0 | 0.3 | ---- |
| as left span | 4929 | 72.8 | 75.0 | 75.8 | 0.989 |

SO₂ Scrubber Check

| | | | Average Correction Factor | 0.990 |
|--------------------|-------|-------------------|---------------------------|----------------|
| Corrected As found | 76.00 | Previous response | 74.61 | % change -1.8% |

* = > +/-5% change initiates investigation

Notes: Zero adjusted slightly.

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association

H₂S Calibration Summary

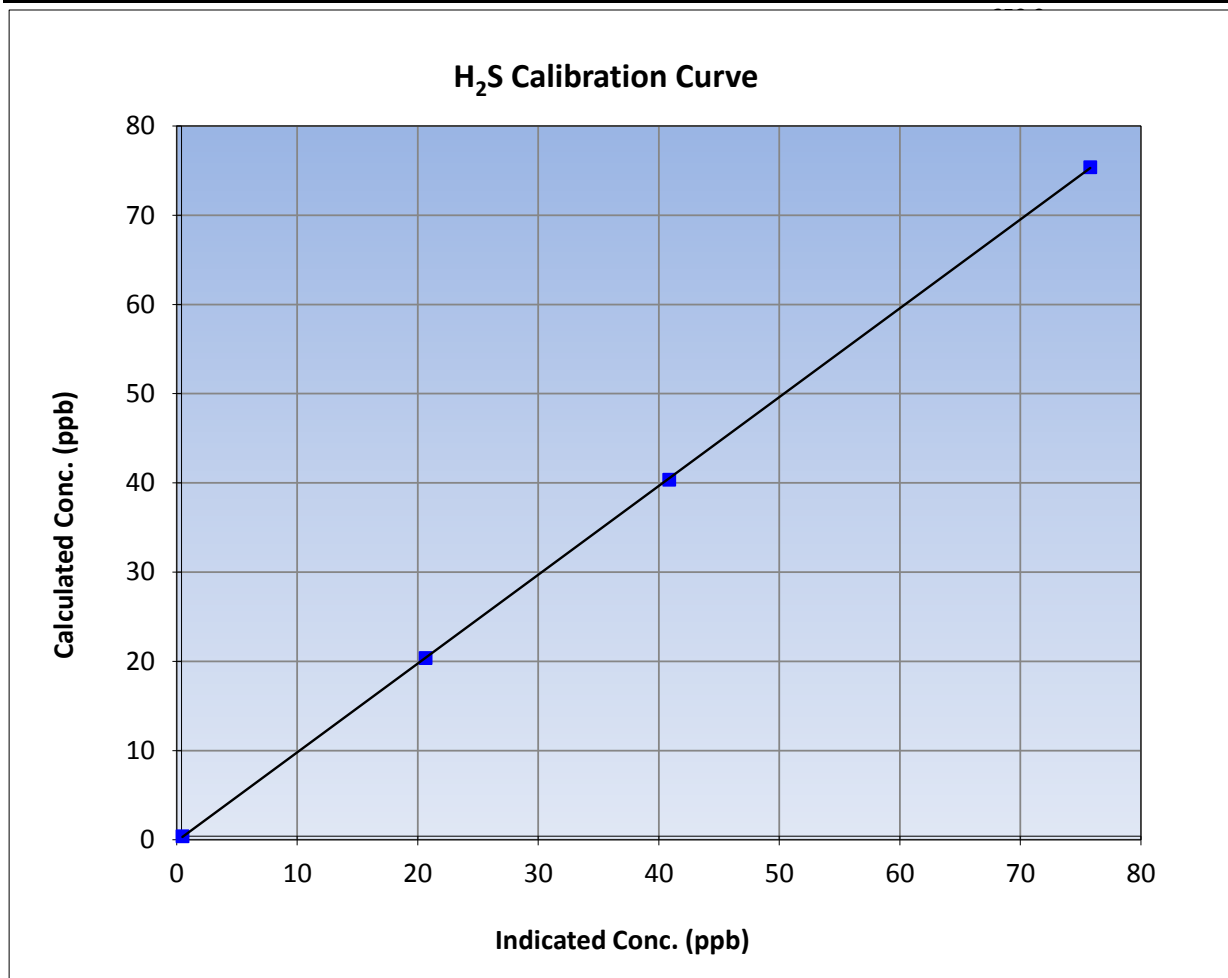
Version-03-2017

Station Information

| | | | |
|------------------|----------------|----------------------|--------------|
| Calibration Date | August 8, 2017 | Previous Calibration | July 4, 2017 |
| Station Name | Lower Camp | Station Number | AMS 11 |
| Start Time (MST) | 9:38 | End Time (MST) | 12:21 |
| Analyzer make | Thermo 450i | Analyzer serial # | 1410661328 |

Calibration Data

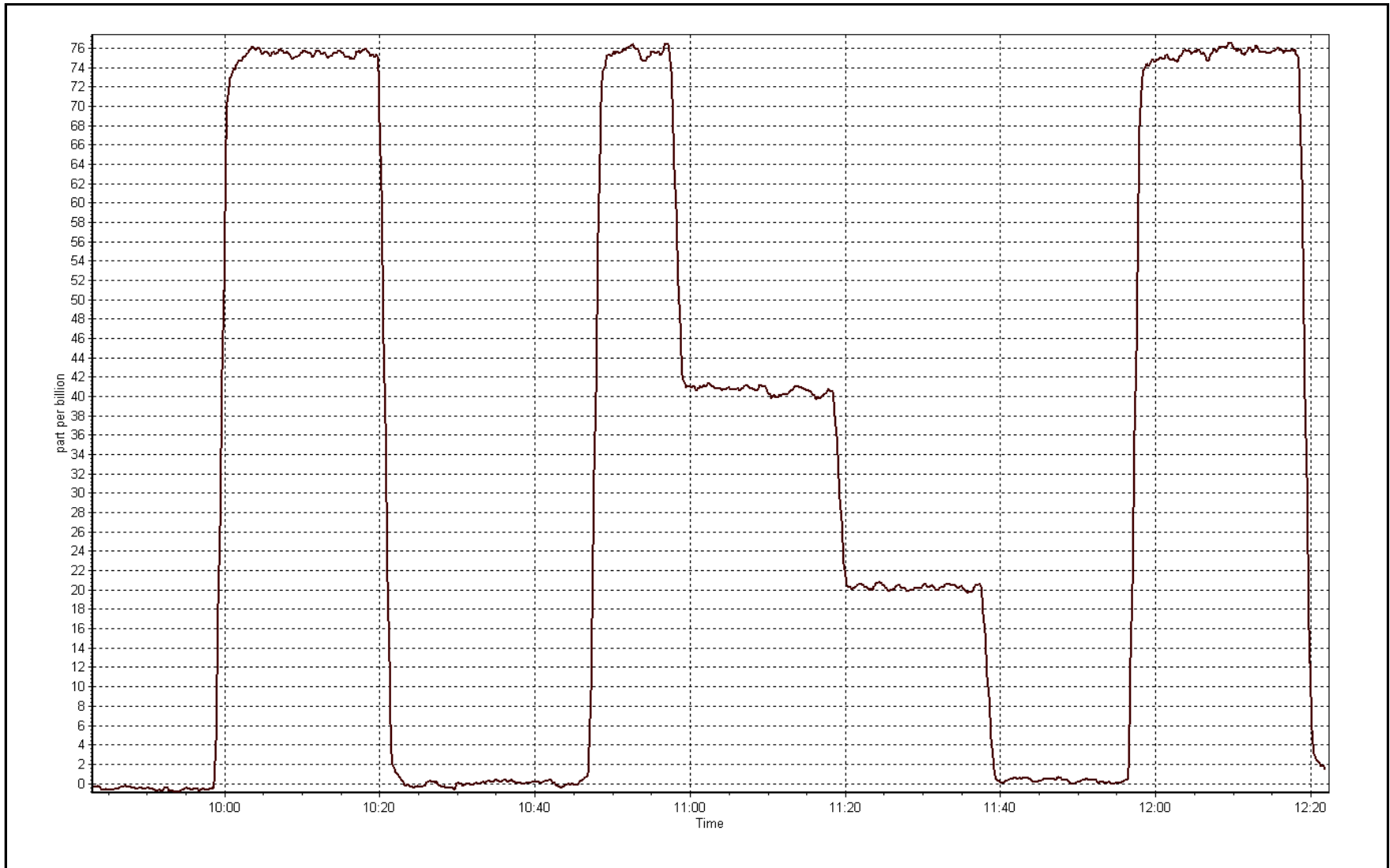
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|-------------|
| 0.0 | 0.1 | ---- | Correlation Coefficient | 0.999986 | ≥0.995 |
| 75.0 | 75.4 | 0.9945 | | | |
| 40.0 | 40.5 | 0.9875 | Slope | 0.995389 | 0.90 - 1.10 |
| 20.0 | 20.3 | 0.9869 | | | |
| | | | Intercept | -0.156271 | +/-3 |



H₂S Calibration Plot

Date: August 8, 2017

Location: Lower Camp





Wood Buffalo Environmental Association

THC Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|----------------|-----------------|---------------|
| Station Name: | Lower Camp | Station number: | AMS 11 |
| Calibration Date: | August 9, 2017 | Last Cal Date: | July 10, 2017 |
| Start time (MST): | 9:14 | End time (MST): | 12:10 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|-----------------------|------------------|---------------------|-------------------|
| Gas Cert Reference | LL101792 | Cal Gas Expiry Date | February 16, 2019 |
| CH4 Cal Gas Conc. | <u>493.0</u> ppm | CH4 Equiv Conc. | 1043.0 ppm |
| C3H8 Cal Gas Conc. | <u>200.0</u> ppm | Station temp. | 22 Deg C |
| Calibrator Make/Model | Sabio 4010 | Serial Number | 11051107 |
| ZAG Make/Model | API 701 | Serial Number | 3411 |

Analyzer Information

| | | | |
|----------------------|--------------|---------------------|--------------|
| Analyzer make: | 51-i-LT | Analyzer serial #: | 1218153353 |
| | <u>Start</u> | <u>Finish</u> | <u>Start</u> |
| Analyzer Range | 0 - 25 ppm | Bias voltage supply | -297.2 |
| Calculated slope | 1.003348 | Sample pressure | 7.8 |
| Calculated intercept | -0.068052 | Fuel pressure | 25.1 |
| Analyzer Background | 3.410 | Air pressure | 40.3 |
| Analyzer Coefficient | 4.403 | Flame temperature | 166.7 |
| | 4.444 | | 167.5 |

THC Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5002 | 0.0 | 0.00 | -0.17 | ---- |
| as found span | 4916 | 83.8 | 17.48 | 17.35 | 1.008 |
| calibrator zero | 5002 | 0.0 | 0.00 | -0.01 | ---- |
| high point | 4916 | 83.8 | 17.48 | 17.51 | 0.998 |
| second point | 4961 | 42.4 | 8.84 | 8.89 | 0.994 |
| third point | 4980 | 21.2 | 4.42 | 4.49 | 0.985 |
| as left zero | 5004 | 0.0 | 0.00 | 0.12 | ---- |
| as left span | 4915 | 83.8 | 17.48 | 17.75 | 0.985 |
| Average Correction Factor | | | | | 0.992 |
| Corrected As found | 17.52 | Previous response | 17.49 | *% change | -0.2% |

* = > +/-5% change initiates investigation

Notes: Zero and span adjusted after as founds.

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association

THC Calibration Summary

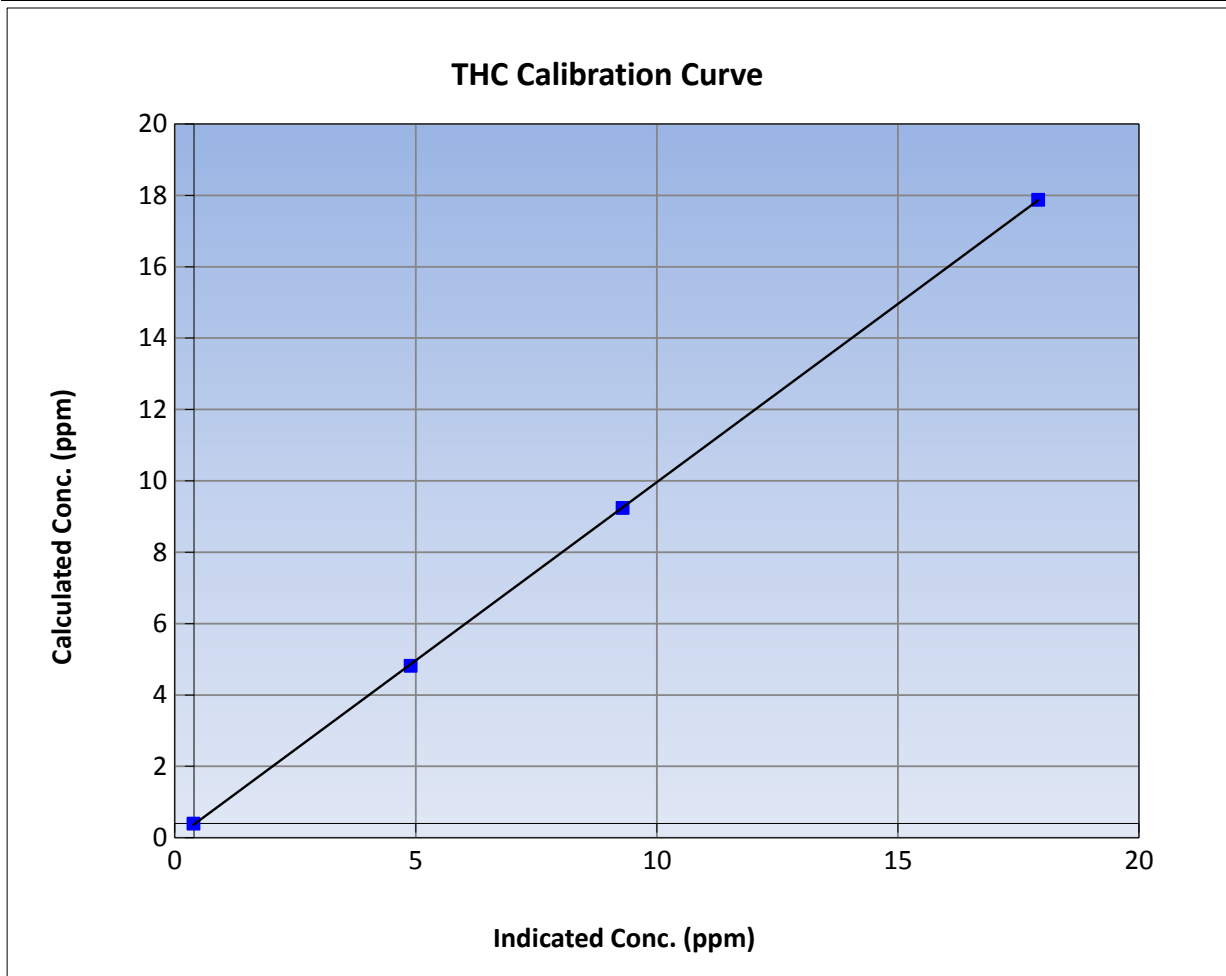
Version-03-2017

Station Information

| | | | |
|------------------|----------------|----------------------|---------------|
| Calibration Date | August 9, 2017 | Previous Calibration | July 10, 2017 |
| Station Name | Lower Camp | Station Number | AMS 11 |
| Start Time (MST) | 8:58 | End Time (MST) | 12:10 |
| Analyzer make | 51-i-LT | Analyzer serial # | 1218153353 |

Calibration Data

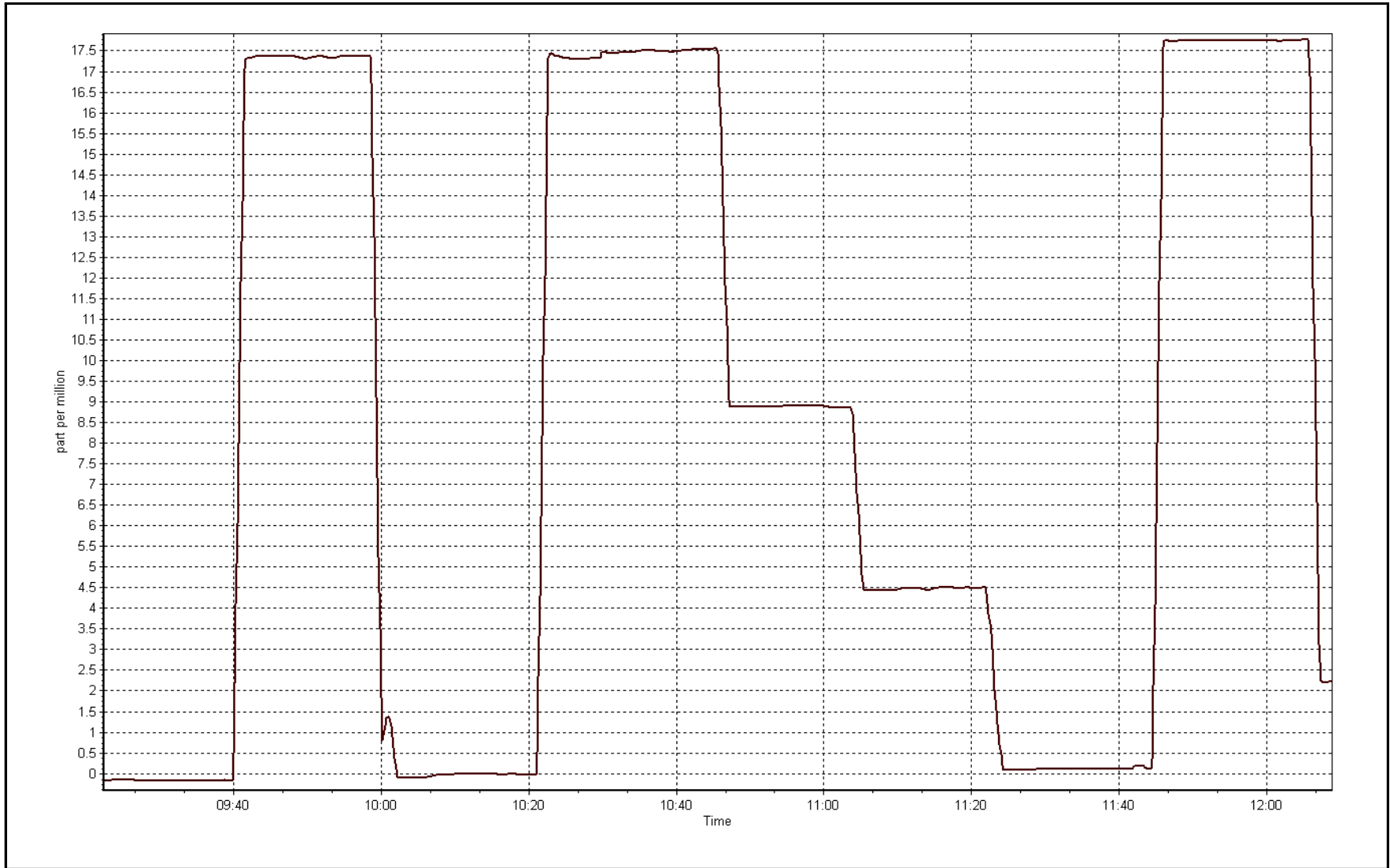
| Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (lc) | Correction factor (Cc/lc) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | 0.999981 | ≥0.995 |
| 17.5 | 17.5 | 0.9984 | | | |
| 8.8 | 8.9 | 0.9942 | Slope | 0.998832 | 0.90 - 1.10 |
| 4.4 | 4.5 | 0.9847 | | | |
| | | | Intercept | -0.025664 | +/-1.5 |



THC Calibration Plot

Date: August 9, 2017

Location: Lower Camp





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 13
FORT MCKAY SOUTH
AUGUST 2017**

Operations, Data Collection,
QA/QC, Data Validation and Reporting by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

September 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)
AUGUST 2017

MONTHLY SUMMARY for
AMD SECTION III.B.1(c)

| Parameter | Hours of Data | Hours of Calibration | Hours without Data | Operational Time | Maximum 1-Hour Value | 1-Hour Exceedances | Maximum 24-Hour Value | 24-Hour Exceedances |
|----------------------|---------------|----------------------|--------------------|------------------|----------------------|--------------------|-----------------------|---------------------|
| SO2(ppb) Average | 708 | 36 | 36 | 100 | 24 | 0 | 3 | 0 |
| TRS(ppb) Average | 709 | 34 | 35 | 99.87 | 3 | 0 | 1 | 0 |
| THC(ppm) Average | 708 | 36 | 36 | 100 | 3.7 | - | 2.5 | - |
| O3(ppb) Average | 708 | 35 | 36 | 99.87 | 55 | 0 | 40 | - |
| NO2(ppb) Average | 640 | 38 | 104 | 91.13 | 20 | 0 | 5 | - |
| NO(ppb) Average | 640 | 38 | 104 | 91.13 | 23 | - | 3 | - |
| NOX(ppb) Average | 640 | 38 | 104 | 91.13 | 38 | - | 9 | - |
| PM2.5(ug/m3) Average | 740 | 1 | 4 | 99.6 | 104.2 | - | 24.8 | 0 |
| ET(C) Average | 744 | 0 | 0 | 100 | 31.7 | - | 23.5 | - |
| RH(%) Average | 744 | 0 | 0 | 100 | 98 | - | 89 | - |
| WS(km/h) Average | 743 | 1 | 1 | 100 | 27 | - | 15 | - |
| WD(deg) Average | 743 | 1 | 1 | 100 | - | - | - | - |

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)
AUGUST 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

| Parameter | Number | Mean | StnDev | Total | Percentile | | | | | | |
|-----------------------------------|--------|-------|--------|-------|------------|-----|-----|--------|------|------|-------|
| | | | | | Min | P10 | Q1 | Median | Q3 | P90 | Max |
| SO2(ppb) Average | 708 | 1 | 2 | - | 0 | 0 | 0 | 0 | 0 | 2 | 24 |
| TRS(ppb) Average | 709 | 0.3 | 0 | - | 0 | 0 | 0 | 0 | 0 | 1 | 3 |
| THC(ppm) Average | 708 | 2.26 | 0.2 | - | 2 | 2.1 | 2.1 | 2.2 | 2.3 | 2.6 | 3.7 |
| O3(ppb) Average | 708 | 20.5 | 13 | - | 1 | 4 | 11 | 19 | 29 | 38 | 55 |
| NO2(ppb) Average | 640 | 2.8 | 3 | - | 0 | 0 | 0 | 2 | 4 | 7 | 20 |
| NO(ppb) Average | 640 | 1 | 3 | - | 0 | 0 | 0 | 0 | 1 | 3 | 23 |
| NOX(ppb) Average | 640 | 3.8 | 5 | - | 0 | 0 | 0 | 2 | 5 | 10 | 38 |
| PM2.5(ug/m3) Average | 740 | 7.75 | 8 | - | 0.2 | 1.7 | 3.1 | 6 | 10 | 15.6 | 104.2 |
| Temperature 2 m (C) Average | 744 | 17.51 | 6.1 | - | 1.8 | 10 | 13 | 17 | 22.5 | 25.8 | 31.7 |
| Relative Humidity (%) Average | 744 | 63.3 | 22 | - | 23 | 31 | 44 | 66 | 82 | 91 | 98 |
| Wind Speed 10 m (km/h) Average | 743 | 7.7 | 5 | - | 0 | 2 | 4 | 7 | 11 | 14 | 27 |
| Wind Direction 10 m (deg) Average | 743 | - | - | - | - | - | - | - | - | - | - |

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -FORT McKAY SOUTH (AMS 13)
AUGUST 2017

OPERATIONAL NOTES

| Parameter | Period Start | Period End | Duration (Hours) | Notes |
|--------------|-------------------|-------------------|------------------|--|
| TRS, O3 | 02 Aug 2017 08:00 | 02 Aug 2017 08:00 | 1 | Maintenance - cleaned glass manifold |
| NO2, NO, NOX | 05 Aug 2017 03:00 | 06 Aug 2017 10:00 | 32 | Analyzer Failure - sample pump failure |
| NO2, NO, NOX | 06 Aug 2017 11:00 | 06 Aug 2017 14:00 | 4 | Maintenance - pump replacement and recalibration |
| NO2, NO, NOX | 07 Aug 2017 05:00 | 08 Aug 2017 10:00 | 30 | Analyzer Failure - sample pump failure |
| PM2.5 | 02 Aug 2017 13:00 | 02 Aug 2017 13:00 | 1 | Unstable operation - baseline drift |
| PM2.5 | 08 Aug 2017 13:00 | 08 Aug 2017 13:00 | 1 | Unstable operation - baseline drift |
| PM2.5 | 16 Aug 2017 13:00 | 16 Aug 2017 13:00 | 1 | Unstable operation - baseline drift |



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - August 2017

| | | | | |
|---|---|----------|---------------------------|-------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 24 ppb on Aug 5 12:00 | Maximum Daily Average: 3.4 ppb on Aug 5 | | Hours of Data: | 708 |
| Minimum Value: 0 ppb on Aug 2 13:00 | Minimum Daily Average: 0.0 ppb on Aug 6 | | Hours of Missing Data: | 36 |
| Maximum Diurnal Average: 2.9 ppb at hour 10 | Minimum Diurnal Average: 0.2 ppb at hour 6 | | Hours of Calibration: | 36 |
| Monthly Average: 1.0 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 O ₃ = 0 P ₉₀ = 2 P ₉₉ = 13 | | Percent Operational Time: | 100.0 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 2-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | C | C | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 2 | 9 | 5 | 7 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1.4 | 9 |
| 4-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 5-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 8 | 12 | 24 | 17 | 1 | 3 | 1 | 5 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 3.4 | 24 |
| 6-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 7-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 8-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 9-Aug | 0 | 0 | 0 | 0 | 0 | Z | 1 | 0 | 1 | 1 | 3 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 6 |
| 10-Aug | Z | 0 | 1 | 3 | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0.8 | 3 |
| 11-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 1 | 0 | 4 | 7 | 8 | 16 | 7 | 4 | 1 | 2 | 1 | 1 | 1 | 0 | 2.6 | 16 |
| 12-Aug | 0 | 0 | Z | 0 | 0 | 0 | 1 | 2 | 3 | 8 | 3 | 5 | 1 | 7 | 6 | 3 | 1 | 2 | 1 | 0 | 0 | 0 | 1 | 1 | 2.0 | 8 |
| 13-Aug | 0 | 1 | 1 | Z | 1 | 0 | 1 | 5 | 8 | 9 | 8 | 2 | 2 | 2 | 1 | 2 | 1 | 2 | 2 | 1 | 0 | 0 | 2 | 4 | 2.4 | 9 |
| 14-Aug | 2 | 0 | 0 | 0 | Z | 0 | 0 | 2 | 7 | 15 | 11 | 3 | 10 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.6 | 15 |
| 15-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 1 | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0.7 | 3 |
| 16-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 17-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 18-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 19-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 20-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 22-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 23-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 13 | 7 | 2 | 0 | 3 | 2 | 1 | 1 | 1 | 2 | 5 | 9 | 4 | 2 | 1 | 2.6 | 13 |
| 24-Aug | 3 | 3 | Z | 7 | 3 | 1 | 0 | 1 | 1 | 8 | 3 | 6 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.8 | 8 |
| 25-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 26-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 28-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 29-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 10 | 6 | 2 | 1 | 1 | 4 | 15 | 14 | 2 | 1 | 0 | 0 | 0 | 2.6 | 15 |
| 30-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 4 | 11 | 15 | 3 | 7 | 4 | 1 | 1 | 3 | 5 | 1 | 2 | 1 | 1 | 1 | 0 | 2.7 | 15 |
| 31-Aug | 0 | 0 | 0 | Z | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 2 |

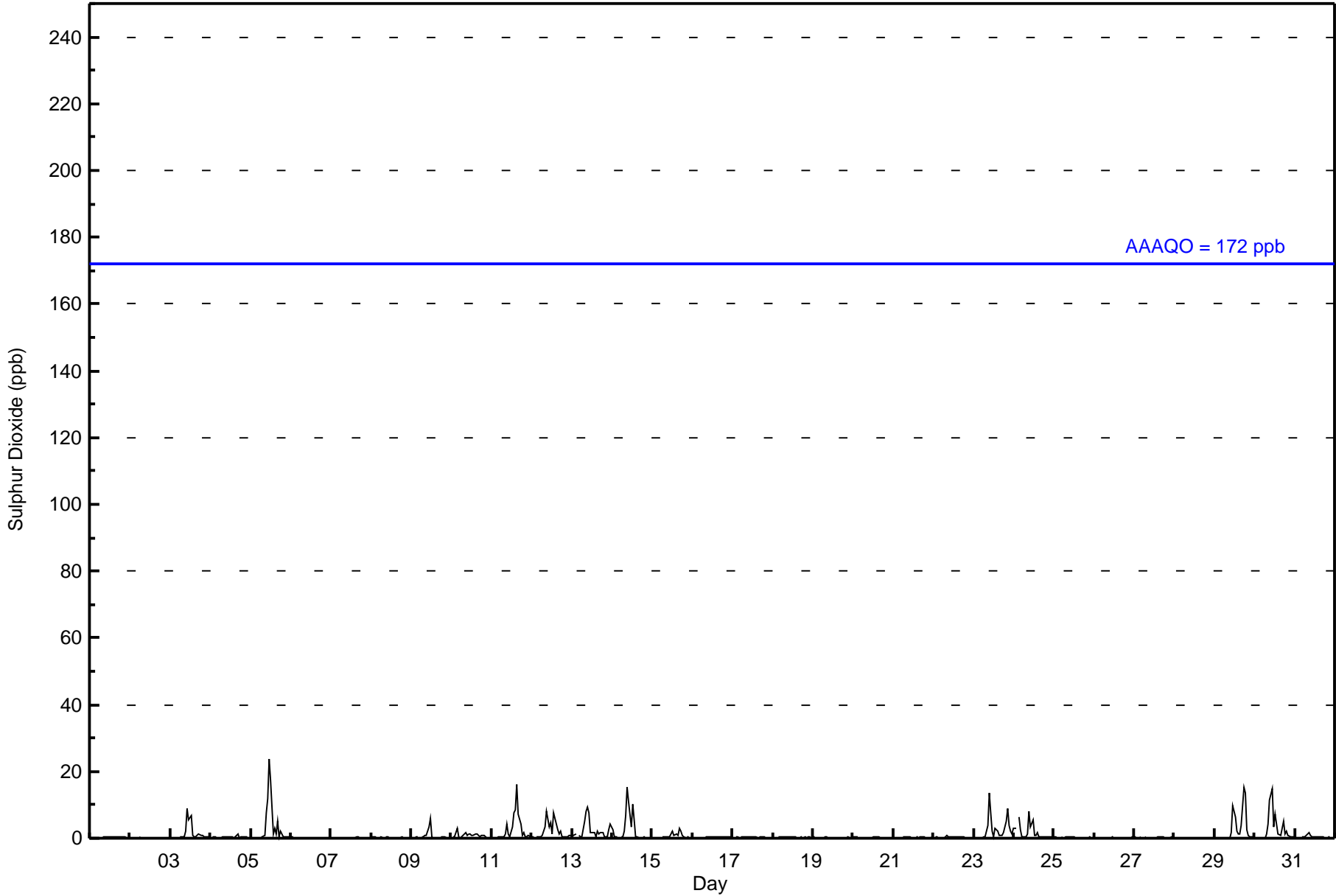
| | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|
| 0.4 | 0.3 | 0.2 | 0.5 | 0.3 | 0.2 | 0.3 | 0.6 | 1.3 | 2.9 | 2.7 | 2.4 | 2.0 | 1.3 | 1.0 | 1.0 | 1.0 | 1.2 | 0.9 | 0.6 | 0.5 | 0.3 | 0.4 | 0.4 | Diurnal Average |
| 3 | 3 | 1 | 7 | 3 | 1 | 1 | 5 | 8 | 15 | 15 | 24 | 17 | 7 | 8 | 16 | 7 | 15 | 14 | 5 | 9 | 4 | 2 | 4 | Diurnal Maximum |

Z - zerospan C - Calibration
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 10 | 697 | 98.45 | 98.45 |
| 11 - 20 | 10 | 1.41 | 99.86 |
| 21 - 60 | 1 | 0.14 | 100.00 |
| 61 - 110 | 0 | 0.00 | 100.00 |
| 111 - 172 | 0 | 0.00 | 100.00 |
| > 172 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Fort McKay South - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|---|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 10 | 36 | 24 | 11 | 7 | 7 | 8 | 20 | 67 | 108 | 126 | 96 | 65 | 42 | 35 | 23 | 21 | 696 |
| 11 - 20 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| 21 - 60 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 61 - 110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 111 - 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 36 | 24 | 11 | 7 | 7 | 9 | 23 | 73 | 109 | 126 | 96 | 65 | 42 | 35 | 23 | 21 | 707 |

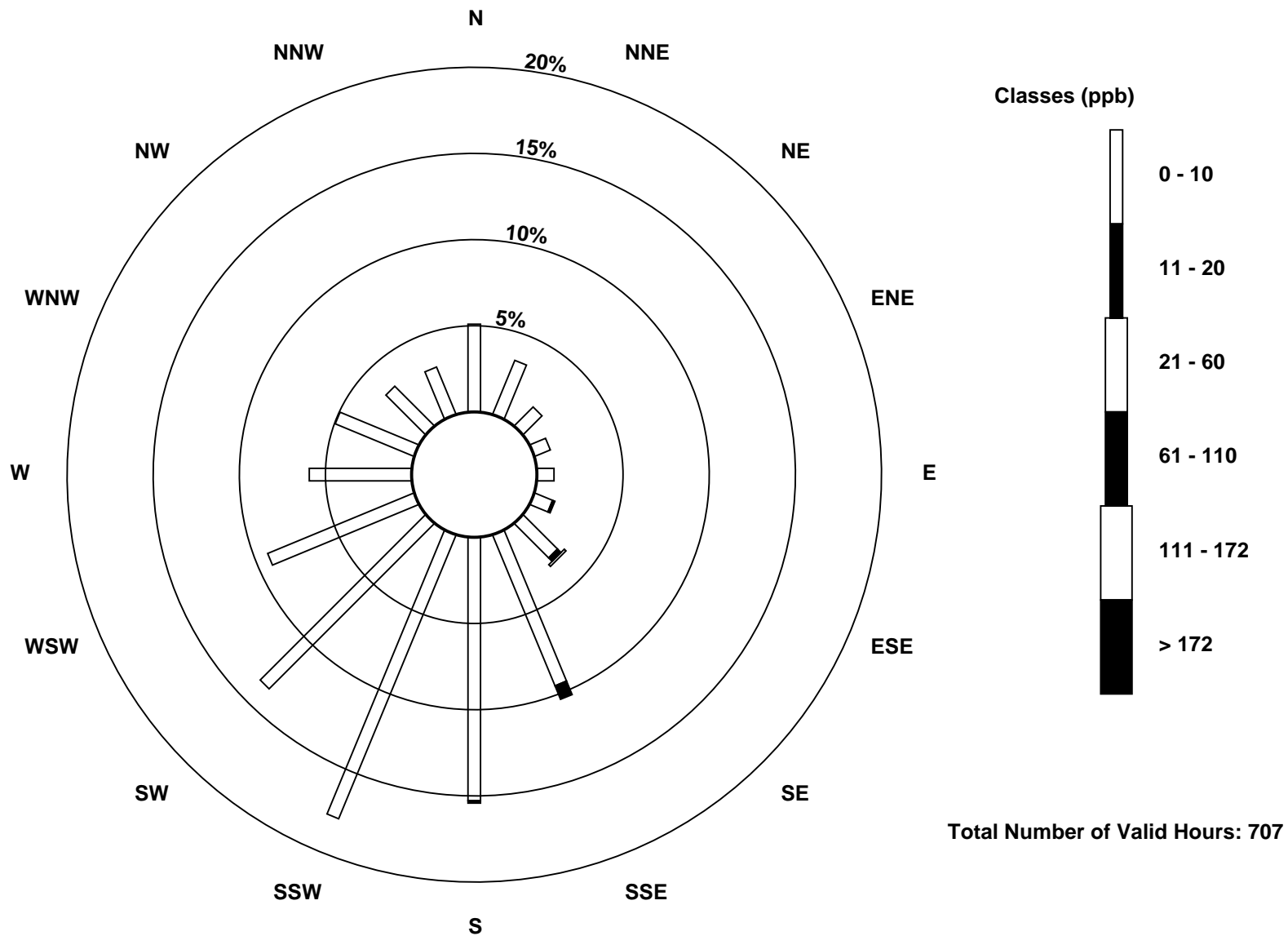
Total Number of Valid Hours: 707

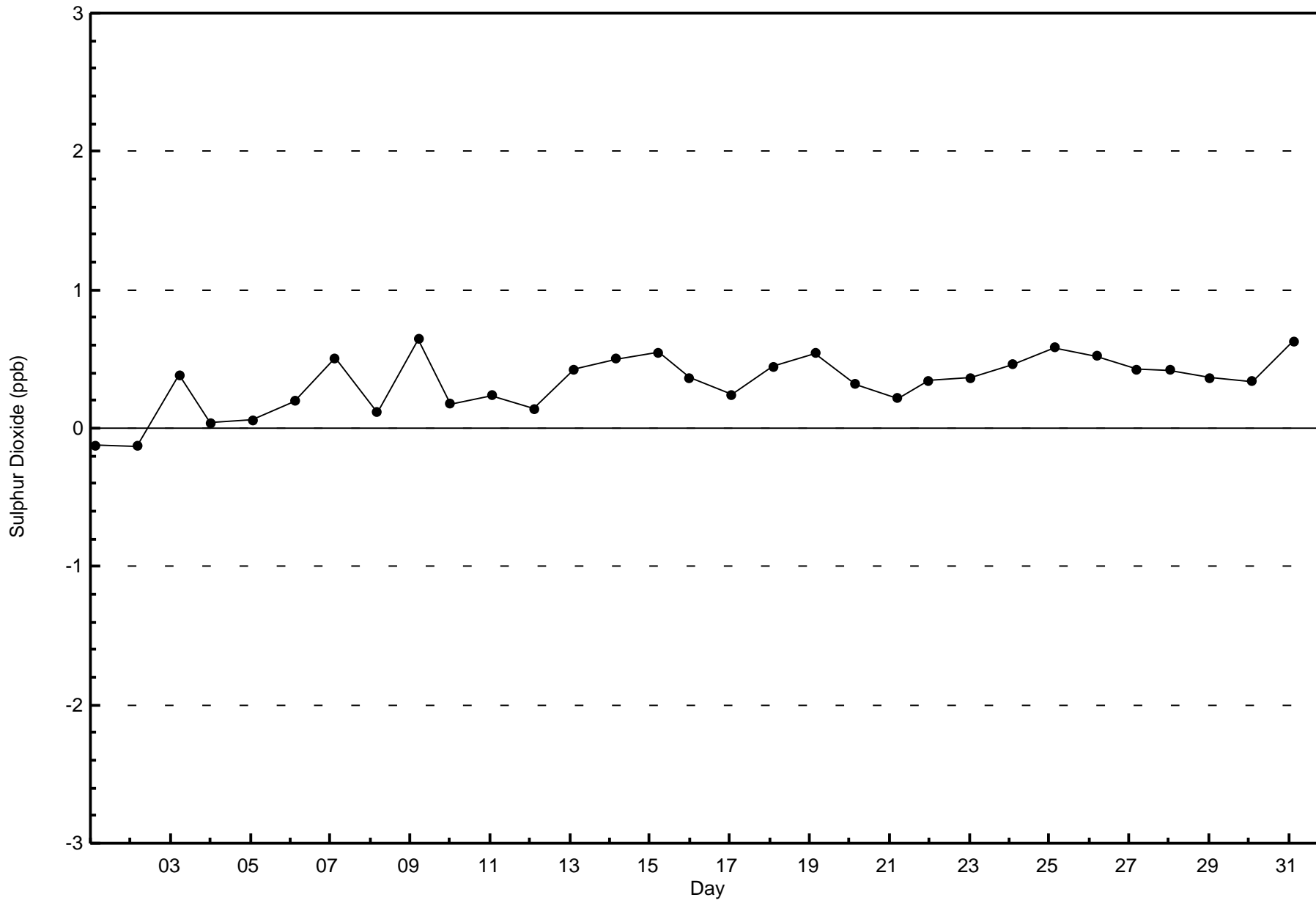
Total Number of Hours: 744

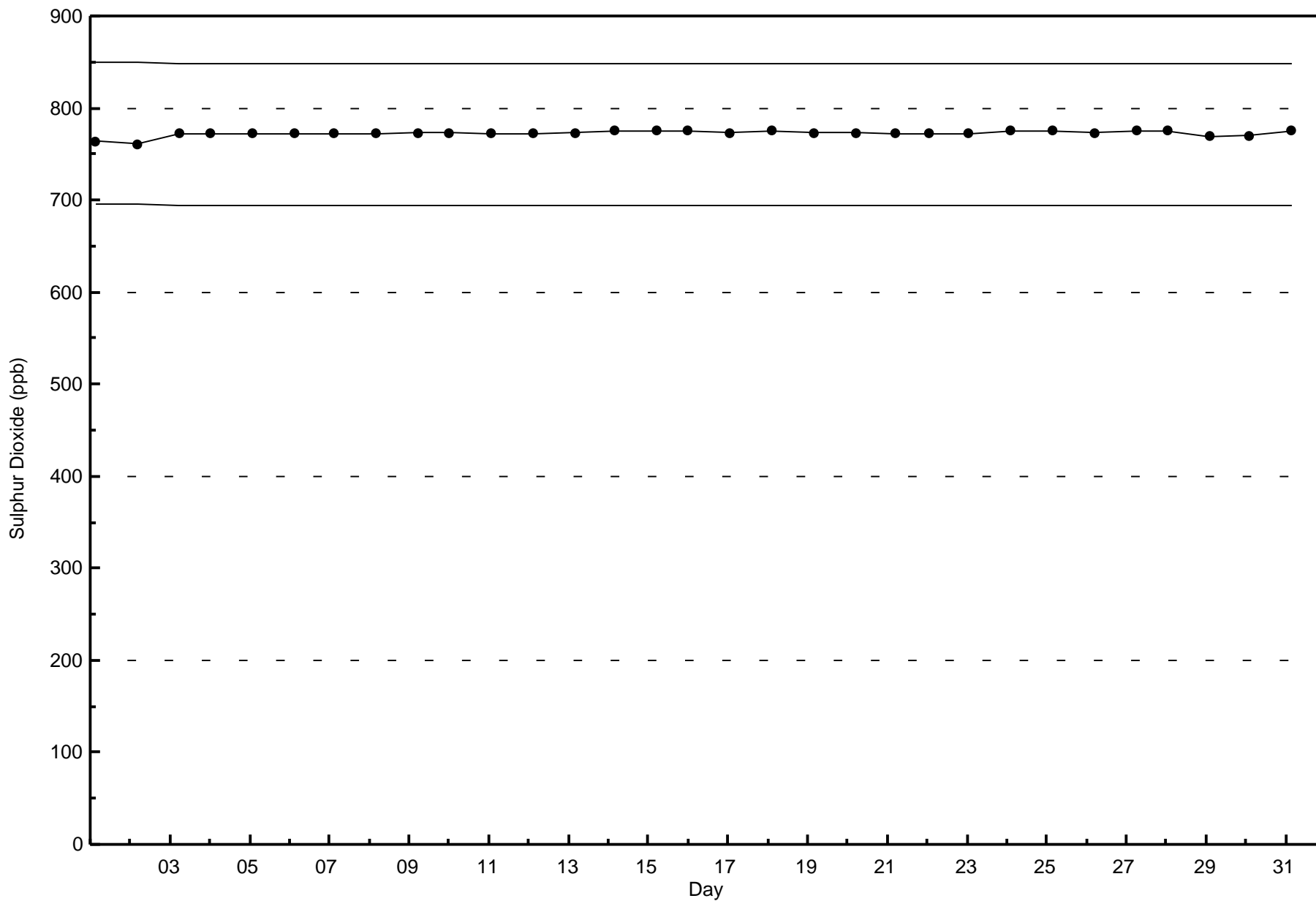


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Sulphur Dioxide (SO₂) - ppb
Fort McKay South (AMS 13)









Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

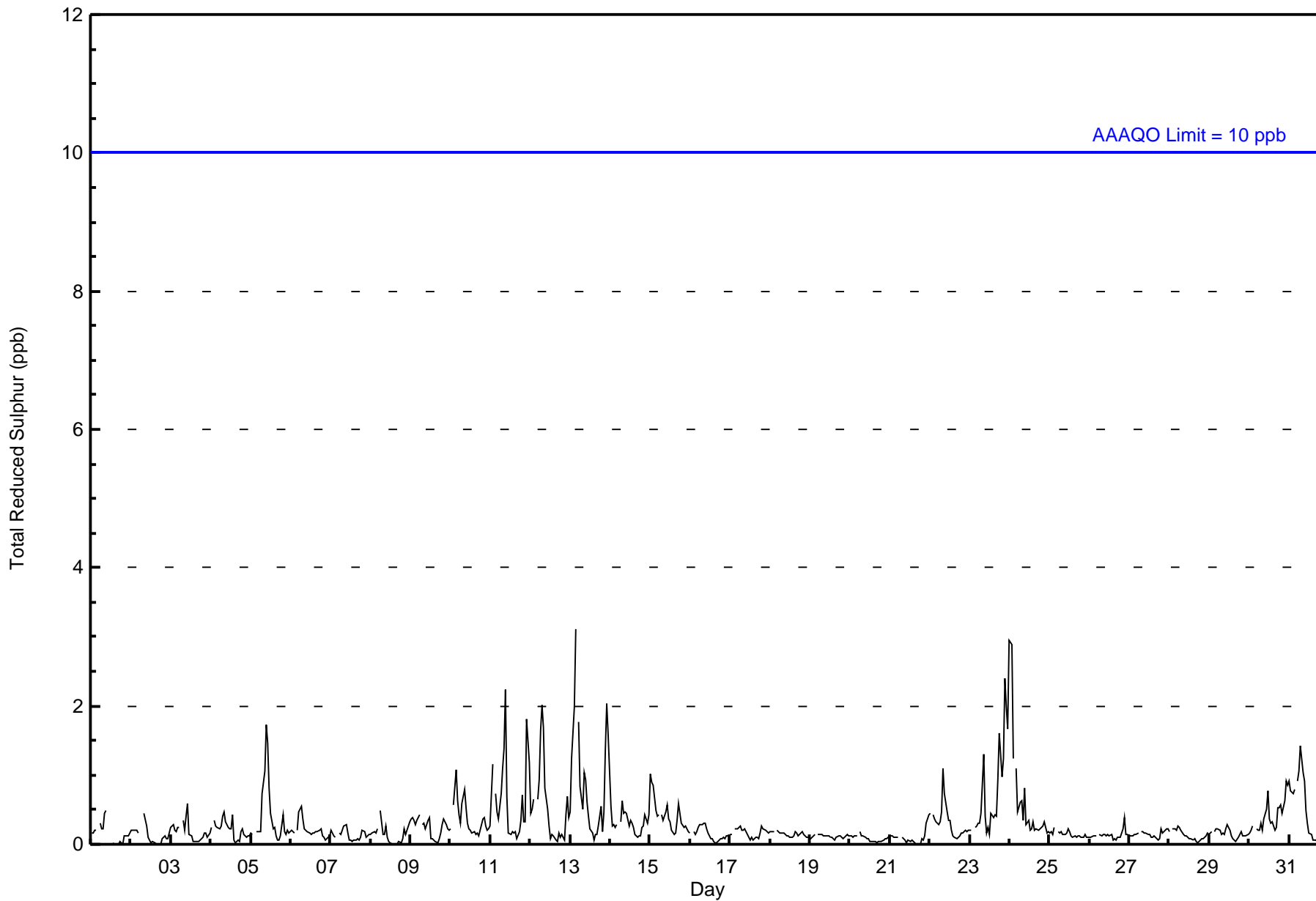
Fort McKay South - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | Daily Average | | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|---|---|---|---|---|---|---|---|--|----|----|----|----|----|----|----|----|----|--------------------------------|----|---------------|----|-----|---------------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|
| Maximum Value: 3 ppb on Aug 13 04:00 | | | | | | | | | | Maximum Daily Average: 0.9 ppb on Aug 13 | | | | | | | | | | Hours of Data: 709 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum Value: 0 ppb on Aug 1 20:00 | | | | | | | | | | Minimum Daily Average: 0.1 ppb on Aug 20 | | | | | | | | | | Hours of Missing Data: 35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 0.5 ppb at hour 9 | | | | | | | | | | Minimum Diurnal Average: 0.1 ppb at hour 17 | | | | | | | | | | Hours of Calibration: 34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 0.3 ppb | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 2 | | | | | | | | | | Percent Operational Time: 99.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 2 | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 0 | 0 | 0 | Z | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 0 | Z | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 0 | 1 | Z | 1 | 0 | 0 | 1 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 0.6 | 2 | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 0 | 1 | 1 | Z | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0.5 | 2 | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 0 | 1 | 2 | 3 | Z | 2 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 | 2 | 0.9 | 3 | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 1 | 0 | 0 | 0 | 0 | Z | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 1 | 1 | 1 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 2 | 2 | 0.7 | 2 | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 3 | 3 | 1 | Z | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 3 | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 1 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.3 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.3 | 0.4 | 0.3 | Diurnal Average |
| | | | | | | | | | | | | | | | | | | | | | | | | 3 | 3 | 2 | 3 | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | Diurnal Maximum |
| Z - zerospan C - Calibration M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Fort McKay South - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2 | 706 | 99.58 | 99.58 |
| 3 - 4 | 3 | 0.42 | 100.00 |
| 5 - 7 | 0 | 0.00 | 100.00 |
| 8 - 11 | 0 | 0.00 | 100.00 |
| > 11 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Fort McKay South - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|---|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2 | 35 | 21 | 11 | 7 | 7 | 9 | 23 | 73 | 106 | 126 | 96 | 70 | 39 | 34 | 25 | 23 | 705 |
| 3 - 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 5 - 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 - 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 35 | 21 | 11 | 7 | 7 | 9 | 23 | 73 | 108 | 127 | 96 | 70 | 39 | 34 | 25 | 23 | 708 |

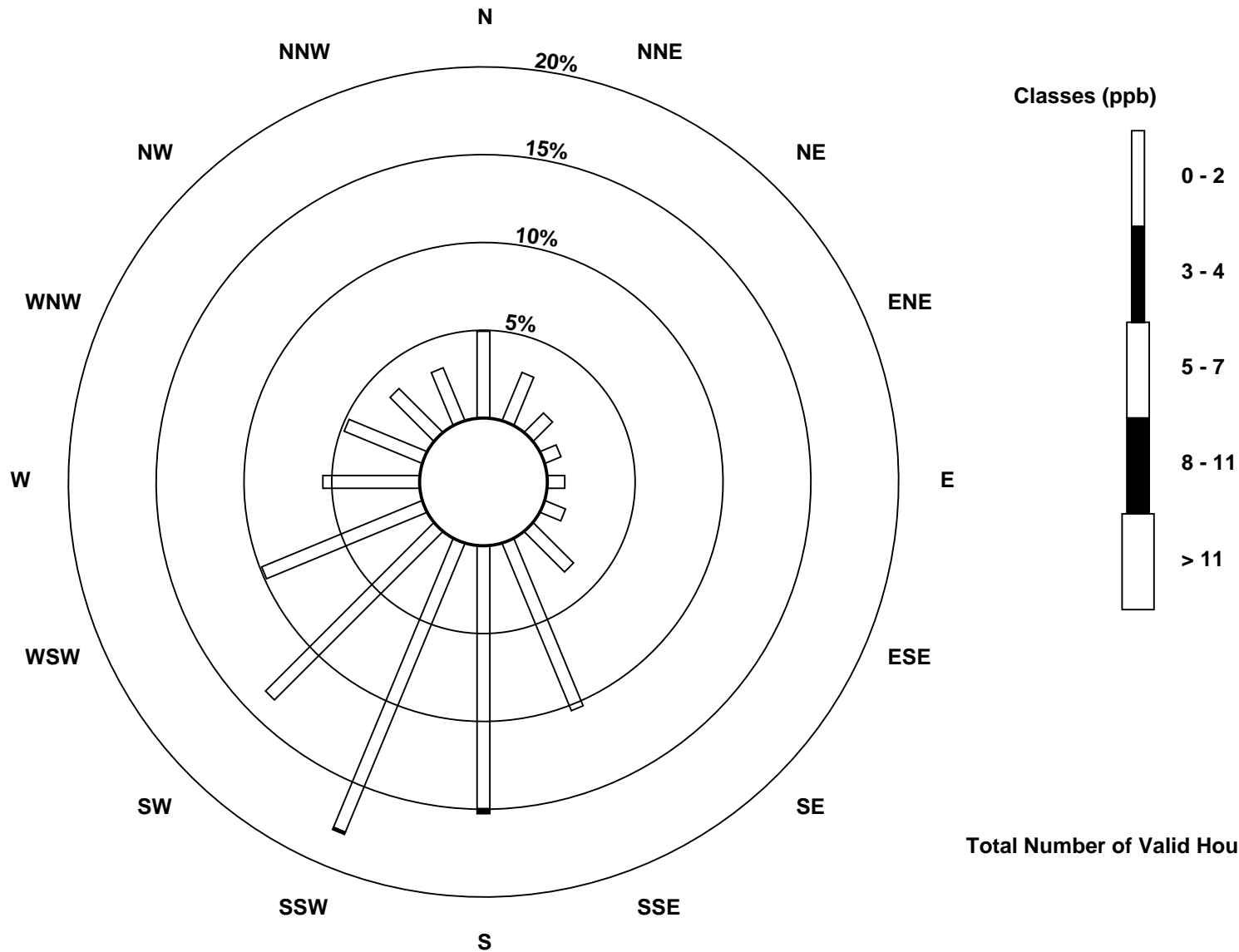
Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Total Reduced Sulphur (TRS) - ppb
Fort McKay South (AMS 13)

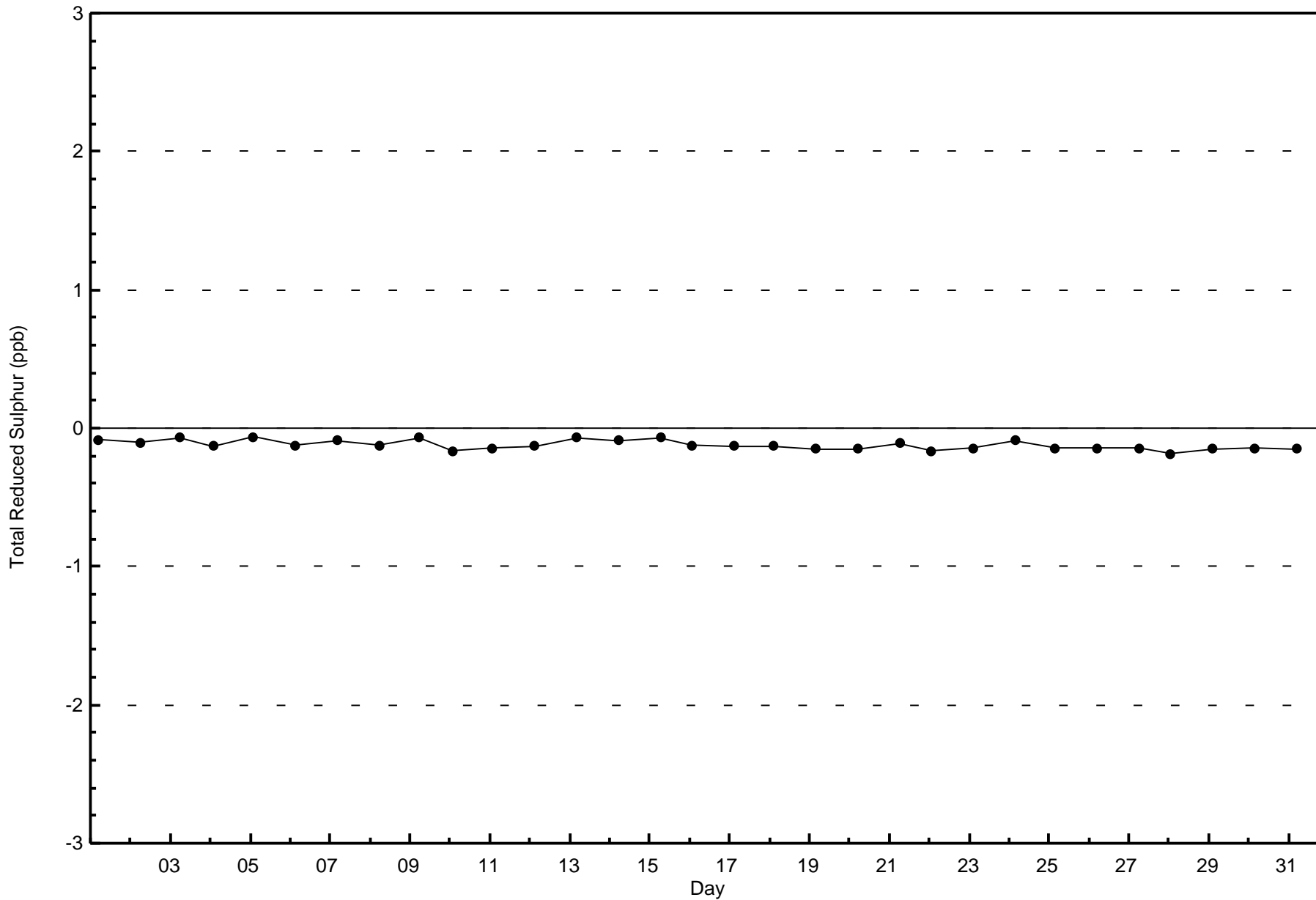


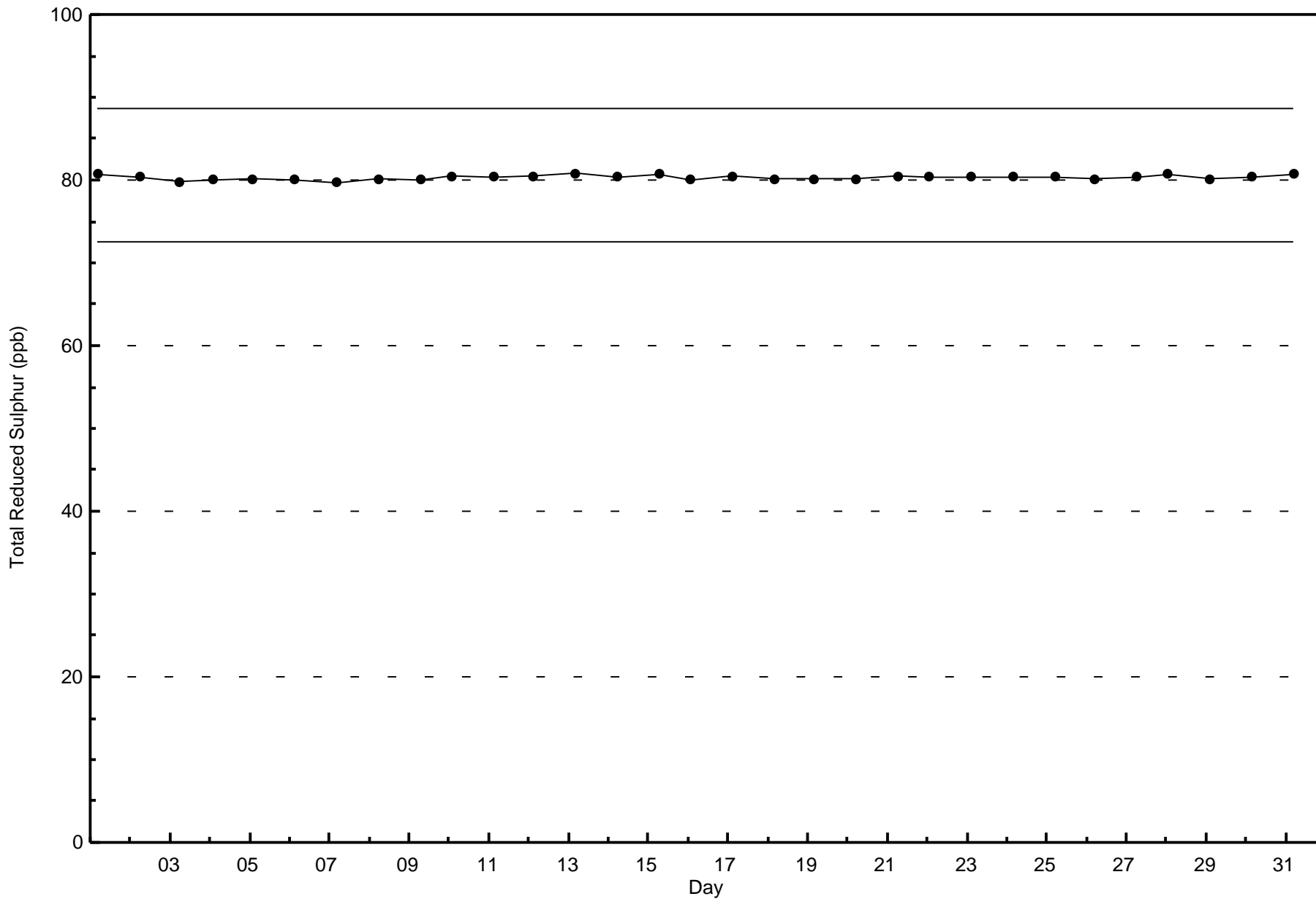
Total Number of Valid Hours: 708



Wood Buffalo Environmental Association
Zero Responses

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - August 2017







Wood Buffalo Environmental Association
Summary of Hour Averages

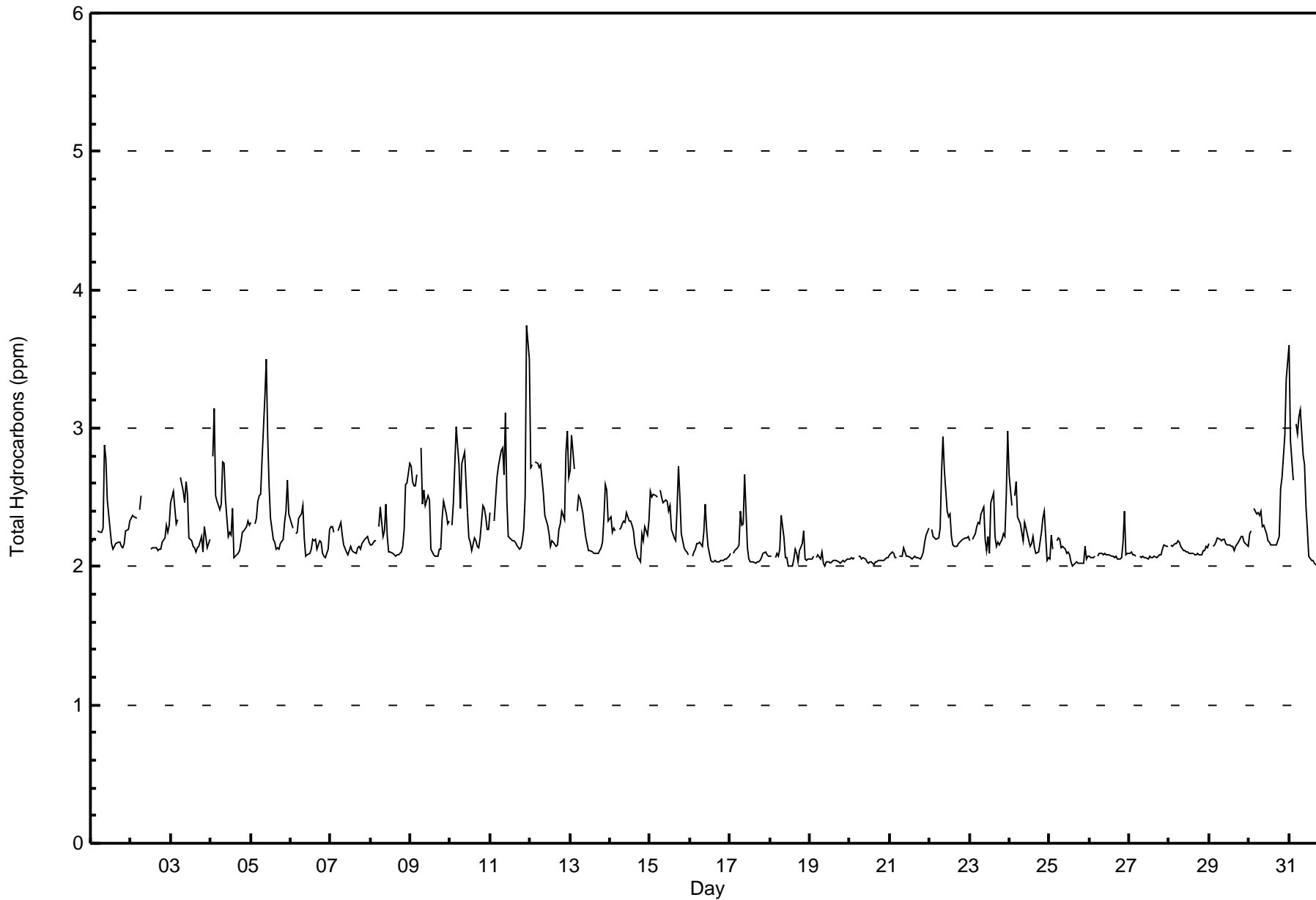
Total Hydrocarbons (THC) - ppm
Fort McKay South - August 2017

| Maximum Value: 3.7 ppm on Aug 11 23:00 | | Maximum Daily Average: 2.5 ppm on Aug 11 | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|--|-----|---------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|---------------|---------------|
| Minimum Value: 2.0 ppm on Aug 18 12:00 | | Minimum Daily Average: 2.0 ppm on Aug 19 | | Hours of Data: 708 | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 2.4 ppm at hour 9 | | Minimum Diurnal Average: 2.1 ppm at hour 16 | | Hours of Missing Data: 36 | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 2.26 ppm | | Percentiles: P ₁ = 2.0 P ₁₀ = 2.1 Q ₁ = 2.1 Median = 2.2 Q ₃ = 2.3 P ₉₀ = 2.6 P ₉₉ = 3.1 | | Hours of Calibration: 36 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 2.2 | 2.2 | 2.2 | Z | 2.3 | 2.2 | 2.2 | 2.3 | 2.9 | 2.8 | 2.5 | 2.3 | 2.2 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.2 | 2.3 | 2.3 | 2.3 | 2.3 | 2.9 |
| 2-Aug | 2.4 | 2.4 | 2.4 | 2.4 | Z | 2.4 | 2.5 | C | C | C | C | C | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.3 | 2.2 | 2.3 | 2.5 | |
| 3-Aug | 2.5 | 2.5 | 2.4 | 2.3 | 2.3 | Z | 2.6 | 2.5 | 2.5 | 2.6 | 2.5 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.3 | 2.2 | 2.1 | 2.2 | 2.6 | |
| 4-Aug | Z | 2.8 | 3.1 | 2.5 | 2.5 | 2.4 | 2.5 | 2.8 | 2.7 | 2.5 | 2.2 | 2.3 | 2.2 | 2.4 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 3.1 | |
| 5-Aug | 2.3 | Z | 2.3 | 2.4 | 2.5 | 2.5 | 2.5 | 2.8 | 3.2 | 3.5 | 3.0 | 2.6 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.3 | 2.4 | 2.6 | 2.4 | 3.5 | |
| 6-Aug | 2.3 | 2.3 | Z | 2.2 | 2.2 | 2.3 | 2.4 | 2.4 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.1 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.3 | 2.4 | |
| 7-Aug | 2.3 | 2.3 | 2.2 | Z | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | |
| 8-Aug | 2.2 | 2.2 | 2.2 | 2.2 | Z | 2.3 | 2.4 | 2.2 | 2.3 | 2.4 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.3 | 2.6 | 2.6 | 2.7 | 2.7 | |
| 9-Aug | 2.7 | 2.6 | 2.6 | 2.6 | 2.7 | Z | 2.9 | 2.4 | 2.6 | 2.4 | 2.5 | 2.5 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.3 | 2.5 | 2.4 | 2.3 | 2.3 | 2.9 | |
| 10-Aug | Z | 2.3 | 2.5 | 3.0 | 2.9 | 2.7 | 2.4 | 2.7 | 2.8 | 2.6 | 2.4 | 2.2 | 2.2 | 2.1 | 2.2 | 2.2 | 2.1 | 2.1 | 2.2 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 3.0 | |
| 11-Aug | 2.4 | Z | 2.3 | 2.5 | 2.6 | 2.7 | 2.8 | 2.9 | 2.7 | 3.1 | 2.5 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.2 | 2.3 | 2.5 | 3.7 | 3.5 | 3.7 | 3.7 | |
| 12-Aug | 2.7 | 2.7 | Z | 2.8 | 2.7 | 2.7 | 2.7 | 2.6 | 2.5 | 2.4 | 2.3 | 2.2 | 2.1 | 2.2 | 2.2 | 2.1 | 2.2 | 2.3 | 2.3 | 2.4 | 2.3 | 2.8 | 3.0 | 2.6 | 3.0 | |
| 13-Aug | 2.7 | 2.9 | 2.7 | Z | 2.4 | 2.5 | 2.5 | 2.4 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.3 | 2.6 | 2.5 | 2.3 | 2.3 | 2.9 | |
| 14-Aug | 2.4 | 2.3 | 2.3 | Z | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.1 | 2.1 | 2.1 | 2.0 | 2.2 | 2.2 | 2.3 | 2.2 | 2.3 | 2.4 | |
| 15-Aug | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | Z | 2.6 | 2.5 | 2.5 | 2.5 | 2.5 | 2.4 | 2.4 | 2.3 | 2.2 | 2.2 | 2.4 | 2.7 | 2.5 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.7 | |
| 16-Aug | Z | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.1 | 2.2 | 2.5 | 2.3 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.5 | |
| 17-Aug | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.2 | 2.4 | 2.3 | 2.3 | 2.7 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.7 | |
| 18-Aug | 2.1 | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.4 | 2.2 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.0 | 2.1 | 2.2 | 2.3 | 2.1 | 2.0 | 2.1 | 2.4 | |
| 19-Aug | 2.1 | 2.1 | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | |
| 20-Aug | 2.1 | 2.1 | 2.1 | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | |
| 21-Aug | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.3 | 2.3 | |
| 22-Aug | Z | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.7 | 2.9 | 2.7 | 2.4 | 2.4 | 2.4 | 2.2 | 2.2 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.9 | |
| 23-Aug | 2.2 | Z | 2.2 | 2.2 | 2.3 | 2.3 | 2.3 | 2.4 | 2.4 | 2.2 | 2.1 | 2.2 | 2.1 | 2.5 | 2.5 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.5 | 3.0 | 3.0 | |
| 24-Aug | 2.7 | 2.4 | Z | 2.5 | 2.6 | 2.4 | 2.3 | 2.2 | 2.2 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.3 | 2.4 | 2.0 | 2.1 | 2.7 | |
| 25-Aug | 2.1 | 2.2 | 2.1 | Z | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.2 | 2.1 | 2.1 | 2.2 | |
| 26-Aug | 2.1 | 2.1 | 2.1 | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.4 | 2.1 | 2.1 | 2.4 | |
| 27-Aug | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.2 | 2.2 | |
| 28-Aug | Z | 2.2 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | |
| 29-Aug | 2.2 | Z | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.2 | |
| 30-Aug | 2.2 | 2.3 | Z | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.6 | 2.6 | 2.9 | 3.4 | 3.5 | 3.5 | |
| 31-Aug | 3.6 | 2.9 | 2.6 | Z | 3.0 | 3.0 | 3.1 | 3.1 | 2.8 | 2.7 | 2.4 | 2.3 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 3.6 | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 2.3 2.3 2.3 2.3 2.4 2.3 2.4 2.4 2.4 2.4 2.4 2.3 2.2 2.1 2.1 2.1 2.1 2.1 2.1 2.2 2.2 2.3 2.3 2.3 2.3 | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 3.6 2.9 3.1 3.0 3.0 3.0 3.1 3.1 3.2 3.5 3.0 2.6 2.4 2.5 2.5 2.2 2.4 2.7 2.5 2.6 2.6 2.9 3.7 3.5 | | |
| Z - zerospan | | | | | | | | | | | | | | | | | | | | | | | | C - Calibration | | |



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Fort McKay South - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Fort McKay South - August 2017

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2.0 | 63 | 8.90 | 8.90 |
| 2.1 - 3.0 | 634 | 89.55 | 98.45 |
| 3.1 - 10.0 | 11 | 1.55 | 100.00 |
| > 10.0 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Fort McKay South - August 2017**

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals | |
|---------------------------------------|-----------------------|-----|----|-----|---|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|---------------|----|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | | |
| 0 - 2.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 19 | 11 | 10 | 12 | 2 | 1 | 63 |
| 2.1 - 3.0 | 36 | 24 | 11 | 7 | 5 | 9 | 22 | 72 | 107 | 116 | 76 | 53 | 31 | 23 | 21 | 20 | 633 | |
| 3.1 - 10.0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 11 | |
| > 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Totals | 36 | 24 | 11 | 7 | 7 | 9 | 23 | 73 | 109 | 126 | 96 | 65 | 42 | 35 | 23 | 21 | 707 | |

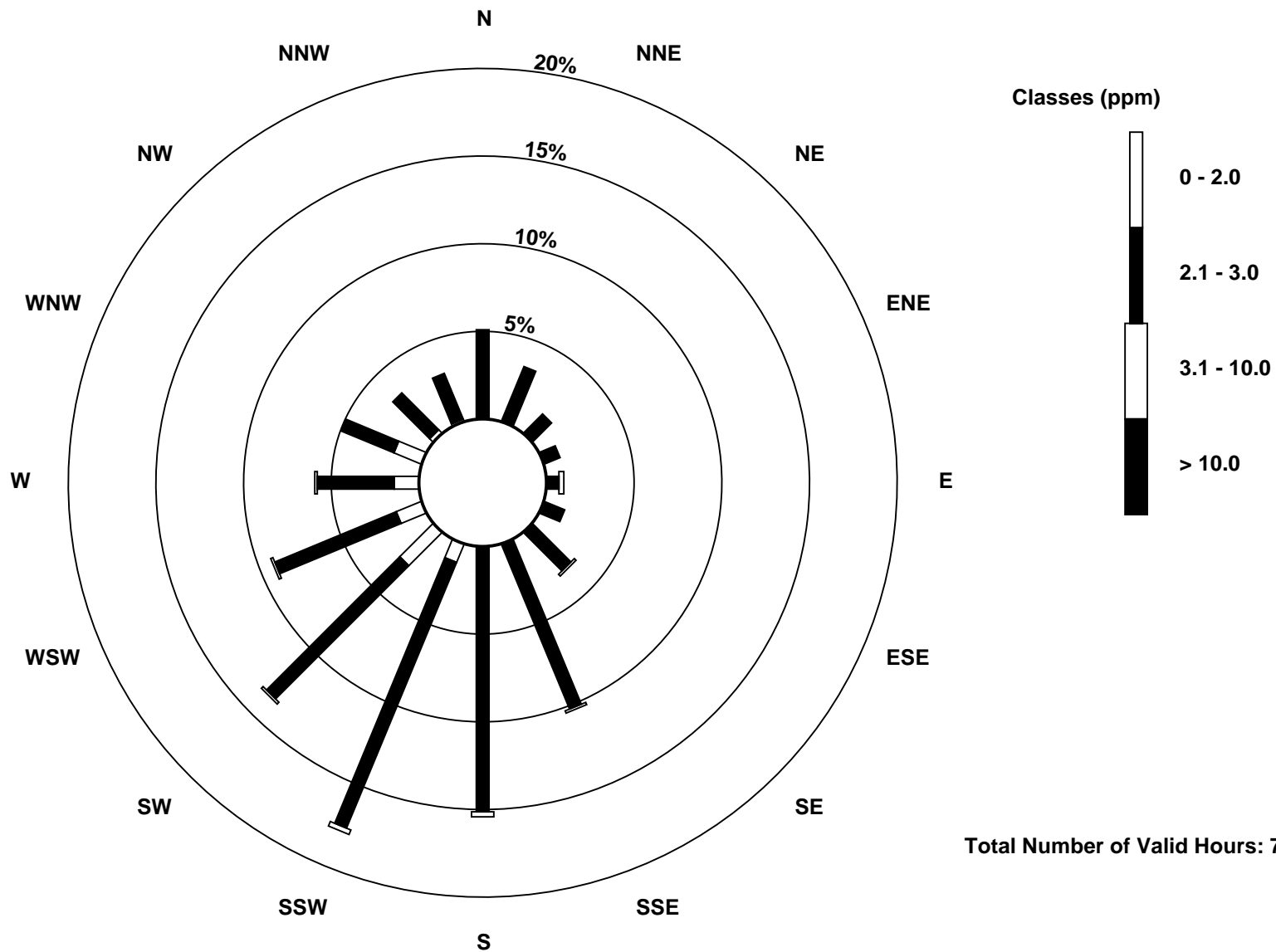
Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

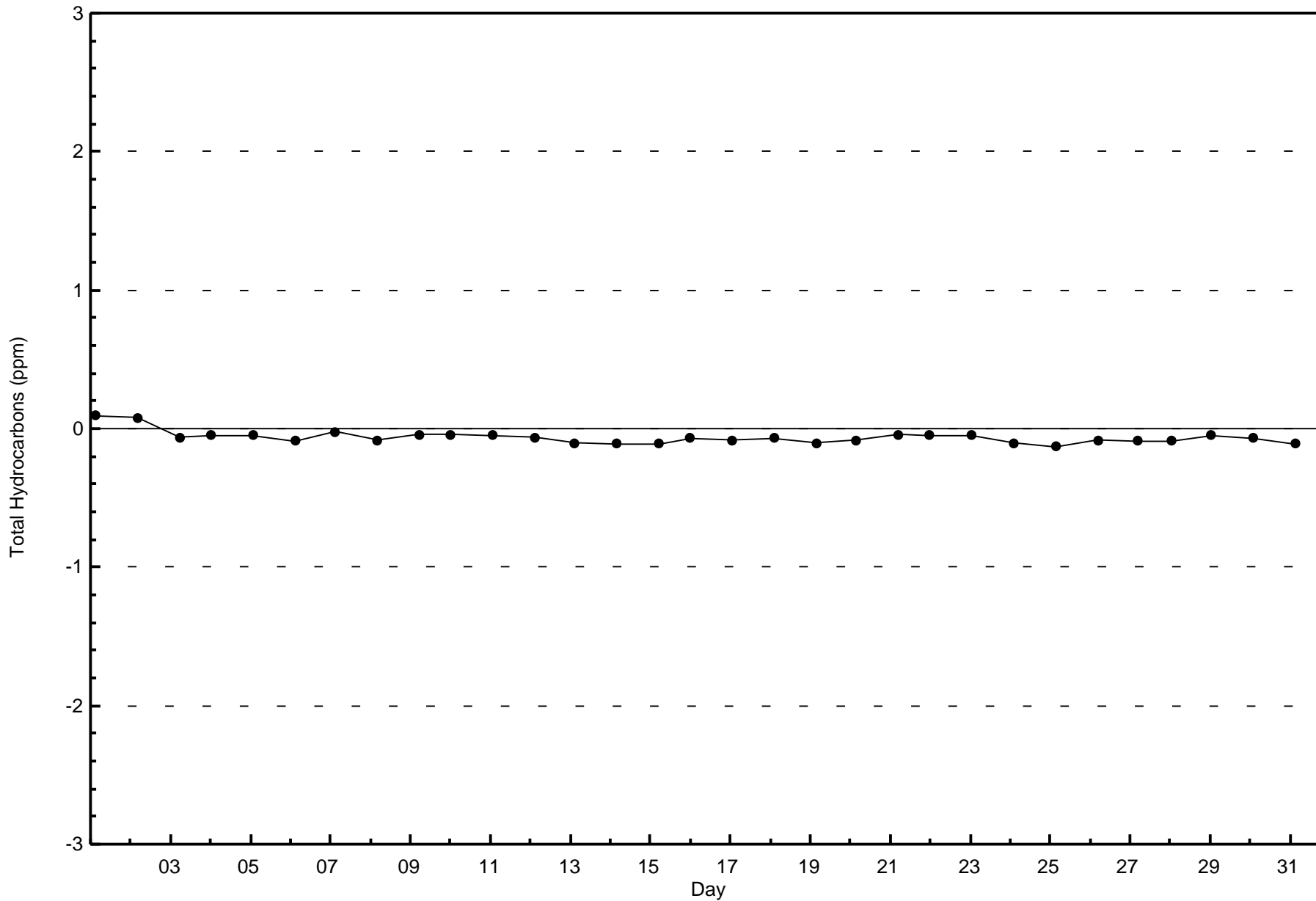
Total Hydrocarbons (THC) - ppm
Fort McKay South (AMS 13)





Wood Buffalo Environmental Association
Zero Responses

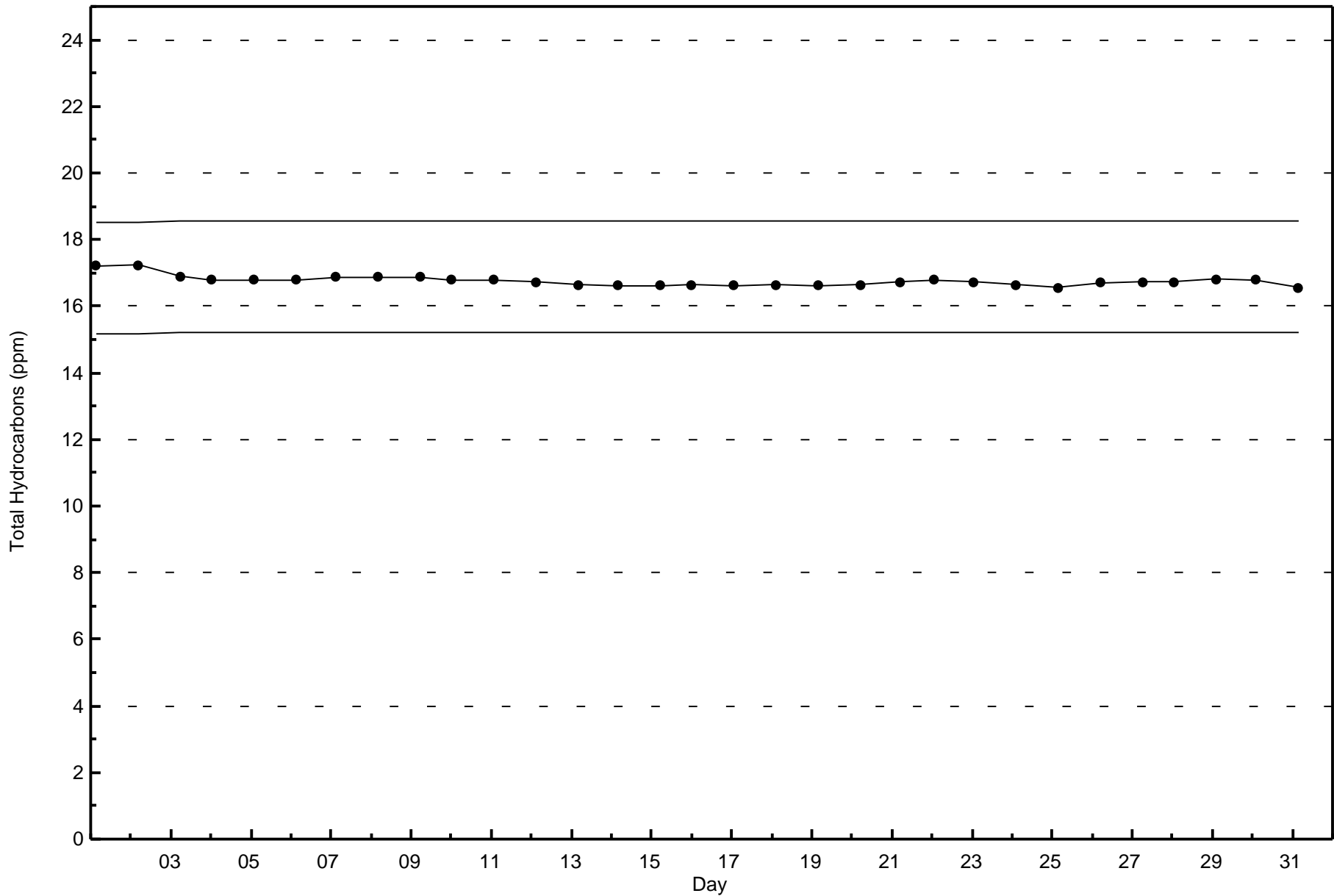
Total Hydrocarbons (THC) - ppm
Fort McKay South - August 2017





Wood Buffalo Environmental Association
Span Responses

Total Hydrocarbons (THC) - ppm
Fort McKay South - August 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

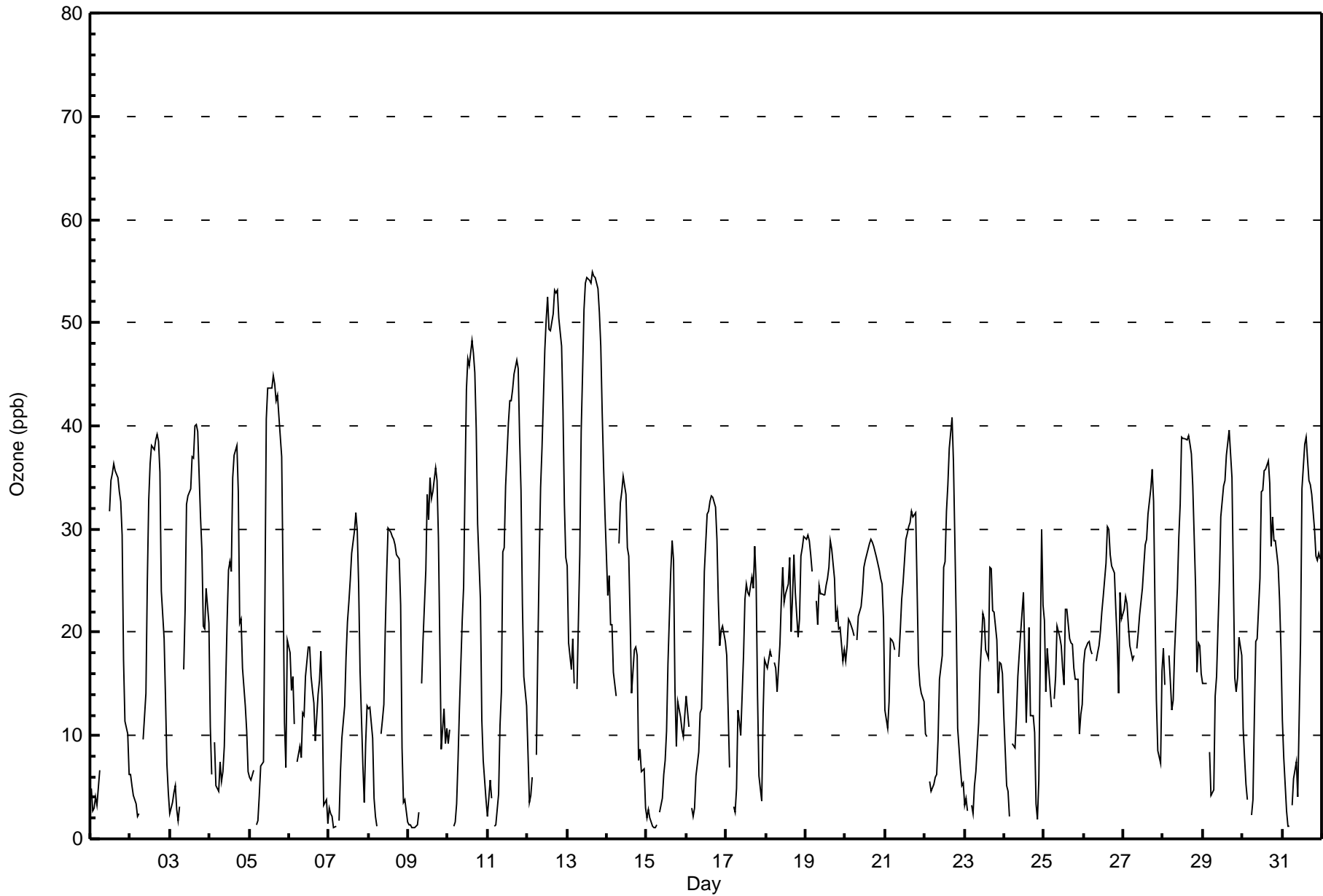
Ozone (O₃) - ppb

Fort McKay South - August 2017

| | | | | |
|--|---|----------|---------------------------|------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 55 ppb on Aug 13 16:00 | Maximum Daily Average: 39.8 ppb on Aug 13 | | Hours of Data: | 708 |
| Minimum Value: 1 ppb on Aug 15 06:00 | Minimum Daily Average: 9.6 ppb on Aug 15 | | Hours of Missing Data: | 36 |
| Maximum Diurnal Average: 33.0 ppb at hour 16 | Minimum Diurnal Average: 7.2 ppb at hour 6 | | Hours of Calibration: | 35 |
| Monthly Average: 20.5 ppb | Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 11 Median = 19 Q ₃ = 29 P ₉₀ = 38 P ₉₉ = 54 | | Percent Operational Time: | 99.9 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | |
|--------|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|------|---------------|---------------|------|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|--|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 5 | 3 | 3 | 4 | 3 | 7 | Z | C | C | C | C | 32 | 35 | 35 | 36 | 36 | 35 | 34 | 33 | 29 | 17 | 11 | 10 | 6 | 19.7 | 36 | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 6 | 5 | 4 | 3 | 2 | 2 | Z | M | 10 | 14 | 25 | 33 | 36 | 38 | 38 | 39 | 39 | 39 | 36 | 24 | 19 | 14 | 7 | 4 | 19.9 | 39 | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 2 | 4 | 4 | 5 | 3 | 2 | 3 | Z | 16 | 22 | 32 | 33 | 34 | 37 | 37 | 40 | 40 | 39 | 31 | 28 | 21 | 20 | 24 | 21 | 21.7 | 40 | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 11 | 6 | Z | 9 | 5 | 5 | 7 | 6 | 7 | 9 | 21 | 26 | 27 | 26 | 35 | 37 | 38 | 34 | 21 | 21 | 16 | 13 | 10 | 7 | 17.2 | 38 | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 6 | 6 | 7 | Z | 1 | 2 | 4 | 7 | 7 | 23 | 41 | 44 | 44 | 44 | 45 | 44 | 42 | 43 | 41 | 37 | 25 | 11 | 7 | 19 | 23.9 | 45 | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 18 | 14 | 16 | 11 | Z | 7 | 9 | 8 | 12 | 12 | 16 | 19 | 19 | 16 | 14 | 13 | 9 | 14 | 15 | 18 | 13 | 3 | 4 | 2 | 12.3 | 19 | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 3 | 2 | 2 | 1 | 1 | Z | 2 | 7 | 10 | 13 | 18 | 21 | 23 | 25 | 28 | 30 | 32 | 30 | 24 | 16 | 7 | 4 | 9 | 13 | 13.9 | 32 | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 13 | 13 | 10 | 4 | 2 | 1 | Z | 10 | 12 | 13 | 20 | 26 | 30 | 30 | 29 | 29 | 29 | 28 | 27 | 23 | 9 | 4 | 4 | 2 | 15.9 | 30 | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 3 | Z | 15 | 19 | 26 | 33 | 31 | 35 | 33 | 34 | 36 | 35 | 29 | 19 | 9 | 13 | 9 | 11 | 17.2 | 36 | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 9 | 11 | Z | 1 | 2 | 3 | 8 | 13 | 21 | 24 | 34 | 44 | 46 | 46 | 48 | 47 | 45 | 40 | 31 | 23 | 12 | 8 | 6 | 4 | 22.8 | 48 | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 2 | 6 | 4 | Z | 1 | 1 | 4 | 11 | 14 | 28 | 28 | 34 | 40 | 42 | 42 | 43 | 45 | 46 | 46 | 39 | 34 | 23 | 16 | 13 | 24.5 | 46 | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 8 | 3 | 4 | 6 | Z | 8 | 18 | 27 | 34 | 38 | 47 | 50 | 52 | 49 | 49 | 51 | 53 | 53 | 53 | 51 | 48 | 41 | 32 | 27 | 35.0 | 53 | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 26 | 19 | 16 | 19 | 15 | Z | 15 | 28 | 39 | 45 | 51 | 54 | 54 | 54 | 55 | 54 | 54 | 53 | 51 | 48 | 41 | 36 | 32 | 39.8 | 55 | | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 24 | 25 | 21 | 21 | 16 | 14 | Z | 29 | 33 | 34 | 35 | 33 | 28 | 27 | 21 | 14 | 18 | 19 | 18 | 8 | 9 | 6 | 7 | 3 | 20.1 | 35 | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 2 | 3 | 2 | 1 | 1 | 1 | 1 | Z | 3 | 4 | 6 | 8 | 10 | 17 | 26 | 29 | 27 | 15 | 9 | 13 | 12 | 11 | 10 | 12 | 9.6 | 29 | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 14 | 11 | Z | 3 | 2 | 3 | 6 | 8 | 12 | 13 | 19 | 26 | 32 | 32 | 33 | 33 | 33 | 32 | 29 | 23 | 19 | 20 | 21 | 19 | 19.2 | 33 | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 18 | 13 | 7 | Z | 3 | 3 | 5 | 12 | 11 | 10 | 18 | 23 | 25 | 24 | 24 | 25 | 24 | 28 | 25 | 14 | 6 | 4 | 12 | 17 | 15.3 | 28 | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 17 | 17 | 18 | 18 | Z | 17 | 17 | 14 | 19 | 23 | 26 | 23 | 24 | 25 | 27 | 20 | 24 | 27 | 24 | 20 | 21 | 27 | 28 | 29 | 21.9 | 29 | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 29 | 29 | 29 | 28 | 26 | Z | 23 | 21 | 24 | 24 | 24 | 24 | 25 | 25 | 26 | 29 | 28 | 25 | 21 | 22 | 20 | 20 | 17 | 18 | 24.2 | 29 | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 17 | 19 | 21 | 21 | 20 | 20 | Z | 19 | 22 | 22 | 24 | 26 | 27 | 28 | 29 | 29 | 29 | 28 | 28 | 27 | 26 | 25 | 25 | 21 | 24.1 | 29 | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 13 | 11 | 13 | 19 | 19 | 19 | 18 | Z | 18 | 20 | 23 | 25 | 29 | 30 | 30 | 31 | 32 | 31 | 32 | 24 | 17 | 15 | 14 | 13 | 21.5 | 32 | | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 10 | 10 | Z | 5 | 5 | 5 | 6 | 6 | 10 | 15 | 18 | 26 | 27 | 32 | 34 | 38 | 41 | 37 | 29 | 21 | 11 | 7 | 5 | 5 | 17.5 | 41 | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 3 | 4 | 3 | Z | 3 | 2 | 5 | 7 | 11 | 16 | 19 | 22 | 21 | 18 | 18 | 26 | 26 | 22 | 22 | 19 | 14 | 17 | 17 | 16 | 14.5 | 26 | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 12 | 5 | 5 | 2 | Z | 9 | 9 | 12 | 16 | 18 | 20 | 24 | 18 | 11 | 16 | 21 | 12 | 12 | 10 | 3 | 2 | 6 | 30 | 23 | 12.8 | 30 | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 21 | 14 | 18 | 17 | 13 | Z | 14 | 16 | 21 | 20 | 19 | 16 | 15 | 22 | 22 | 19 | 19 | 19 | 17 | 15 | 15 | 10 | 12 | 13 | 16.8 | 22 | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 17 | 18 | 19 | 19 | 18 | 18 | Z | 17 | 18 | 19 | 20 | 22 | 24 | 27 | 30 | 30 | 28 | 26 | 26 | 22 | 19 | 14 | 24 | 21 | 21.6 | 30 | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 22 | 23 | 23 | 21 | 19 | 17 | 18 | Z | 19 | 20 | 22 | 24 | 27 | 28 | 29 | 31 | 34 | 36 | 33 | 23 | 13 | 9 | 7 | 16 | 22.3 | 36 | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 18 | 15 | Z | 18 | 15 | 12 | 13 | 18 | 24 | 29 | 32 | 39 | 39 | 39 | 39 | 39 | 38 | 37 | 34 | 24 | 16 | 19 | 19 | 16 | 25.8 | 39 | | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 15 | 15 | 15 | Z | 8 | 4 | 5 | 14 | 16 | 21 | 25 | 31 | 34 | 35 | 37 | 38 | 40 | 35 | 25 | 16 | 14 | 16 | 19 | 18 | 21.5 | 40 | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 11 | 8 | 5 | 4 | Z | 2 | 4 | 12 | 19 | 19 | 25 | 34 | 34 | 36 | 36 | 37 | 35 | 28 | 31 | 29 | 29 | 26 | 23 | 18 | 22.0 | 37 | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 12 | 8 | 3 | 1 | 1 | Z | 3 | 6 | 7 | 4 | 12 | 19 | 34 | 38 | 39 | 37 | 35 | 34 | 33 | 30 | 27 | 27 | 28 | 27 | 20.2 | 39 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 12.4 | 11.0 | 10.5 | 10.1 | 8.0 | 7.2 | 8.8 | 13.6 | 16.6 | 19.7 | 24.9 | 28.8 | 30.4 | 31.3 | 32.4 | 33.0 | 32.9 | 31.6 | 28.5 | 23.6 | 18.3 | 15.7 | 15.9 | 15.1 | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | | | | | | | 29 | 29 | 29 | 28 | 26 | 20 | 23 | 29 | 39 | 45 | 51 | 54 | 54 | 54 | 54 | 55 | 54 | 54 | 53 | 51 | 48 | 41 | 36 | 32 | Diurnal Maximum | |

Z - zerospan C - Calibration M - Maintenance
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Fort McKay South - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 379 | 53.53 | 53.53 |
| 21 - 50 | 313 | 44.21 | 97.74 |
| 51 - 82 | 16 | 2.26 | 100.00 |
| > 83 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Ozone (O₃) - ppb
Fort McKay South - August 2017

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---|-----------------------|-----|----|-----|---|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 24 | 7 | 2 | 1 | 3 | 5 | 9 | 24 | 55 | 78 | 58 | 42 | 21 | 13 | 17 | 19 | 378 |
| 21 - 50 | 12 | 13 | 7 | 6 | 4 | 3 | 13 | 38 | 49 | 50 | 40 | 27 | 19 | 21 | 8 | 3 | 313 |
| 51 - 82 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 9 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 |
| > 83 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 36 | 20 | 9 | 7 | 7 | 8 | 23 | 71 | 110 | 128 | 98 | 69 | 40 | 34 | 25 | 22 | 707 |

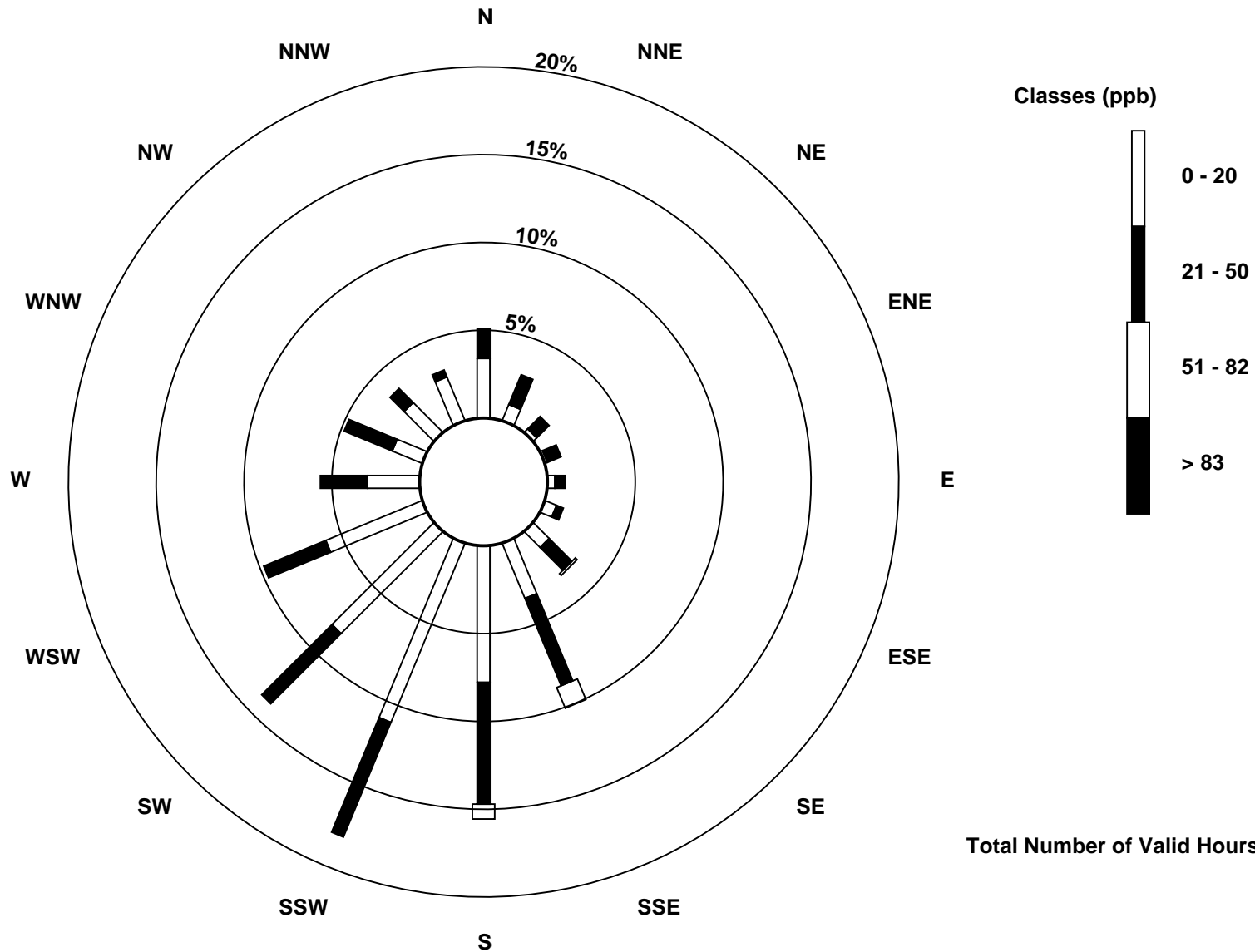
Total Number of Valid Hours: 707

Total Number of Hours: 744

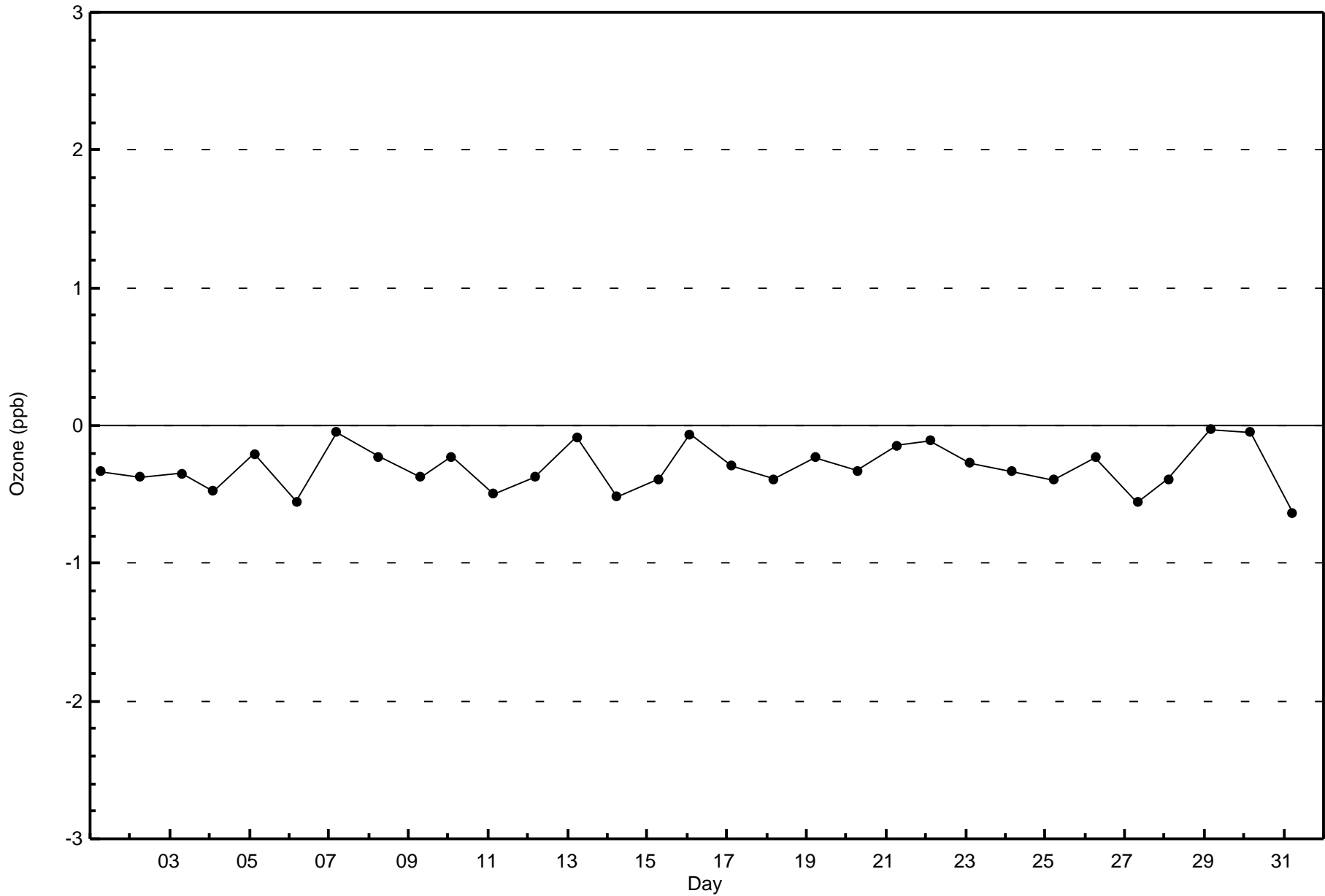


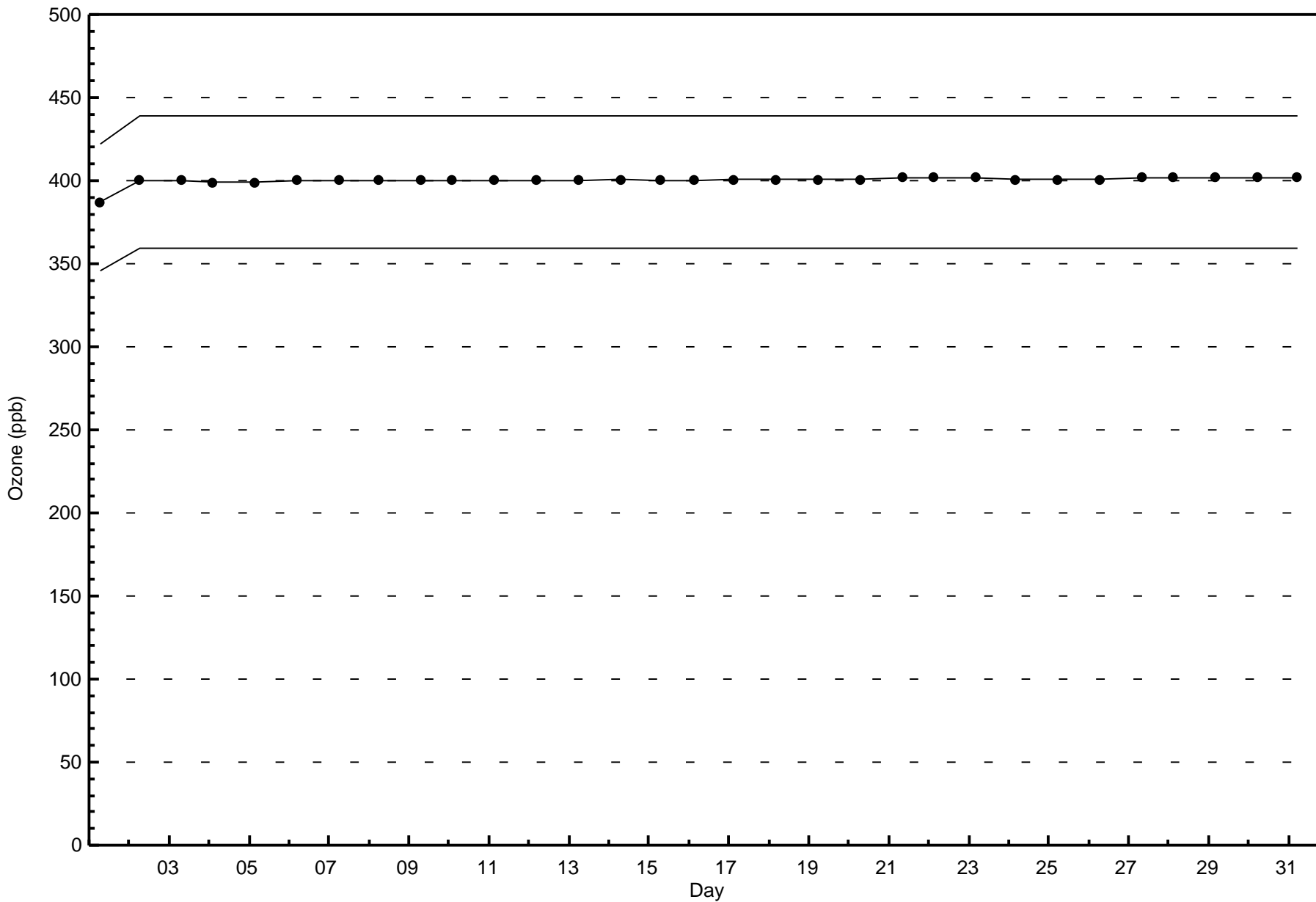
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Ozone (O₃) - ppb
Fort McKay South (AMS 13)



Total Number of Valid Hours: 707





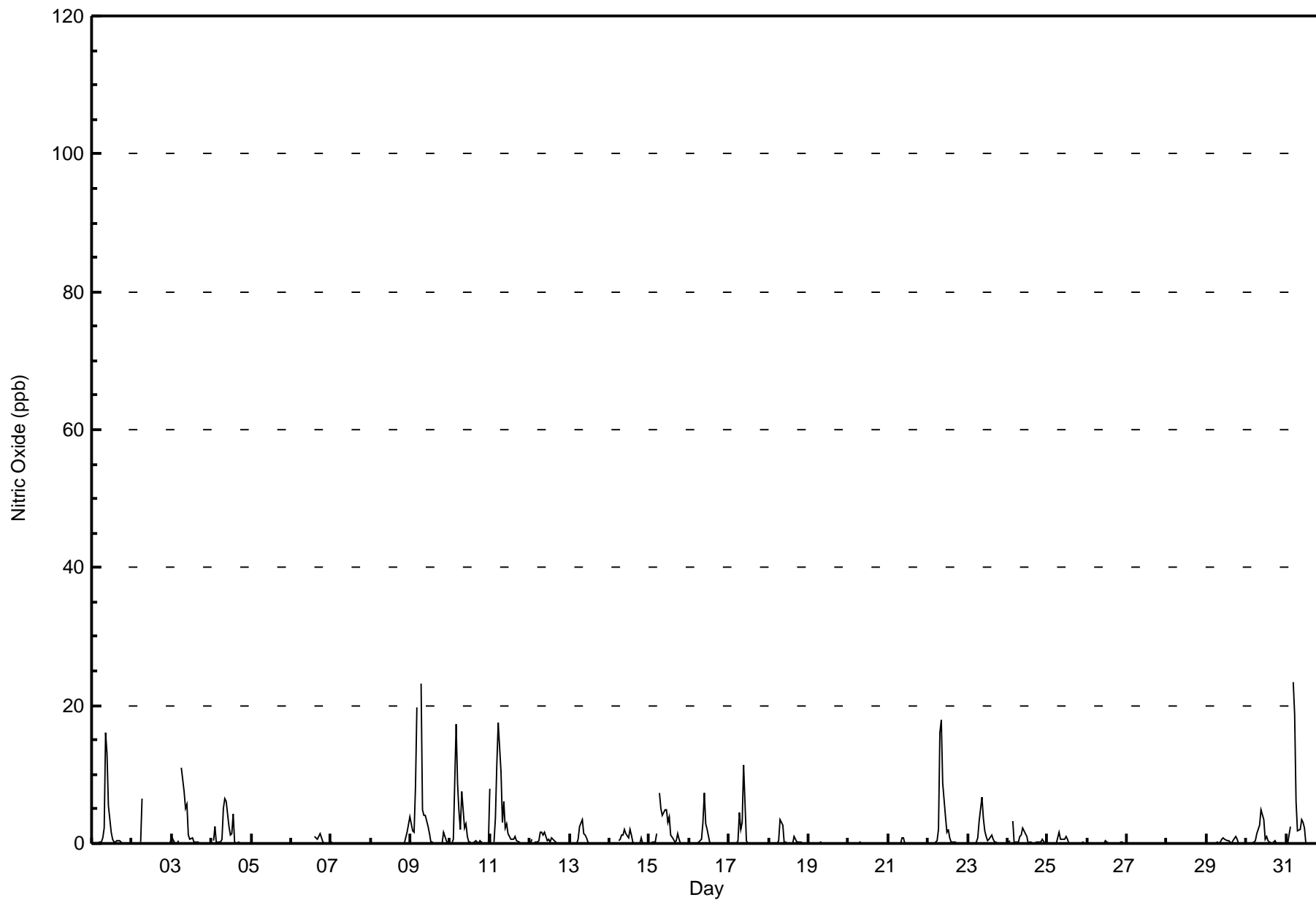


| Maximum Value: 23 ppb on Aug 31 05:00 | | | | | | | | | | | | | | Maximum Daily Average: 3.4 ppb on Aug 9 | | | | | | | | | | | | | | Hours in Service: 744 | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|----|----|-----------------|---------------|---------------|--|--------------------------------|--|--|--|
| Minimum Value: 0 ppb on Aug 1 20:00 | | | | | | | | | | | | | | Minimum Daily Average: 0.0 ppb on Aug 27 | | | | | | | | | | | | | | Hours of Data: 640 | | | |
| Maximum Diurnal Average: 3.4 ppb at hour 9 | | | | | | | | | | | | | | Minimum Diurnal Average: 0.1 ppb at hour 20 | | | | | | | | | | | | | | Hours of Missing Data: 104 | | | |
| Monthly Average: 1.0 ppb | | | | | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 17 | | | | | | | | | | | | | | Hours of Calibration: 38 | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 91.1 | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | |
| 1-Aug | 0 | 0 | 0 | Z | 0 | 0 | 1 | 2 | 16 | 13 | 5 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.8 | 16 | | | | | |
| 2-Aug | 0 | 0 | 0 | 0 | Z | 0 | 7 | C | C | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 7 | | | | | |
| 3-Aug | 1 | 0 | 0 | 0 | 0 | Z | 11 | 8 | 5 | 6 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.5 | 11 | | | | | | |
| 4-Aug | Z | 0 | 2 | 0 | 0 | 0 | 1 | 5 | 7 | 6 | 2 | 1 | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.4 | 7 | | | | | | |
| 5-Aug | 0 | Z | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- | 0 | | | | | |
| 6-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | M | M | M | M | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | -- | 1 | | | | | | |
| 7-Aug | 0 | 0 | 0 | Z | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- | 0 | | | | | | |
| 8-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | C | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 4 | -- | 4 | | | | | |
| 9-Aug | 3 | 2 | 2 | 8 | 20 | Z | 23 | 5 | 4 | 4 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 3.4 | 23 | | | | | | |
| 10-Aug | Z | 0 | 1 | 17 | 9 | 5 | 2 | 7 | 2 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.1 | 17 | | | | | | |
| 11-Aug | 8 | Z | 0 | 4 | 11 | 18 | 10 | 3 | 6 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.0 | 18 | | | | | | |
| 12-Aug | 0 | 1 | Z | 0 | 0 | 0 | 2 | 2 | 1 | 2 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 2 | | | | | | |
| 13-Aug | 0 | 0 | 0 | Z | 0 | 1 | 3 | 3 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 3 | | | | | | |
| 14-Aug | 0 | 0 | 0 | 0 | Z | 0 | 1 | 1 | 1 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0.5 | 2 | | | | | | |
| 15-Aug | 0 | 0 | 0 | 0 | 1 | Z | 7 | 5 | 4 | 5 | 5 | 3 | 4 | 1 | 1 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 1.7 | 7 | | | | | | |
| 16-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 7 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 7 | | | | | | |
| 17-Aug | 0 | Z | 0 | 0 | 0 | 0 | 4 | 2 | 3 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.0 | 11 | | | | | | |
| 18-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 3 | | | | | | |
| 19-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | |
| 20-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 | | | | | | |
| 22-Aug | Z | 0 | 0 | 0 | 0 | 0 | 2 | 16 | 18 | 9 | 4 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.4 | 18 | | | | | | |
| 23-Aug | 0 | Z | 0 | 0 | 0 | 0 | 1 | 3 | 7 | 4 | 2 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.9 | 7 | | | | | | |
| 24-Aug | 0 | 0 | Z | 3 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0.6 | 3 | | | | | | |
| 25-Aug | 0 | 0 | 0 | Z | 0 | 0 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 2 | | | | | | |
| 26-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | |
| 28-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | |
| 29-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | |
| 30-Aug | 0 | 0 | Z | 0 | 0 | 0 | 1 | 2 | 3 | 5 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.8 | 5 | | | | | | |
| 31-Aug | 0 | 0 | 3 | Z | 23 | 19 | 6 | 2 | 2 | 3 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.8 | 23 | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | | | |
| Z - zerospan C - Calibration M - Maintenance AF - Analyzer Failure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Fort McKay South - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Fort McKay South - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 638 | 99.69 | 99.69 |
| 21 - 40 | 2 | 0.31 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 640

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Fort McKay South - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|---|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 26 | 19 | 10 | 6 | 5 | 7 | 20 | 71 | 99 | 110 | 88 | 61 | 40 | 35 | 23 | 17 | 637 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 26 | 19 | 10 | 6 | 5 | 7 | 20 | 71 | 101 | 110 | 88 | 61 | 40 | 35 | 23 | 17 | 639 |

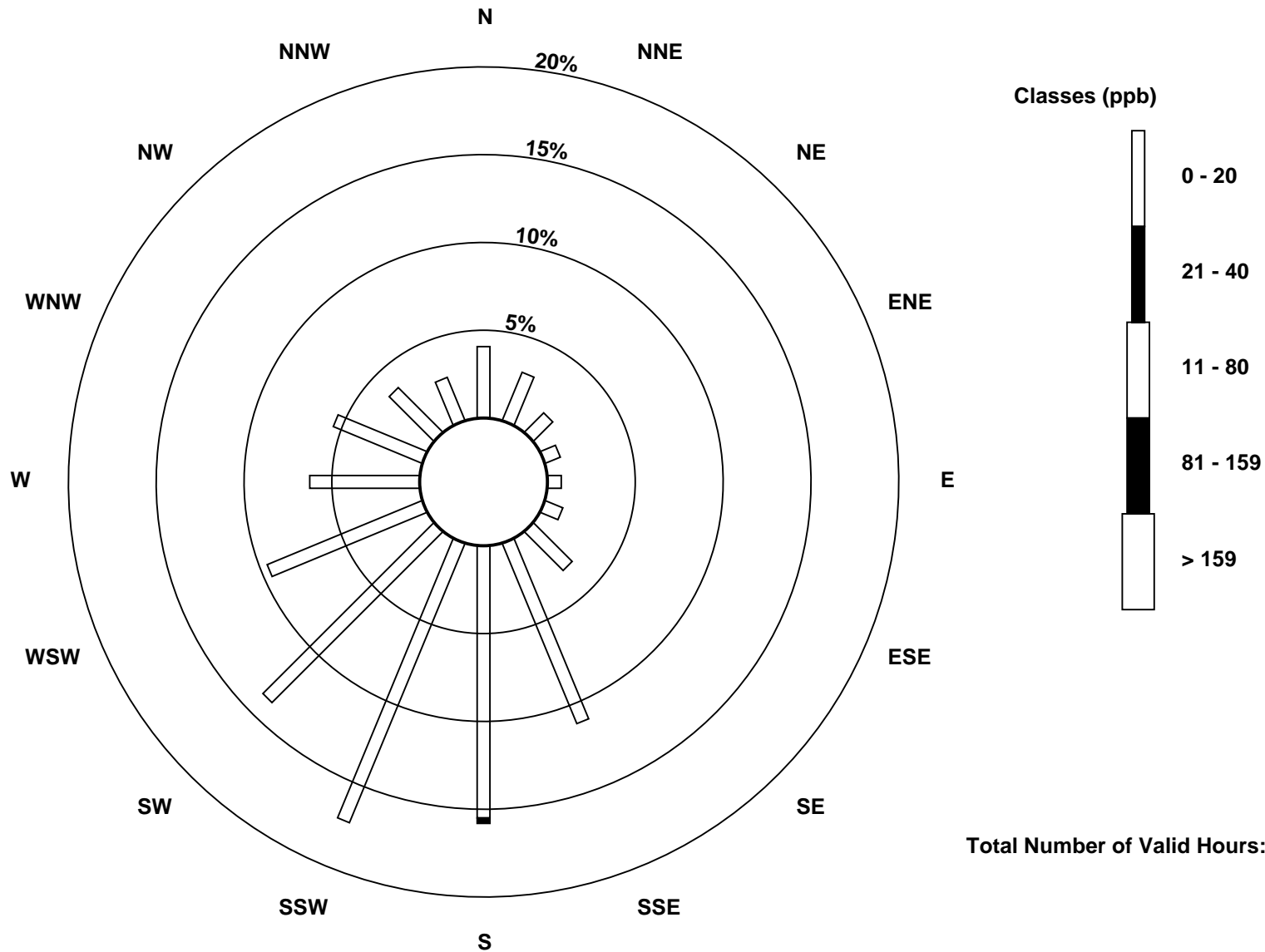
Total Number of Valid Hours: 639

Total Number of Hours: 744

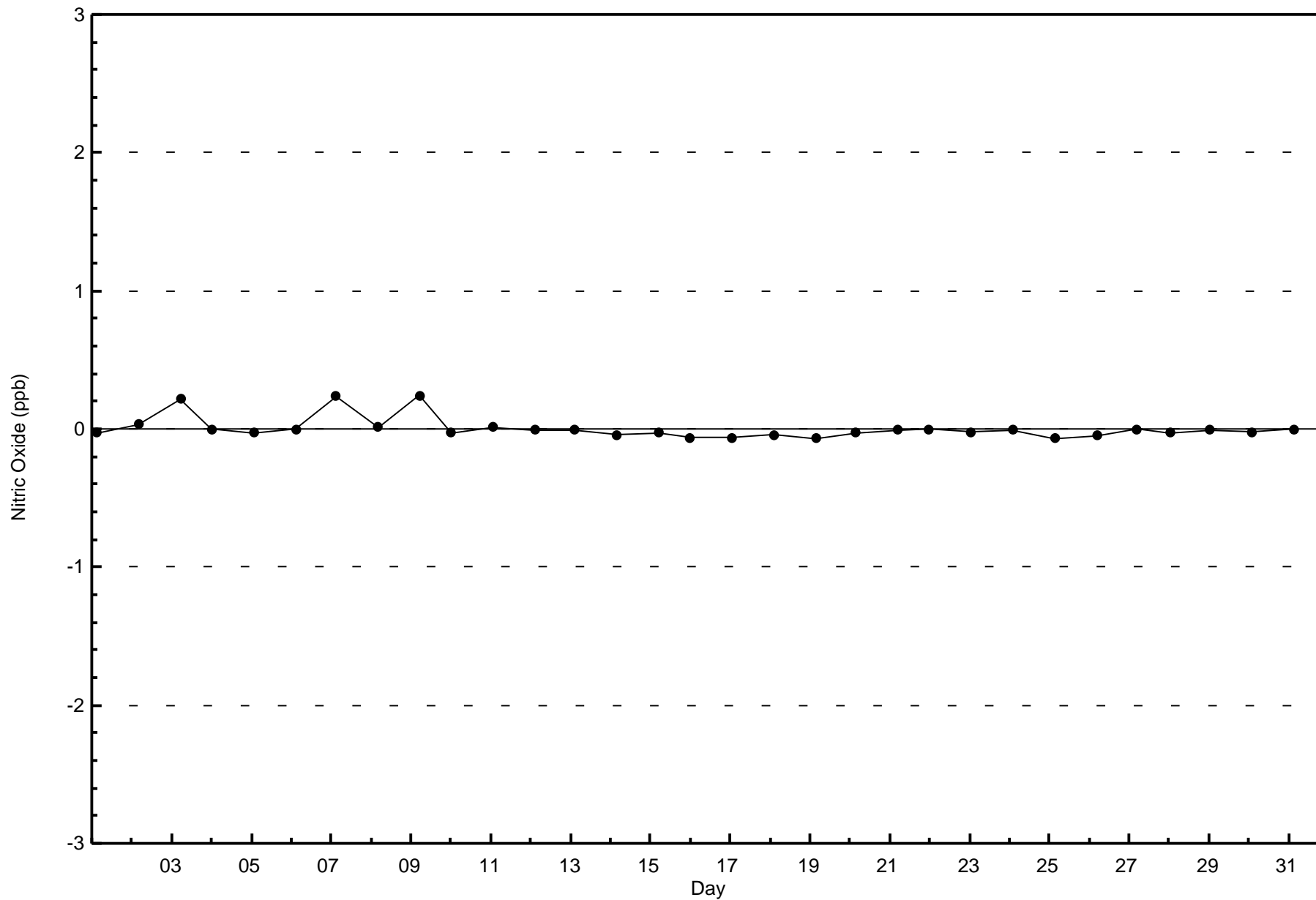


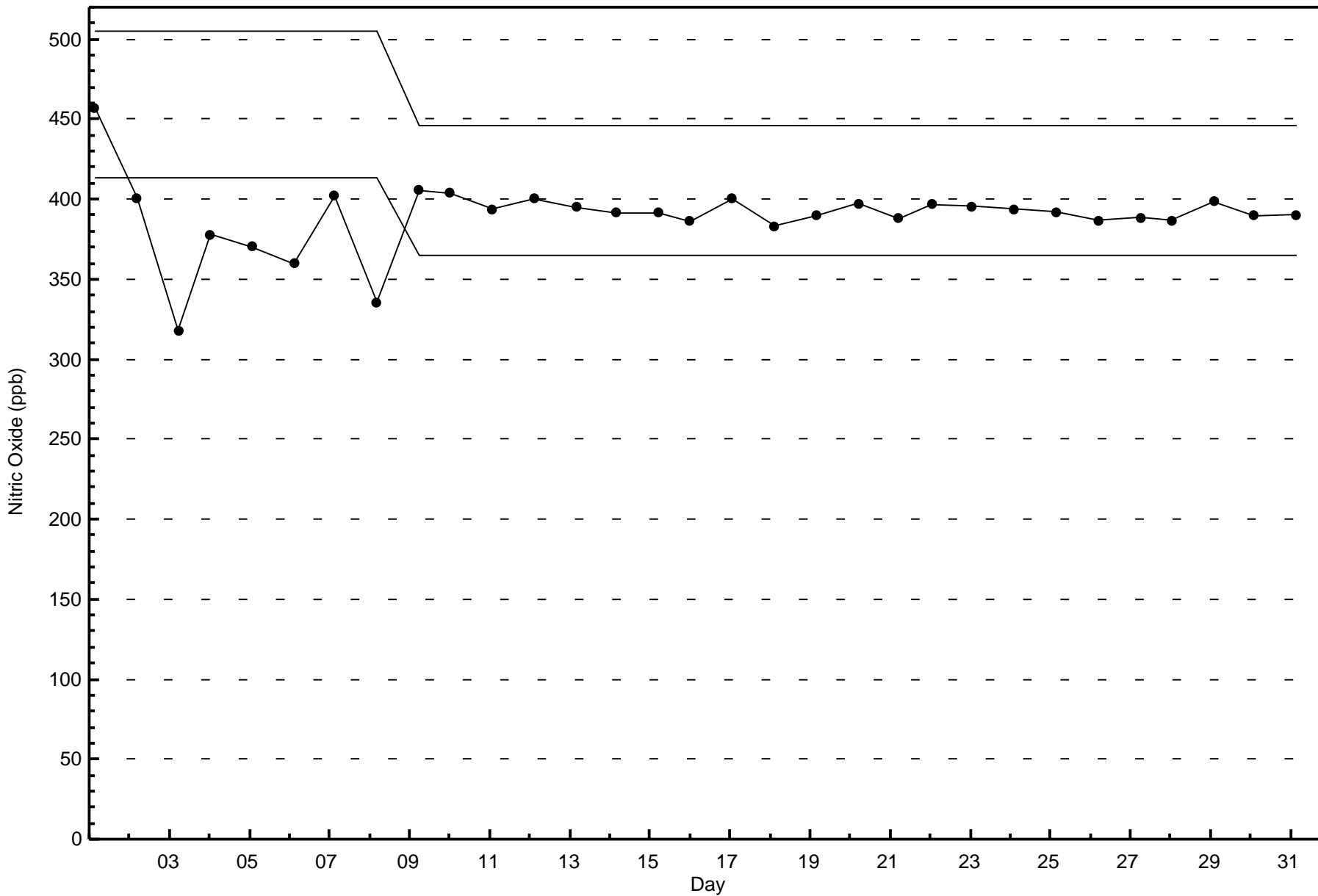
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitric Oxide (NO) - ppb
Fort McKay South (AMS 13)



Total Number of Valid Hours: 639







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

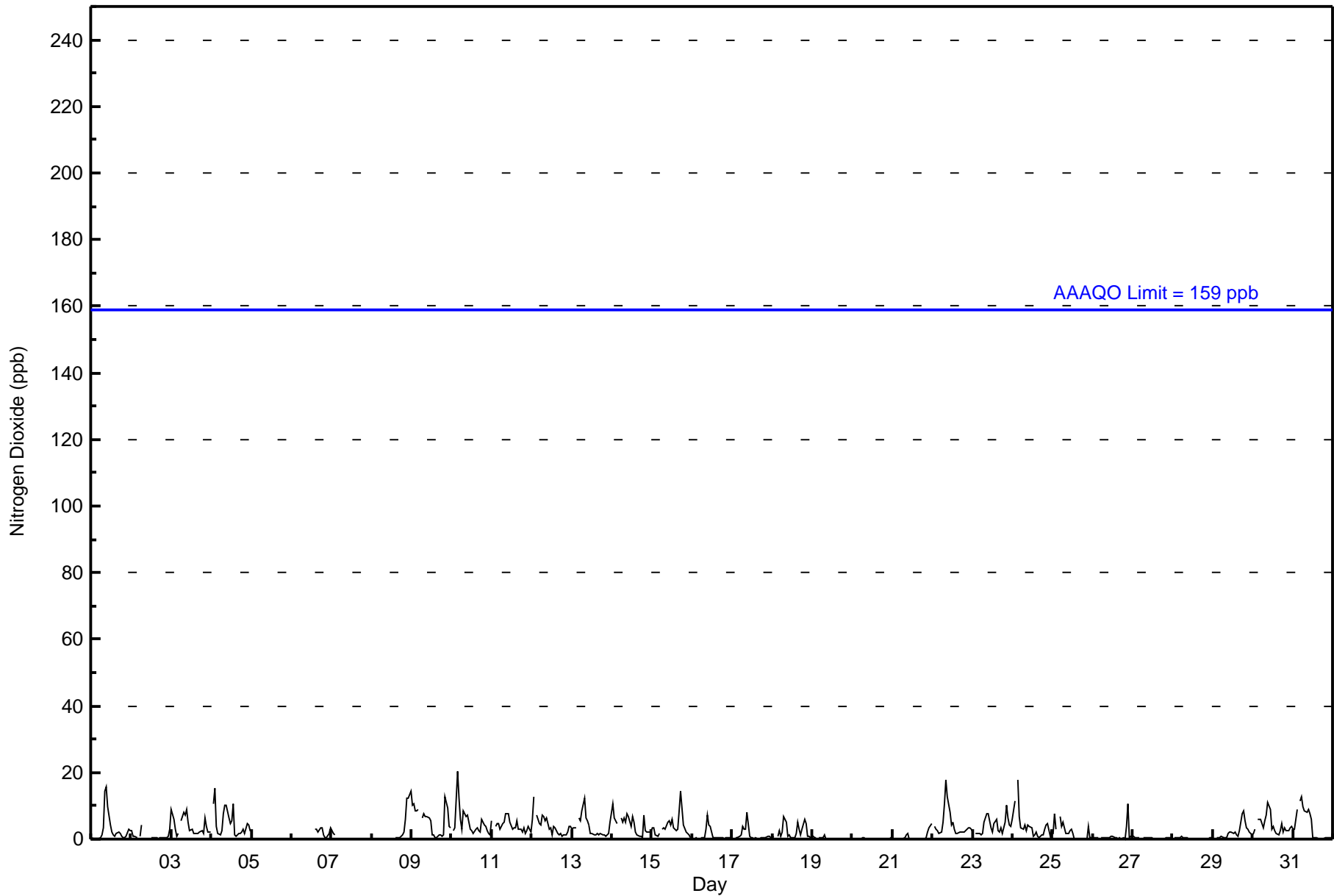
Fort McKay South - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | | | | | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|----|----|-----------------|---------------|---------------|
| Maximum Value: 20 ppb on Aug 10 04:00 | | | | | | | | | | | | | | Maximum Daily Average: 5.4 ppb on Aug 9 | | | | | | | | | | | | |
| Minimum Value: 0 ppb on Aug 16 04:00 | | | | | | | | | | | | | | Minimum Daily Average: 0.2 ppb on Aug 20 | | | | | | | | | | | | |
| Maximum Diurnal Average: 5.7 ppb at hour 10 | | | | | | | | | | | | | | Minimum Diurnal Average: 1.3 ppb at hour 16 | | | | | | | | | | | | |
| Monthly Average: 2.8 ppb | | | | | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 2 Q ₃ = 4 P ₉₀ = 7 P ₉₉ = 14 | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0 | 0 | 0 | Z | 0 | 0 | 1 | 3 | 14 | 16 | 10 | 4 | 2 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 3 | 3 | 3.0 | 16 |
| 2-Aug | 3 | 1 | 1 | 1 | Z | 1 | 4 | C | C | C | C | C | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 3 | 1.0 | 4 |
| 3-Aug | 9 | 6 | 3 | 1 | 2 | Z | 5 | 8 | 7 | 9 | 5 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 6 | 4 | 2 | 2 | 3.8 | 9 |
| 4-Aug | Z | 11 | 15 | 4 | 2 | 1 | 3 | 8 | 10 | 10 | 6 | 5 | 6 | 11 | 1 | 1 | 2 | 2 | 2 | 3 | 2 | 5 | 4 | 3 | 5.0 | 15 |
| 5-Aug | 3 | Z | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- | 3 |
| 6-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | M | M | M | M | 3 | 3 | 2 | 3 | 4 | 1 | 0 | 0 | 2 | 4 | -- | 4 |
| 7-Aug | 3 | 2 | 1 | Z | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- | 3 |
| 8-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | C | C | C | C | 1 | 0 | 0 | 0 | 1 | 2 | 6 | 12 | 12 | 15 | -- | 15 |
| 9-Aug | 10 | 10 | 9 | 8 | 9 | Z | 6 | 8 | 7 | 7 | 6 | 6 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 13 | 9 | 4 | 4 | 5.4 | 13 |
| 10-Aug | Z | 3 | 4 | 20 | 12 | 6 | 3 | 8 | 7 | 7 | 5 | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 6 | 4 | 4 | 3 | 2 | 1 | 4.9 | 20 |
| 11-Aug | 5 | Z | 4 | 5 | 5 | 3 | 5 | 5 | 8 | 8 | 8 | 5 | 3 | 3 | 3 | 6 | 3 | 3 | 2 | 3 | 2 | 3 | 4 | 2 | 4.2 | 8 |
| 12-Aug | 6 | 13 | Z | 7 | 5 | 4 | 7 | 7 | 5 | 6 | 3 | 3 | 1 | 4 | 3 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 4 | 4 | 4.1 | 13 |
| 13-Aug | 3 | 3 | 4 | Z | 7 | 5 | 8 | 12 | 6 | 6 | 4 | 2 | 2 | 1 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 5 | 3.5 | 12 |
| 14-Aug | 11 | 6 | 6 | 5 | Z | 6 | 5 | 6 | 5 | 8 | 7 | 4 | 7 | 5 | 2 | 1 | 1 | 1 | 1 | 7 | 3 | 2 | 2 | 2 | 4.4 | 11 |
| 15-Aug | 3 | 3 | 1 | 1 | 2 | Z | 3 | 3 | 3 | 5 | 6 | 4 | 6 | 4 | 3 | 3 | 8 | 15 | 10 | 4 | 2 | 2 | 1 | 1 | 4.0 | 15 |
| 16-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 7 | 4 | 4 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1.0 | 7 |
| 17-Aug | 0 | Z | 0 | 0 | 1 | 1 | 4 | 3 | 3 | 8 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1.2 | 8 |
| 18-Aug | 1 | 1 | Z | 1 | 2 | 1 | 2 | 7 | 5 | 1 | 1 | 1 | 1 | 2 | 5 | 3 | 1 | 3 | 6 | 5 | 1 | 1 | 1 | 1 | 2.2 | 7 |
| 19-Aug | 1 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 20-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 5 | 0.7 | 5 |
| 22-Aug | Z | 4 | 3 | 3 | 2 | 2 | 5 | 11 | 18 | 13 | 8 | 4 | 5 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 4.5 | 18 |
| 23-Aug | 2 | Z | 2 | 2 | 2 | 1 | 2 | 5 | 8 | 8 | 6 | 3 | 2 | 5 | 6 | 3 | 2 | 3 | 2 | 5 | 10 | 6 | 4 | 4 | 4.0 | 10 |
| 24-Aug | 6 | 12 | Z | 18 | 7 | 3 | 3 | 4 | 3 | 4 | 4 | 4 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 3 | 4 | 5 | 1 | 2 | 3.9 | 18 |
| 25-Aug | 2 | 8 | 3 | Z | 7 | 4 | 5 | 3 | 2 | 2 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 2.1 | 8 |
| 26-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 10 | 1 | 1 | 1.0 | 10 |
| 27-Aug | 1 | 1 | 0 | 0 | 1 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.4 | 1 |
| 28-Aug | Z | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.3 | 1 |
| 29-Aug | 1 | Z | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 3 | 8 | 9 | 6 | 4 | 3 | 2 | 1 | 2.2 | 9 |
| 30-Aug | 2 | 3 | Z | 6 | 6 | 5 | 3 | 6 | 7 | 11 | 9 | 3 | 4 | 3 | 2 | 1 | 2 | 5 | 2 | 3 | 3 | 3 | 3 | 4 | 4.1 | 11 |
| 31-Aug | 3 | 3 | 9 | Z | 12 | 13 | 10 | 8 | 8 | 9 | 8 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4.0 | 13 |
| 3.1 3.7 2.8 3.8 3.6 2.7 3.3 4.6 5.1 5.7 4.1 2.7 2.0 1.9 1.4 1.3 1.4 2.0 1.8 2.0 2.6 2.9 2.2 2.4 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| 11 13 15 20 12 13 10 12 18 16 10 6 7 11 6 6 8 15 10 7 13 12 12 15 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| Z - zerospan C - Calibration M - Maintenance AF - Analyzer Failure | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 640 | 100.00 | 100.00 |
| 21 - 40 | 0 | 0.00 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 640

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|---|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 26 | 19 | 10 | 6 | 5 | 7 | 20 | 71 | 101 | 110 | 88 | 61 | 40 | 35 | 23 | 17 | 639 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 26 | 19 | 10 | 6 | 5 | 7 | 20 | 71 | 101 | 110 | 88 | 61 | 40 | 35 | 23 | 17 | 639 |

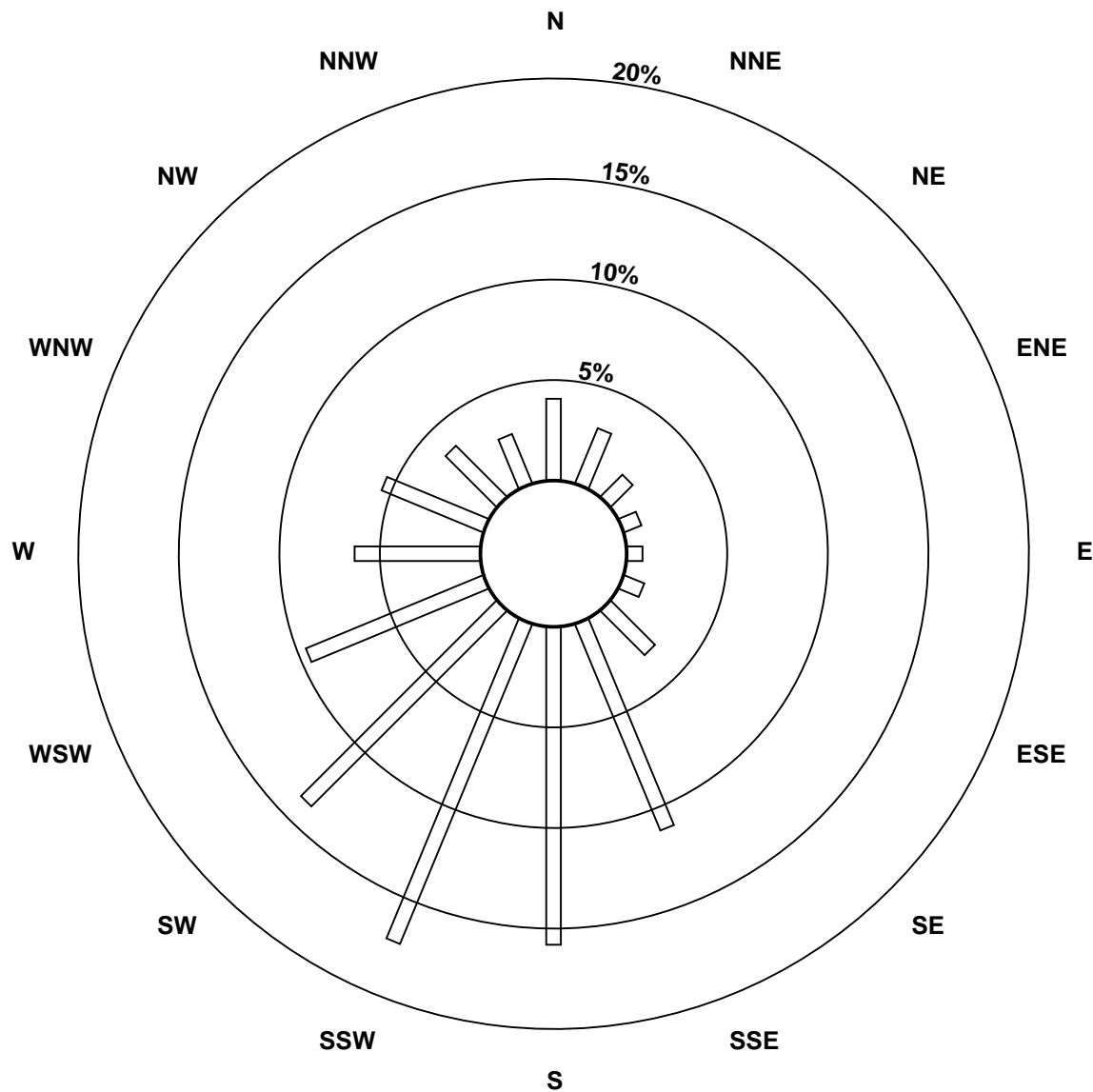
Total Number of Valid Hours: 639

Total Number of Hours: 744

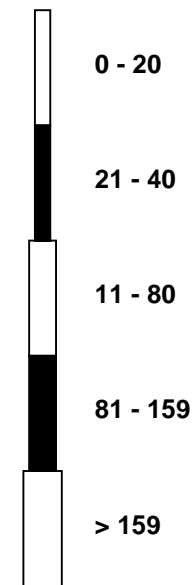


Wood Buffalo Environmental Association
Wind Rose Aug 2017

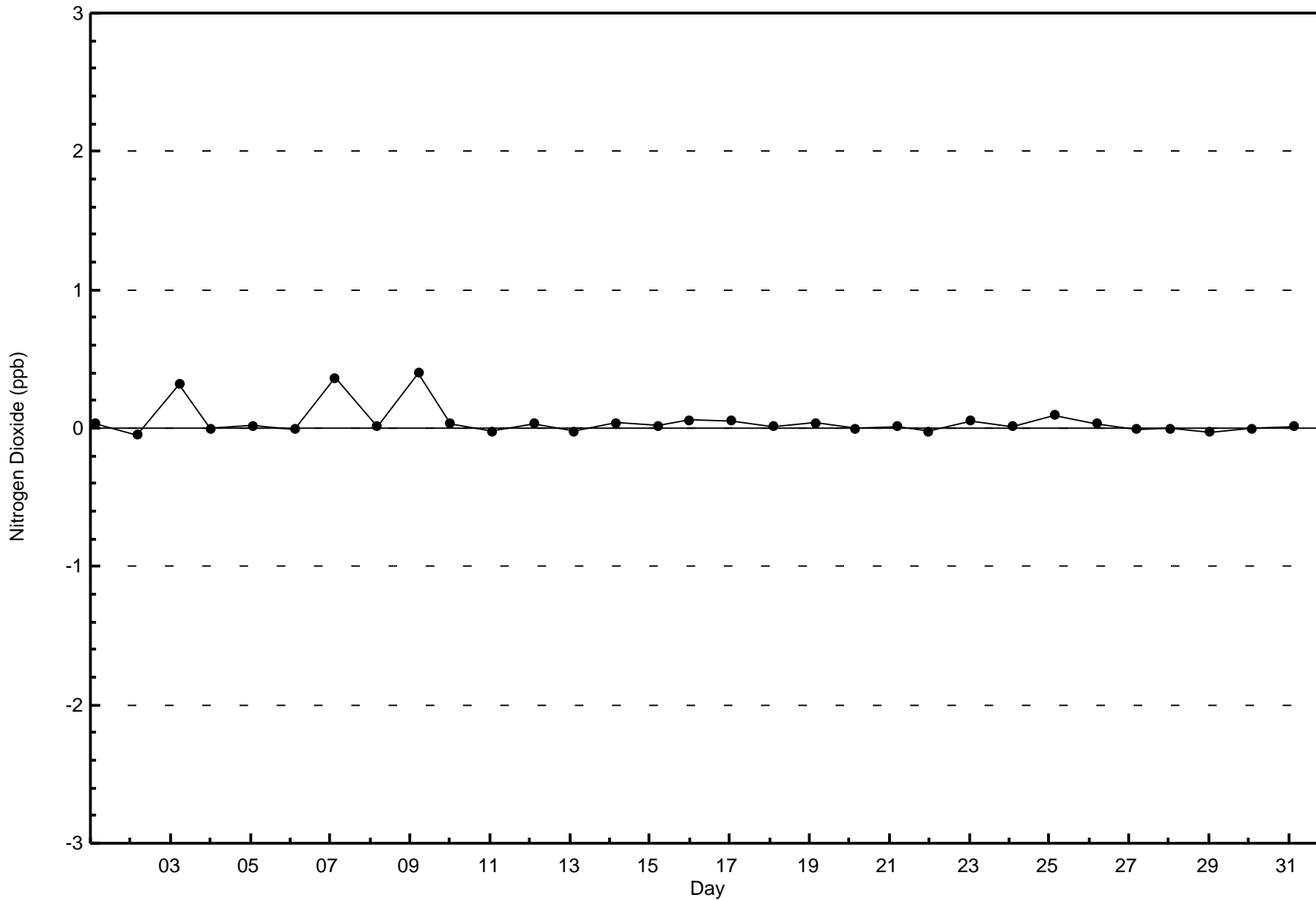
Nitrogen Dioxide (NO₂) - ppb
Fort McKay South (AMS 13)

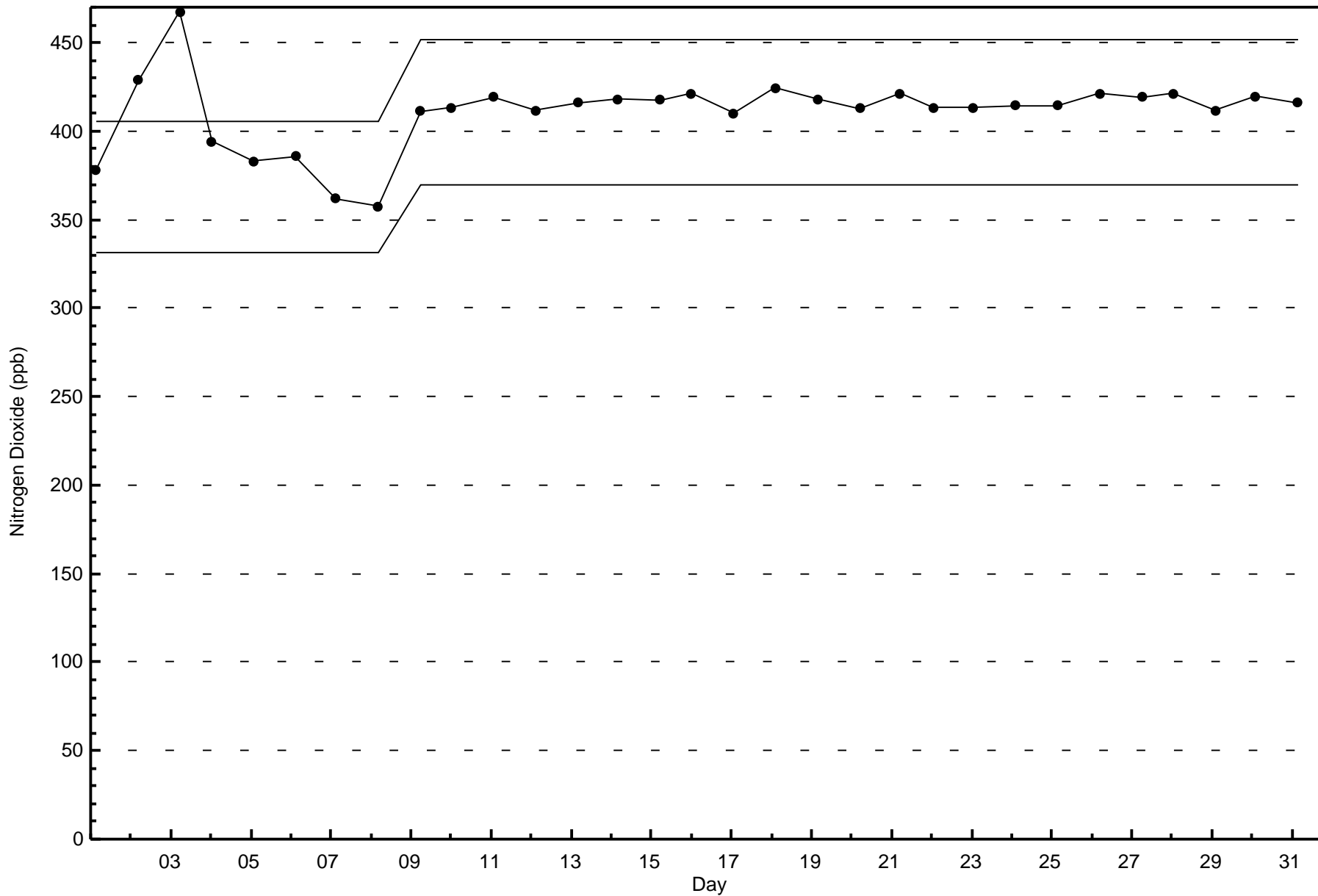


Classes (ppb)



Total Number of Valid Hours: 639







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb

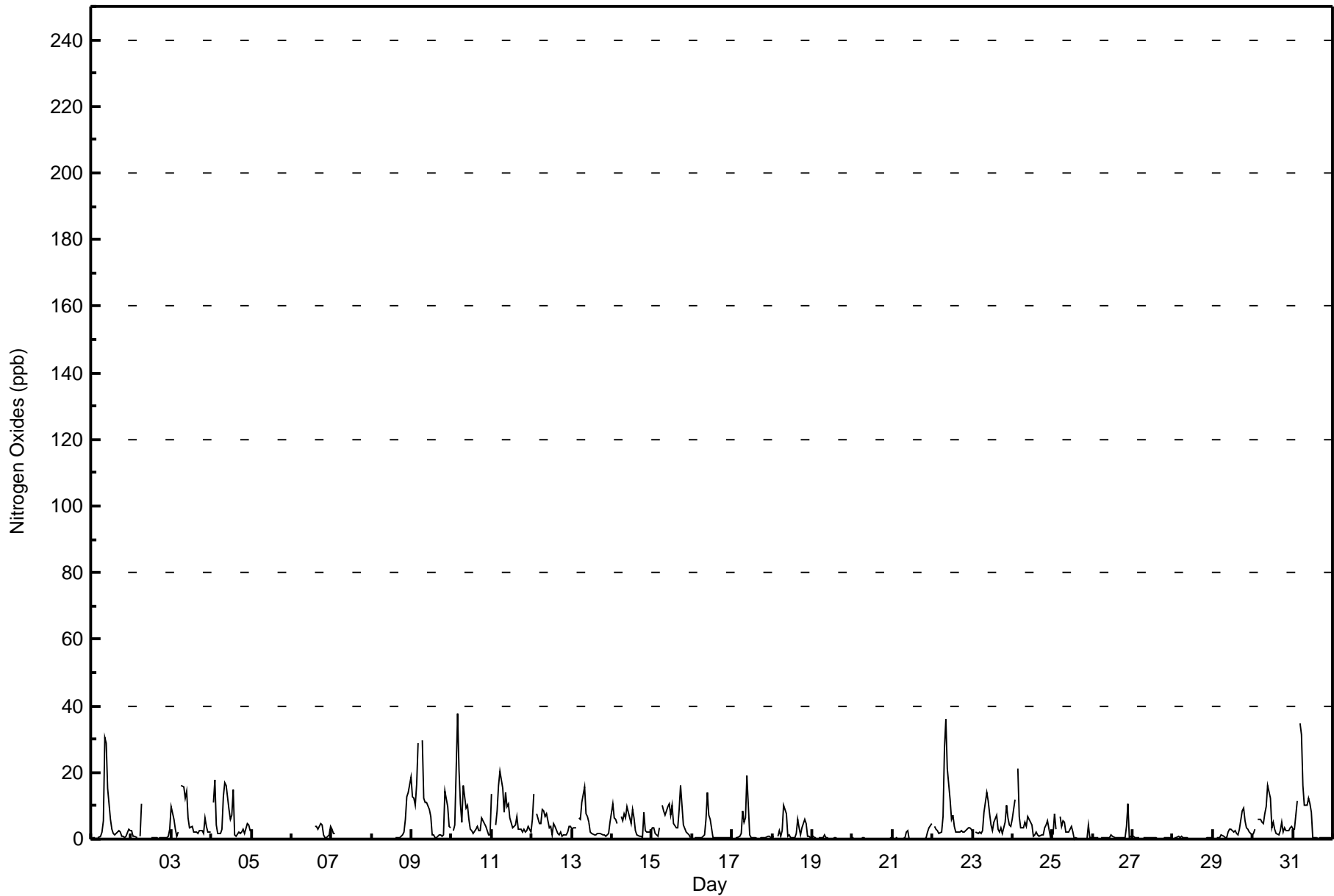
Fort McKay South - August 2017

| Maximum Value: 38 ppb on Aug 10 04:00 | | Maximum Daily Average: 8.7 ppb on Aug 9 | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|--|-----------------|--------------------------------|----|----|-----------------|----|----|----|-----------------------|----|----|----|----|----|----|----|----|----|----|----|----|-----------------|---------------|---------------|
| Minimum Value: 0 ppb on Aug 20 16:00 | | Minimum Daily Average: 0.2 ppb on Aug 20 | | Hours of Data: 640 | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 9.0 ppb at hour 10 | | Minimum Diurnal Average: 1.5 ppb at hour 16 | | Hours of Missing Data: 104 | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 3.8 ppb | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 2 Q ₃ = 5 P ₉₀ = 10 P ₉₉ = 29 | | Hours of Calibration: 38 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Percent Operational Time: 91.1 | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0 | 0 | 0 | Z | 0 | 1 | 2 | 5 | 30 | 29 | 15 | 6 | 3 | 1 | 1 | 2 | 3 | 2 | 1 | 1 | 1 | 1 | 3 | 3 | 4.8 | 30 |
| 2-Aug | 3 | 1 | 1 | 1 | Z | 1 | 11 | C | C | C | C | C | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 3 | 1.4 | 11 |
| 3-Aug | 10 | 6 | 3 | 1 | 2 | Z | 16 | 16 | 12 | 15 | 6 | 3 | 4 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 6 | 4 | 2 | 2 | 5.3 | 16 |
| 4-Aug | Z | 11 | 18 | 4 | 2 | 2 | 3 | 13 | 17 | 16 | 9 | 6 | 7 | 15 | 1 | 1 | 2 | 2 | 2 | 3 | 2 | 5 | 4 | 3 | 6.3 | 18 |
| 5-Aug | 3 | Z | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- | 3 |
| 6-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | M | M | M | M | 4 | 4 | 3 | 5 | 4 | 1 | 0 | 0 | 1 | 4 | -- | 5 |
| 7-Aug | 3 | 2 | 1 | Z | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- | 3 |
| 8-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | C | C | C | C | 1 | 0 | 0 | 0 | 1 | 2 | 6 | 13 | 14 | 19 | -- | 19 |
| 9-Aug | 13 | 12 | 10 | 17 | 29 | Z | 30 | 12 | 11 | 11 | 9 | 7 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 14 | 10 | 4 | 4 | 8.7 | 30 |
| 10-Aug | Z | 2 | 4 | 38 | 21 | 11 | 5 | 16 | 9 | 10 | 6 | 3 | 3 | 2 | 3 | 4 | 3 | 2 | 6 | 4 | 4 | 3 | 1 | 1 | 7.0 | 38 |
| 11-Aug | 13 | Z | 4 | 8 | 16 | 20 | 15 | 8 | 14 | 10 | 11 | 6 | 3 | 4 | 4 | 7 | 3 | 3 | 2 | 3 | 2 | 3 | 4 | 2 | 7.2 | 20 |
| 12-Aug | 6 | 13 | Z | 8 | 5 | 5 | 9 | 8 | 7 | 8 | 3 | 4 | 1 | 5 | 4 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 4 | 4 | 4.5 | 13 |
| 13-Aug | 3 | 3 | 4 | Z | 6 | 6 | 11 | 16 | 8 | 7 | 5 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 5 | 4.0 | 16 |
| 14-Aug | 10 | 6 | 6 | 5 | Z | 7 | 6 | 7 | 6 | 10 | 8 | 5 | 9 | 6 | 2 | 1 | 1 | 1 | 1 | 8 | 3 | 2 | 2 | 2 | 5.0 | 10 |
| 15-Aug | 3 | 3 | 2 | 1 | 3 | Z | 10 | 9 | 7 | 10 | 10 | 7 | 10 | 5 | 3 | 3 | 9 | 16 | 10 | 4 | 2 | 2 | 1 | 1 | 5.7 | 16 |
| 16-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 14 | 7 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.7 | 14 |
| 17-Aug | 0 | Z | 0 | 0 | 1 | 1 | 8 | 5 | 6 | 19 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 2.1 | 19 |
| 18-Aug | 1 | 1 | Z | 1 | 2 | 1 | 3 | 10 | 8 | 1 | 1 | 1 | 1 | 1 | 2 | 6 | 4 | 1 | 3 | 6 | 5 | 1 | 1 | 1 | 2.6 | 10 |
| 19-Aug | 1 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 20-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 5 | 0.8 | 5 |
| 22-Aug | Z | 4 | 3 | 3 | 2 | 2 | 7 | 27 | 36 | 21 | 12 | 6 | 7 | 4 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 6.9 | 36 |
| 23-Aug | 2 | Z | 2 | 2 | 2 | 2 | 3 | 8 | 14 | 11 | 7 | 4 | 3 | 5 | 7 | 3 | 2 | 3 | 2 | 5 | 10 | 6 | 4 | 4 | 4.9 | 14 |
| 24-Aug | 6 | 12 | Z | 21 | 7 | 3 | 3 | 5 | 4 | 7 | 6 | 4 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 3 | 4 | 5 | 1 | 2 | 4.5 | 21 |
| 25-Aug | 2 | 8 | 3 | Z | 7 | 4 | 6 | 5 | 2 | 2 | 3 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 2.3 | 8 |
| 26-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 11 | 1 | 1 | 1.1 | 11 |
| 27-Aug | 1 | 1 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.4 | 1 |
| 28-Aug | Z | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0.3 | 1 |
| 29-Aug | 1 | Z | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 2 | 3 | 3 | 2 | 3 | 2 | 1 | 3 | 9 | 9 | 6 | 3 | 3 | 2 | 1 | 2.5 | 9 |
| 30-Aug | 2 | 3 | Z | 6 | 6 | 5 | 5 | 7 | 10 | 16 | 12 | 3 | 5 | 3 | 2 | 1 | 2 | 5 | 2 | 3 | 2 | 3 | 3 | 4 | 4.8 | 16 |
| 31-Aug | 3 | 3 | 12 | Z | 35 | 31 | 16 | 10 | 10 | 12 | 11 | 8 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6.7 | 35 |
| 3.6 3.9 3.1 5.3 6.4 4.8 6.3 7.4 8.5 9.0 5.7 3.5 2.5 2.3 1.6 1.5 1.6 2.2 1.9 2.1 2.6 3.0 2.2 2.5 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| 13 13 18 38 35 31 30 27 36 29 15 8 10 15 7 7 9 16 10 8 14 13 14 19 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| Z - zerospan | | | C - Calibration | | | | M - Maintenance | | | | AF - Analyzer Failure | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort McKay South - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 628 | 98.13 | 98.13 |
| 21 - 40 | 12 | 1.88 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 640

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort McKay South - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|---|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 24 | 16 | 10 | 6 | 5 | 7 | 20 | 71 | 97 | 109 | 86 | 61 | 40 | 35 | 23 | 17 | 627 |
| 21 - 40 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 12 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 26 | 19 | 10 | 6 | 5 | 7 | 20 | 71 | 101 | 110 | 88 | 61 | 40 | 35 | 23 | 17 | 639 |

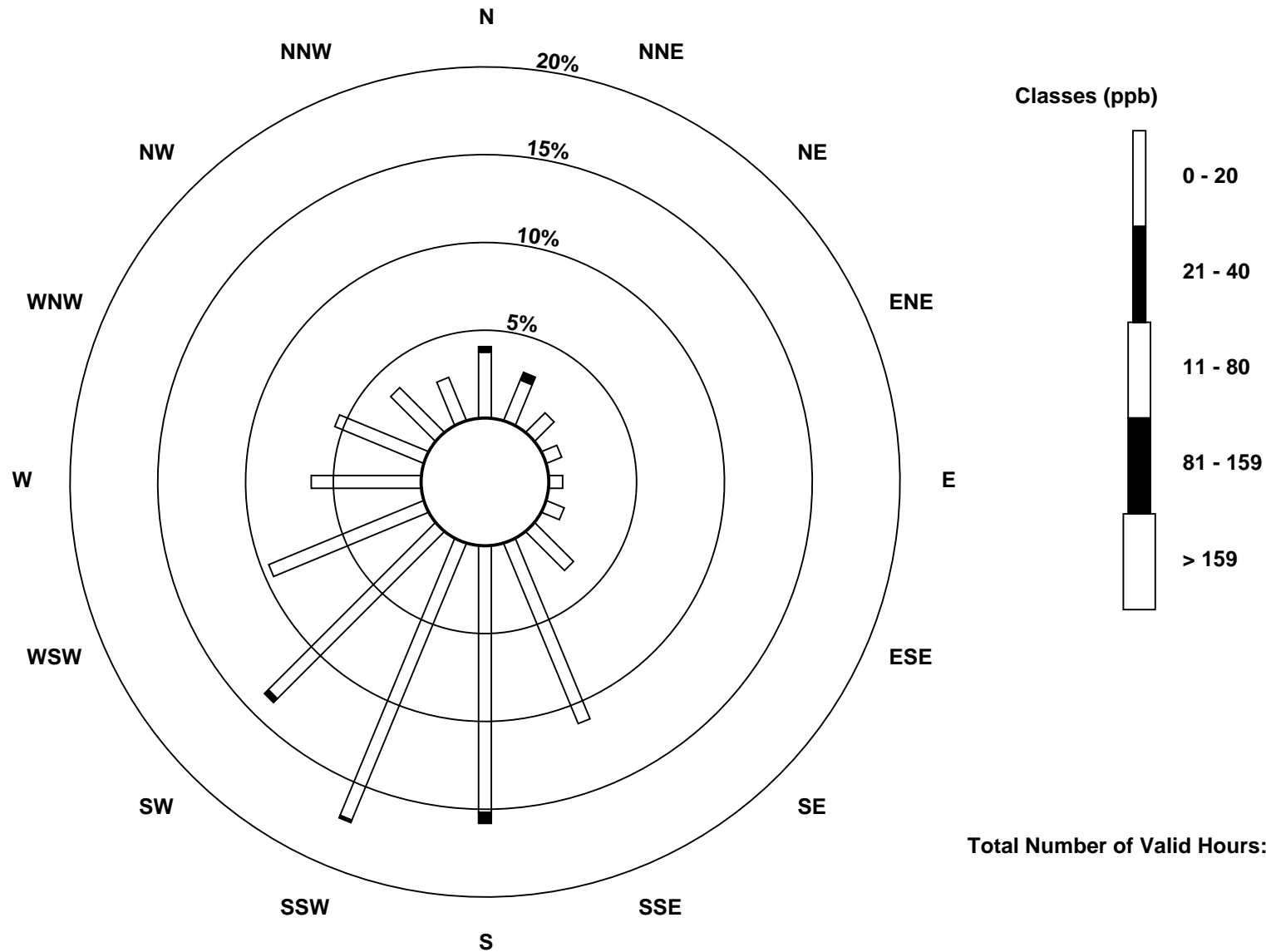
Total Number of Valid Hours: 639

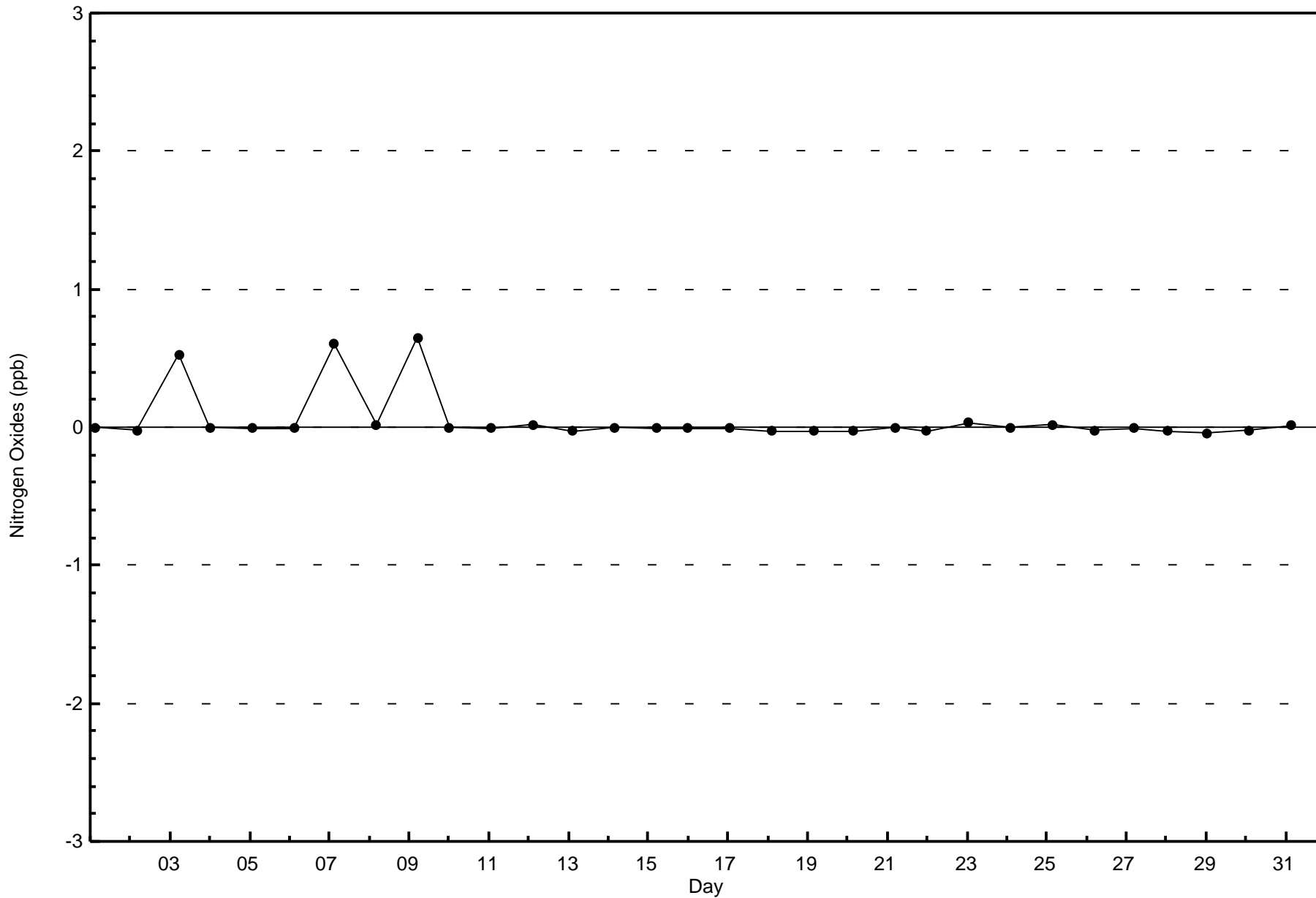
Total Number of Hours: 744

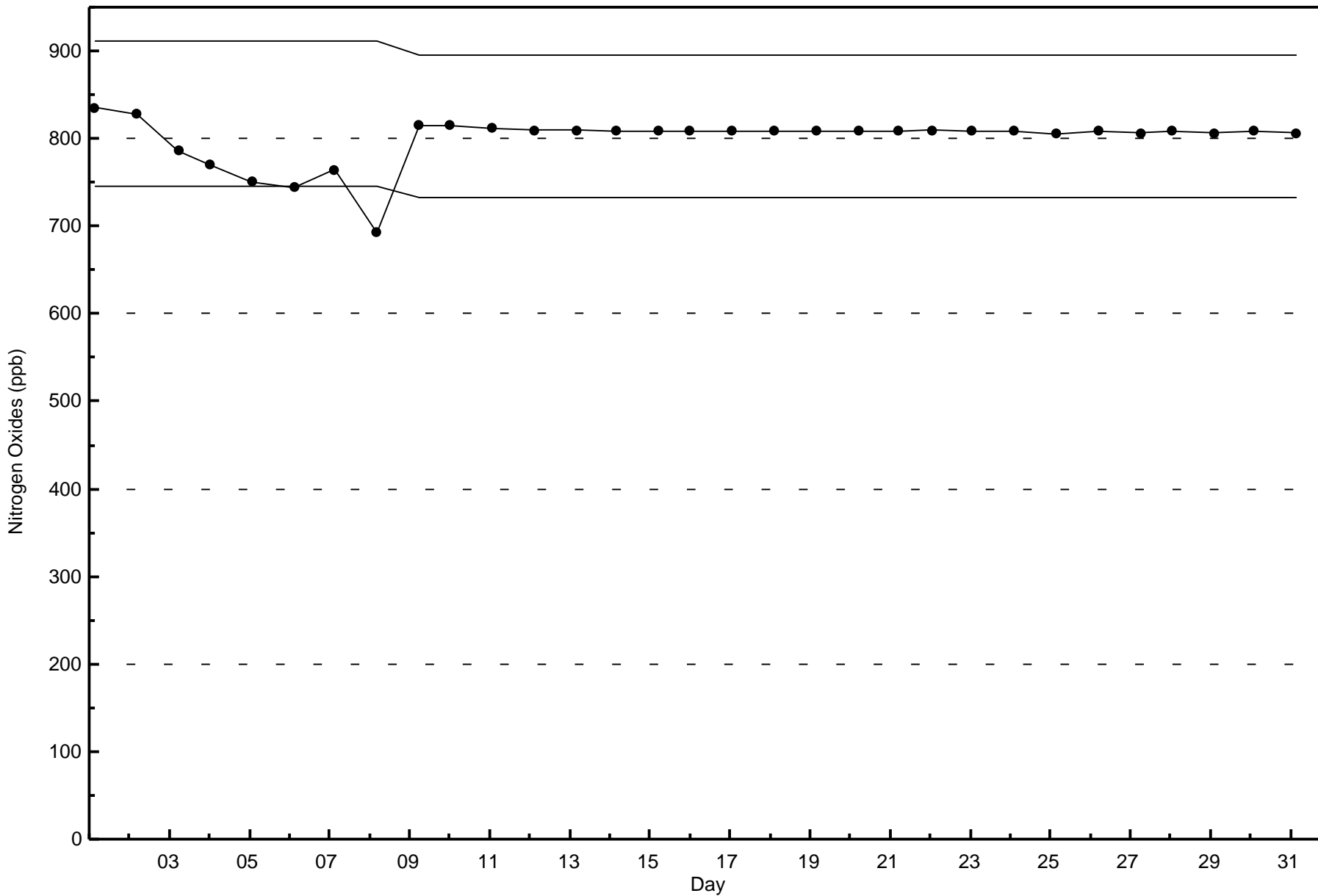


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Oxides (NO_x) - ppb
Fort McKay South (AMS 13)







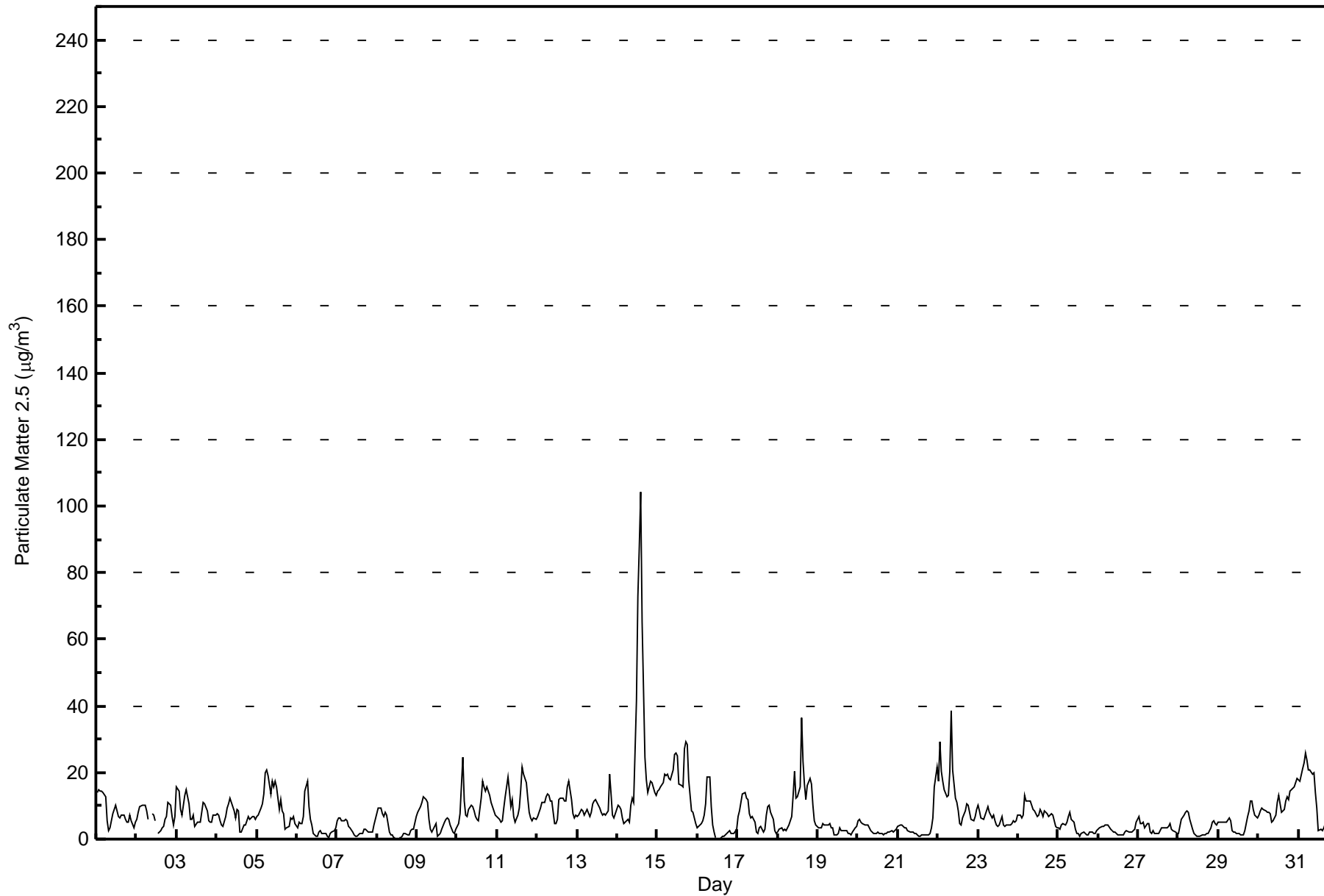


| Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 104.2 µg/m ³ on Aug 14 15:00 Minimum Value: 0.2 µg/m ³ on Aug 16 14:00 Maximum Diurnal Average: 10.0 µg/m ³ at hour 7 Monthly Average: 7.75 µg/m ³ | | Maximum Daily Average: 24.8 µg/m ³ on Aug 14 Minimum Daily Average: 2.7 µg/m ³ on Aug 26 Minimum Diurnal Average: 5.6 µg/m ³ at hour 23 Percentiles: P ₁ = 0.6 P ₁₀ = 1.7 Q ₁ = 3.1 Median = 6.0 Q ₃ = 10.0 P ₉₀ = 15.6 P ₉₉ = 34.5 | | Hours in Service: 744 Hours of Data: 740 Hours of Missing Data: 4 Hours of Calibration: 1 Percent Operational Time: 99.6 | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|---|------|--|------|------|------|------|------|------|------|------|------|------|-------|------|------|------|------|------|------|------|------|-----------------|---------------|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 13.9 | 14.7 | 14.3 | 14.4 | 13.8 | 12.7 | 5.4 | 2.4 | 3.2 | 5.6 | 7.7 | 10.0 | 8.3 | 6.8 | 6.3 | 7.3 | 7.3 | 6.1 | 5.0 | 5.3 | 7.1 | 5.3 | 3.6 | 5.0 | 8.0 | 14.7 |
| 2-Aug | 6.1 | 8.3 | 9.8 | 10.3 | 10.1 | 10.0 | 8.5 | 6.0 | C | 7.5 | 7.1 | 5.3 | UO | 1.8 | 2.4 | 3.4 | 3.9 | 5.8 | 6.7 | 10.9 | 10.3 | 6.8 | 4.3 | 6.7 | 6.9 | 10.9 |
| 3-Aug | 15.5 | 14.5 | 8.8 | 7.4 | 10.0 | 13.0 | 14.7 | 10.4 | 6.0 | 5.8 | 7.0 | 3.8 | 5.0 | 4.9 | 5.2 | 7.9 | 10.9 | 10.6 | 8.6 | 5.7 | 5.2 | 5.1 | 7.1 | 7.2 | 8.4 | 15.5 |
| 4-Aug | 7.6 | 7.1 | 5.5 | 4.2 | 3.8 | 7.0 | 9.1 | 10.6 | 12.1 | 11.1 | 8.6 | 6.2 | 8.7 | 8.4 | 2.1 | 2.1 | 4.2 | 4.3 | 5.5 | 6.6 | 6.1 | 6.8 | 6.6 | 6.0 | 6.7 | 12.1 |
| 5-Aug | 6.9 | 7.3 | 9.3 | 10.7 | 13.6 | 20.0 | 20.6 | 18.9 | 13.6 | 17.3 | 15.6 | 17.3 | 15.6 | 9.1 | 11.9 | 8.6 | 7.5 | 3.1 | 3.5 | 3.8 | 6.3 | 5.8 | 6.9 | 4.6 | 10.7 | 20.6 |
| 6-Aug | 3.5 | 5.3 | 4.8 | 4.8 | 6.9 | 14.2 | 17.3 | 9.7 | 6.1 | 4.2 | 1.5 | 0.9 | 1.0 | 2.1 | 2.7 | 1.7 | 1.9 | 1.6 | 0.9 | 0.3 | 1.5 | 2.2 | 2.7 | 3.6 | 4.2 | 17.3 |
| 7-Aug | 5.6 | 6.2 | 6.3 | 5.6 | 5.3 | 6.1 | 5.6 | 4.0 | 3.2 | 1.9 | 1.1 | 0.7 | 0.9 | 1.2 | 1.7 | 1.9 | 3.1 | 3.1 | 2.5 | 2.3 | 2.0 | 2.0 | 4.3 | 5.8 | 3.4 | 6.3 |
| 8-Aug | 7.8 | 9.5 | 9.4 | 7.6 | 6.7 | 8.0 | 7.4 | 2.0 | 1.4 | 1.3 | 0.6 | 0.2 | UO | 0.3 | 0.6 | 1.0 | 1.6 | 1.7 | 1.4 | 1.5 | 2.3 | 3.1 | 3.0 | 6.7 | 3.7 | 9.5 |
| 9-Aug | 7.9 | 9.0 | 9.7 | 10.9 | 12.6 | 12.0 | 11.0 | 5.8 | 3.1 | 2.3 | 3.8 | 4.6 | 0.8 | 1.4 | 1.8 | 3.1 | 5.2 | 6.0 | 6.5 | 5.9 | 4.0 | 2.3 | 1.7 | 3.1 | 5.6 | 12.6 |
| 10-Aug | 3.9 | 4.6 | 7.8 | 24.4 | 11.4 | 7.0 | 6.8 | 8.8 | 10.3 | 9.8 | 8.6 | 7.0 | 5.9 | 5.7 | 12.3 | 17.4 | 15.6 | 14.4 | 15.7 | 12.9 | 11.2 | 9.8 | 8.4 | 7.3 | 10.3 | 24.4 |
| 11-Aug | 7.0 | 6.0 | 5.1 | 5.7 | 9.1 | 12.6 | 18.8 | 14.3 | 10.0 | 11.8 | 6.6 | 5.3 | 7.0 | 9.4 | 14.8 | 21.8 | 19.4 | 16.8 | 12.3 | 8.1 | 6.3 | 5.5 | 6.4 | 6.1 | 10.3 | 21.8 |
| 12-Aug | 6.9 | 7.9 | 9.3 | 11.0 | 11.1 | 12.9 | 13.4 | 13.1 | 11.6 | 11.3 | 4.7 | 4.8 | 5.7 | 12.1 | 12.4 | 12.5 | 11.4 | 11.3 | 15.8 | 17.2 | 11.9 | 7.5 | 6.5 | 7.2 | 10.4 | 17.2 |
| 13-Aug | 6.7 | 7.2 | 8.8 | 8.7 | 7.4 | 8.0 | 8.9 | 7.0 | 8.2 | 10.5 | 11.3 | 11.9 | 10.9 | 9.3 | 8.1 | 7.1 | 7.6 | 7.4 | 8.4 | 19.6 | 13.5 | 7.4 | 6.3 | 7.8 | 9.1 | 19.6 |
| 14-Aug | 10.2 | 9.8 | 8.9 | 6.2 | 4.5 | 5.6 | 6.0 | 5.0 | 10.0 | 12.5 | 10.9 | 41.6 | 72.7 | 87.8 | 104.2 | 65.4 | 24.7 | 17.9 | 13.9 | 15.8 | 17.2 | 17.0 | 14.1 | 13.3 | 24.8 | 104.2 |
| 15-Aug | 14.4 | 14.8 | 15.6 | 17.0 | 19.5 | 18.9 | 19.5 | 18.1 | 17.9 | 20.6 | 25.3 | 26.0 | 25.1 | 16.6 | 16.2 | 15.8 | 26.9 | 29.0 | 28.4 | 17.8 | 8.4 | 8.0 | 6.5 | 4.9 | 18.0 | 29.0 |
| 16-Aug | 3.5 | 4.1 | 4.5 | 5.3 | 7.4 | 10.5 | 18.5 | 18.5 | 9.7 | 4.4 | 2.0 | 0.6 | UO | 0.2 | 0.4 | 0.7 | 1.0 | 1.6 | 2.0 | 2.7 | 1.7 | 1.6 | 1.8 | 3.0 | 4.6 | 18.5 |
| 17-Aug | 6.6 | 8.4 | 10.8 | 13.5 | 13.8 | 12.4 | 12.0 | 7.8 | 6.2 | 6.8 | 5.2 | 2.3 | 1.5 | 3.3 | 3.9 | 1.9 | 2.9 | 7.4 | 9.8 | 10.2 | 8.0 | 5.9 | 2.4 | 1.7 | 6.9 | 13.8 |
| 18-Aug | 2.2 | 3.0 | 3.2 | 2.6 | 3.0 | 2.7 | 3.6 | 4.3 | 7.0 | 13.3 | 20.4 | 12.1 | 12.8 | 15.5 | 36.5 | 23.2 | 16.6 | 11.7 | 16.3 | 18.3 | 16.7 | 10.2 | 5.6 | 4.4 | 11.0 | 36.5 |
| 19-Aug | 3.5 | 3.3 | 3.6 | 4.6 | 4.2 | 4.1 | 4.1 | 4.5 | 3.3 | 3.2 | 1.4 | 1.4 | 1.8 | 3.2 | 2.6 | 2.4 | 2.7 | 2.5 | 1.7 | 1.6 | 1.5 | 2.2 | 3.3 | 3.9 | 2.9 | 4.6 |
| 20-Aug | 5.7 | 5.7 | 4.9 | 4.6 | 4.4 | 4.2 | 4.4 | 3.6 | 2.4 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.6 | 1.2 | 1.7 | 1.6 | 2.2 | 2.0 | 2.4 | 2.3 | 2.6 | 2.9 | 2.9 | 5.7 |
| 21-Aug | 3.8 | 4.3 | 4.2 | 3.9 | 3.3 | 3.3 | 2.4 | 1.9 | 2.1 | 2.0 | 1.6 | 1.6 | 1.0 | 1.0 | 1.1 | 1.2 | 1.1 | 1.2 | 1.3 | 1.7 | 3.4 | 6.3 | 15.5 | 21.5 | 3.8 | 21.5 |
| 22-Aug | 17.3 | 29.2 | 20.2 | 17.4 | 15.0 | 12.6 | 13.0 | 20.2 | 38.7 | 20.9 | 12.2 | 11.0 | 8.6 | 4.9 | 4.4 | 6.2 | 8.6 | 10.8 | 10.2 | 7.9 | 6.1 | 5.4 | 7.0 | 8.8 | 13.2 | 38.7 |
| 23-Aug | 10.0 | 8.5 | 6.2 | 6.0 | 7.4 | 8.6 | 9.6 | 7.9 | 6.4 | 7.0 | 5.7 | 4.2 | 3.8 | 4.1 | 6.8 | 4.4 | 3.9 | 4.3 | 4.3 | 4.4 | 4.8 | 5.7 | 5.1 | 5.5 | 6.0 | 10.0 |
| 24-Aug | 7.1 | 7.3 | 6.5 | 7.1 | 13.0 | 11.3 | 11.3 | 11.5 | 10.1 | 8.8 | 8.5 | 6.9 | 7.2 | 8.7 | 7.9 | 6.7 | 8.4 | 7.7 | 6.8 | 7.2 | 7.5 | 7.2 | 3.6 | 3.5 | 8.0 | 13.0 |
| 25-Aug | 3.2 | 3.1 | 4.1 | 4.7 | 4.3 | 5.2 | 6.9 | 7.9 | 5.7 | 5.2 | 2.9 | 1.6 | 1.5 | 1.0 | 1.7 | 2.1 | 1.7 | 1.4 | 1.4 | 2.3 | 2.2 | 1.9 | 1.6 | 2.7 | 3.2 | 7.9 |
| 26-Aug | 3.0 | 3.5 | 3.8 | 3.8 | 4.1 | 4.3 | 4.2 | 2.8 | 2.3 | 2.3 | 2.0 | 1.6 | 1.4 | 1.3 | 1.2 | 1.5 | 2.3 | 2.4 | 2.3 | 2.0 | 2.1 | 2.7 | 2.9 | 5.1 | 2.7 | 5.1 |
| 27-Aug | 6.7 | 4.5 | 4.5 | 5.0 | 3.5 | 4.6 | 4.6 | 2.3 | 1.9 | 2.6 | 1.7 | 1.5 | 1.9 | 2.6 | 3.3 | 3.5 | 3.5 | 3.2 | 3.7 | 4.5 | 2.9 | 2.5 | 2.0 | 1.7 | 3.3 | 6.7 |
| 28-Aug | 1.9 | 3.7 | 6.0 | 7.2 | 7.9 | 8.6 | 8.0 | 6.0 | 2.8 | 1.7 | 1.4 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.4 | 1.6 | 1.8 | 3.3 | 5.2 | 5.4 | 4.6 | 4.4 | 3.7 | 8.6 |
| 29-Aug | 5.1 | 5.2 | 5.0 | 5.2 | 5.1 | 5.2 | 6.3 | 5.3 | 2.6 | 2.1 | 1.9 | 1.6 | 1.6 | 1.4 | 1.2 | 1.4 | 2.7 | 6.7 | 8.5 | 11.5 | 11.5 | 9.0 | 7.2 | 6.2 | 5.0 | 11.5 |
| 30-Aug | 7.4 | 8.7 | 9.1 | 8.9 | 8.4 | 7.9 | 8.0 | 7.7 | 5.2 | 5.6 | 7.2 | 10.8 | 13.2 | 10.4 | 8.1 | 8.9 | 11.3 | 12.6 | 11.8 | 14.4 | 14.9 | 15.6 | 16.9 | 18.4 | 10.5 | 18.4 |
| 31-Aug | 17.6 | 17.4 | 21.0 | 22.8 | 26.0 | 23.9 | 20.9 | 20.9 | 19.7 | 20.0 | 14.1 | 9.4 | 2.7 | 2.8 | 2.7 | 3.2 | 4.5 | 4.7 | 4.9 | 5.7 | 4.3 | 4.0 | 4.1 | 4.6 | 11.7 | 26.0 |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| 7.4 8.1 8.1 8.8 8.9 9.6 10.0 8.7 8.1 7.8 6.8 6.9 8.2 7.7 9.3 8.0 7.3 7.1 7.2 7.5 6.7 5.9 5.6 6.2 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| 17.6 29.2 21.0 24.4 26.0 23.9 20.9 20.9 38.7 20.9 25.3 41.6 72.7 87.8 104.2 65.4 26.9 29.0 28.4 19.6 17.2 17.0 16.9 21.5 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| C - Calibration UO - Unstable Operation | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³ | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay South - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay South - August 2017

| Concentration Ranges ($\mu\text{g}/\text{m}^3$) | Number of Hours | % | Cumulative % |
|---|------------------------|----------|---------------------|
| 1 - 5 | 319 | 43.11 | 43.11 |
| 6 - 15 | 324 | 43.78 | 86.89 |
| 16 - 25 | 66 | 8.92 | 95.81 |
| 26 - 80 | 11 | 1.49 | 97.30 |
| > 81.0 | 2 | 0.27 | 97.57 |

Total Number of Valid Hours: 740

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Fort McKay South - August 2017

| Concentration Ranges (μg/m ³) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|--|----------------|-----|----|-----|---|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 1 - 5 | 8 | 8 | 4 | 4 | 1 | 2 | 3 | 19 | 32 | 65 | 61 | 44 | 29 | 22 | 9 | 7 | 318 |
| 6 - 15 | 18 | 12 | 2 | 3 | 5 | 5 | 17 | 47 | 62 | 52 | 28 | 25 | 13 | 10 | 14 | 11 | 324 |
| 16 - 25 | 8 | 0 | 3 | 0 | 1 | 2 | 3 | 7 | 15 | 11 | 6 | 1 | 0 | 2 | 2 | 5 | 66 |
| 26 - 80 | 0 | 1 | 2 | 0 | 0 | 0 | 1 | 0 | 3 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 11 |
| > 81.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Totals | 34 | 21 | 11 | 7 | 7 | 9 | 24 | 73 | 113 | 130 | 96 | 70 | 43 | 34 | 25 | 24 | 721 |

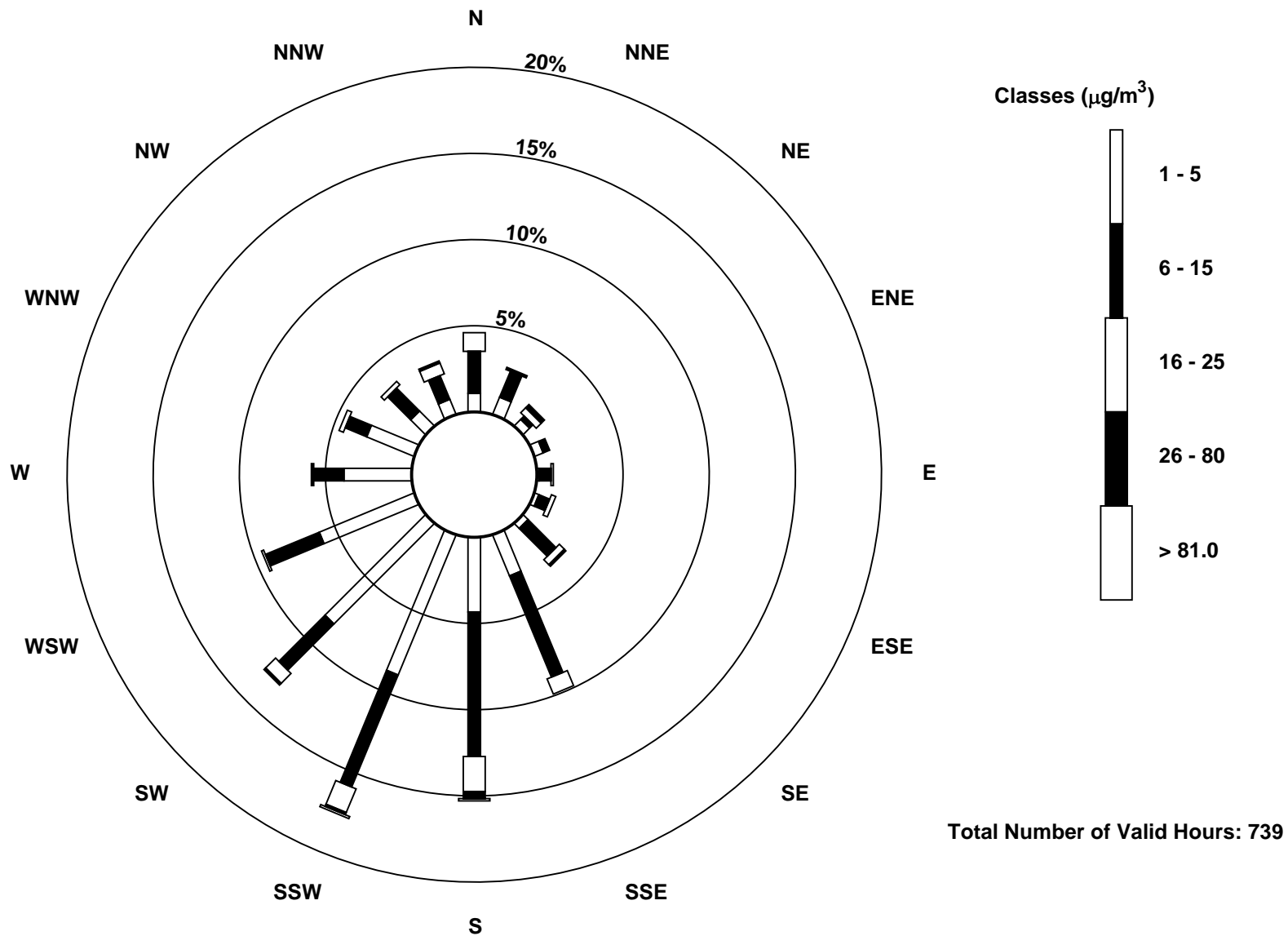
Total Number of Valid Hours: 739

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay South (AMS 13)





Wood Buffalo Environmental Association
Summary of Hour Averages

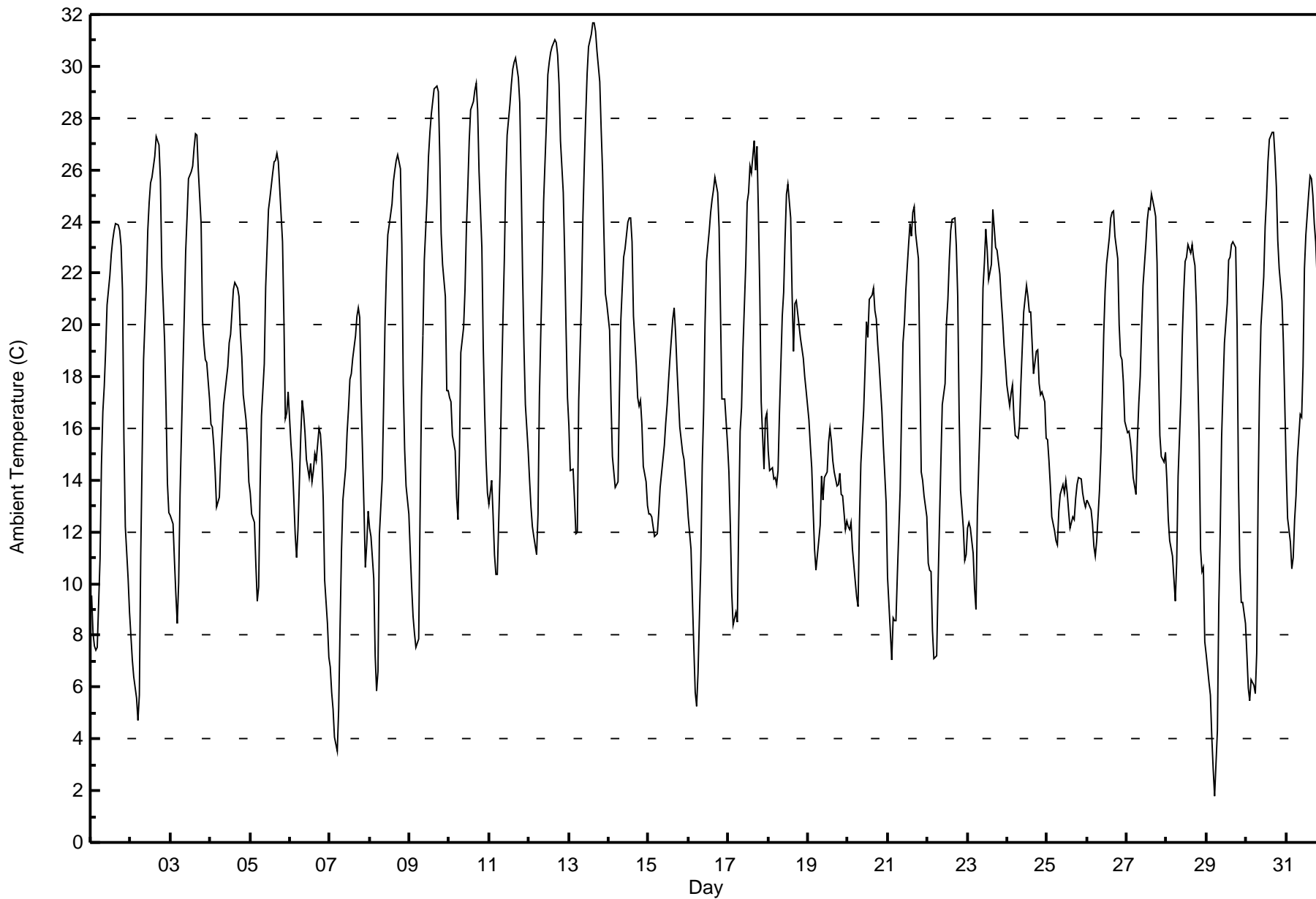
Ambient Temperature (AT) - C
Fort McKay South - August 2017

| Maximum Value: 31.7 C on Aug 13 16:00 Maximum Daily Average: 23.5 C on Aug 13 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 | | | | |
|--|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|------|-----------------|---------------|---------------|
| Minimum Value: 1.8 C on Aug 29 06:00 Minimum Daily Average: 13.0 C on Aug 7 Maximum Diurnal Average: 23.9 C at hour 16 Minimum Diurnal Average: 9.8 C at hour 5 Monthly Average: 17.51 C Percentiles: P ₁ = 5.1 P ₁₀ = 10.0 Q ₁ = 13.0 Median = 17.0 Q ₃ = 22.5 P ₉₀ = 25.8 P ₉₉ = 30.6 | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 9.5 | 8.1 | 7.6 | 7.4 | 7.6 | 11.0 | 14.6 | 16.6 | 17.6 | 19.1 | 20.8 | 21.9 | 22.8 | 23.3 | 23.7 | 23.9 | 23.9 | 23.7 | 23.1 | 21.3 | 15.6 | 12.2 | 10.2 | 8.9 | 16.4 | 23.9 |
| 2-Aug | 8.0 | 7.1 | 6.4 | 5.6 | 4.7 | 5.7 | 11.1 | 15.0 | 18.7 | 21.6 | 23.7 | 24.7 | 25.5 | 25.7 | 26.5 | 27.3 | 27.1 | 27.0 | 25.6 | 22.3 | 19.4 | 16.8 | 13.9 | 12.7 | 17.6 | 27.3 |
| 3-Aug | 12.6 | 12.3 | 10.9 | 9.6 | 8.5 | 10.0 | 13.5 | 18.2 | 20.4 | 22.8 | 24.2 | 25.6 | 25.9 | 26.2 | 26.8 | 27.4 | 27.3 | 26.0 | 23.9 | 20.2 | 19.2 | 18.7 | 18.5 | 17.1 | 19.4 | 27.4 |
| 4-Aug | 16.2 | 16.0 | 15.4 | 14.3 | 13.0 | 13.3 | 14.8 | 15.9 | 16.9 | 17.4 | 18.4 | 19.3 | 19.6 | 20.5 | 21.4 | 21.6 | 21.4 | 21.1 | 19.7 | 18.8 | 17.3 | 16.3 | 15.5 | 14.0 | 17.4 | 21.6 |
| 5-Aug | 13.5 | 12.7 | 12.4 | 10.7 | 9.3 | 9.9 | 13.7 | 16.5 | 18.5 | 21.5 | 23.0 | 24.5 | 24.9 | 25.9 | 26.3 | 26.4 | 26.6 | 26.3 | 25.3 | 23.2 | 20.2 | 16.4 | 16.6 | 17.4 | 19.2 | 26.6 |
| 6-Aug | 15.4 | 14.6 | 13.3 | 11.9 | 11.0 | 12.1 | 15.7 | 17.1 | 16.6 | 15.8 | 14.8 | 14.1 | 14.6 | 14.0 | 14.4 | 15.0 | 14.8 | 16.0 | 15.8 | 14.9 | 13.2 | 10.1 | 8.5 | 7.2 | 13.8 | 17.1 |
| 7-Aug | 6.8 | 5.8 | 5.1 | 4.1 | 3.5 | 5.2 | 8.4 | 11.3 | 13.2 | 14.5 | 15.9 | 16.7 | 17.9 | 18.1 | 18.7 | 19.6 | 20.3 | 20.7 | 20.3 | 17.1 | 13.0 | 10.7 | 11.5 | 12.8 | 13.0 | 20.7 |
| 8-Aug | 12.1 | 11.8 | 10.2 | 7.2 | 5.8 | 6.6 | 11.9 | 14.1 | 16.9 | 20.0 | 22.1 | 23.5 | 23.9 | 24.7 | 25.6 | 26.0 | 26.4 | 26.6 | 26.1 | 23.1 | 17.7 | 15.2 | 13.8 | 12.7 | 17.7 | 26.6 |
| 9-Aug | 11.3 | 9.9 | 8.7 | 8.1 | 7.5 | 7.8 | 12.7 | 17.2 | 19.6 | 22.5 | 24.9 | 26.5 | 27.4 | 28.1 | 28.6 | 29.1 | 29.2 | 29.0 | 26.6 | 23.5 | 22.3 | 21.1 | 17.5 | 17.5 | 19.9 | 29.2 |
| 10-Aug | 17.2 | 17.0 | 15.8 | 15.1 | 13.3 | 12.5 | 15.0 | 18.9 | 19.9 | 21.4 | 23.8 | 25.3 | 27.1 | 28.3 | 28.7 | 29.1 | 29.3 | 28.3 | 25.9 | 23.0 | 19.1 | 16.7 | 14.8 | 13.5 | 20.8 | 29.3 |
| 11-Aug | 13.1 | 14.0 | 12.6 | 11.1 | 10.3 | 10.3 | 14.4 | 17.6 | 20.2 | 22.5 | 25.5 | 27.4 | 28.5 | 29.3 | 29.9 | 30.2 | 30.3 | 29.6 | 28.6 | 25.6 | 22.0 | 19.2 | 16.9 | 15.2 | 21.0 | 30.3 |
| 12-Aug | 14.0 | 12.9 | 12.2 | 11.8 | 11.1 | 12.7 | 17.3 | 19.7 | 22.0 | 24.8 | 27.8 | 29.7 | 30.1 | 30.5 | 30.7 | 31.0 | 30.9 | 30.4 | 29.3 | 27.1 | 25.1 | 22.7 | 19.8 | 17.2 | 22.6 | 31.0 |
| 13-Aug | 16.1 | 14.4 | 14.4 | 13.3 | 12.0 | 12.0 | 17.1 | 21.1 | 24.2 | 26.2 | 28.1 | 29.7 | 30.7 | 31.2 | 31.7 | 31.7 | 31.4 | 30.6 | 29.4 | 27.6 | 25.9 | 23.4 | 21.2 | 20.8 | 23.5 | 31.7 |
| 14-Aug | 19.8 | 17.1 | 14.9 | 14.3 | 13.7 | 13.9 | 17.3 | 20.2 | 21.4 | 22.6 | 22.9 | 24.0 | 24.1 | 24.1 | 23.2 | 20.3 | 18.4 | 17.2 | 16.9 | 17.1 | 16.2 | 14.5 | 13.9 | 13.0 | 18.4 | 24.1 |
| 15-Aug | 12.7 | 12.7 | 12.6 | 11.8 | 11.9 | 11.9 | 12.8 | 13.7 | 14.3 | 15.3 | 16.2 | 16.9 | 17.8 | 18.7 | 20.2 | 20.7 | 19.7 | 18.3 | 17.2 | 16.1 | 15.1 | 14.8 | 14.1 | 13.5 | 15.4 | 20.7 |
| 16-Aug | 12.6 | 11.3 | 9.4 | 7.6 | 5.8 | 5.2 | 6.6 | 10.9 | 14.6 | 16.7 | 20.1 | 22.5 | 23.7 | 24.4 | 24.8 | 25.2 | 25.7 | 25.1 | 23.8 | 20.5 | 17.1 | 17.1 | 17.1 | 15.4 | 16.8 | 25.7 |
| 17-Aug | 14.3 | 12.2 | 9.7 | 8.4 | 8.9 | 8.5 | 12.5 | 15.9 | 16.8 | 19.1 | 22.3 | 24.8 | 25.1 | 26.2 | 25.8 | 27.1 | 26.0 | 26.9 | 24.4 | 21.3 | 17.1 | 14.4 | 16.4 | 16.6 | 18.4 | 27.1 |
| 18-Aug | 15.2 | 14.4 | 14.5 | 14.0 | 14.1 | 13.8 | 14.4 | 16.6 | 20.3 | 21.2 | 23.3 | 25.1 | 25.4 | 24.1 | 21.2 | 19.0 | 20.8 | 20.9 | 20.4 | 19.5 | 19.1 | 18.7 | 18.0 | 17.5 | 18.8 | 25.4 |
| 19-Aug | 16.3 | 15.3 | 14.5 | 12.9 | 11.3 | 10.5 | 11.7 | 12.2 | 14.2 | 13.2 | 14.1 | 14.3 | 15.4 | 16.0 | 15.5 | 14.7 | 14.3 | 13.8 | 13.8 | 14.3 | 13.4 | 13.4 | 12.1 | 12.4 | 13.7 | 16.3 |
| 20-Aug | 12.2 | 12.1 | 12.4 | 11.3 | 10.1 | 9.5 | 9.1 | 12.4 | 14.6 | 16.7 | 18.4 | 20.1 | 19.5 | 21.0 | 21.2 | 21.4 | 20.6 | 20.2 | 19.3 | 18.5 | 16.6 | 15.3 | 14.3 | 13.2 | 15.8 | 21.4 |
| 21-Aug | 10.2 | 8.1 | 7.1 | 8.7 | 8.6 | 8.6 | 10.4 | 13.6 | 16.7 | 19.3 | 20.1 | 21.3 | 23.1 | 23.9 | 23.4 | 24.4 | 24.6 | 23.5 | 22.5 | 18.4 | 14.3 | 14.0 | 13.4 | 12.6 | 16.3 | 24.6 |
| 22-Aug | 10.8 | 10.5 | 10.5 | 8.2 | 7.1 | 7.2 | 10.0 | 12.4 | 14.7 | 16.9 | 17.7 | 20.1 | 21.0 | 22.5 | 23.7 | 24.1 | 24.2 | 23.0 | 21.1 | 16.6 | 13.6 | 12.2 | 10.9 | 11.1 | 15.4 | 24.2 |
| 23-Aug | 12.1 | 12.4 | 12.2 | 11.2 | 9.8 | 9.0 | 12.8 | 14.6 | 18.2 | 21.4 | 22.4 | 23.7 | 22.9 | 21.7 | 22.4 | 24.4 | 23.7 | 23.0 | 22.9 | 22.0 | 21.0 | 20.2 | 19.2 | 18.5 | 18.4 | 24.4 |
| 24-Aug | 17.7 | 16.9 | 17.3 | 17.7 | 16.5 | 15.7 | 15.6 | 16.1 | 17.7 | 19.2 | 20.5 | 21.5 | 21.1 | 20.5 | 20.5 | 19.3 | 18.1 | 19.0 | 19.0 | 17.7 | 17.3 | 17.4 | 17.0 | 15.6 | 18.1 | 21.5 |
| 25-Aug | 15.5 | 14.7 | 13.8 | 12.6 | 12.0 | 11.7 | 11.5 | 12.8 | 13.5 | 13.8 | 13.5 | 14.0 | 13.5 | 12.8 | 12.2 | 12.6 | 12.5 | 13.3 | 13.8 | 14.1 | 14.1 | 13.5 | 13.2 | 13.0 | 13.2 | 15.5 |
| 26-Aug | 13.2 | 13.1 | 12.8 | 12.3 | 11.4 | 11.1 | 11.7 | 13.6 | 15.1 | 17.2 | 19.7 | 21.3 | 22.3 | 23.4 | 24.1 | 24.3 | 24.4 | 23.4 | 22.6 | 20.0 | 18.8 | 18.6 | 17.8 | 16.3 | 17.9 | 24.4 |
| 27-Aug | 15.8 | 15.9 | 15.5 | 14.9 | 14.1 | 13.4 | 15.6 | 17.0 | 18.0 | 19.9 | 21.5 | 23.1 | 24.0 | 24.5 | 24.4 | 25.1 | 24.5 | 24.2 | 22.4 | 18.6 | 15.7 | 14.9 | 14.7 | 15.1 | 18.9 | 25.1 |
| 28-Aug | 14.0 | 12.5 | 11.7 | 11.0 | 10.2 | 9.3 | 10.9 | 14.2 | 17.2 | 19.6 | 21.3 | 22.5 | 22.6 | 23.1 | 22.8 | 23.1 | 22.6 | 22.3 | 20.8 | 15.6 | 11.3 | 10.5 | 10.6 | 7.7 | 16.1 | 23.1 |
| 29-Aug | 7.3 | 6.2 | 5.7 | 4.1 | 2.8 | 1.8 | 4.3 | 9.2 | 12.0 | 15.7 | 17.6 | 19.3 | 20.8 | 22.5 | 22.6 | 23.1 | 23.2 | 23.0 | 19.9 | 13.9 | 10.6 | 9.3 | 9.3 | 8.4 | 13.0 | 23.2 |
| 30-Aug | 7.3 | 6.0 | 5.5 | 6.3 | 6.1 | 5.8 | 7.3 | 13.5 | 17.5 | 19.9 | 21.9 | 23.8 | 24.9 | 26.3 | 27.2 | 27.5 | 27.4 | 26.5 | 25.3 | 23.2 | 22.2 | 21.0 | 19.3 | 16.9 | 17.9 | 27.5 |
| 31-Aug | 14.4 | 12.5 | 11.6 | 10.6 | 11.0 | 12.5 | 13.4 | 14.9 | 16.5 | 16.4 | 18.4 | 22.2 | 23.5 | 25.0 | 25.7 | 25.7 | 25.0 | 23.9 | 23.2 | 20.4 | 17.2 | 16.1 | 15.8 | 15.0 | 18.0 | 25.7 |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Fort McKay South - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Fort McKay South - August 2017**

| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 75 | 10.08 | 10.08 |
| 10 - 20 | 401 | 53.90 | 63.98 |
| > 20 | 268 | 36.02 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



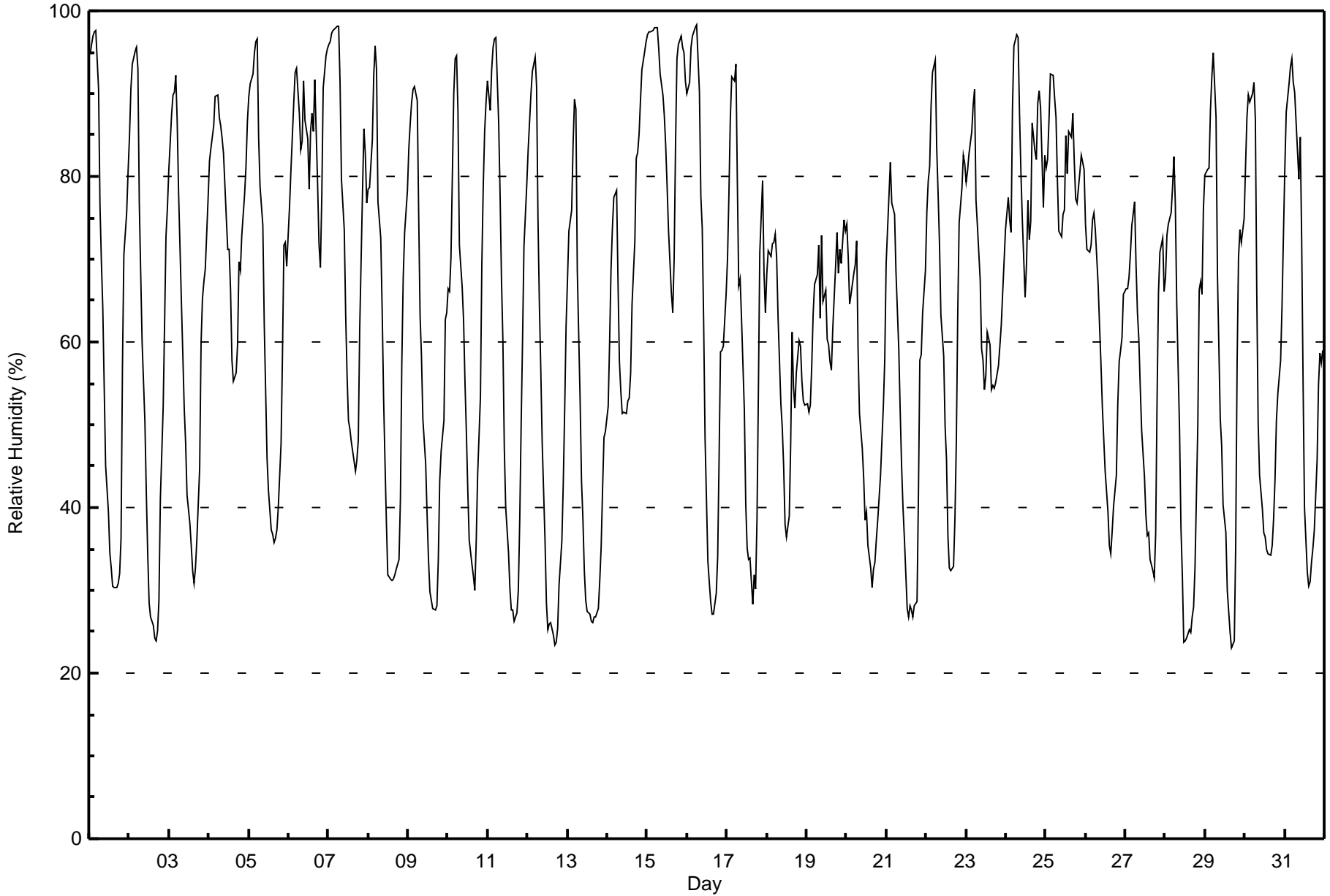
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Fort McKay South - August 2017

| Maximum Value: 98 % on Aug 16 07:00 | | | | | | | | | | | | | | | | | | | Maximum Daily Average: 89.0 % on Aug 15 | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|------|---------------------------------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|
| Minimum Value: 23 % on Aug 29 17:00 | | | | | | | | | | | | | | | | | | | Minimum Daily Average: 47.4 % on Aug 13 | | | | | | Hours of Data: 744 | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 88.2 % at hour 6 | | | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 40.8 % at hour 16 | | | | | | Hours of Missing Data: 0 | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 63.3 % | | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 24 P ₁₀ = 31 Q ₁ = 44 Median = 66 O ₃ = 82 P ₉₀ = 91 P ₉₉ = 98 | | | | | | Hours of Calibration: 0 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 95 | 96 | 97 | 97 | 98 | 91 | 76 | 70 | 64 | 54 | 45 | 39 | 35 | 33 | 31 | 30 | 30 | 31 | 32 | 36 | 57 | 70 | 76 | 80 | 61.0 | 98 | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 85 | 90 | 94 | 95 | 96 | 93 | 77 | 68 | 60 | 50 | 42 | 34 | 28 | 27 | 26 | 24 | 24 | 25 | 29 | 41 | 52 | 62 | 73 | 76 | 57.1 | 96 | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 81 | 87 | 90 | 90 | 92 | 87 | 78 | 65 | 58 | 52 | 48 | 41 | 38 | 35 | 32 | 31 | 33 | 36 | 45 | 60 | 65 | 67 | 69 | 77 | 60.8 | 92 | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 82 | 83 | 85 | 86 | 90 | 90 | 87 | 86 | 85 | 83 | 75 | 71 | 71 | 66 | 58 | 55 | 56 | 60 | 70 | 69 | 73 | 78 | 81 | 87 | 76.1 | 90 | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 90 | 91 | 92 | 95 | 96 | 97 | 85 | 79 | 74 | 62 | 54 | 46 | 42 | 37 | 37 | 36 | 36 | 37 | 40 | 48 | 59 | 72 | 72 | 69 | 64.4 | 97 | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 76 | 81 | 85 | 89 | 93 | 93 | 88 | 83 | 84 | 91 | 87 | 85 | 78 | 85 | 88 | 85 | 92 | 79 | 72 | 69 | 78 | 91 | 95 | 96 | 85.0 | 96 | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 96 | 96 | 97 | 98 | 98 | 98 | 98 | 91 | 80 | 73 | 63 | 56 | 50 | 50 | 48 | 46 | 44 | 46 | 48 | 62 | 78 | 86 | 83 | 77 | 73.4 | 98 | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 78 | 79 | 84 | 92 | 96 | 93 | 77 | 73 | 64 | 53 | 46 | 38 | 32 | 31 | 31 | 31 | 32 | 32 | 34 | 41 | 58 | 68 | 73 | 78 | 58.9 | 96 | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 83 | 86 | 89 | 90 | 91 | 89 | 76 | 63 | 58 | 51 | 45 | 39 | 34 | 30 | 29 | 28 | 28 | 28 | 34 | 43 | 47 | 51 | 63 | 64 | 55.8 | 91 | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 66 | 66 | 70 | 90 | 94 | 94 | 88 | 72 | 67 | 62 | 55 | 49 | 42 | 36 | 33 | 32 | 30 | 36 | 44 | 53 | 69 | 79 | 85 | 89 | 62.6 | 94 | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 92 | 88 | 93 | 96 | 97 | 97 | 87 | 78 | 68 | 60 | 47 | 40 | 35 | 30 | 28 | 28 | 26 | 27 | 30 | 39 | 50 | 60 | 71 | 79 | 60.2 | 97 | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 83 | 87 | 90 | 93 | 94 | 91 | 75 | 64 | 57 | 48 | 36 | 29 | 25 | 26 | 26 | 25 | 23 | 24 | 25 | 31 | 36 | 43 | 52 | 62 | 51.8 | 94 | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 67 | 73 | 76 | 84 | 89 | 88 | 69 | 53 | 43 | 39 | 32 | 29 | 28 | 27 | 26 | 26 | 27 | 27 | 28 | 31 | 35 | 42 | 48 | 49 | 47.4 | 89 | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 52 | 60 | 69 | 74 | 77 | 78 | 67 | 58 | 54 | 51 | 52 | 51 | 53 | 53 | 56 | 65 | 72 | 82 | 83 | 85 | 89 | 93 | 95 | 96 | 69.4 | 96 | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 97 | 97 | 98 | 98 | 98 | 98 | 98 | 95 | 92 | 90 | 87 | 83 | 79 | 73 | 66 | 64 | 70 | 84 | 94 | 96 | 97 | 96 | 95 | 91 | 89.0 | 98 | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 90 | 91 | 96 | 97 | 98 | 98 | 98 | 90 | 78 | 74 | 62 | 49 | 34 | 31 | 29 | 27 | 27 | 30 | 34 | 46 | 59 | 59 | 60 | 66 | 63.3 | 98 | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 70 | 78 | 87 | 92 | 92 | 94 | 79 | 67 | 68 | 63 | 52 | 40 | 35 | 34 | 34 | 28 | 32 | 30 | 39 | 54 | 71 | 80 | 68 | 64 | 60.3 | 94 | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 68 | 71 | 70 | 72 | 72 | 73 | 70 | 63 | 53 | 50 | 45 | 38 | 36 | 39 | 48 | 61 | 55 | 52 | 56 | 60 | 60 | 55 | 53 | 52 | 57.2 | 73 | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 53 | 52 | 52 | 57 | 63 | 67 | 68 | 72 | 63 | 73 | 65 | 66 | 60 | 60 | 58 | 57 | 62 | 69 | 73 | 68 | 71 | 69 | 75 | 73 | 64.4 | 75 | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 74 | 70 | 65 | 66 | 68 | 69 | 72 | 59 | 51 | 47 | 44 | 38 | 39 | 35 | 33 | 30 | 33 | 33 | 36 | 39 | 44 | 48 | 52 | 58 | 50.2 | 74 | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 69 | 78 | 82 | 77 | 76 | 75 | 69 | 59 | 52 | 45 | 40 | 36 | 28 | 27 | 28 | 28 | 27 | 28 | 29 | 42 | 58 | 58 | 64 | 69 | 51.7 | 82 | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 76 | 80 | 81 | 88 | 93 | 94 | 84 | 78 | 72 | 63 | 58 | 50 | 46 | 37 | 33 | 32 | 33 | 39 | 48 | 63 | 74 | 79 | 83 | 82 | 65.2 | 94 | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 79 | 81 | 83 | 85 | 89 | 91 | 77 | 74 | 68 | 59 | 58 | 54 | 56 | 61 | 60 | 54 | 55 | 54 | 55 | 57 | 60 | 62 | 66 | 70 | 67.0 | 91 | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 74 | 78 | 75 | 73 | 88 | 96 | 97 | 97 | 88 | 81 | 75 | 65 | 69 | 77 | 72 | 75 | 86 | 83 | 82 | 89 | 90 | 88 | 76 | 83 | 81.5 | 97 | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 81 | 82 | 87 | 92 | 92 | 90 | 87 | 80 | 73 | 73 | 75 | 76 | 85 | 80 | 85 | 85 | 88 | 82 | 77 | 77 | 81 | 82 | 82 | 81 | 82.2 | 92 | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 74 | 71 | 71 | 72 | 75 | 76 | 74 | 67 | 62 | 57 | 52 | 48 | 44 | 39 | 35 | 34 | 37 | 40 | 44 | 53 | 58 | 59 | 61 | 66 | 57.0 | 76 | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 66 | 66 | 68 | 71 | 74 | 77 | 69 | 64 | 60 | 55 | 49 | 44 | 39 | 37 | 37 | 34 | 32 | 31 | 37 | 53 | 66 | 71 | 73 | 66 | 55.8 | 77 | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 68 | 73 | 74 | 76 | 79 | 82 | 77 | 65 | 49 | 38 | 32 | 24 | 24 | 24 | 25 | 25 | 27 | 28 | 33 | 50 | 66 | 67 | 66 | 76 | 51.9 | 82 | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 80 | 81 | 81 | 88 | 92 | 95 | 87 | 68 | 59 | 51 | 47 | 40 | 37 | 30 | 27 | 25 | 23 | 24 | 36 | 57 | 70 | 73 | 72 | 75 | 59.2 | 95 | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 81 | 87 | 90 | 89 | 90 | 91 | 87 | 66 | 50 | 44 | 40 | 37 | 36 | 35 | 34 | 34 | 35 | 39 | 43 | 50 | 54 | 58 | 64 | 73 | 58.7 | 91 | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 81 | 88 | 91 | 93 | 94 | 91 | 90 | 87 | 80 | 85 | 72 | 55 | 40 | 32 | 30 | 31 | 33 | 35 | 37 | 46 | 55 | 59 | 57 | 59 | 63.4 | 94 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 77.7 | 80.2 | 82.6 | 85.6 | 88.2 | 88.2 | 80.9 | 72.7 | 65.6 | 60.5 | 54.2 | 48.2 | 44.5 | 42.6 | 41.4 | 40.8 | 42.2 | 43.6 | 47.3 | 55.1 | 63.8 | 68.6 | 71.0 | 73.6 | Diurnal Average |
| | | | | | | | | | | | | | | | | | | | | | | | | 97 | 97 | 98 | 98 | 98 | 98 | 98 | 97 | 92 | 91 | 87 | 85 | 85 | 85 | 88 | 85 | 92 | 84 | 94 | 96 | 97 | 96 | 95 | 96 | Diurnal Maximum |





| | | |
|--|---|---------------------------------|
| Maximum Speed: 27 km/h on Aug 30 16:00 | Maximum Daily Speed Average: 14.5 km/h on Aug 13 | Hours in Service: 744 |
| Minimum Speed Value: 0 km/h on Aug 8 05:00 | Minimum Daily Speed Average: 0.5 km/h on Aug 10 | Hours of Data: 743 |
| Maximum Diurnal Speed Average: 6.3 km/h at hour 16 | Minimum Diurnal Speed Average: 2.7 km/h at hour 7 | Hours of Missing Data: 1 |
| Monthly Average Velocity: 4.2 km/h 205.3 deg | Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 4 Median = 7 Q ₃ = 11 P ₉₀ = 14 P ₉₉ = 24 | Percent Operational Time: 100.0 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | S1 | SSW3 | SW3 | SW1 | S2 | N1 | NE3 | NNE5 | NNE8 | NNE9 | NNE9 | NNE11 | NNE13 | NNE13 | NNE12 | N10 | NNE12 | NNE9 | NE8 | NNE4 | W3 | WSW3 | SW2 | WSW3 | NNE4.6 | NNE13 |
| 2-Aug | SSW1 | WSW3 | SSW2 | S2 | WSW5 | SSW4 | SSE4 | SE4 | S5 | S7 | S9 | S9 | SW6 | WSW6 | SW7 | SSW12 | SSW11 | SW8 | SW6 | SW4 | WSW6 | WSW5 | SW4 | SSW4 | SSW4.9 | SSW12 |
| 3-Aug | SE1 | NE1 | WSW2 | SW3 | SW3 | SSW3 | S4 | S9 | SSW8 | S7 | SSE12 | S12 | SSE9 | SSW5 | SSW7 | S7 | SSW5 | E5 | NNW8 | N10 | SSE3 | NNE1 | NNE5 | N4 | S2.6 | S12 |
| 4-Aug | WNW2 | WNW3 | W2 | SW1 | WSW1 | NW3 | NNW4 | NNW5 | ENE2 | NNE3 | NNE6 | N7 | ENE7 | E8 | ESE7 | SSE10 | SSE9 | S6 | SSW3 | SSW4 | SSW1 | NNW3 | SSW2 | SSW3 | ESE0.7 | SSE10 |
| 5-Aug | W1 | NNW3 | SW3 | SSW3 | SSW2 | SSW2 | S2 | ESE3 | E4 | E4 | ESE7 | SE7 | SE9 | SSE13 | SE12 | SSE15 | S14 | SSW10 | S14 | S9 | SW5 | SSW5 | SSW6 | SSW6 | S5.2 | SSE15 |
| 6-Aug | S2 | NNW4 | SSW2 | W1 | NNW3 | N4 | N5 | N11 | N13 | N10 | N18 | N16 | N15 | N11 | N9 | NNW8 | NW4 | NNE11 | NNE10 | N11 | NNW6 | WNW4 | WNW2 | WSW1 | N6.8 | N18 |
| 7-Aug | NNW3 | SSE2 | SSW1 | WSW3 | W1 | SW1 | NNW1 | NNW3 | NNE6 | N7 | NNE6 | NNE8 | NNE7 | NE5 | ENE4 | NNE2 | SSW5 | SSW8 | SSW7 | SSW4 | SW4 | SW4 | WSW8 | WSW11 | WNW0.9 | WSW11 |
| 8-Aug | WSW12 | SW9 | SSW5 | SSW3 | NW0 | WSW3 | S2 | SSW6 | S8 | S7 | SSW7 | SSW7 | SW6 | SSW6 | SW7 | SSW9 | SSW7 | SSW9 | SSW9 | SSW7 | SSW4 | SSW3 | SSW2 | SW1 | SSW5.5 | WSW12 |
| 9-Aug | WSW3 | SSW3 | SW3 | SW4 | SSW3 | WSW3 | S4 | S8 | S8 | SSW7 | S7 | S7 | SSW11 | S12 | SSW9 | S6 | S8 | S9 | S7 | SSW4 | SW5 | WSW5 | SW3 | NW2 | SSW5.3 | S12 |
| 10-Aug | SW1 | SSW6 | W2 | SW6 | SW4 | S3 | SSE3 | E4 | E3 | N2 | ENE2 | N5 | NE4 | NNE5 | N11 | N10 | NE8 | ESE9 | SSE8 | SSW2 | SW3 | WSW2 | SSW3 | SW4 | ESE0.5 | N11 |
| 11-Aug | S4 | SSW5 | SSW2 | SW3 | SW3 | SSW3 | S6 | SSE7 | SSE8 | SE8 | S11 | S12 | SSE14 | S10 | S14 | S13 | S12 | SSE13 | SSE13 | SSE9 | S8 | SSW2 | WSW3 | SW3 | S7.3 | S14 |
| 12-Aug | WSW4 | SSW4 | SSW4 | SSW4 | SSW5 | S7 | SSE10 | SSE11 | SE9 | SE13 | SSE17 | S23 | S25 | S24 | S23 | S22 | S23 | S22 | S19 | S14 | S12 | S9 | S3 | S6 | S12.5 | S25 |
| 13-Aug | SSE7 | SSE9 | SSW3 | SSW3 | S3 | WNW1 | SSE4 | SSE12 | SSE15 | SE18 | SE23 | SSE26 | SSE26 | SSE25 | SSE26 | SSE22 | SSE23 | SSE25 | SSE22 | SSE21 | SSE16 | S10 | S8 | SSE8 | SSE14.5 | SSE26 |
| 14-Aug | SSE5 | S4 | S3 | S5 | SSW4 | SSW4 | S4 | SSE12 | SSE13 | SE11 | SSE13 | S11 | S15 | S15 | SSW14 | SW13 | SW10 | SW8 | SSW5 | SSE5 | S5 | S5 | S5 | SSW4 | S7.3 | S15 |
| 15-Aug | S4 | SSE4 | WNW1 | SSE1 | SW2 | SW2 | N4 | NW5 | N3 | N3 | NNW2 | W5 | WNW4 | N4 | NE6 | NE7 | NE5 | NE3 | SE1 | WSW5 | W5 | WNW3 | W5 | W8 | NW1.4 | W8 |
| 16-Aug | W8 | W3 | NE1 | S2 | S3 | SSW2 | S3 | SE3 | SSE5 | SSE7 | S8 | S9 | SW9 | SW10 | SW12 | SW9 | SSW8 | SSW8 | SW7 | SW6 | SW6 | SW7 | SW8 | WSW8 | SSW5.3 | SW12 |
| 17-Aug | WSW8 | NW2 | SW2 | SSW4 | SSW4 | S3 | SSE4 | SSW5 | S6 | SSW7 | C | SSW8 | SW8 | SSW9 | NNW3 | W8 | WNW6 | WNW6 | W4 | WSW4 | SSW2 | SSW2 | SW7 | WSW6 | SSW4.1 | SSW9 |
| 18-Aug | WSW7 | SW6 | SW6 | SSW7 | SSW8 | SSW9 | SSW10 | SSW11 | S13 | SW11 | SSW11 | WSW13 | SW15 | SW15 | SSW19 | SSW18 | SSW18 | SSW17 | SSW15 | SSW12 | SSW13 | SSW12 | SSW11 | SSW12 | SSW11.7 | SSW19 |
| 19-Aug | SSW9 | SW8 | WSW10 | SW7 | SW7 | SW7 | SSW7 | SSW10 | WSW13 | SW12 | WSW14 | WSW14 | W15 | WNW15 | WNW16 | WNW19 | WNW17 | W10 | SW7 | WSW7 | SW6 | WSW5 | WSW5 | SW7 | WSW8.9 | WNW19 |
| 20-Aug | SW7 | WSW8 | WSW11 | WSW12 | WSW12 | SW8 | SSE3 | SW6 | WSW11 | W13 | W12 | W14 | W12 | W14 | WNW16 | WNW16 | NW12 | WNW11 | NW12 | WNW9 | W7 | WSW9 | WSW9 | NNW4 | W9.1 | WNW16 |
| 21-Aug | SSW3 | S5 | SSW5 | WSW6 | WSW8 | WSW9 | SW7 | SW5 | S8 | SSW8 | WSW9 | SW12 | WSW13 | WSW12 | WSW11 | W9 | WSW9 | WNW5 | NW6 | WNW5 | W5 | NW5 | NNW8 | NW6 | WSW6.0 | WSW13 |
| 22-Aug | NNW6 | NNW7 | NNW6 | NW2 | WNW2 | NW4 | N4 | N6 | NNE9 | N12 | N11 | N8 | N7 | N4 | N2 | S5 | WSW4 | SW2 | NW2 | NW3 | WNW3 | NW3 | NW3 | NW2 | NNW3.8 | N12 |
| 23-Aug | NW2 | NNW3 | NW2 | W3 | W2 | WSW3 | W1 | N3 | SE6 | SSE14 | SSE13 | S17 | S16 | S14 | SSE14 | SSE23 | SSE19 | SSE15 | SSE14 | SSE13 | SSE9 | S10 | S11 | SSE13 | S8.8 | SSE23 |
| 24-Aug | S8 | S4 | S10 | S10 | SSW9 | ESE1 | NNW3 | ESE3 | SE7 | SE8 | SE7 | SE8 | S3 | N1 | ESE6 | SE9 | NW4 | N6 | NW3 | WNW3 | S2 | SSW8 | SSW9 | S8 | SSE3.5 | S10 |
| 25-Aug | S12 | S11 | SSW8 | S10 | S10 | SSW11 | S12 | SSW14 | SSW14 | SSW16 | SSW16 | S16 | SSW15 | SW17 | SW17 | SW18 | SW17 | WSW15 | SW9 | SSW8 | SSW9 | SSW8 | W1 | SSW7 | SSW11.6 | SW18 |
| 26-Aug | SW8 | SW10 | SW13 | SW13 | SW11 | SW10 | SW8 | SW10 | WSW14 | SW12 | SSW12 | SSW14 | SSW15 | SW14 | SW13 | SW14 | SW11 | SW10 | SW8 | SW5 | SSW7 | SSW9 | SSW8 | SSW6 | SW10.2 | SSW15 |
| 27-Aug | SSW8 | SSW8 | SSW8 | SSW8 | SSW7 | SSW7 | SW7 | WSW11 | WSW12 | WSW13 | WSW14 | WSW14 | W14 | WSW14 | W10 | W11 | W10 | W9 | W5 | WSW5 | W3 | SSW1 | SSW4 | WNW3 | WSW7.8 | W14 |
| 28-Aug | NW3 | SSW2 | WSW5 | W5 | WSW2 | S2 | SE1 | SW4 | WNW6 | W9 | WNW11 | NW13 | WNW13 | WNW13 | WNW12 | WNW12 | WNW11 | NW8 | NW6 | W4 | W4 | W7 | WNW2 | SW1 | WNW5.9 | WNW13 |
| 29-Aug | NNW2 | WSW3 | W1 | ESE1 | SSE0 | S2 | S3 | SE2 | E3 | S2 | ENE6 | ENE6 | ENE5 | SSE8 | SE8 | SE7 | SSE7 | SSE8 | SSE4 | WSW2 | WSW3 | SSW4 | S4 | SW1 | SSE2.2 | SSE8 |
| 30-Aug | W2 | W2 | SW3 | WNW2 | WNW1 | NW2 | NW2 | ESE6 | SSE13 | SSE17 | SSE20 | SSE21 | SE22 | SSE25 | SSE25 | SSE27 | SSE21 | SSE18 | S16 | S13 | S16 | S14 | S9 | S7 | SSE11.4 | SSE27 |
| 31-Aug | SSW4 | SSW5 | S3 | SSW4 | S5 | S4 | S6 | SSE5 | SSE9 | S5 | S9 | S9 | SW11 | WSW15 | WSW14 | WSW12 | W11 | WNW10 | WNW7 | WSW5 | SW6 | SW7 | SW7 | SW8 | SW6.0 | WSW15 |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-------|-------|-------|-------|-------|------|-------|-------|------|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|-----------------|
| SW3.3 | SW3.2 | SW3.5 | SW3.9 | SW3.7 | SW3.1 | S2.7 | S3.2 | S3.8 | S4.1 | S4.7 | SSW5.4 | SSW5.5 | SSW5.8 | SSW5.5 | SSW6.3 | SSW5.9 | SSW5.0 | SSW4.5 | SSW4.0 | SSW4.7 | SW4.3 | SW4.1 | SW3.9 | Diurnal Average |
| WSW12 | S11 | SW13 | SW13 | WSW12 | SSW11 | S12 | SSW14 | SSE15 | SE18 | SE23 | SSE26 | SSE26 | SSE25 | SSE26 | SSE27 | S23 | SSE25 | SSE22 | SSE21 | SSE16 | S14 | SSW11 | SSE13 | Diurnal Maximum |

C - Calibration
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

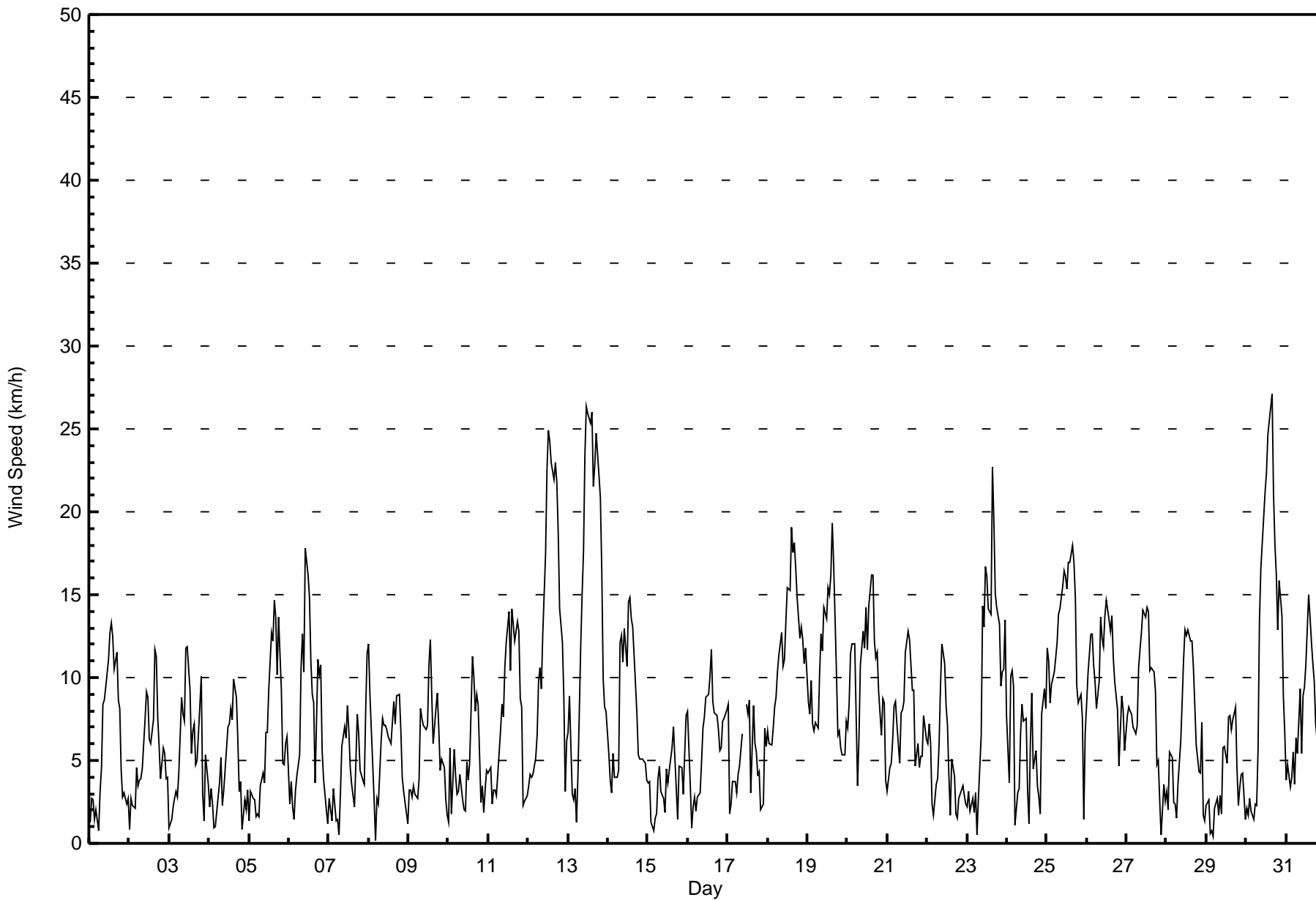
Wind Speed (WS) - km/h
Fort McKay South - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Aug 3 19:00 Minimum Value: 1 km/h on Aug 4 21:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 7 | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | |
|---|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 4 | 4 | 4 | 5 | 4 | 4 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 5 |
| 2-Aug | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 4 |
| 3-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 9 | 4 | 3 | 2 | 2 | 2 | 9 |
| 4-Aug | 1 | 1 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 2 | 3 |
| 5-Aug | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 4 | 5 | 4 | 3 | 4 | 4 | 3 | 2 | 1 | 1 | 1 | 2 | 5 |
| 6-Aug | 1 | 3 | 2 | 1 | 1 | 2 | 3 | 2 | 3 | 3 | 4 | 4 | 3 | 2 | 2 | 2 | 1 | 4 | 3 | 2 | 2 | 1 | 2 | 1 | 4 |
| 7-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 1 | 2 | 2 | 3 | 2 | 3 |
| 8-Aug | 2 | 3 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 4 | 4 | 3 | 4 | 4 | 4 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 4 |
| 9-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 3 | 3 | 1 | 1 | 2 | 2 | 2 | 4 |
| 10-Aug | 1 | 1 | 2 | 6 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 4 | 3 | 5 | 3 | 2 | 2 | 1 | 2 | 2 | 6 |
| 11-Aug | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 4 |
| 12-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 6 | 5 | 6 | 5 | 6 | 5 | 5 | 4 | 4 | 3 | 3 | 2 | 1 | 1 | 6 |
| 13-Aug | 1 | 2 | 1 | 1 | 1 | 1 | 3 | 3 | 4 | 4 | 5 | 6 | 6 | 5 | 5 | 6 | 5 | 5 | 4 | 4 | 4 | 3 | 1 | 1 | 6 |
| 14-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 4 | 4 | 3 | 3 | 4 | 3 | 4 | 4 | 4 | 4 | 3 | 2 | 1 | 1 | 1 | 2 | 1 | 4 |
| 15-Aug | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 1 | 2 | 1 | 2 | 4 | 2 | 2 | 2 | 2 | 4 |
| 16-Aug | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 4 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 4 |
| 17-Aug | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 7 | 3 | 4 | 4 | 3 | 4 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 7 |
| 18-Aug | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 4 | 5 | 6 | 6 | 6 | 5 | 5 | 5 | 4 | 3 | 3 | 3 | 3 | 4 | 6 |
| 19-Aug | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 5 | 4 | 5 | 5 | 6 | 6 | 7 | 8 | 7 | 4 | 3 | 3 | 2 | 4 | 2 | 3 | 8 |
| 20-Aug | 2 | 3 | 3 | 4 | 3 | 4 | 1 | 3 | 4 | 5 | 5 | 5 | 6 | 7 | 6 | 6 | 5 | 4 | 4 | 3 | 2 | 3 | 3 | 3 | 7 |
| 21-Aug | 1 | 1 | 1 | 2 | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 4 | 5 | 4 | 4 | 4 | 3 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 5 |
| 22-Aug | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 |
| 23-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 5 | 3 | 3 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 3 | 3 | 2 | 2 | 1 | 1 | 5 |
| 24-Aug | 4 | 1 | 2 | 2 | 4 | 2 | 2 | 1 | 2 | 3 | 2 | 3 | 2 | 1 | 4 | 5 | 1 | 1 | 2 | 1 | 1 | 5 | 4 | 3 | 5 |
| 25-Aug | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 5 | 4 | 4 | 4 | 4 | 6 | 6 | 7 | 6 | 5 | 4 | 3 | 3 | 2 | 2 | 7 |
| 26-Aug | 3 | 3 | 4 | 4 | 3 | 3 | 2 | 5 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 4 | 3 | 3 | 1 | 1 | 2 | 2 | 1 | 5 |
| 27-Aug | 1 | 2 | 2 | 2 | 2 | 1 | 3 | 4 | 5 | 5 | 4 | 5 | 5 | 5 | 4 | 4 | 4 | 5 | 1 | 1 | 2 | 1 | 1 | 2 | 5 |
| 28-Aug | 3 | 2 | 3 | 3 | 1 | 1 | 2 | 2 | 2 | 3 | 4 | 5 | 5 | 5 | 5 | 5 | 4 | 3 | 2 | 1 | 1 | 1 | 3 | 1 | 5 |
| 29-Aug | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 3 |
| 30-Aug | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 5 | 3 | 5 | 4 | 5 | 5 | 5 | 6 | 6 | 6 | 4 | 3 | 3 | 2 | 3 | 2 | 1 | 6 |
| 31-Aug | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 2 | 2 | 3 | 2 | 2 | 4 | 6 | 5 | 4 | 4 | 4 | 3 | 1 | 1 | 2 | 2 | 2 | 6 |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Fort McKay South - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Fort McKay South - August 2017**

| Wind Speed Ranges (km/h) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 5 | 304 | 40.92 | 40.92 |
| 6 - 11 | 280 | 37.69 | 78.60 |
| 12 - 19 | 134 | 18.03 | 96.64 |
| 20 - 28 | 25 | 3.36 | 100.00 |
| 29 - 38 | 0 | 0.00 | 100.00 |
| > 38 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 743

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Fort McKay South - August 2017**

| Wind Speed Ranges (km/h) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-----------------------------|----------------|-----|----|-----|---|-----|----|-----|-----|-----|-----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 5 | 15 | 7 | 7 | 4 | 6 | 4 | 6 | 15 | 39 | 60 | 35 | 29 | 24 | 17 | 20 | 16 | 304 |
| 6 - 11 | 16 | 13 | 4 | 3 | 1 | 5 | 13 | 18 | 45 | 55 | 52 | 23 | 12 | 9 | 3 | 8 | 280 |
| 12 - 19 | 5 | 4 | 0 | 0 | 0 | 0 | 3 | 24 | 24 | 19 | 16 | 19 | 7 | 10 | 3 | 0 | 134 |
| 20 - 28 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 16 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 |
| 29 - 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 36 | 24 | 11 | 7 | 7 | 9 | 24 | 73 | 115 | 134 | 103 | 71 | 43 | 36 | 26 | 24 | 743 |

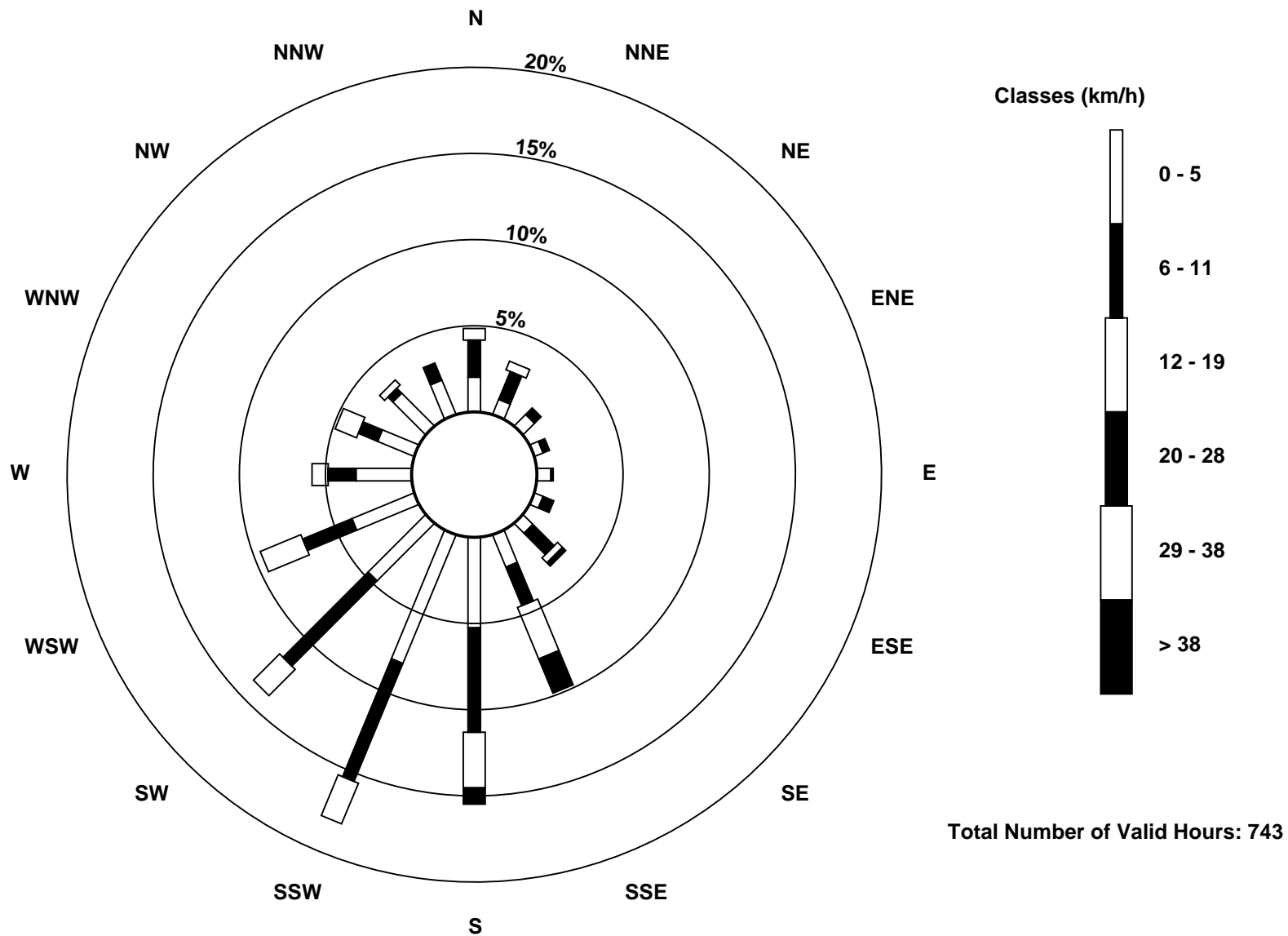
Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Wind Speed (WS) - km/h
Fort McKay South (AMS 13)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Fort McKay South - August 2017

| Direction of Maximum Speed: 164 deg on Aug 30 16:00 | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 | | | | | |
|---|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------------------------|-----|-----|-----|-----|---------------|
| Direction of Maximum Daily Speed Average: 156.4 deg on Aug 13 | | | | | | | | | | | | | | | | | | | | Hours of Data: 743 | | | | | |
| Direction of Minimum Speed: 313 deg on Aug 8 05:00 | | | | | | | | | | Direction of Minimum Daily Speed Average: 0.5 deg on Aug 10 | | | | | | | | | | Hours of Missing Data: 1 | | | | | |
| Monthly Average Direction: 227.8 deg | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 177 | 201 | 220 | 235 | 182 | 4 | 48 | 33 | 16 | 13 | 13 | 24 | 17 | 22 | 14 | 10 | 19 | 33 | 39 | 23 | 270 | 255 | 225 | 244 | 16.4 |
| 2-Aug | 205 | 243 | 208 | 190 | 237 | 193 | 152 | 129 | 173 | 177 | 185 | 175 | 218 | 238 | 227 | 208 | 198 | 218 | 230 | 232 | 242 | 243 | 215 | 209 | 206.5 |
| 3-Aug | 141 | 37 | 242 | 222 | 227 | 203 | 171 | 181 | 203 | 172 | 152 | 178 | 148 | 199 | 208 | 189 | 200 | 85 | 341 | 10 | 147 | 15 | 22 | 9 | 176.0 |
| 4-Aug | 292 | 298 | 272 | 234 | 247 | 304 | 330 | 336 | 76 | 22 | 23 | 7 | 63 | 84 | 120 | 152 | 152 | 178 | 210 | 197 | 208 | 327 | 210 | 194 | 109.9 |
| 5-Aug | 263 | 337 | 231 | 193 | 198 | 193 | 181 | 111 | 99 | 80 | 122 | 139 | 137 | 153 | 145 | 164 | 184 | 196 | 185 | 190 | 222 | 203 | 209 | 221 | 171.1 |
| 6-Aug | 172 | 334 | 201 | 271 | 336 | 5 | 10 | 9 | 356 | 353 | 1 | 1 | 0 | 357 | 354 | 343 | 323 | 17 | 12 | 353 | 334 | 300 | 300 | 241 | 354.9 |
| 7-Aug | 347 | 153 | 205 | 251 | 262 | 218 | 348 | 346 | 14 | 9 | 27 | 30 | 12 | 40 | 62 | 17 | 195 | 201 | 209 | 203 | 231 | 224 | 243 | 245 | 282.5 |
| 8-Aug | 247 | 236 | 201 | 207 | 313 | 252 | 178 | 211 | 191 | 181 | 205 | 211 | 216 | 205 | 229 | 213 | 198 | 197 | 194 | 192 | 194 | 197 | 210 | 230 | 209.3 |
| 9-Aug | 257 | 213 | 230 | 215 | 212 | 238 | 179 | 179 | 173 | 192 | 170 | 176 | 201 | 189 | 200 | 185 | 181 | 175 | 189 | 212 | 217 | 244 | 218 | 310 | 195.3 |
| 10-Aug | 222 | 202 | 259 | 214 | 217 | 175 | 155 | 94 | 88 | 8 | 75 | 360 | 53 | 12 | 4 | 11 | 41 | 121 | 163 | 197 | 236 | 241 | 213 | 217 | 103.4 |
| 11-Aug | 178 | 193 | 198 | 216 | 219 | 207 | 185 | 150 | 156 | 131 | 180 | 188 | 163 | 188 | 178 | 182 | 183 | 155 | 150 | 162 | 180 | 200 | 241 | 235 | 175.1 |
| 12-Aug | 237 | 200 | 205 | 206 | 196 | 184 | 165 | 151 | 125 | 138 | 164 | 172 | 175 | 173 | 179 | 182 | 177 | 175 | 181 | 186 | 187 | 180 | 186 | 178 | 174.9 |
| 13-Aug | 162 | 154 | 208 | 206 | 173 | 285 | 159 | 151 | 152 | 145 | 144 | 150 | 158 | 155 | 156 | 147 | 151 | 152 | 157 | 166 | 167 | 173 | 182 | 167 | 156.4 |
| 14-Aug | 149 | 175 | 183 | 179 | 194 | 194 | 169 | 156 | 159 | 144 | 168 | 185 | 190 | 187 | 207 | 230 | 225 | 200 | 156 | 181 | 189 | 190 | 200 | 200 | 185.3 |
| 15-Aug | 186 | 163 | 289 | 158 | 226 | 215 | 351 | 324 | 351 | 358 | 339 | 273 | 292 | 359 | 52 | 34 | 44 | 51 | 124 | 258 | 262 | 298 | 266 | 265 | 315.4 |
| 16-Aug | 271 | 269 | 44 | 190 | 183 | 208 | 185 | 127 | 165 | 158 | 171 | 186 | 223 | 216 | 215 | 229 | 208 | 204 | 221 | 223 | 230 | 236 | 236 | 252 | 213.6 |
| 17-Aug | 253 | 308 | 219 | 193 | 202 | 177 | 164 | 206 | 187 | 200 | C | 199 | 217 | 213 | 331 | 264 | 284 | 282 | 260 | 254 | 200 | 208 | 231 | 240 | 227.8 |
| 18-Aug | 238 | 224 | 215 | 212 | 204 | 207 | 201 | 194 | 190 | 224 | 205 | 242 | 228 | 230 | 210 | 201 | 194 | 200 | 199 | 196 | 200 | 208 | 202 | 209 | 208.6 |
| 19-Aug | 213 | 236 | 249 | 234 | 226 | 215 | 202 | 199 | 242 | 225 | 246 | 250 | 280 | 295 | 286 | 289 | 297 | 266 | 230 | 254 | 221 | 258 | 241 | 232 | 253.1 |
| 20-Aug | 224 | 240 | 245 | 248 | 243 | 233 | 154 | 227 | 258 | 259 | 269 | 268 | 272 | 272 | 301 | 295 | 308 | 303 | 310 | 292 | 260 | 254 | 258 | 332 | 269.2 |
| 21-Aug | 208 | 182 | 209 | 239 | 239 | 247 | 232 | 216 | 183 | 213 | 243 | 235 | 249 | 237 | 243 | 259 | 251 | 292 | 305 | 289 | 279 | 326 | 331 | 326 | 248.3 |
| 22-Aug | 330 | 335 | 338 | 308 | 295 | 325 | 356 | 10 | 12 | 359 | 2 | 4 | 4 | 4 | 6 | 178 | 244 | 235 | 318 | 306 | 298 | 324 | 311 | 325 | 343.8 |
| 23-Aug | 323 | 337 | 315 | 272 | 262 | 241 | 272 | 358 | 137 | 161 | 164 | 185 | 187 | 180 | 165 | 158 | 161 | 164 | 165 | 163 | 164 | 176 | 178 | 167 | 170.6 |
| 24-Aug | 171 | 177 | 180 | 179 | 192 | 110 | 342 | 112 | 133 | 137 | 125 | 128 | 173 | 353 | 110 | 136 | 310 | 351 | 316 | 300 | 188 | 201 | 213 | 189 | 167.0 |
| 25-Aug | 189 | 189 | 195 | 189 | 186 | 194 | 190 | 192 | 197 | 195 | 193 | 190 | 204 | 232 | 218 | 226 | 229 | 238 | 234 | 218 | 208 | 201 | 270 | 199 | 206.1 |
| 26-Aug | 218 | 229 | 235 | 233 | 231 | 227 | 215 | 231 | 238 | 223 | 200 | 197 | 205 | 223 | 229 | 230 | 224 | 217 | 224 | 219 | 193 | 201 | 206 | 202 | 219.9 |
| 27-Aug | 205 | 207 | 211 | 211 | 209 | 207 | 215 | 248 | 240 | 252 | 240 | 251 | 262 | 257 | 270 | 266 | 259 | 264 | 270 | 251 | 269 | 206 | 202 | 285 | 243.1 |
| 28-Aug | 325 | 211 | 257 | 268 | 255 | 178 | 141 | 225 | 290 | 266 | 299 | 308 | 293 | 295 | 296 | 293 | 300 | 306 | 308 | 279 | 276 | 261 | 287 | 232 | 287.1 |
| 29-Aug | 331 | 255 | 267 | 107 | 165 | 179 | 185 | 134 | 96 | 191 | 59 | 57 | 66 | 152 | 131 | 128 | 153 | 157 | 157 | 258 | 252 | 199 | 188 | 225 | 146.5 |
| 30-Aug | 269 | 262 | 236 | 292 | 284 | 316 | 318 | 117 | 147 | 152 | 151 | 162 | 144 | 152 | 161 | 164 | 159 | 153 | 173 | 184 | 183 | 186 | 191 | 179 | 163.5 |
| 31-Aug | 198 | 193 | 191 | 192 | 174 | 170 | 181 | 163 | 163 | 175 | 183 | 191 | 219 | 246 | 249 | 258 | 266 | 284 | 284 | 248 | 230 | 227 | 227 | 224 | 222.0 |
| 222.7 219.2 224.6 218.5 216.2 215.7 189.7 179.4 180.2 184.4 181.2 195.8 202.5 208.2 206.1 207.2 205.2 196.2 201.1 210.5 209.5 217.5 221.4 219.7 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Diurnal Average | | | | | | | | | | | | | | | | | | | | | | | | | |
| C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | | |
| All monthly, daily, and diurnal averages have been calculated using vector methods | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

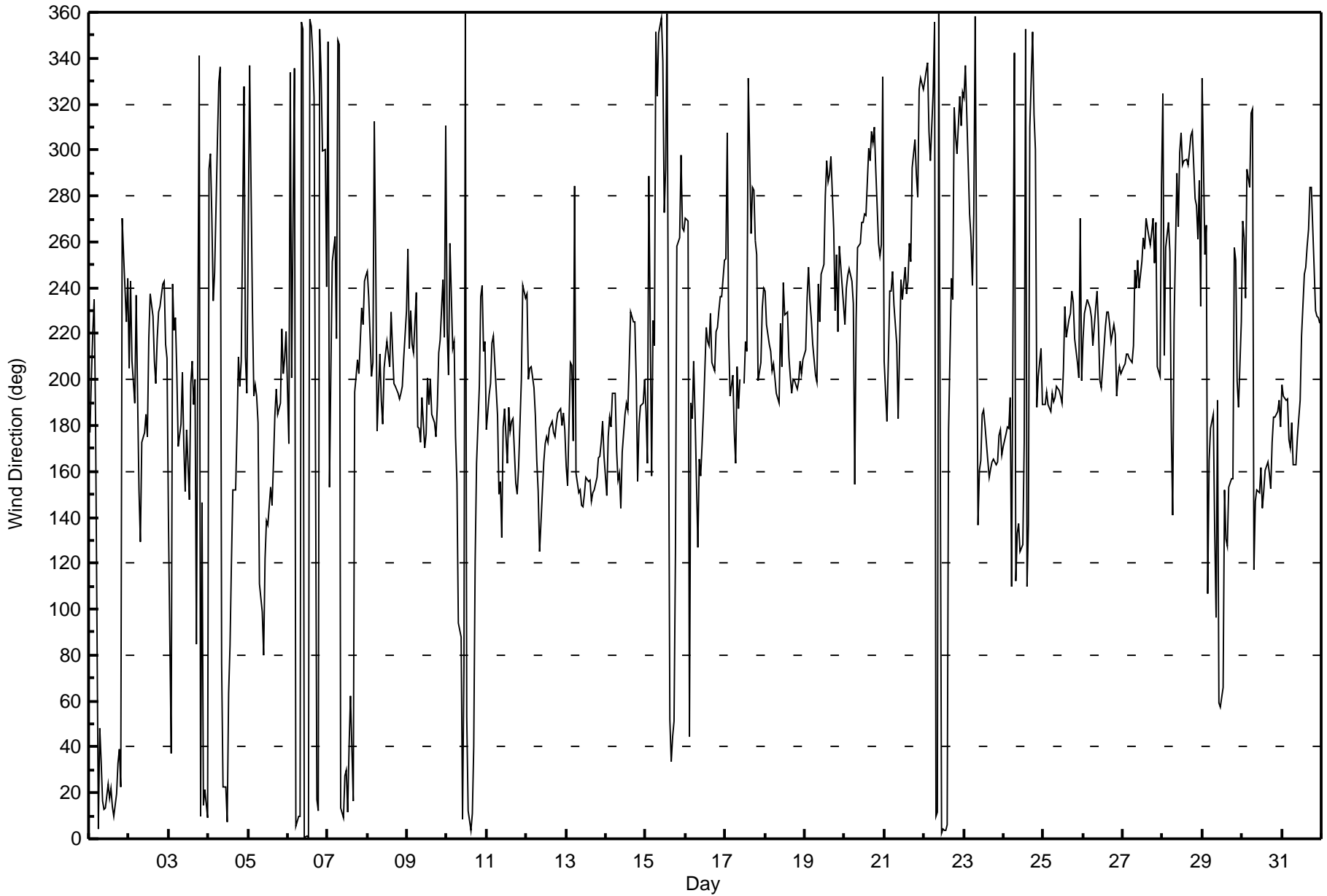
Wind Direction (WD) - deg
Fort McKay South - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 100 deg on Aug 4 04:00 Minimum Value: 7 deg on Aug 27 20:00 Percentiles: P ₁ = 9 P ₁₀ = 13 Q ₁ = 17 Median = 27 Q ₃ = 41 P ₉₀ = 66 P ₉₉ = 92 | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 1 Percent Operational Time: 100.0 | | | | | | |
|--|-------------------------------|----|----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|-----------------|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 65 | 34 | 23 | 70 | 56 | 87 | 20 | 27 | 25 | 24 | 29 | 29 | 32 | 23 | 32 | 34 | 34 | 34 | 30 | 35 | 14 | 8 | 31 | 45 | 87 |
| 2-Aug | 86 | 41 | 32 | 36 | 13 | 24 | 18 | 41 | 54 | 41 | 38 | 55 | 65 | 69 | 60 | 31 | 37 | 35 | 26 | 14 | 8 | 11 | 32 | 30 | 86 |
| 3-Aug | 89 | 65 | 52 | 29 | 21 | 30 | 31 | 23 | 33 | 39 | 26 | 28 | 40 | 68 | 54 | 49 | 45 | 46 | 81 | 19 | 73 | 82 | 45 | 47 | 89 |
| 4-Aug | 65 | 40 | 72 | 100 | 77 | 45 | 35 | 14 | 66 | 55 | 35 | 26 | 25 | 32 | 37 | 19 | 18 | 16 | 24 | 74 | 52 | 69 | 47 | 100 | |
| 5-Aug | 59 | 70 | 68 | 24 | 73 | 63 | 59 | 38 | 41 | 52 | 32 | 50 | 42 | 31 | 32 | 23 | 33 | 31 | 16 | 11 | 18 | 17 | 13 | 21 | 73 |
| 6-Aug | 63 | 85 | 90 | 83 | 18 | 35 | 32 | 19 | 17 | 18 | 16 | 15 | 16 | 19 | 18 | 25 | 19 | 18 | 17 | 23 | 15 | 81 | 64 | 90 | |
| 7-Aug | 56 | 73 | 79 | 19 | 64 | 63 | 90 | 24 | 19 | 31 | 40 | 31 | 60 | 67 | 80 | 93 | 71 | 31 | 27 | 18 | 23 | 30 | 12 | 13 | 93 |
| 8-Aug | 14 | 19 | 17 | 41 | 93 | 9 | 60 | 26 | 29 | 37 | 50 | 59 | 78 | 66 | 59 | 51 | 61 | 29 | 17 | 9 | 11 | 24 | 25 | 59 | 93 |
| 9-Aug | 28 | 54 | 23 | 25 | 30 | 26 | 17 | 14 | 30 | 38 | 40 | 57 | 30 | 37 | 51 | 78 | 43 | 40 | 16 | 11 | 13 | 31 | 54 | 84 | 84 |
| 10-Aug | 84 | 16 | 81 | 62 | 39 | 59 | 69 | 34 | 47 | 81 | 89 | 52 | 72 | 80 | 21 | 36 | 37 | 55 | 22 | 70 | 38 | 61 | 43 | 27 | 89 |
| 11-Aug | 30 | 38 | 58 | 23 | 25 | 28 | 12 | 20 | 29 | 14 | 30 | 24 | 22 | 35 | 25 | 23 | 20 | 16 | 14 | 20 | 11 | 26 | 21 | 27 | 58 |
| 12-Aug | 14 | 17 | 12 | 10 | 11 | 10 | 10 | 13 | 23 | 17 | 20 | 16 | 15 | 15 | 17 | 17 | 14 | 13 | 11 | 10 | 10 | 9 | 16 | 11 | 23 |
| 13-Aug | 8 | 9 | 46 | 20 | 13 | 54 | 75 | 13 | 16 | 16 | 14 | 16 | 15 | 17 | 14 | 16 | 18 | 14 | 12 | 10 | 10 | 11 | 10 | 12 | 75 |
| 14-Aug | 18 | 13 | 14 | 13 | 14 | 18 | 20 | 17 | 21 | 19 | 19 | 33 | 22 | 22 | 24 | 23 | 26 | 26 | 31 | 15 | 15 | 12 | 19 | 17 | 33 |
| 15-Aug | 17 | 15 | 56 | 96 | 64 | 68 | 35 | 23 | 36 | 35 | 64 | 48 | 49 | 53 | 53 | 24 | 24 | 46 | 78 | 76 | 54 | 66 | 27 | 14 | 96 |
| 16-Aug | 20 | 66 | 77 | 17 | 20 | 53 | 55 | 32 | 42 | 24 | 34 | 31 | 38 | 35 | 31 | 46 | 39 | 29 | 25 | 16 | 13 | 12 | 13 | 14 | 77 |
| 17-Aug | 24 | 66 | 38 | 20 | 30 | 53 | 27 | 42 | 22 | 34 | C | 36 | 46 | 52 | 85 | 41 | 29 | 37 | 22 | 16 | 28 | 43 | 15 | 13 | 85 |
| 18-Aug | 12 | 19 | 21 | 19 | 17 | 16 | 14 | 15 | 17 | 28 | 28 | 33 | 27 | 26 | 23 | 19 | 17 | 18 | 18 | 15 | 17 | 20 | 18 | 20 | 33 |
| 19-Aug | 20 | 27 | 20 | 19 | 19 | 19 | 19 | 20 | 29 | 26 | 26 | 28 | 33 | 31 | 32 | 29 | 29 | 38 | 39 | 34 | 22 | 44 | 18 | 21 | 44 |
| 20-Aug | 23 | 19 | 18 | 19 | 18 | 31 | 24 | 43 | 32 | 31 | 41 | 34 | 34 | 35 | 31 | 30 | 31 | 26 | 23 | 28 | 30 | 23 | 25 | 55 | 55 |
| 21-Aug | 25 | 18 | 27 | 28 | 27 | 28 | 29 | 58 | 25 | 34 | 32 | 29 | 37 | 36 | 32 | 39 | 34 | 33 | 19 | 15 | 34 | 14 | 10 | 12 | 58 |
| 22-Aug | 11 | 11 | 12 | 34 | 60 | 30 | 32 | 24 | 17 | 18 | 19 | 33 | 35 | 76 | 98 | 60 | 61 | 78 | 49 | 33 | 20 | 15 | 31 | 38 | 98 |
| 23-Aug | 27 | 13 | 35 | 36 | 41 | 17 | 85 | 35 | 54 | 14 | 13 | 18 | 14 | 12 | 13 | 14 | 11 | 10 | 11 | 13 | 11 | 11 | 8 | 7 | 85 |
| 24-Aug | 15 | 16 | 11 | 10 | 27 | 96 | 57 | 25 | 22 | 20 | 20 | 22 | 51 | 80 | 74 | 55 | 29 | 16 | 34 | 34 | 52 | 24 | 30 | 17 | 96 |
| 25-Aug | 15 | 13 | 16 | 12 | 12 | 14 | 12 | 15 | 18 | 19 | 16 | 16 | 22 | 26 | 24 | 26 | 24 | 27 | 30 | 24 | 22 | 26 | 75 | 22 | 75 |
| 26-Aug | 26 | 24 | 23 | 22 | 21 | 23 | 26 | 36 | 22 | 26 | 25 | 23 | 24 | 29 | 34 | 27 | 29 | 26 | 28 | 19 | 10 | 16 | 15 | 14 | 36 |
| 27-Aug | 14 | 16 | 17 | 16 | 15 | 18 | 28 | 31 | 30 | 34 | 28 | 34 | 34 | 36 | 37 | 37 | 35 | 34 | 24 | 7 | 55 | 91 | 29 | 74 | 91 |
| 28-Aug | 80 | 69 | 56 | 55 | 70 | 78 | 77 | 54 | 43 | 37 | 36 | 31 | 33 | 40 | 33 | 33 | 31 | 29 | 19 | 11 | 11 | 9 | 88 | 65 | 88 |
| 29-Aug | 56 | 74 | 94 | 92 | 90 | 48 | 65 | 77 | 57 | 88 | 47 | 46 | 66 | 45 | 36 | 46 | 33 | 15 | 27 | 15 | 12 | 14 | 12 | 41 | 94 |
| 30-Aug | 26 | 18 | 29 | 28 | 24 | 8 | 48 | 61 | 15 | 15 | 14 | 14 | 14 | 15 | 14 | 13 | 15 | 12 | 12 | 11 | 10 | 10 | 13 | 11 | 61 |
| 31-Aug | 20 | 14 | 22 | 12 | 22 | 82 | 24 | 35 | 26 | 44 | 13 | 23 | 27 | 30 | 34 | 33 | 31 | 26 | 30 | 22 | 15 | 18 | 17 | 18 | 82 |
| 89 85 94 100 93 96 90 77 66 88 89 59 78 80 98 93 71 78 81 76 74 91 88 84 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | |
| C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Fort McKay South - August 2017





Wood Buffalo Environmental Association

SO₂ Calibration Report

Version-03-2017

Station Information

Station Name: Fort McKay South Station number: AMS 13
Calibration Date: August 2, 2017 Last Cal Date: July 10, 2017
Start time (MST): 7:25 End time (MST): 11:57
Reason: Routine

Calibration Standards

Cal Gas Concentration 49.8 ppm Cal Gas Exp Date September 8, 2018
Cal Gas Cylinder # LL110515
Calibrator Make/Model API T700 Serial Number 2448
ZAG Make/Model API 701 Serial Number 5613

Analyzer Information

Analyzer make: API T100 Analyzer serial #: 599

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|----------------------|--------------|---------------|--------------|--------------|---------------|
| Analyzer Range | 0 - 1000 ppb | | HVPS voltage | 524 | 524 |
| Calculated slope | 1.000057 | 0.994422 | Lamp voltage | 2100 | 2100 |
| Calculated intercept | 2.055394 | 2.810375 | Pressure | 26.5 | 26.5 |
| Analyzer Background | 34.9 | 34.9 | Flow | 699 | 699 |
| Analyzer Coefficient | 1.053 | 1.062 | Lamp Ratio | 70.9 | 70.9 |

SO₂ Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|-----------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5009 | 0.0 | 0.0 | -0.2 | ---- |
| as found span | 4935 | 79.0 | 784.6 | 776.1 | 1.011 |
| calibrator zero | 5009 | 0.0 | 0.0 | 0.2 | ---- |
| high point | 4935 | 79.0 | 784.6 | 787.9 | 0.996 |
| second point | 4978 | 39.6 | 393.0 | 390.3 | 1.007 |
| third point | 4995 | 19.9 | 197.6 | 193.3 | 1.022 |
| as left zero | 5009 | 0.0 | 0.0 | 0.0 | ---- |
| as left span | 4935 | 79.0 | 784.6 | 782.0 | 1.003 |

| Average Correction Factor | | | | | 1.008 |
|---------------------------|--------|-------------------|--------|-----------|-------|
| Corrected As found | 776.30 | Previous response | 782.54 | *% change | 0.8% |

* = > +/-5% change initiates investigation

Notes:

span adjusted, no maintenance done

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

SO₂ Calibration Summary

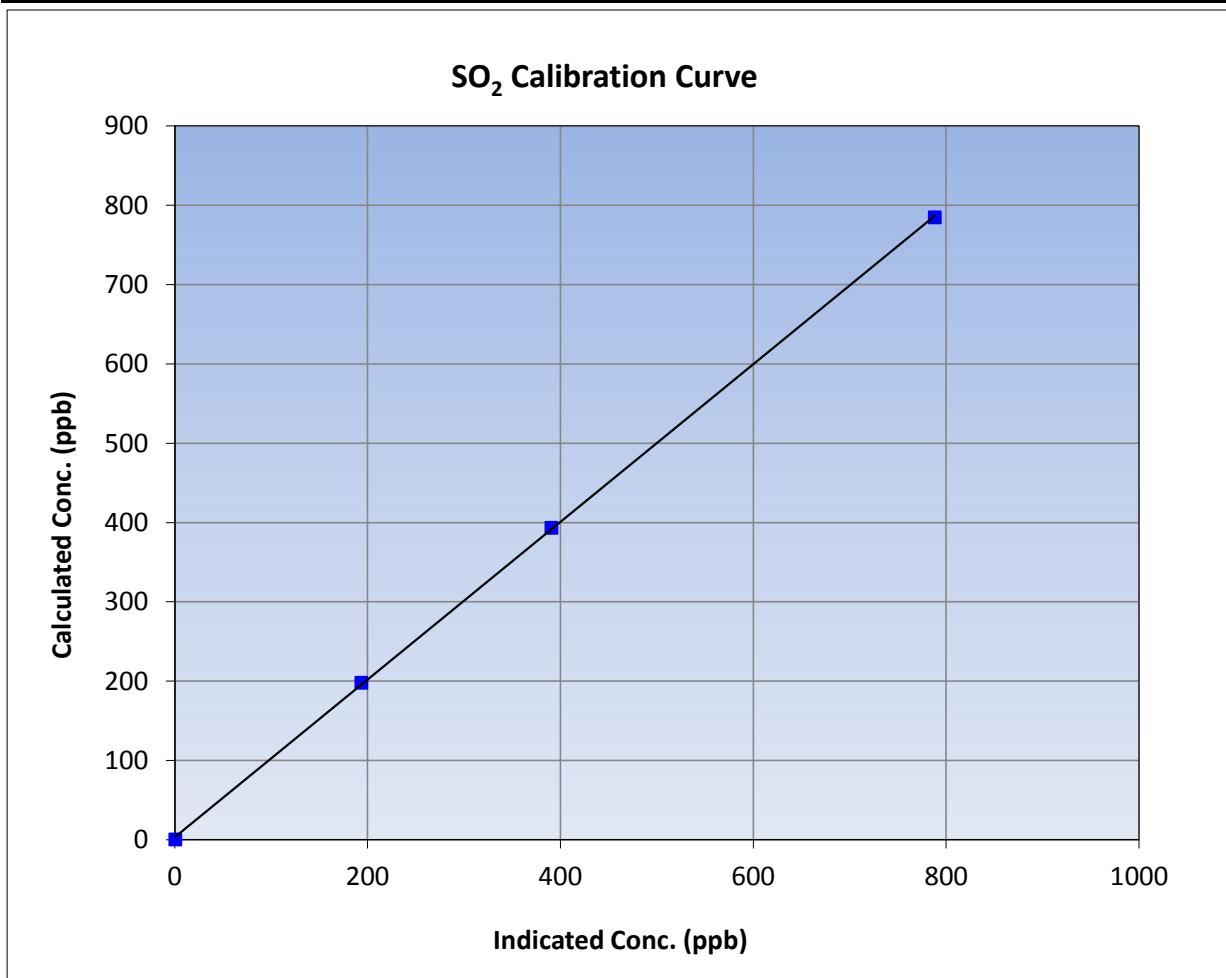
Version-03-2017

Station Information

| | | | |
|------------------|------------------|----------------------|---------------|
| Calibration Date | August 2, 2017 | Previous Calibration | July 10, 2017 |
| Station Name | Fort McKay South | Station Number | AMS 13 |
| Start Time (MST) | 7:25 | End Time (MST) | 11:57 |
| Analyzer make | API T100 | Analyzer serial # | 599 |

Calibration Data

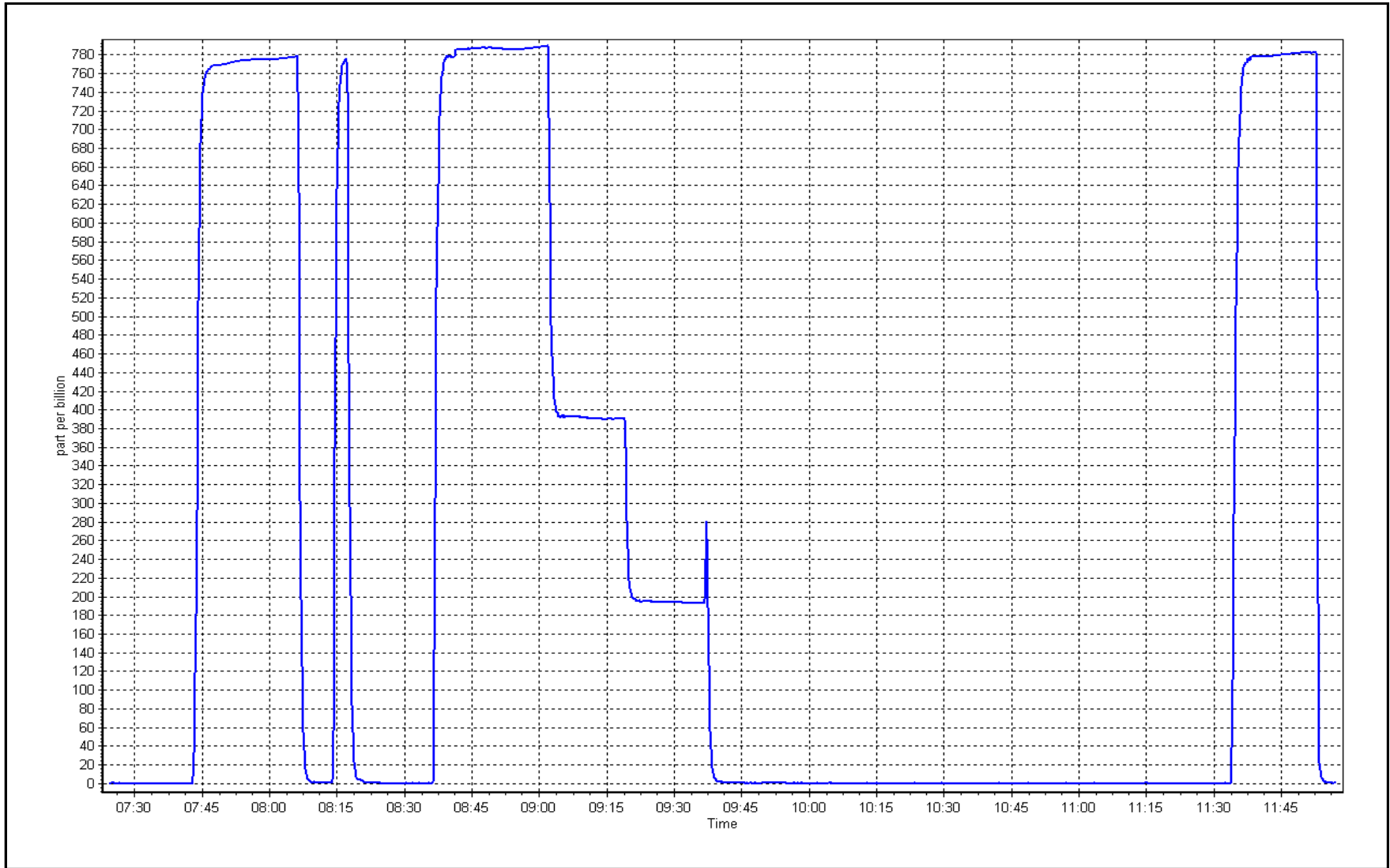
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|-------------|
| 0.0 | 0.2 | ---- | Correlation Coefficient | 0.999932 | ≥0.995 |
| 784.6 | 787.9 | 0.9959 | | | |
| 393.0 | 390.3 | 1.0070 | Slope | 0.994422 | 0.90 - 1.10 |
| 197.6 | 193.3 | 1.0223 | | | |
| | | | Intercept | 2.810375 | +/-30 |



SO2 Calibration Plot

Date: August 2, 2017

Location: Fort McKay South





Wood Buffalo Environmental Association

TRS Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|------------------|-----------------|---------------|
| Station Name: | Fort McKay South | Station number: | AMS 13 |
| Calibration Date: | August 1, 2017 | Last Cal Date: | July 18, 2017 |
| Start time (MST): | 10:30 | End time (MST): | 12:33 |
| Reason: | Routine | | |

Calibration Standards

| | | | | |
|-----------------------|-----------------|-----|------------------|-------------------|
| Cal Gas Concentration | <u>5.07</u> | ppm | Cal Gas Exp Date | September 9, 2017 |
| Cal Gas Cylinder # | <u>CC178364</u> | | | |
| Calibrator Make/Model | API T700P | | Serial Number | 2448 |
| ZAG Make/Model | API 701 | | Serial Number | 5613 |

Analyzer Information

Analyzer make: Thermo 43i-LTE Analyzer serial #: 1218153359

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|----------------------|--------------|---------------|--------------|--------------|---------------|
| Analyzer Range | 0 - 100 ppb | | PMT voltage | -727.1 | -727.1 |
| Calculated slope | 0.993557 | 0.988629 | Lamp voltage | 1003 | 1003 |
| Calculated intercept | 0.388877 | 0.324643 | Pressure | 721.8 | 721.8 |
| Analyzer Background | 2.11 | 2.11 | Flow | 0.461 | 0.461 |
| Analyzer Coefficient | 1.035 | 1.035 | Intensity | 90 | 90 |

TRS Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|-----------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5000 | 0.0 | 0.0 | -0.1 | ---- |
| as found span | 4922 | 78.5 | 79.6 | 80.3 | 0.991 |
| calibrator zero | 5000 | 0.0 | 0.0 | -0.1 | ---- |
| high point | 4922 | 78.5 | 79.6 | 80.3 | 0.991 |
| second point | 4978 | 39.4 | 39.8 | 39.8 | 1.000 |
| third point | 4998 | 19.8 | 20.0 | 19.7 | 1.016 |
| as left zero | 5000 | 0.0 | 0.0 | -0.1 | ---- |
| as left span | 4922 | 78.5 | 79.6 | 79.6 | 1.000 |

SO2 Scrubber Check

| | | | | Average Correction Factor | 1.002 |
|--------------------|-------|-------------------|-------|---------------------------|-------|
| Corrected As found | 80.40 | Previous response | 79.72 | *% change | -0.8% |

* = > +/-5% change initiates investigation

Notes:

No maintenance or adjustments done,

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

TRS Calibration Summary

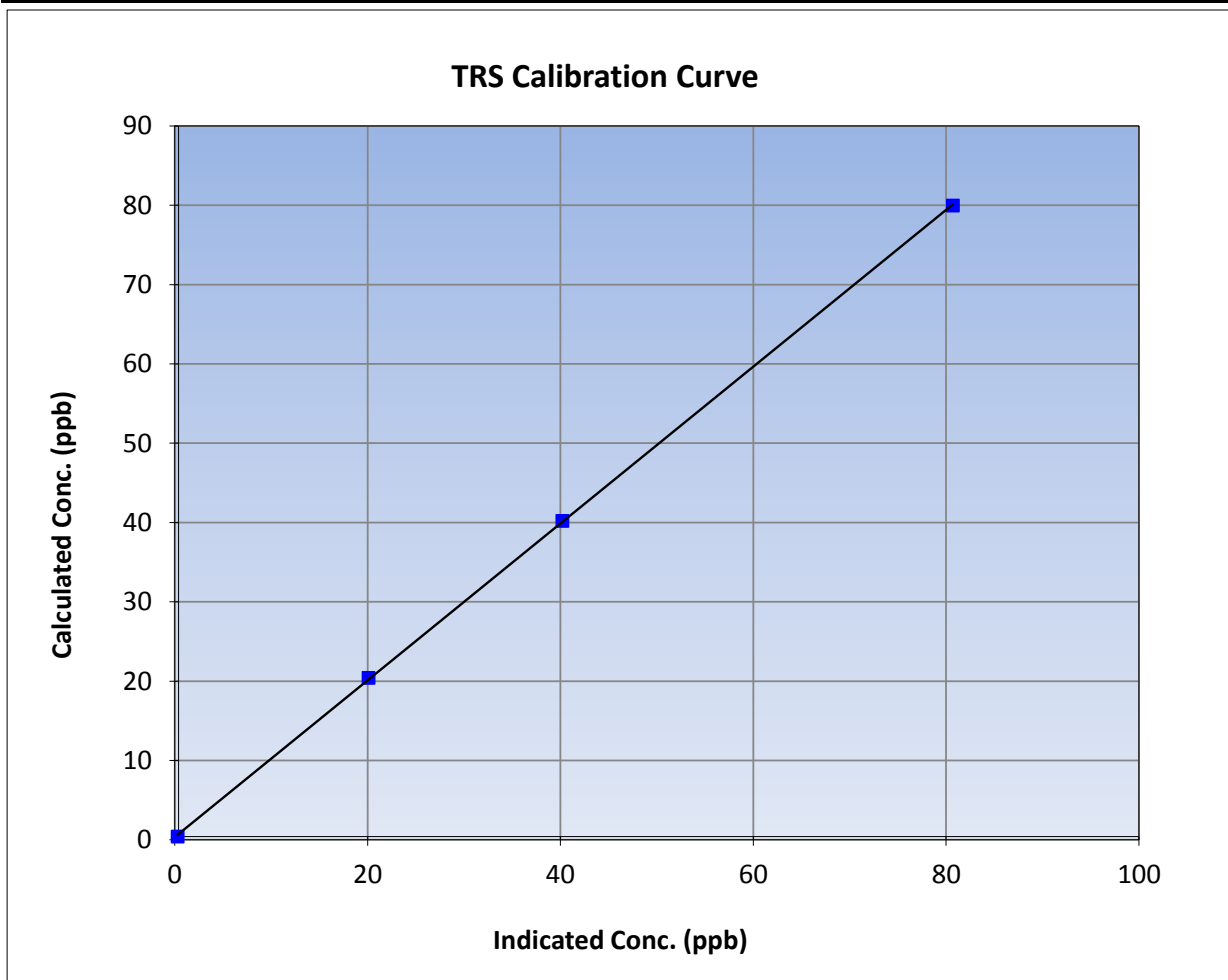
Version-03-2017

Station Information

| | | | |
|------------------|------------------|----------------------|---------------|
| Calibration Date | August 1, 2017 | Previous Calibration | July 18, 2017 |
| Station Name | Fort McKay South | Station Number | AMS 13 |
| Start Time (MST) | 10:30 | End Time (MST) | 12:33 |
| Analyzer make | Thermo 43i-LTE | Analyzer serial # | 1218153359 |

Calibration Data

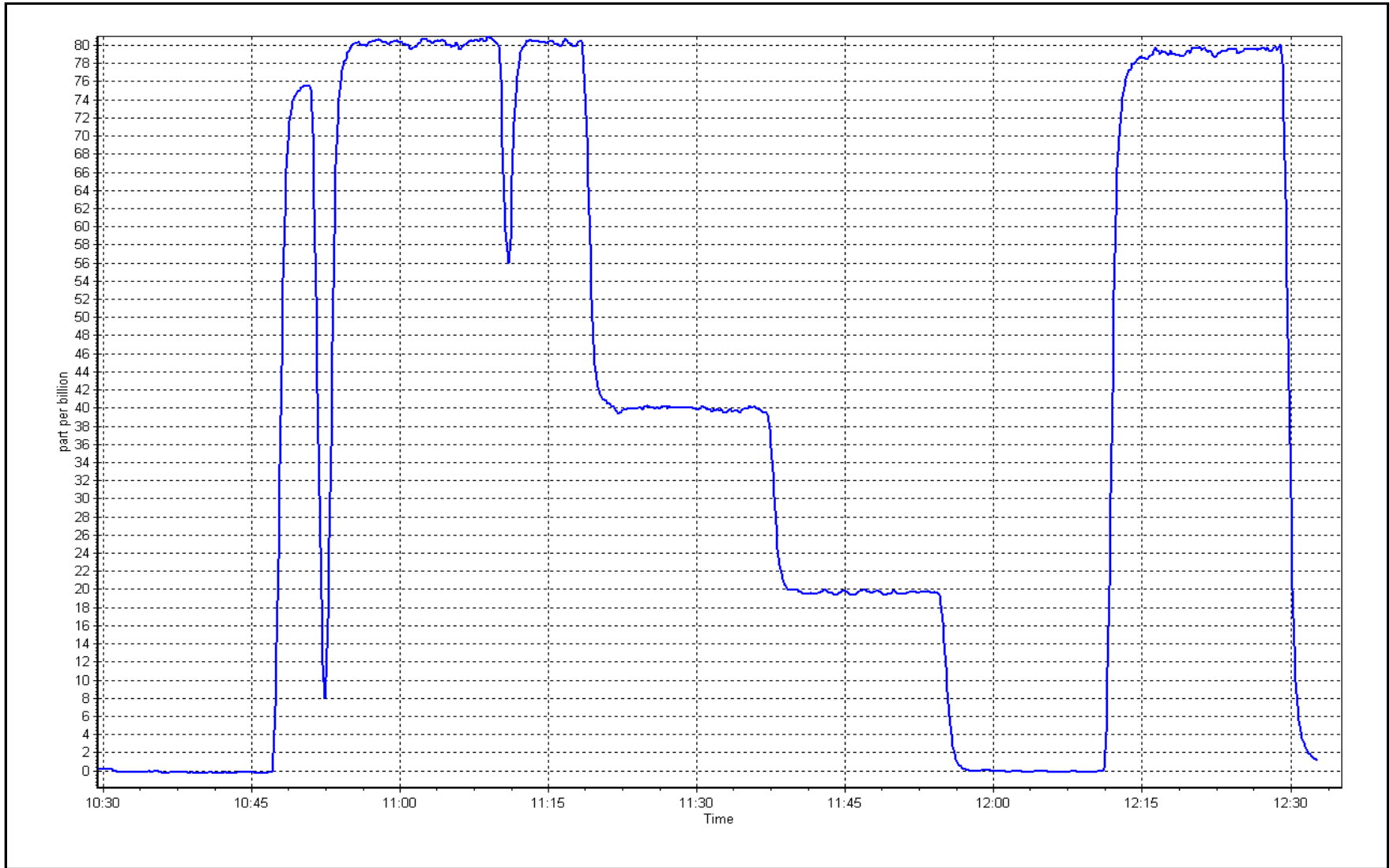
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|-------------|
| 0.0 | -0.1 | ---- | Correlation Coefficient | 0.999963 | ≥0.995 |
| 79.6 | 80.3 | 0.9912 | | | |
| 39.8 | 39.8 | 1.0003 | Slope | 0.988629 | 0.90 - 1.10 |
| 20.0 | 19.7 | 1.0155 | | | |
| | | | Intercept | 0.324643 | +/-3 |



TRS Calibration Plot

Date: August 1, 2017

Location: Fort McKay South





Wood Buffalo Environmental Association

THC Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|------------------|-----------------|---------------|
| Station Name: | Fort McKay South | Station number: | AMS 13 |
| Calibration Date: | August 2, 2017 | Last Cal Date: | July 10, 2017 |
| Start time (MST): | 7:25 | End time (MST): | 11:55 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|-----------------------|------------------|---------------------|-----------------|
| Gas Cert Reference | LL110515 | Cal Gas Expiry Date | September-08-18 |
| CH4 Cal Gas Conc. | <u>517.0</u> ppm | CH4 Equiv Conc. | 1067.0 ppm |
| C3H8 Cal Gas Conc. | <u>200.0</u> ppm | Station temp. | 22 Deg C |
| Calibrator Make/Model | Teledyne API 700 | Serial Number | 2448 |
| ZAG Make/Model | Teledyne API 701 | Serial Number | 5613 |

Analyzer Information

| | | | |
|----------------------|---------------|---------------------|---------------|
| Analyzer make: | Thermo 51i-LT | Analyzer serial #: | 1505164380 |
| | <u>Start</u> | <u>Finish</u> | <u>Start</u> |
| Analyzer Range | 0 - 25 ppm | Bias voltage supply | -303.4 |
| Calculated slope | 1.003882 | Sample pressure | 9.2 |
| Calculated intercept | 0.075829 | Fuel pressure | 23.1 |
| Analyzer Background | 3.042 | Air pressure | 34.3 |
| Analyzer Coefficient | 1.390 | Flame temperature | 153.5 |
| | | | <u>Finish</u> |

THC Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5009 | 0.0 | 0.00 | 0.08 | ---- |
| as found span | 4935 | 79.0 | 16.81 | 17.04 | 0.987 |
| calibrator zero | 5009 | 0.0 | 0.00 | -0.02 | ---- |
| high point | 4935 | 79.0 | 16.81 | 16.82 | 0.999 |
| second point | 4978 | 39.6 | 8.42 | 8.35 | 1.009 |
| third point | 4995 | 19.9 | 4.23 | 4.12 | 1.028 |
| as left zero | 5009 | 0.0 | 0.00 | -0.02 | ---- |
| as left span | 4935 | 79.0 | 16.81 | 16.96 | 0.991 |
| Average Correction Factor | | | | | 1.012 |
| Corrected As found | 16.96 | Previous response | 16.67 | *% change | -1.7% |

* = > +/-5% change initiates investigation

Notes: no maintenance done, zero and span adjusted

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

THC Calibration Summary

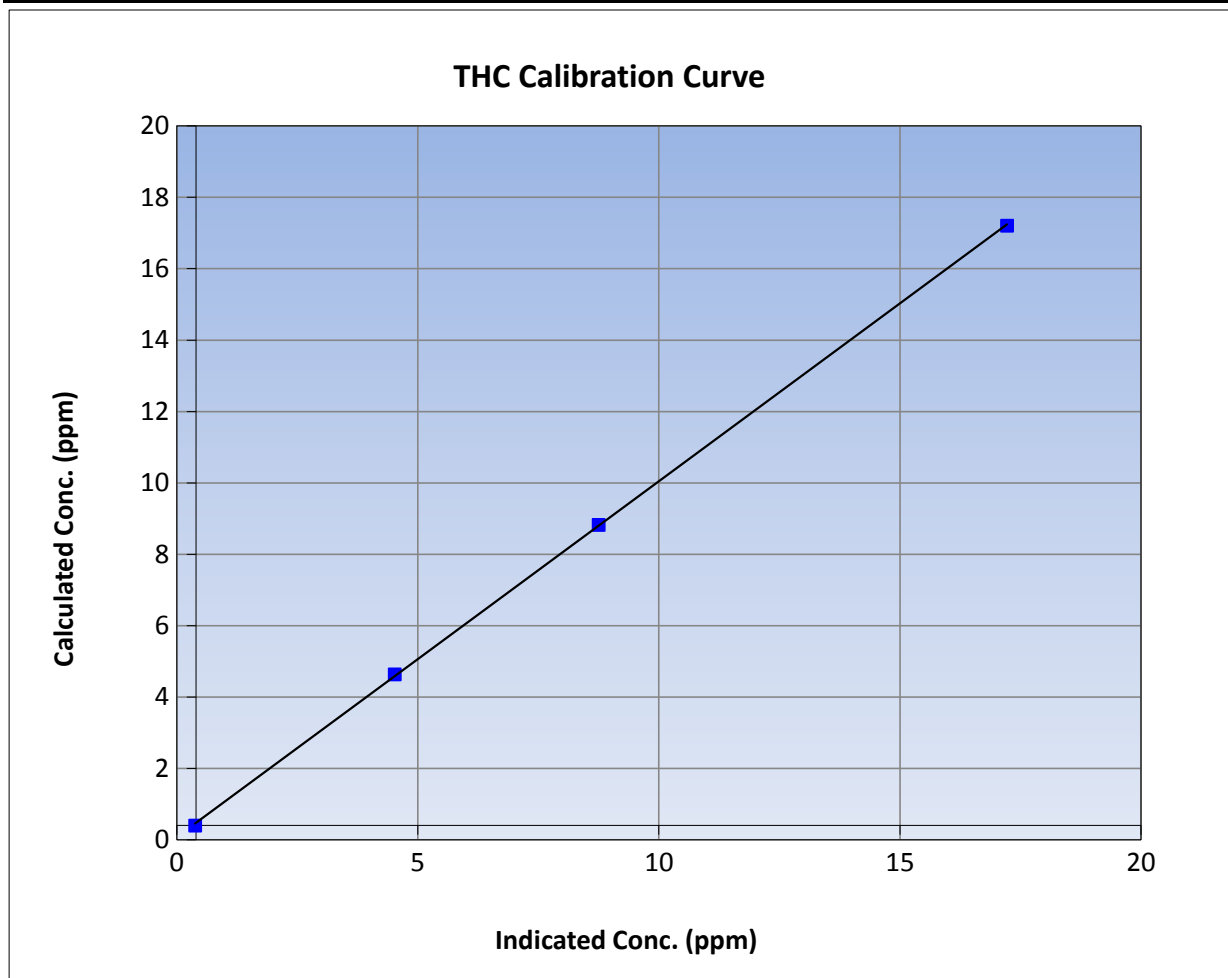
Version-03-2017

Station Information

| | | | |
|------------------|------------------|----------------------|---------------|
| Calibration Date | August 2, 2017 | Previous Calibration | July 10, 2017 |
| Station Name | Fort McKay South | Station Number | AMS 13 |
| Start Time (MST) | 7:25 | End Time (MST) | 11:55 |
| Analyzer make | Thermo 51i-LT | Analyzer serial # | 1505164380 |

Calibration Data

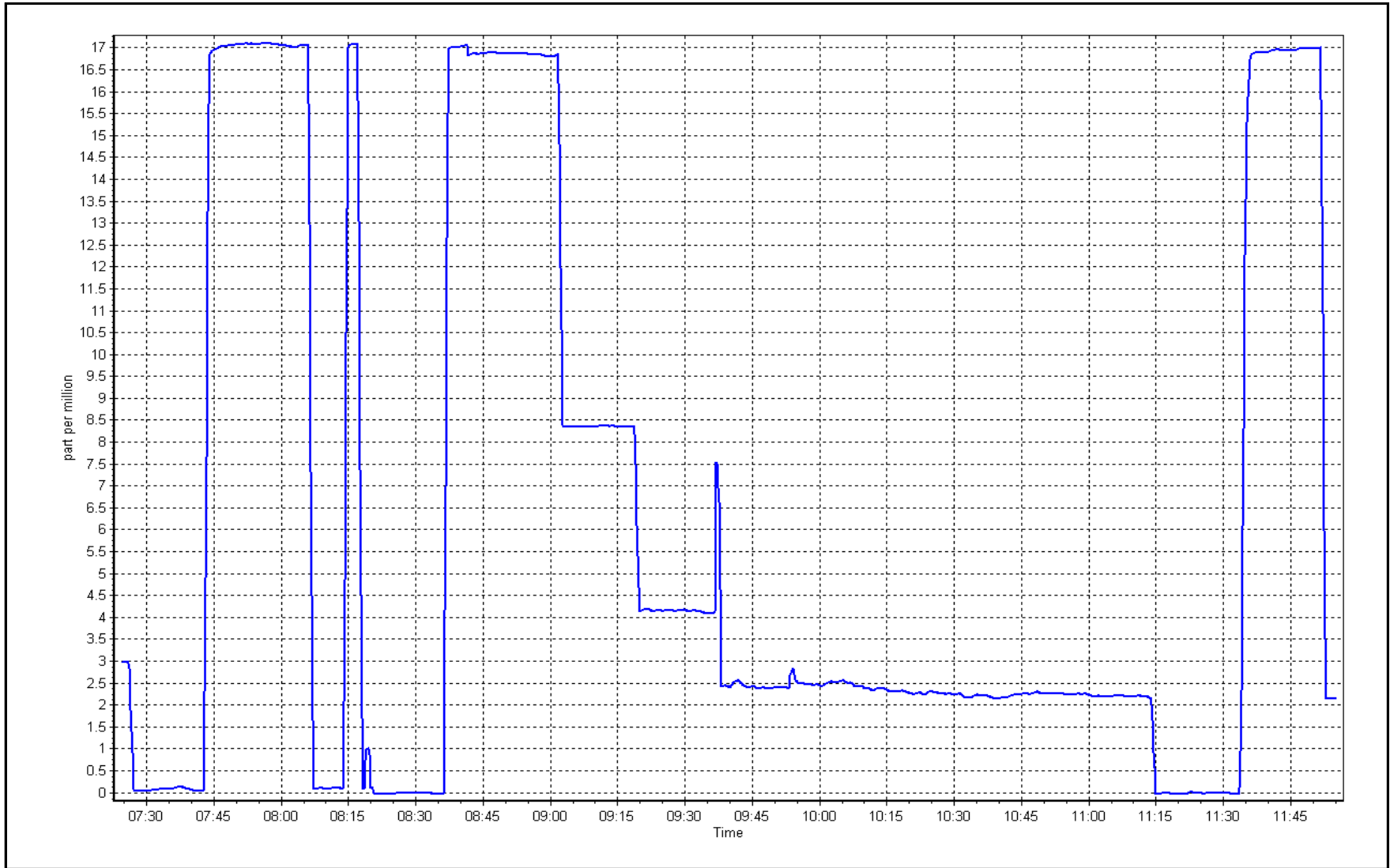
| Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | 0.999954 | ≥0.995 |
| 16.8 | 16.8 | 0.9995 | | | |
| 8.4 | 8.4 | 1.0085 | Slope | 0.996663 | 0.90 - 1.10 |
| 4.2 | 4.1 | 1.0277 | | | |
| | | | Intercept | 0.073558 | +/-1.5 |



THC Calibration Plot

Date: August 2, 2017

Location: Fort McKay South





Wood Buffalo Environmental Association

O₃ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|------------------|-----------------|---------------|
| Station Name: | Fort McKay South | Station number: | AMS 13 |
| Calibration Date: | August 1, 2017 | Last Cal Date: | July 18, 2017 |
| Start time (MST): | 8:10 | End time (MST): | 10:32 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|------------------------|-------------------|--------------------|-------|
| O3 generation mode: | Photometer | O3 reference Date: | NA |
| Calibrator Make/Model: | Teledyne API 700P | Serial Number: | 2448 |
| ZAG Make/Model: | Teledyne API 701 | Serial Number: | 11038 |

Analyzer Information

| | | | |
|----------------|----------|--------------------|-----|
| Analyzer make: | API T400 | Analyzer serial #: | 825 |
|----------------|----------|--------------------|-----|

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|----------------------|--------------|---------------|-----------|--------------|---------------|
| Analyzer Range | 0 - 500 ppb | | Pressure | 27.0 | 27.0 |
| Calculated slope | 1.000229 | 0.996340 | Flow | 774 | 774 |
| Calculated intercept | 0.708928 | -0.654666 | Intensity | 3949.0 | 3949.0 |
| Analyzer Background | 1.4 | 1.3 | | | |
| Analyzer Coefficient | 1.095 | 1.005 | | | |

O₃ Calibration Data

| Set Point | Total air flow rate (sccm) | Calibrator Lamp Voltage Drive | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|---------------------------|----------------------------|-------------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5009 | 0.0 | 0.0 | -0.1 | ---- |
| as found span | 4830 | 1079.2 | 400.0 | 435.5 | 0.918 |
| calibrator zero | 5009 | 0.0 | 0.0 | -0.1 | ---- |
| high point | 4830 | 1079.2 | 400.0 | 401.7 | 0.996 |
| second point | 4833 | 907.3 | 200.0 | 201.9 | 0.991 |
| third point | 4832 | 802.1 | 100.0 | 101.7 | 0.983 |
| as left zero | 5000 | 0.0 | 0.0 | 0.4 | ---- |
| as left span | 4830 | 1079.2 | 400.0 | 402.9 | 0.993 |
| Average Correction Factor | | | | | 0.990 |
| Corrected As found | 435.60 | Previous response | 399.20 | *% change | -8.4% |

* = > +/-8% change initiates investigation

Notes: no maintenance done, span adjusted; calibrator changed out; %change was due to GPT on the Nox being out by 4%

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

O₃ Calibration Summary

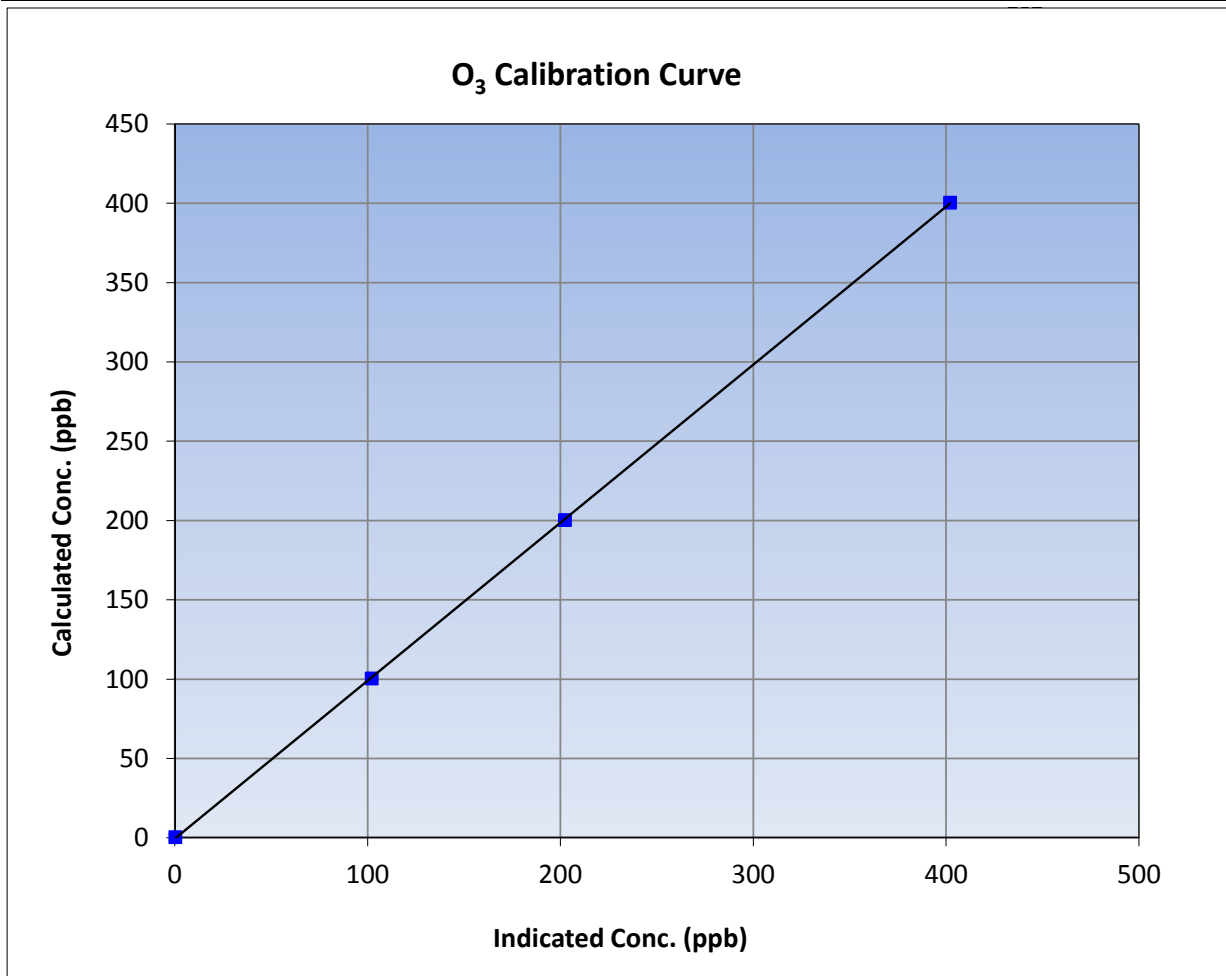
Version-03-2017

Station Information

| | | | |
|------------------|------------------|----------------------|---------------|
| Calibration Date | August 1, 2017 | Previous Calibration | July 18, 2017 |
| Station Name | Fort McKay South | Station Number | AMS 13 |
| Start Time (MST) | 8:10 | End Time (MST) | 10:32 |
| Analyzer make | API T400 | Analyzer serial # | 825 |

Calibration Data

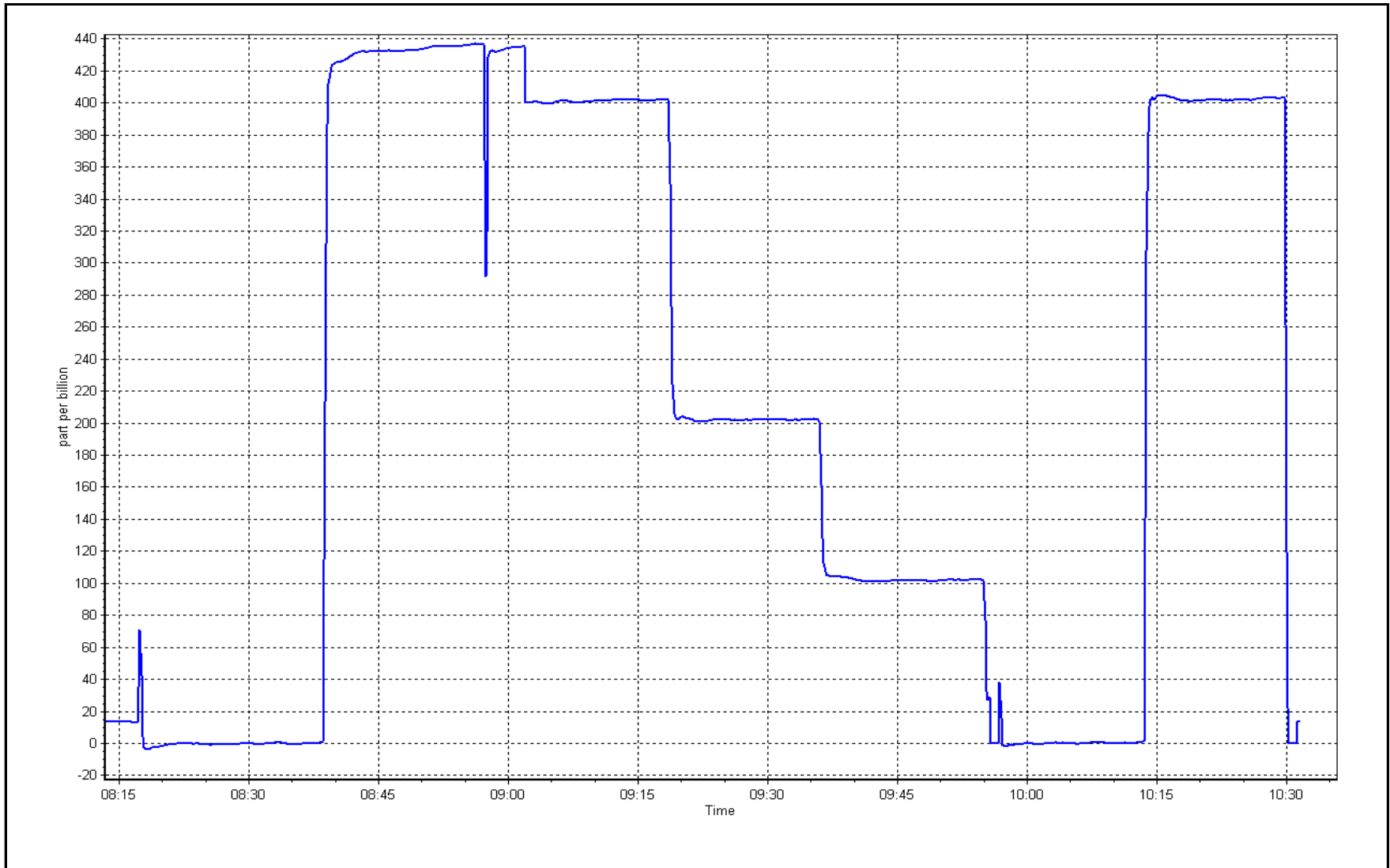
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | -0.1 | ---- | Correlation Coefficient | 0.999983 | ≥0.995 |
| 400.0 | 401.7 | 0.9958 | | | |
| 200.0 | 201.9 | 0.9906 | Slope | 0.996340 | 0.90 - 1.10 |
| 100.0 | 101.7 | 0.9833 | | | |
| | | | Intercept | -0.654666 | +/- 10 |



O₃ Calibration Plot

Date: August 1, 2017

Location: Fort McKay South





Wood Buffalo Environmental Association

NO_x - NO - NO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|------------------|-----------------|---------------|
| Station Name: | Fort McKay South | Station number: | AMS 13 |
| Calibration Date: | August 2, 2017 | Last Cal Date: | July 10, 2017 |
| Start time (MST): | 7:25 | End time (MST): | 11:56 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|-------------------|-----------------|---------------------|-----------------|
| NO Gas Cylinder # | LL110515 | Cal Gas Expiry Date | September-08-18 |
| NOX Cal Gas Conc. | <u>50.9</u> ppb | NO Cal Gas Conc. | <u>50.7</u> ppb |
| Calibrator Model | API T700 | Serial Number | 2448 |
| ZAG make/model | API T701 | Serial Number | 5613 |

Analyzer Information

| | | | | | |
|---------------------------|--------------|---------------|-------------------------------|--------------|---------------|
| Analyzer make: Thermo 42i | | | Analyzer serial #: 1410661329 | | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| NO coefficient | 1.208 | 1.244 | NOX Range (ppb) | 0 - 1000 ppb | |
| NOX coefficient | 1.002 | 1.003 | PMT Temperature | -3.0 | -3.0 |
| NO2 coefficient | 1.000 | 1.000 | Reaction cell Press | 218.4 | 225.5 |
| NO bkgrnd | 9.0 | 9.4 | Sample Flow | 0.738 | 0.714 |
| NOX bkgrnd | 9.0 | 9.6 | PMT Voltage | -828.1 | -828.1 |

Calibration Statistics

| | | |
|----------------------------|--------------|---------------|
| | <u>Start</u> | <u>Finish</u> |
| NO _x Cal Slope | 0.996034 | 0.995979 |
| NO _x Cal Offset | 1.225716 | 1.280727 |
| NO Cal Slope | 0.995640 | 0.995372 |
| NO Cal Offset | 1.404158 | 1.457068 |
| NO ₂ Cal Slope | 0.997100 | 0.990890 |
| NO ₂ Cal Offset | -0.094698 | 0.255088 |



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Version-03-2017

Dilution Calibration Data

| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|----------------------------------|---------------------------|-----------------------------|---|--|---|--|---------------------------------------|--|---|--|
| as found zero | 5009 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | ---- | ---- |
| as found span | 4935 | 79.0 | 802.0 | 798.8 | 3.2 | 800.8 | 797.7 | 3.1 | 1.0015 | 1.0014 |
| calibrator zero | 5009 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.1 | 0.1 | ---- | ---- |
| high point | 4935 | 79.0 | 802.0 | 798.8 | 3.2 | 804.5 | 801.7 | 2.4 | 0.9969 | 0.9964 |
| second point | 4978 | 39.6 | 401.7 | 400.1 | 1.6 | 401.8 | 400.2 | 1.5 | 0.9998 | 0.9998 |
| third point | 4995 | 19.9 | 202.0 | 201.2 | 0.8 | 199.7 | 198.8 | 0.8 | 1.0114 | 1.0120 |
| as left zero | 5009 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | ---- | ---- |
| as left span | 4935 | 79.0 | 802.0 | 337.3 | 464.7 | 807.4 | 330.4 | 476.8 | 0.9933 | 1.0209 |
| Average Correction Factor | | | | | | | | | 1.0027 | 1.0028 |

| | | | | | |
|--------------------|-----------------------------|----------------|--|-----------------|------------------------|
| Corrected As found | NO _x = 800.7 ppb | NO = 797.7 ppb | | *Percent Change | NO _x = 0.4% |
| Previous Response | NO _x = 803.9 ppb | NO = 800.9 ppb | | *Percent Change | NO = 0.4% |

* = > +/-5% change initiates investigation

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO drop conc (ppb) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | Converter Efficiency <i>Limit = 96-104%</i> |
|----------------------------------|------------------------------|---|--|---------------------------------------|--|---|--|---|--|
| 1st NO ref point | | 3.2 | 796.4 | 795.4 | 2.0 | 1.0070 | 1.0043 | ---- | ---- |
| 1st NO2 (400 ppb O3) | 337.3 | 461.3 | 802.4 | 337.3 | 465.2 | 0.9995 | ---- | 0.9915 | 100.9% |
| 2nd NO2 (200 ppb O3) | 561.7 | 236.9 | 800.8 | 561.7 | 239.2 | 1.0015 | ---- | 0.9902 | 101.0% |
| 3rd NO2 (100 ppb O3) | 683.5 | 115.1 | 798.6 | 683.5 | 115.1 | 1.0042 | ---- | 0.9996 | 100.0% |
| 2nd NO ref point | ---- | 3.2 | 803.6 | 801.4 | 2.2 | 0.9980 | 0.9968 | ---- | ---- |
| Average Correction Factor | | | | | | 1.0008 | 1.0005 | 0.9938 | 100.6% |

Notes: Pump and charcoal replaced due to pressure and span instability. Span adjusted; 2nd NO ref point used due to GPT instability

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

Version-03-2017

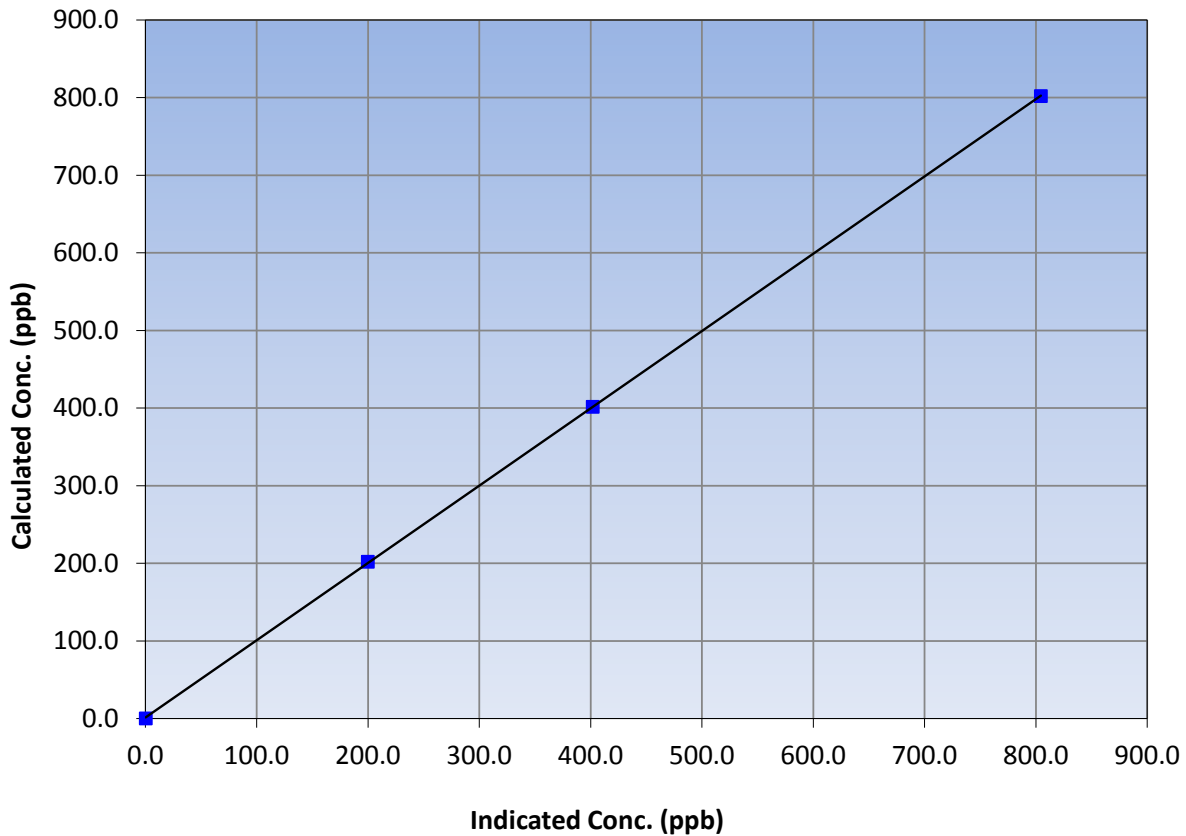
Station Information

| | | | |
|------------------|------------------|----------------------|---------------|
| Calibration Date | August 2, 2017 | Previous Calibration | July 10, 2017 |
| Station Name | Fort McKay South | Station Number | AMS 13 |
| Start Time (MST) | 7:25 | End Time (MST) | 11:56 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1410661329 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.2 | ---- | Correlation Coefficient | ≥0.995 | |
| 802.0 | 804.5 | 0.9969 | | | |
| 401.7 | 401.8 | 0.9998 | | | |
| 202.0 | 199.7 | 1.0114 | | | |
| | | | Slope | 0.995979 | 0.90 - 1.10 |
| | | | Intercept | 1.280727 | +/-20 |

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

Version-03-2017

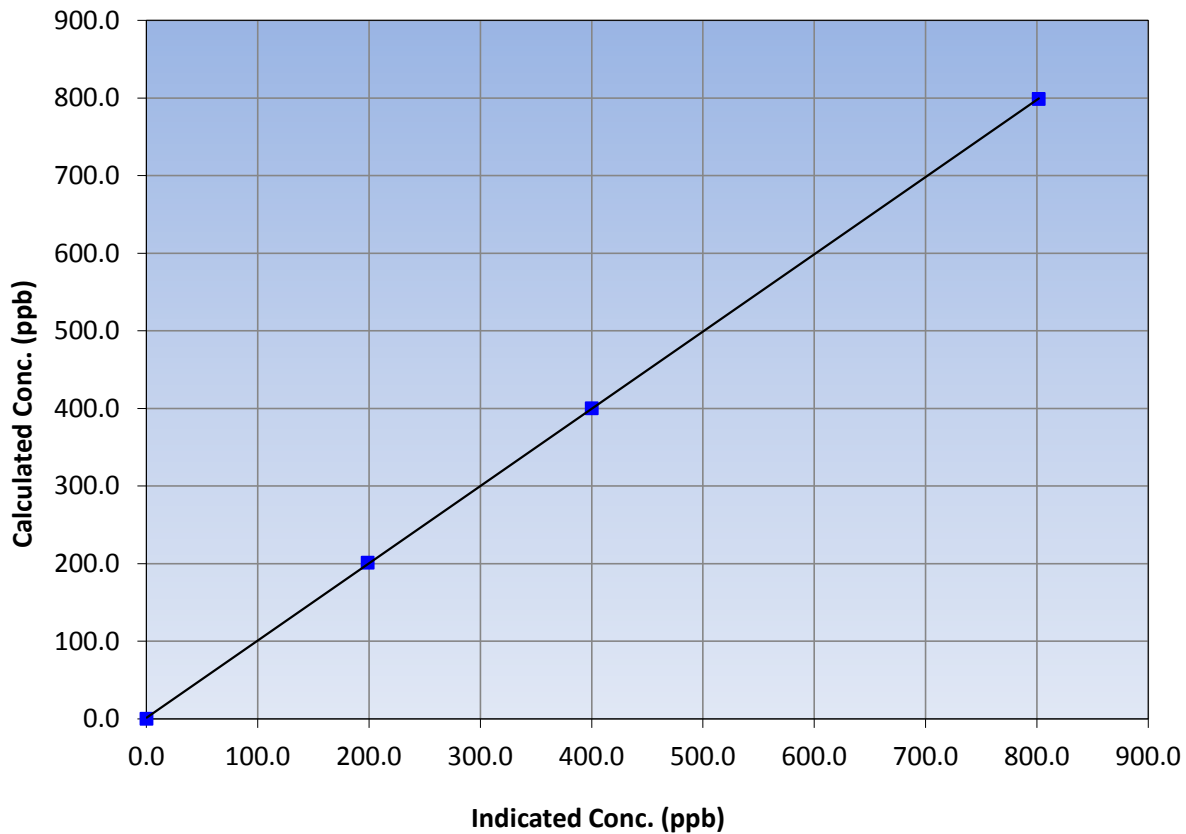
Station Information

| | | | |
|------------------|------------------|----------------------|---------------|
| Calibration Date | August 2, 2017 | Previous Calibration | July 10, 2017 |
| Station Name | Fort McKay South | Station Number | AMS 13 |
| Start Time (MST) | 7:25 | End Time (MST) | 11:56 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1410661329 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|-------------|
| 0.0 | 0.1 | ---- | Correlation Coefficient | ≥0.995 | |
| 798.8 | 801.7 | 0.9964 | | | |
| 400.1 | 400.2 | 0.9998 | | | |
| 201.2 | 198.8 | 1.0120 | | | |
| | | | Slope | 0.995372 | 0.90 - 1.10 |
| | | | Intercept | 1.457068 | +/-20 |

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

Version-03-2017

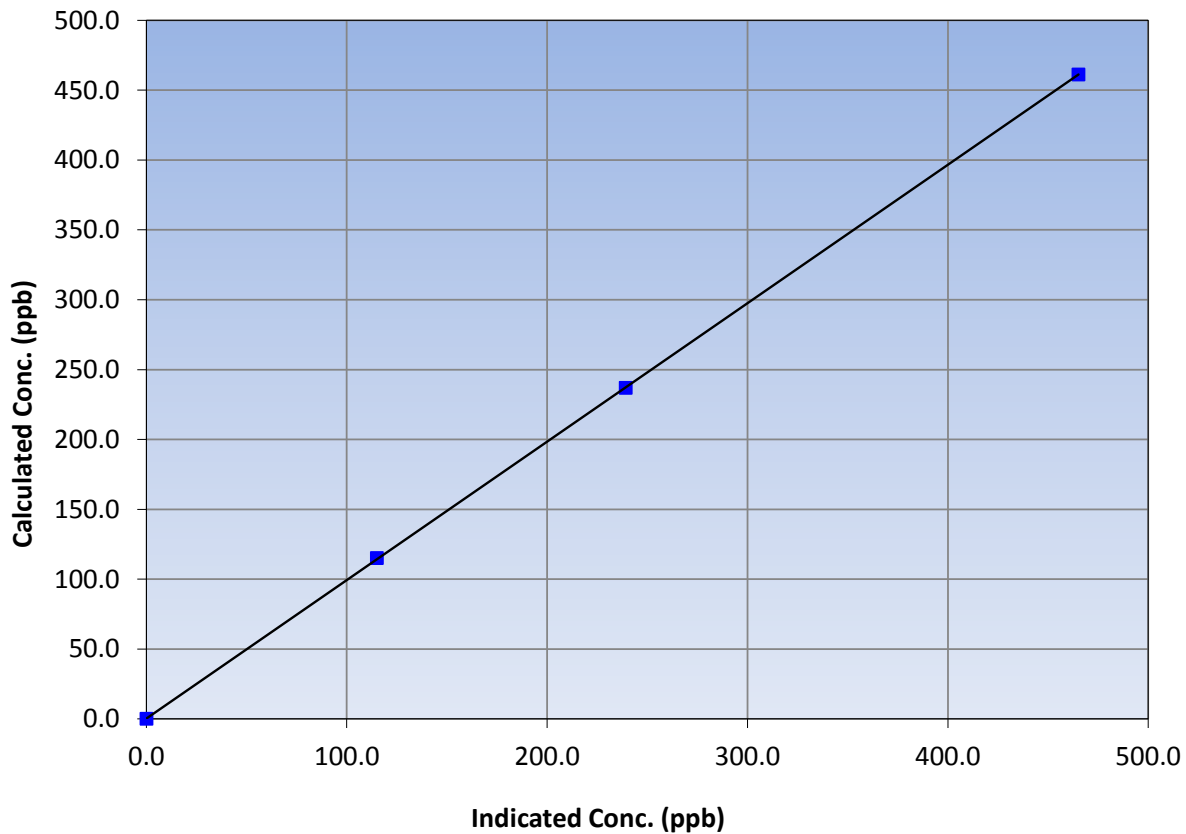
Station Information

| | | | |
|------------------|------------------|----------------------|---------------|
| Calibration Date | August 2, 2017 | Previous Calibration | July 10, 2017 |
| Station Name | Fort McKay South | Station Number | AMS 13 |
| Start Time (MST) | 7:25 | End Time (MST) | 11:56 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1410661329 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.1 | ---- | Correlation Coefficient | ≥0.995 | |
| 461.3 | 465.2 | 0.9915 | | | |
| 236.9 | 239.2 | 0.9902 | | | |
| 115.1 | 115.1 | 0.9996 | | | |
| | | | Slope | 0.990890 | 0.90 - 1.10 |
| | | | Intercept | 0.255088 | +/-20 |

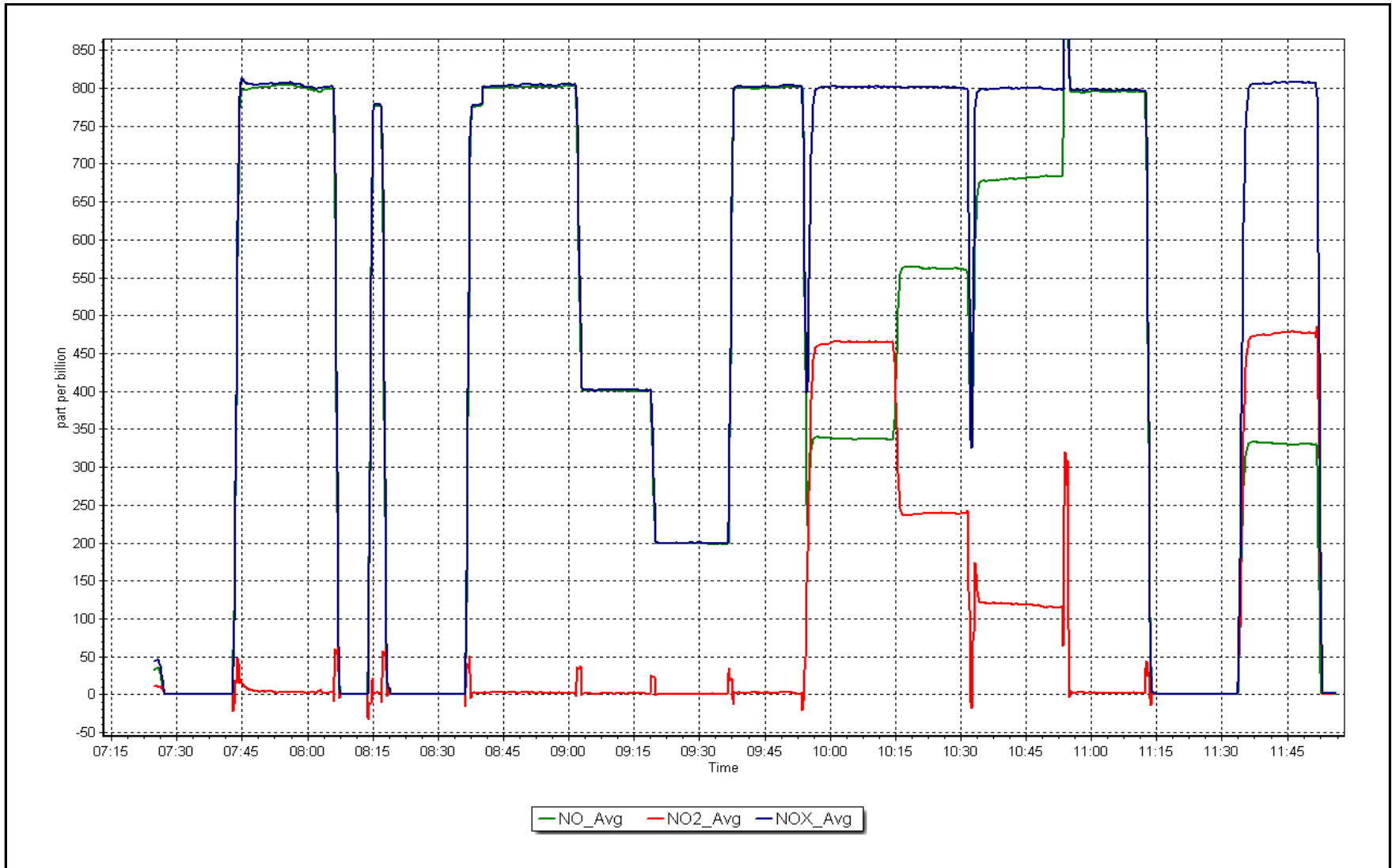
NO₂ Calibration Curve



NO_x Calibration Plot

Date: August 2, 2017

Location: Fort McKay South





Wood Buffalo Environmental Association

NO_x - NO - NO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|------------------|-----------------|----------------|
| Station Name: | Fort McKay South | Station number: | AMS 13 |
| Calibration Date: | August 6, 2017 | Last Cal Date: | August 2, 2017 |
| Start time (MST): | 9:30 | End time (MST): | 14:01 |
| Reason: | Maintenance | | |

Calibration Standards

| | | | |
|-------------------|-----------------|---------------------|-------------------|
| NO Gas Cylinder # | LL110515 | Cal Gas Expiry Date | September 8, 2018 |
| NOX Cal Gas Conc. | <u>50.9</u> ppb | NO Cal Gas Conc. | <u>50.7</u> ppb |
| Calibrator Model | API T700 | Serial Number | 2448 |
| ZAG make/model | API T701 | Serial Number | 5613 |

Analyzer Information

| | | | | | |
|-----------------------------|--------------|---------------|-------------------------------|--------------|---------------|
| Analyzer make: Thermo 42i | | | Analyzer serial #: 1410661329 | | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| NO coefficient | 1.244 | 1.251 | NOX Range (ppb) | 0 - 1000 ppb | |
| NOX coefficient | 1.003 | 1.002 | PMT Temperature | -3.0 | -2.7 |
| NO ₂ coefficient | 1.000 | 1.000 | Reaction cell Press | 248.6 | 230.3 |
| NO bkgrnd | 9.4 | 9.5 | Sample Flow | 0.635 | 0.724 |
| NOX bkgrnd | 9.6 | 9.6 | PMT Voltage | -828.1 | -827.7 |

Calibration Statistics

| | | |
|----------------------------|--------------|---------------|
| | <u>Start</u> | <u>Finish</u> |
| NO _x Cal Slope | 0.995979 | 1.003388 |
| NO _x Cal Offset | 1.280727 | 2.012344 |
| NO Cal Slope | 0.995372 | 1.001909 |
| NO Cal Offset | 1.457068 | 2.148507 |
| NO ₂ Cal Slope | 0.990890 | 1.002755 |
| NO ₂ Cal Offset | 0.255088 | 1.523726 |



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Version-03-2017

Dilution Calibration Data

| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|----------------------------------|---------------------------|-----------------------------|---|--|---|--|---------------------------------------|--|---|--|
| as found zero | 5009 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | ---- | ---- |
| as found span | 4935 | 79.0 | 802.0 | 798.8 | 3.2 | 699.4 | 695.2 | 4.0 | 1.1467 | 1.1491 |
| calibrator zero | 5009 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.1 | 0.2 | ---- | ---- |
| high point | 4935 | 79.0 | 802.0 | 798.8 | 3.2 | 798.4 | 796.4 | 2.0 | 1.0045 | 1.0030 |
| second point | 4978 | 39.6 | 401.7 | 400.1 | 1.6 | 397.1 | 395.7 | 1.4 | 1.0116 | 1.0112 |
| third point | 4995 | 19.9 | 202.0 | 201.2 | 0.8 | 197.2 | 196.7 | 0.5 | 1.0242 | 1.0228 |
| as left zero | 5009 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | ---- | ---- |
| as left span | 4935 | 79.0 | 802.0 | 399.3 | 402.7 | 799.6 | 411.8 | 387.8 | 1.0030 | 0.9696 |
| Average Correction Factor | | | | | | | | | 1.0134 | 1.0124 |

| | | | | |
|--------------------|-----------------------------|----------------|-----------------|-------------------------|
| Corrected As found | NO _x = 699.3 ppb | NO = 695.2 ppb | *Percent Change | NO _x = 15.0% |
| Previous Response | NO _x = 803.9 ppb | NO = 801.1 ppb | *Percent Change | NO = 15.2% |

* = > +/-5% change initiates investigation

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO drop conc (ppb) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | Converter Efficiency <i>Limit = 96-104%</i> |
|----------------------------------|------------------------------|---|--|---------------------------------------|--|---|--|---|--|
| 1st NO ref point | | 3.2 | 793.5 | 789.8 | 3.9 | 1.0107 | 1.0114 | ---- | ---- |
| 1st NO2 (400 ppb O3) | 399.3 | 393.7 | 790.3 | 399.3 | 391.9 | 1.0148 | ---- | 1.0045 | 99.6% |
| 2nd NO2 (200 ppb O3) | 546.8 | 246.2 | 790.3 | 546.8 | 243.6 | 1.0148 | ---- | 1.0105 | 99.0% |
| 3rd NO2 (100 ppb O3) | 677.4 | 115.6 | 788.9 | 677.4 | 111.5 | 1.0166 | ---- | 1.0363 | 96.5% |
| 2nd NO ref point | ---- | 3.2 | 798.4 | 785.2 | 4.1 | 1.0045 | 1.0174 | ---- | ---- |
| Average Correction Factor | | | | | | 1.0126 | 1.0144 | 1.0171 | 98.3% |

Notes: Daily span was 10% low from target last night. Increase in chamber pressure showed that pump had started to wear out. Did a 3-point cal check for linearity before replacing the pump. Adjustd span slightly.

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

NO_x Calibration Summary

Version-03-2017

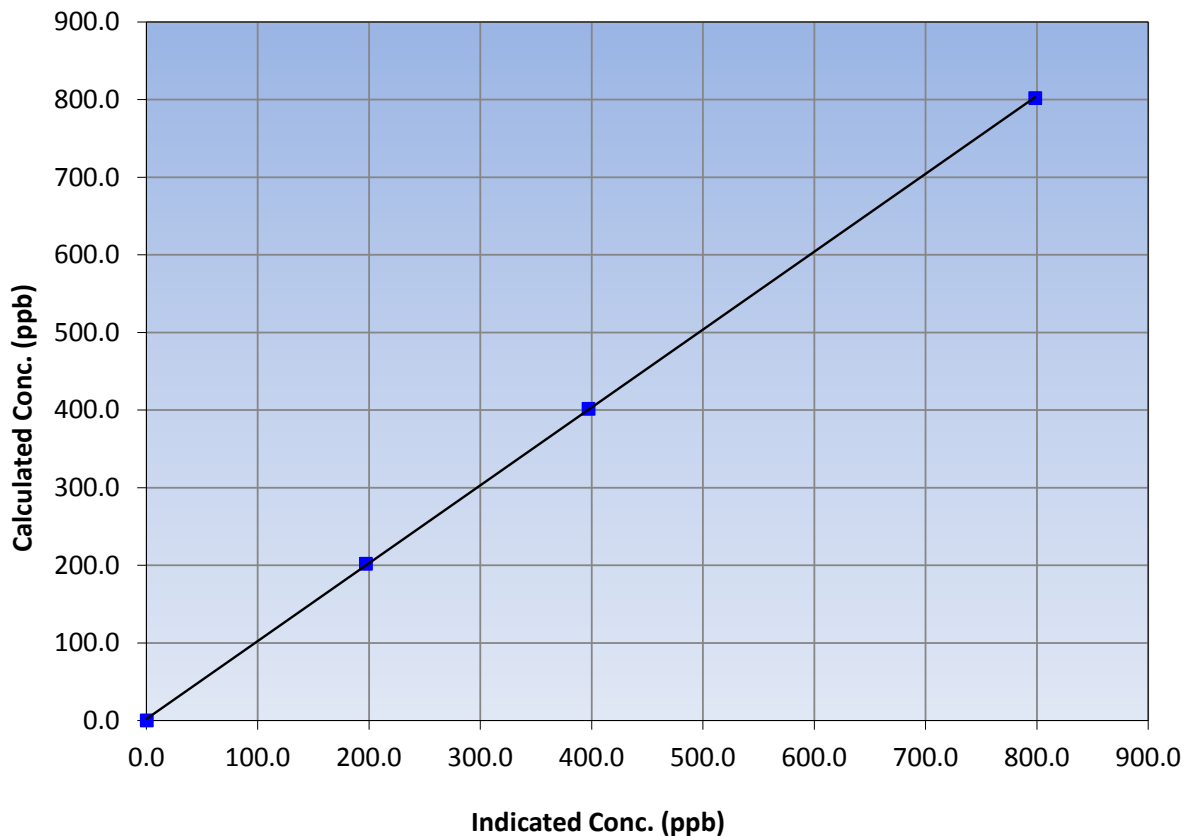
Station Information

| | | | |
|------------------|------------------|----------------------|----------------|
| Calibration Date | August 6, 2017 | Previous Calibration | August 2, 2017 |
| Station Name | Fort McKay South | Station Number | AMS 13 |
| Start Time (MST) | 9:30 | End Time (MST) | 14:01 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1410661329 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.2 | ---- | Correlation Coefficient | ≥0.995 | |
| 802.0 | 798.4 | 1.0045 | | | |
| 401.7 | 397.1 | 1.0116 | | | |
| 202.0 | 197.2 | 1.0242 | | | |
| | | | Slope | 1.003388 | 0.90 - 1.10 |
| | | | Intercept | 2.012344 | +/-20 |

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

Version-03-2017

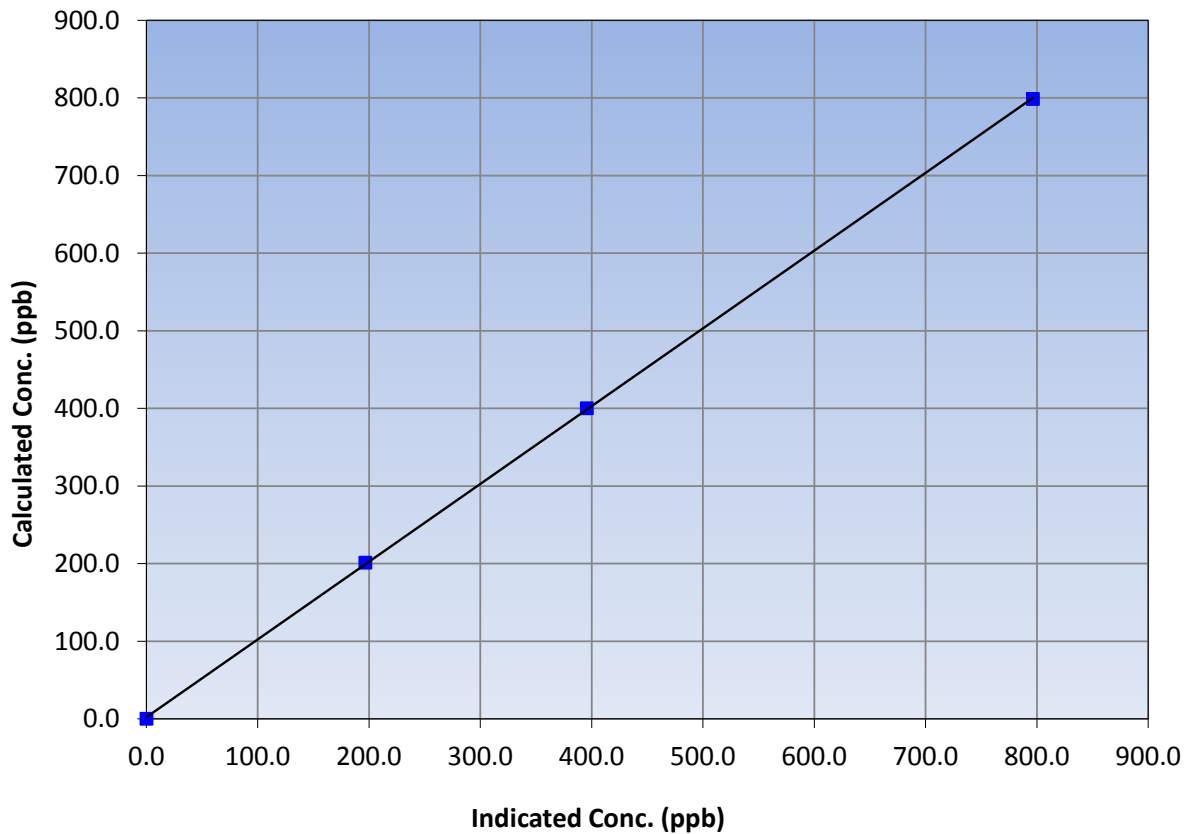
Station Information

| | | | |
|------------------|------------------|----------------------|----------------|
| Calibration Date | August 6, 2017 | Previous Calibration | August 2, 2017 |
| Station Name | Fort McKay South | Station Number | AMS 13 |
| Start Time (MST) | 9:30 | End Time (MST) | 14:01 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1410661329 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|
| 0.0 | 0.1 | ---- | Correlation Coefficient | ≥0.995 |
| 798.8 | 796.4 | 1.0030 | | |
| 400.1 | 395.7 | 1.0112 | Slope | 0.90 - 1.10 |
| 201.2 | 196.7 | 1.0228 | | |
| | | | Intercept | +/-20 |

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

Version-03-2017

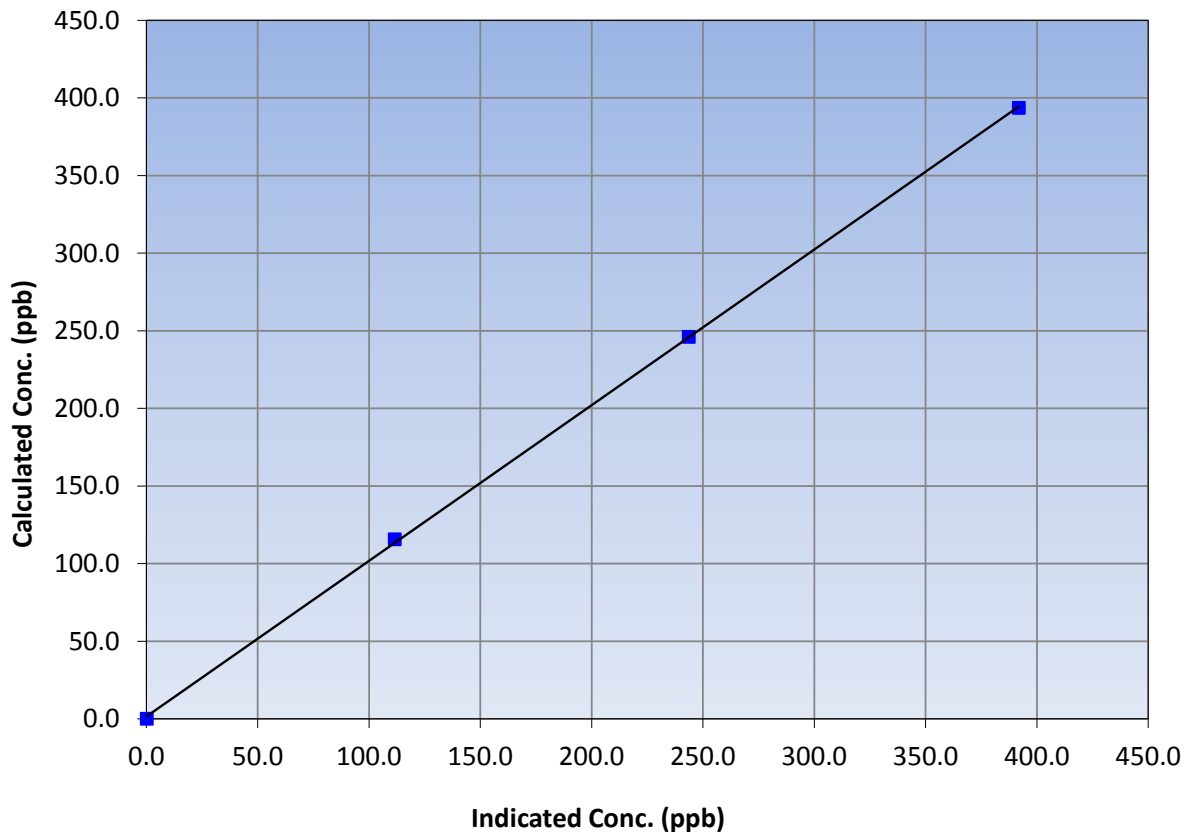
Station Information

| | | | |
|------------------|------------------|----------------------|----------------|
| Calibration Date | August 6, 2017 | Previous Calibration | August 2, 2017 |
| Station Name | Fort McKay South | Station Number | AMS 13 |
| Start Time (MST) | 9:30 | End Time (MST) | 14:01 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1410661329 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> |
|-------------------------------------|------------------------------------|---------------------------|---|--------------------------------|
| 0.0 | 0.2 | ---- | Correlation Coefficient Slope Intercept | ≥0.995 0.90 - 1.10 +/-20 |
| 393.7 | 391.9 | 1.0045 | | |
| 246.2 | 243.6 | 1.0105 | | |
| 115.6 | 111.5 | 1.0363 | | |
| | | | 0.999898 | |
| | | | 1.002755 | |
| | | | 1.523726 | |

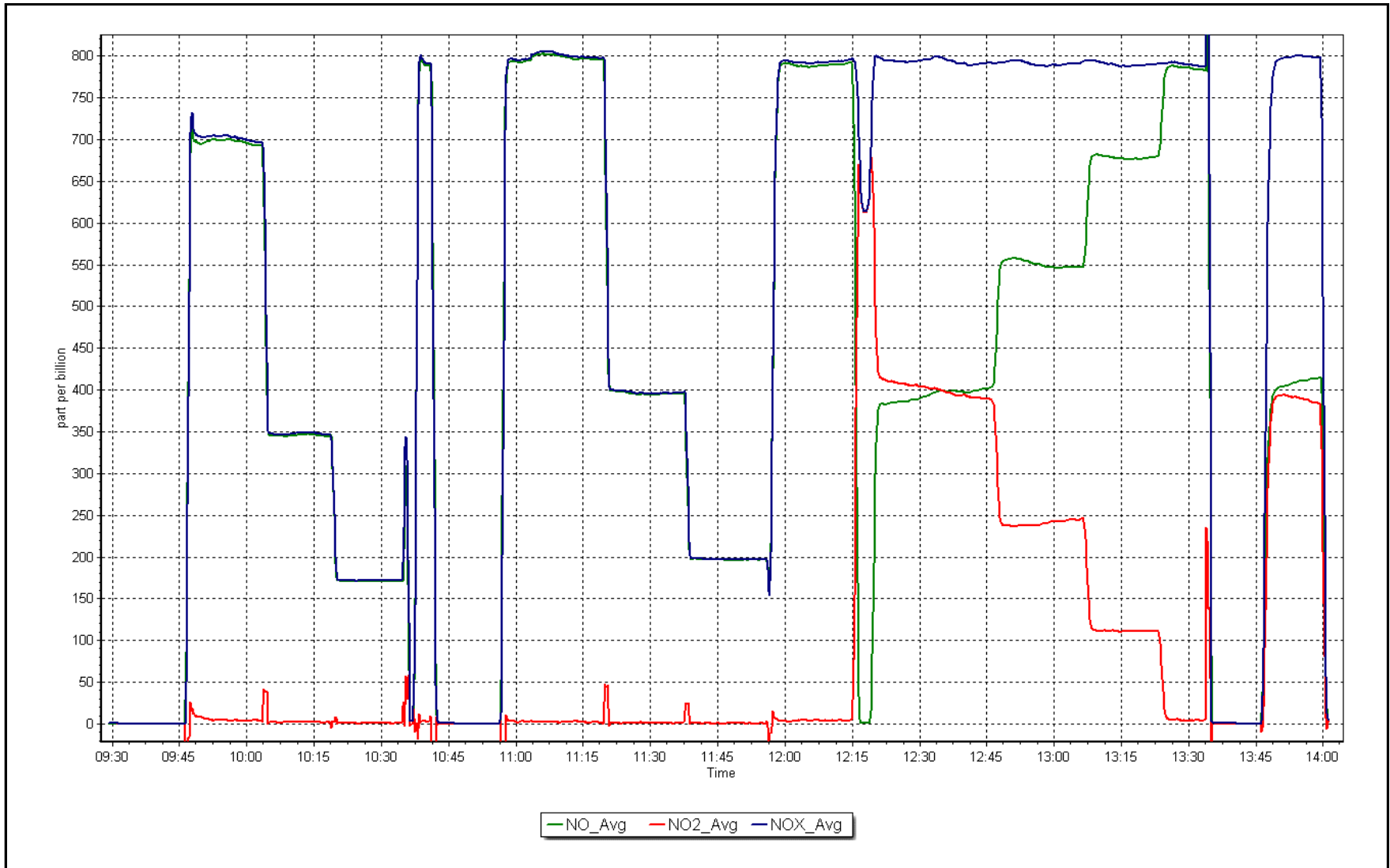
NO₂ Calibration Curve



NO_x Calibration Plot

Date: August 6, 2017

Location: Fort McKay South





Wood Buffalo Environmental Association

NO_x - NO - NO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|------------------|-----------------|----------------|
| Station Name: | Fort McKay South | Station number: | AMS 13 |
| Calibration Date: | August 8, 2017 | Last Cal Date: | August 6, 2017 |
| Start time (MST): | 9:33 | End time (MST): | 14:00 |
| Reason: | Maintenance | | |

Calibration Standards

| | | | |
|-------------------|-----------------|---------------------|-------------------|
| NO Gas Cylinder # | LL110515 | Cal Gas Expiry Date | September 8, 2018 |
| NOX Cal Gas Conc. | <u>50.9</u> ppb | NO Cal Gas Conc. | <u>50.7</u> ppb |
| Calibrator Model | API T700 | Serial Number | 2448 |
| ZAG make/model | API T701 | Serial Number | 5613 |

Analyzer Information

| | | | | | |
|-----------------------------|--------------|---------------|-------------------------------|--------------|---------------|
| Analyzer make: Thermo 42i | | | Analyzer serial #: 1410661329 | | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| NO coefficient | 1.251 | 1.021 | NOX Range (ppb) | 0 - 1000 ppb | |
| NOX coefficient | 1.002 | 1.003 | PMT Temperature | -2.7 | -2.9 |
| NO ₂ coefficient | 1.000 | 1.000 | Reaction cell Press | 266.3 | 180.5 |
| NO bkgrnd | 9.5 | 7.5 | Sample Flow | 0.591 | 0.944 |
| NOX bkgrnd | 9.6 | 7.6 | PMT Voltage | -827.7 | -827.7 |

Calibration Statistics

| | | |
|----------------------------|--------------|---------------|
| | <u>Start</u> | <u>Finish</u> |
| NO _x Cal Slope | 1.003388 | 1.000928 |
| NO _x Cal Offset | 2.012344 | 1.142538 |
| NO Cal Slope | 1.001909 | 0.999676 |
| NO Cal Offset | 2.148507 | 1.299182 |
| NO ₂ Cal Slope | 1.002755 | 0.996604 |
| NO ₂ Cal Offset | 1.523726 | 0.055516 |



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Version-03-2017

Dilution Calibration Data

| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|----------------------------------|---------------------------|-----------------------------|---|--|---|--|---------------------------------------|--|---|--|
| as found zero | 5009 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | ---- | ---- |
| as found span | 4935 | 79.0 | 802.0 | 798.8 | 3.2 | 671.8 | 668.9 | 2.9 | 1.1938 | 1.1942 |
| calibrator zero | 5009 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.1 | 0.1 | ---- | ---- |
| high point | 4935 | 79.0 | 802.0 | 798.8 | 3.2 | 800.6 | 798.4 | 2.2 | 1.0017 | 1.0005 |
| second point | 4978 | 39.6 | 401.7 | 400.1 | 1.6 | 400.0 | 398.5 | 1.4 | 1.0043 | 1.0041 |
| third point | 4995 | 19.9 | 202.0 | 201.2 | 0.8 | 199.0 | 198.4 | 0.6 | 1.0150 | 1.0140 |
| as left zero | 5009 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | 0.2 | ---- | ---- |
| as left span | 4935 | 79.0 | 802.0 | 389.3 | 412.7 | 818.5 | 401.3 | 417.3 | 0.9798 | 0.9701 |
| Average Correction Factor | | | | | | | | | 1.0070 | 1.0062 |

| | | | | | |
|--------------------|-----------------------------|----------------|--|-----------------|-------------------------|
| Corrected As found | NO _x = 671.8 ppb | NO = 668.9 ppb | | *Percent Change | NO _x = 18.7% |
| Previous Response | NO _x = 797.3 ppb | NO = 795.2 ppb | | *Percent Change | NO = 18.9% |

* = > +/-5% change initiates investigation

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO drop conc (ppb) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | Converter Efficiency <i>Limit = 96-104%</i> |
|----------------------------------|------------------------------|---|--|---------------------------------------|--|---|--|---|--|
| 1st NO ref point | | 3.2 | 803.9 | 799.9 | 4.0 | 0.9976 | 0.9987 | ---- | ---- |
| 1st NO2 (400 ppb O3) | 389.3 | 413.8 | 804.5 | 389.3 | 415.2 | 0.9969 | ---- | 0.9965 | 100.4% |
| 2nd NO2 (200 ppb O3) | 544.0 | 259.1 | 803.8 | 544.0 | 259.8 | 0.9977 | ---- | 0.9971 | 100.3% |
| 3rd NO2 (100 ppb O3) | 692.4 | 110.7 | 803.2 | 692.4 | 110.8 | 0.9985 | ---- | 0.9987 | 100.1% |
| 2nd NO ref point | ---- | 3.2 | 803.4 | 799.4 | 4.0 | 0.9982 | 0.9993 | ---- | ---- |
| Average Correction Factor | | | | | | 0.9978 | 0.9990 | 0.9974 | 100.3% |

Notes: Daily span was 16% low from target last night. Suspected a bad pump issue since the chamber pressure had significantly increased. Sample pump replaced after as founds. Adjusted span.

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

NO_x Calibration Summary

Version-03-2017

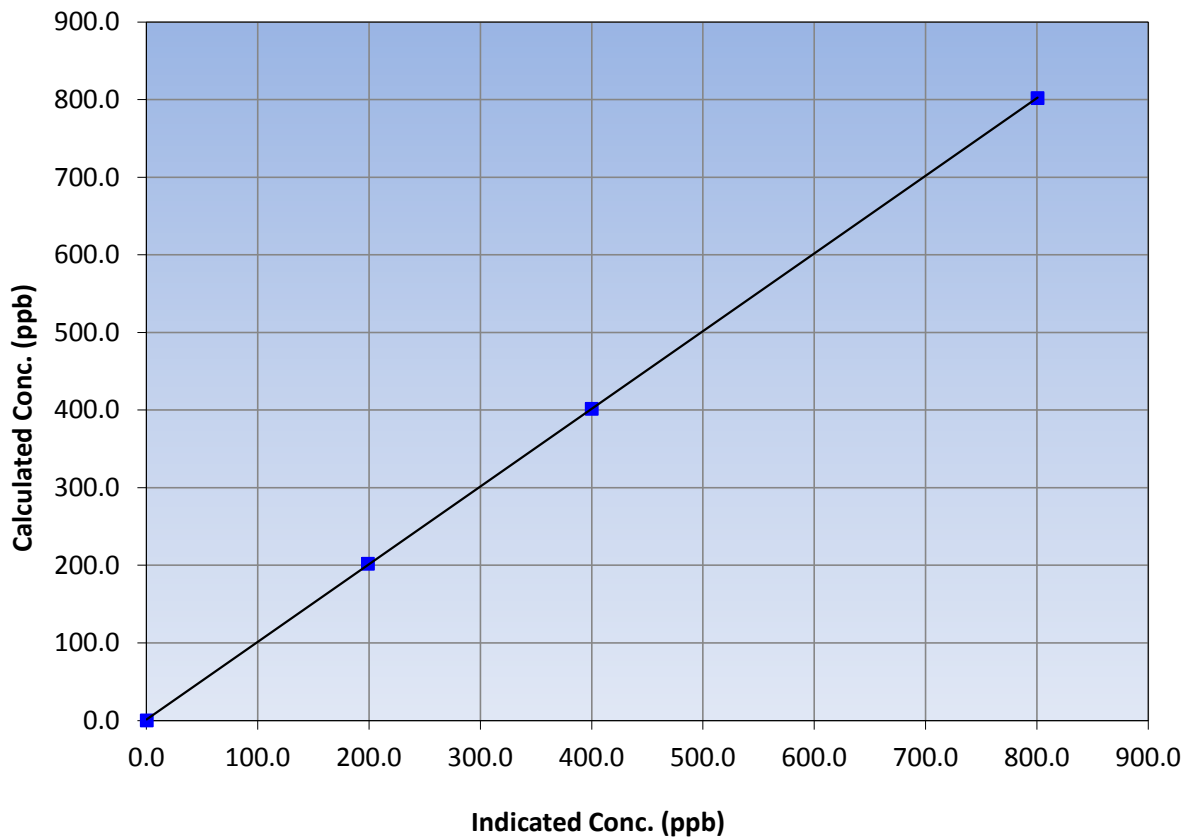
Station Information

| | | | |
|------------------|------------------|----------------------|----------------|
| Calibration Date | August 8, 2017 | Previous Calibration | August 6, 2017 |
| Station Name | Fort McKay South | Station Number | AMS 13 |
| Start Time (MST) | 9:33 | End Time (MST) | 14:00 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1410661329 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.2 | ---- | Correlation Coefficient | ≥0.995 | |
| 802.0 | 800.6 | 1.0017 | | | |
| 401.7 | 400.0 | 1.0043 | | | |
| 202.0 | 199.0 | 1.0150 | | | |
| | | | Slope | 1.000928 | 0.90 - 1.10 |
| | | | Intercept | 1.142538 | +/-20 |

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

Version-03-2017

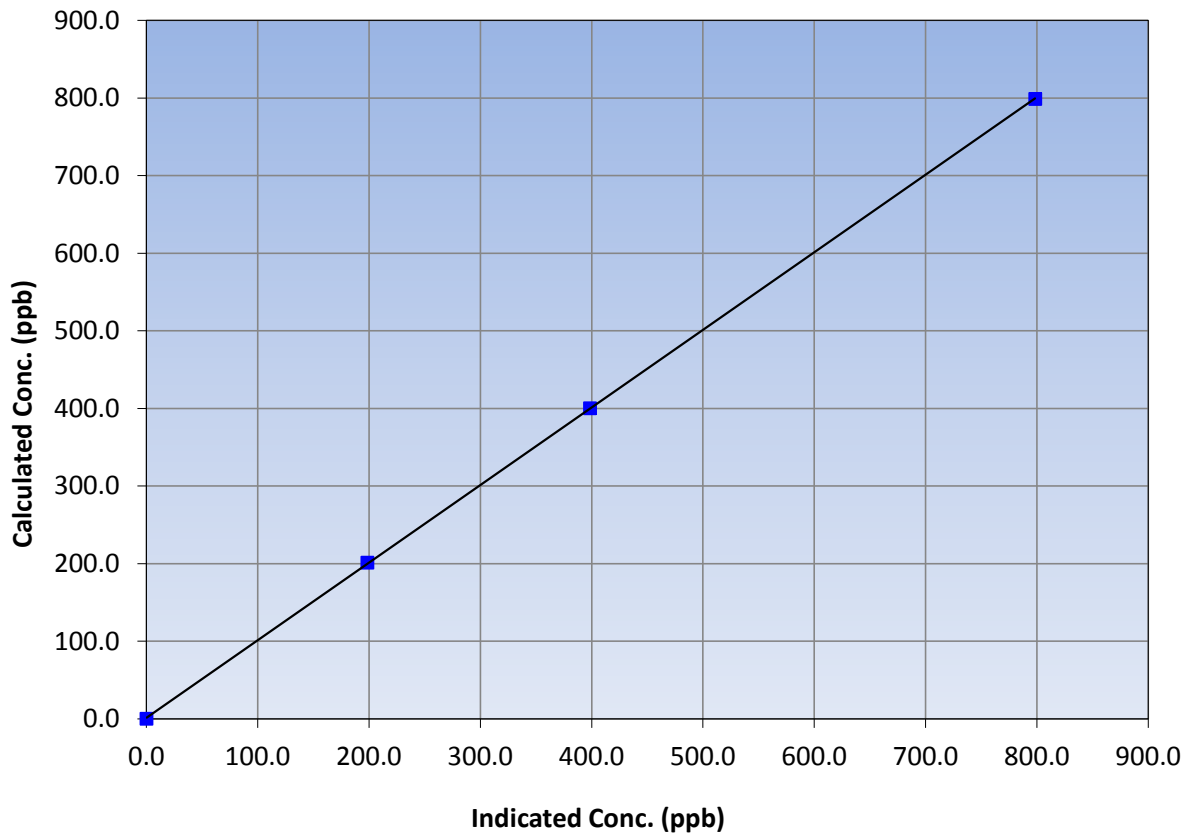
Station Information

| | | | |
|------------------|------------------|----------------------|----------------|
| Calibration Date | August 8, 2017 | Previous Calibration | August 6, 2017 |
| Station Name | Fort McKay South | Station Number | AMS 13 |
| Start Time (MST) | 9:33 | End Time (MST) | 14:00 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1410661329 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.1 | ---- | Correlation Coefficient | ≥0.995 | |
| 798.8 | 798.4 | 1.0005 | | | |
| 400.1 | 398.5 | 1.0041 | | | |
| 201.2 | 198.4 | 1.0140 | | | |
| | | | Slope | 0.999676 | 0.90 - 1.10 |
| | | | Intercept | 1.299182 | +/-20 |

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

Version-03-2017

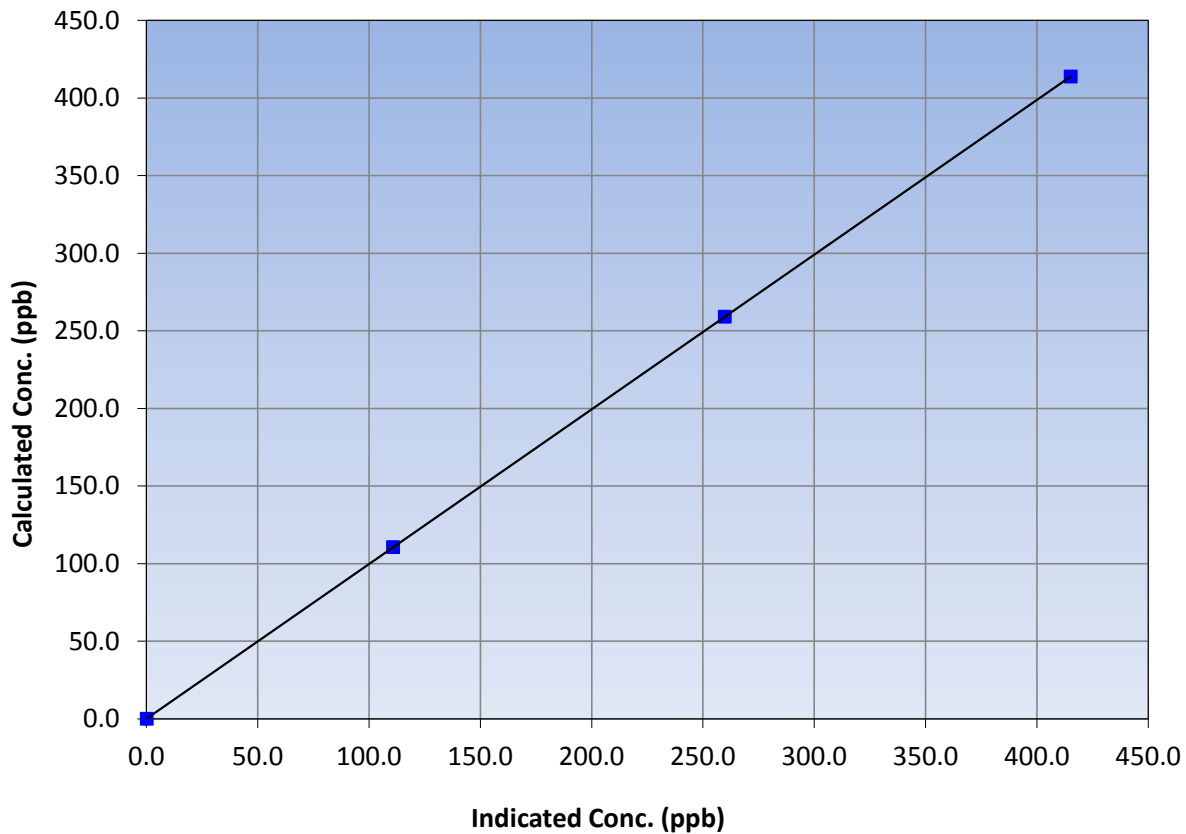
Station Information

| | | | |
|------------------|------------------|----------------------|----------------|
| Calibration Date | August 8, 2017 | Previous Calibration | August 6, 2017 |
| Station Name | Fort McKay South | Station Number | AMS 13 |
| Start Time (MST) | 9:33 | End Time (MST) | 14:00 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1410661329 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.1 | ---- | Correlation Coefficient | ≥0.995 | |
| 413.8 | 415.2 | 0.9965 | | | |
| 259.1 | 259.8 | 0.9971 | | | |
| 110.7 | 110.8 | 0.9987 | | | |
| | | | Slope | 0.996604 | 0.90 - 1.10 |
| | | | Intercept | 0.055516 | +/-20 |

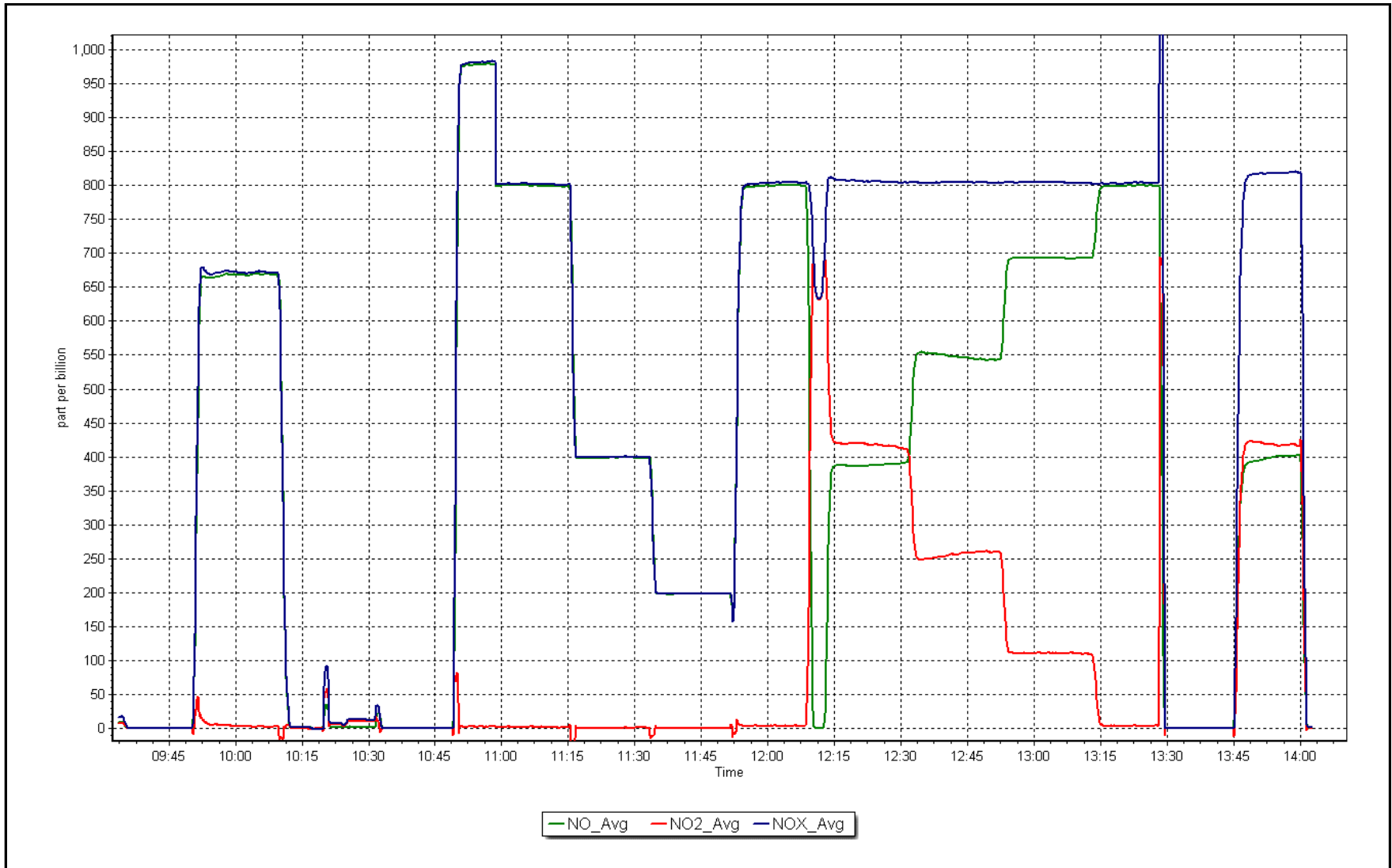
NO₂ Calibration Curve



NO_x Calibration Plot

Date: August 8, 2017

Location: Fort McKay South





Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-02-2017

Station Information

| | | | |
|------------------------|------------------|-----------------|---------------|
| Station Name: | Fort McKay South | Station number: | AMS 13 |
| Calibration Date: | August 2, 2017 | Last Cal Date: | July 18, 2017 |
| Start time (MST): | 8:24 | End time (MST): | 9:13 |
| Sharp Model: | 5030 | S/N: | E-803 |
| Particulate Fraction: | PM2.5 | C14 Source S/N: | 4066 |
| Flow Meter Make/Model: | Delta Cal | S/N: | 1450 |
| Temp/RH standard: | Delta Cal | S/N: | 1450 |

Monthly Calibration Test

| <u>Parameter</u> | <u>As found</u> | <u>Measured</u> | <u>As left</u> | <u>Adjusted</u> | (Limits) |
|-----------------------------|-----------------|-------------------------------------|----------------|-------------------------------------|-----------------|
| T1 (°C) | 19 | 19.3 | 19 | <input type="checkbox"/> | +/- 2 °C |
| P3 (hPa) | 982 | 972 | 982 | <input type="checkbox"/> | +/- 13 hPa |
| flow (LPH) | 1000 | 975 | 1000 | <input checked="" type="checkbox"/> | +/- 50 LPH |
| Nephelometer zero | 0.8 | ----- | 0 | <input checked="" type="checkbox"/> | +/- 0.5 ug/m3 |
| Instrument Clock: | Verified | <input checked="" type="checkbox"/> | | | |
| Cyclone cleaning : | PM10 Cyclone | <input checked="" type="checkbox"/> | PM2.5 Cyclone | <input checked="" type="checkbox"/> | |
| Date Filter Tape Installed: | | | | | |

Quarterly Calibration Test

Leak Test: Date of check: _____ Last Cal Date: July 18, 2017
 Flow w/o adaptor: _____ Flow w/ adaptor: _____

(Limit) 0.4 LPM

| <u>Adjusted</u> | <u>Current Test</u> | <u>Previous Test</u> | <u>% Change</u> |
|-----------------------------------|--------------------------|---------------------------------|-----------------|
| <input type="checkbox"/> | Foil S/N: _____ | Foil S/N: 5872 | |
| Foil Calibration | Foil Mass: _____ | Foil Mass: 1337 | |
| | Calibration Date: _____ | Calibration Date: July 18, 2017 | |
| (Limit) +/- 5% of previous | Correction Factor: _____ | Correction Factor: _____ | --- |

Annual Calibration Test

| <u>Parameter</u> | <u>As found</u> | <u>Measured</u> | <u>As left</u> | <u>Adjusted</u> | (Limits) |
|-----------------------------|-----------------|-----------------|----------------|--------------------------|-----------------|
| T2 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| T3 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| T4 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| RH (%) | | | | <input type="checkbox"/> | +/- 10% |
| Date Sample Tube Cleaned: | | | | | |
| Date Pump Rebuilt/Replaced: | | | | | |

Notes: Flow and Nephelometer adjusted, Cyclone head cleaned

Calibration by: Melissa Lemay



Wood Buffalo Environmental Association

Wind Speed/Direction Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|------------------|-----------------|----------------|
| Station Name: | Fort McKay South | Station Number: | AMS 13 |
| Calibration Date: | August-17-17 | Prev Cal Date: | November-29-16 |
| Start Time (MST): | 10:15 | End Time (MST): | 11:00 |
| Barometric Press: | 732 | Station Temp: | 22 Deg C |
| Reason: | Routine | | |

Wind Speed Information

| | | | |
|--------------------|----------------|----------------|--------|
| Sensor make/model: | Met One 010C-1 | Serial Number: | U11127 |
| WS Calibrator: | MetOne 053 | Serial Number: | P15103 |

| Shaft RPM | Actual Speed (K/hr) (Cv) | Indicated Speed (K/hr) (Iv) | Correction factor (Cv/Iv) <i>Limit = 0.95-1.05</i> |
|----------------------------------|--------------------------|-----------------------------|---|
| 0 | 0.0 | 0.0 | n/a |
| 200 | 20.2 | 20.2 | 0.9981 |
| 400 | 39.4 | 39.4 | 0.9990 |
| 600 | 58.6 | 58.5 | 1.0009 |
| 800 | 77.8 | 77.9 | 0.9981 |
| Average Correction Factor | | | 0.9990 |

| | <u>Start</u> | <u>Finish</u> | <u>Limits</u> |
|--------------------------------|--------------|---------------|---------------|
| Correl Coeff (r ²) | | 0.999998 | ≥0.995 |
| Calculated slope | | 0.998951 | 0.90 - 1.10 |
| Calculated intercept | | 0.006719 | +/- 2 |

Wind Direction Information

| | | | |
|--|----------------|---|-----------|
| Sensor make/model: | Met One 020C-1 | Serial Number: | N13744 |
| As Found Declination (deg west of North) | <u>14</u> | As Left Declination (deg west of North) | <u>14</u> |

| Physical Direction (Degrees) (Cv) | Indicated Direction (Degrees) (Iv) | Correction factor (Cv/Iv) <i>Limit = 0.95-1.05</i> |
|-----------------------------------|------------------------------------|---|
| 0 | 1.2 | n/a |
| 90 | 90.5 | 0.9945 |
| 180 | 181.4 | 0.9923 |
| 270 | 271.0 | 0.9963 |
| 357 | 357.0 | 1.0000 |
| Average Correction Factor | | 0.9958 |

| | <u>Start</u> | <u>Finish</u> | <u>Limits</u> |
|--------------------------------|--------------|---------------|---------------|
| Correl Coeff (r ²) | | 0.999994 | ≥0.995 |
| Calculated slope | | 1.001989 | 0.90 - 1.10 |
| Calculated intercept | | -1.168381 | +/- 7 |

Notes: Torque test passed

Calibration Performed By: Melissa Lemay



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT

**AMS 14
ANZAC
AUGUST 2017**

Operations, Data Collection,
QA/QC, Data Validation and Reporting by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

September 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
AUGUST 2017

MONTHLY SUMMARY for
AMD SECTION III.B.1(c)

| Parameter | Hours of Data | Hours of Calibration | Hours without Data | Operational Time | Maximum 1-Hour Value | 1-Hour Exceedances | Maximum 24-Hour Value | 24-Hour Exceedances |
|-----------------------------------|---------------|----------------------|--------------------|------------------|----------------------|--------------------|-----------------------|---------------------|
| SO2(ppb) Average | 708 | 36 | 36 | 100 | 2 | 0 | 1 | 0 |
| TRS(ppb) Average | 679 | 32 | 65 | 95.56 | 1 | 0 | 0 | 0 |
| THC(ppm) Average | 708 | 35 | 36 | 99.87 | 2.7 | - | 2.1 | - |
| NMHC(ppm) Average | 708 | 35 | 36 | 99.87 | 0.248 | - | 0.056 | - |
| CH4(ppm) Average | 708 | 35 | 36 | 99.87 | 2.5 | - | 2 | - |
| NO2(ppb) Average | 709 | 35 | 35 | 100 | 7 | 0 | 2 | - |
| NO(ppb) Average | 709 | 35 | 35 | 100 | 7 | - | 1 | - |
| NOX(ppb) Average | 709 | 35 | 35 | 100 | 9 | - | 3 | - |
| O3(ppb) Average | 709 | 34 | 35 | 99.87 | 55 | 0 | 45 | - |
| PM2.5(ug/m3) Average | 743 | 1 | 1 | 100 | 60.2 | - | 18.1 | 0 |
| AT 2m(C) Average | 744 | 0 | 0 | 100 | 29.1 | - | 22.4 | - |
| RH(%) Average | 744 | 0 | 0 | 100 | 98 | - | 88 | - |
| Leaf Wetness (% of range) Average | 744 | 0 | 0 | 100 | 54 | - | 13 | - |
| WS(km/h) Average | 742 | 2 | 2 | 100 | 29 | - | 17 | - |
| WD(deg) Average | 742 | 2 | 2 | 100 | - | - | - | - |
| PC(mm) Total | 744 | 0 | 0 | 100 | 2.3 | - | 2.8 | - |

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
AUGUST 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

| Parameter | Number | Mean | StnDev | Total | Percentile | | | | | | |
|-----------------------------------|--------|-------|--------|-------|------------|------|------|--------|------|------|-------|
| | | | | | Min | P10 | Q1 | Median | Q3 | P90 | Max |
| SO2(ppb) Average | 708 | 0.3 | 0 | - | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| TRS(ppb) Average | 679 | 0.2 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| THC(ppm) Average | 708 | 2 | 0.1 | - | 1.9 | 1.9 | 1.9 | 2 | 2 | 2.2 | 2.7 |
| NMHC (ppm) Average | 708 | 0.021 | 0.04 | - | 0 | 0 | 0 | 0 | 0 | 0.1 | 0.248 |
| CH4(ppm) Average | 708 | 1.98 | 0.1 | - | 1.9 | 1.9 | 1.9 | 2 | 2 | 2.1 | 2.5 |
| NO2(ppb) Average | 709 | 1 | 1 | - | 0 | 0 | 1 | 1 | 1 | 2 | 7 |
| NO(ppb) Average | 709 | 0.3 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| NOX(ppb) Average | 709 | 1.2 | 1 | - | 0 | 0 | 1 | 1 | 1 | 2 | 9 |
| O3(ppb) Average | 709 | 26.3 | 10 | - | 2 | 12 | 20 | 26 | 33 | 38 | 55 |
| PM2.5(ug/m3) Average | 743 | 6.89 | 6.8 | - | 0.8 | 1.7 | 2.8 | 5 | 8.3 | 13.9 | 60.2 |
| Temperature 2 m (C) Average | 744 | 17 | 4.7 | - | 4.9 | 11.4 | 13.3 | 16.6 | 20.7 | 23.3 | 29.1 |
| Relative Humidity (%) Average | 744 | 63.5 | 19 | - | 26 | 37 | 48 | 63 | 79 | 91 | 98 |
| Leaf Wetness (% of range) Average | 744 | 3.6 | 9 | - | -1 | 0 | 0 | 0 | 1 | 13 | 54 |
| Wind Speed 20 m (km/h) Average | 742 | 9.3 | 5 | - | 0 | 4 | 6 | 9 | 12 | 16 | 29 |
| Wind Direction 20 m (deg) Average | 742 | - | - | - | - | - | - | - | - | - | - |
| Precipitation (mm) Total | 744 | - | - | 8.64 | - | - | - | - | - | - | - |

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
AUGUST 2017

OPERATIONAL NOTES

| Parameter | Period Start | Period End | Duration (Hours) | Notes |
|-----------|-------------------|-------------------|------------------|---|
| O3, TRS | 09 Aug 2017 16:00 | 09 Aug 2017 16:00 | 1 | Maintenance - sample manifold cleaned |
| TRS | 08 Aug 2017 06:00 | 09 Aug 2017 10:00 | 29 | Unstable operation - excessive baseline drift |
| TRS | 09 Aug 2017 11:00 | 09 Aug 2017 13:00 | 3 | Maintenance - replace SOx scrubber |
| THC | 24 Aug 2017 11:00 | 24 Aug 2017 11:00 | 1 | Maintenance - replace carrier gas |



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

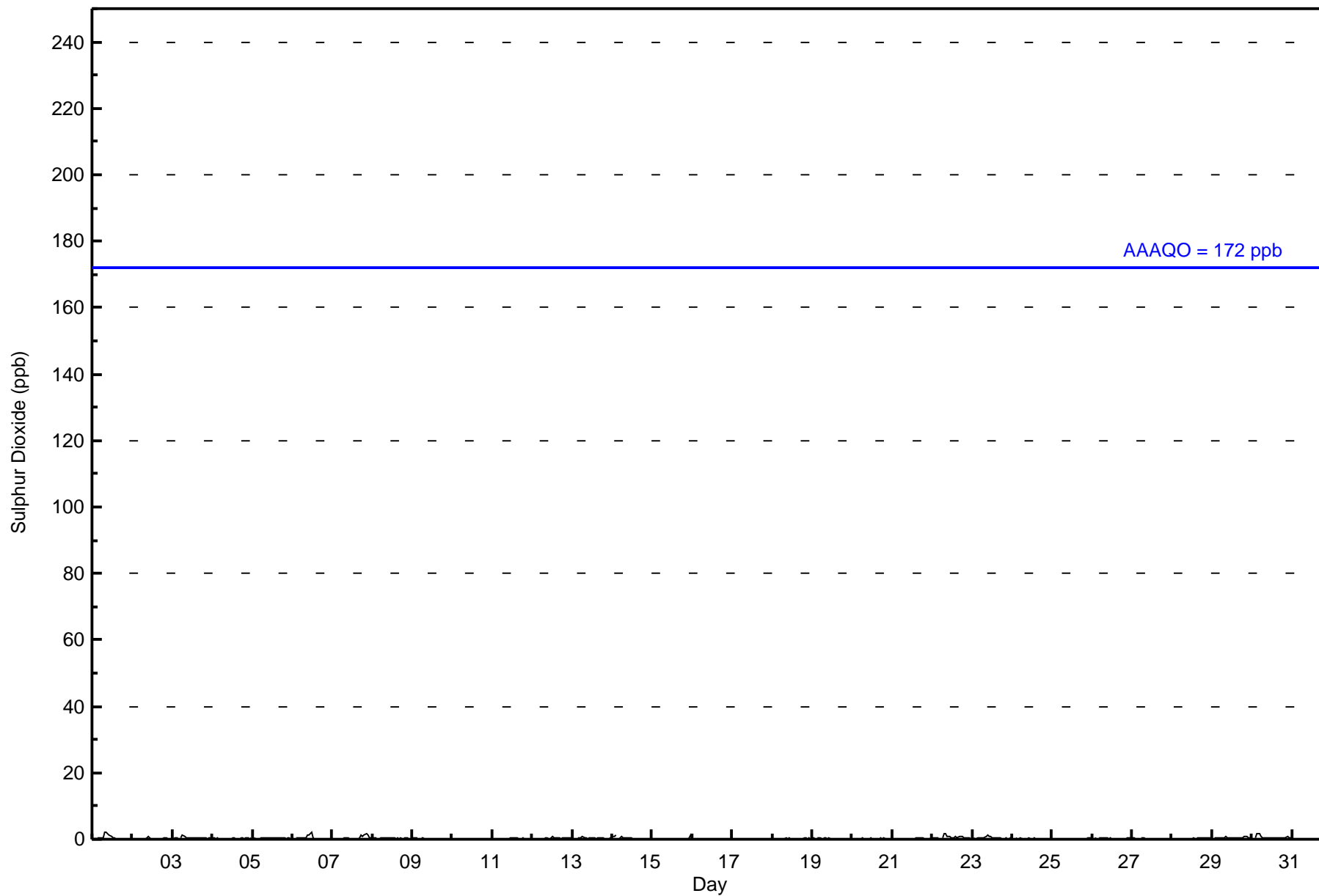
Anzac - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | | | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | |
|---|-------------------------------|---|---|---|---|---|---|---|---|----|----|--|----|----|----|----|----|----|----|----|----|----|----|---------------------------------|---------------|---------------|
| Maximum Value: 2 ppb on Aug 1 08:00 | | | | | | | | | | | | Maximum Daily Average: 0.6 ppb on Aug 22 | | | | | | | | | | | | Hours of Data: 708 | | |
| Minimum Value: 0 ppb on Aug 2 06:00 | | | | | | | | | | | | Minimum Daily Average: 0.0 ppb on Aug 17 | | | | | | | | | | | | Hours of Missing Data: 36 | | |
| Maximum Diurnal Average: 0.4 ppb at hour 10 | | | | | | | | | | | | Minimum Diurnal Average: 0.2 ppb at hour 2 | | | | | | | | | | | | Hours of Calibration: 36 | | |
| Monthly Average: 0.3 ppb | | | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 O ₃ = 0 P ₉₀ = 1 P ₉₉ = 2 | | | | | | | | | | | | Percent Operational Time: 100.0 | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0 | 0 | Z | 0 | 0 | 0 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 2 |
| 2-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 3-Aug | 0 | 0 | 0 | 0 | Z | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.4 | 1 |
| 4-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 5-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 6-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 2 |
| 7-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 1 | 0 | 0 | 0.4 | 2 |
| 8-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 9-Aug | 0 | 0 | 1 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | C | C | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 10-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 11-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 12-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 13-Aug | 0 | 0 | Z | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0.3 | 1 |
| 14-Aug | 1 | 1 | 1 | Z | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 15-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.1 | 1 |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 17-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 18-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 19-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 20-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 21-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 22-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 2 | 2 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0.6 | 2 |
| 23-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 24-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 25-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 26-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 27-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 29-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0.5 | 1 |
| 30-Aug | 0 | Z | 0 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0.5 | 2 |
| 31-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.3 0.4 0.4 0.3 0.3 0.3 0.2 0.2 0.2 0.2 0.3 0.2 0.2 0.3 0.2 0.2 0.2 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| 1 1 1 2 2 1 1 2 2 2 2 1 2 1 1 1 1 1 1 1 1 2 1 1 1 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| Z - zerospan C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Anzac - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Anzac - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 10 | 708 | 100.00 | 100.00 |
| 11 - 20 | 0 | 0.00 | 100.00 |
| 21 - 60 | 0 | 0.00 | 100.00 |
| 61 - 110 | 0 | 0.00 | 100.00 |
| 111 - 172 | 0 | 0.00 | 100.00 |
| > 172 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Anzac - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 10 | 25 | 6 | 5 | 6 | 7 | 11 | 30 | 87 | 66 | 30 | 56 | 73 | 109 | 139 | 43 | 13 | 706 |
| 11 - 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21 - 60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 61 - 110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 111 - 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 25 | 6 | 5 | 6 | 7 | 11 | 30 | 87 | 66 | 30 | 56 | 73 | 109 | 139 | 43 | 13 | 706 |

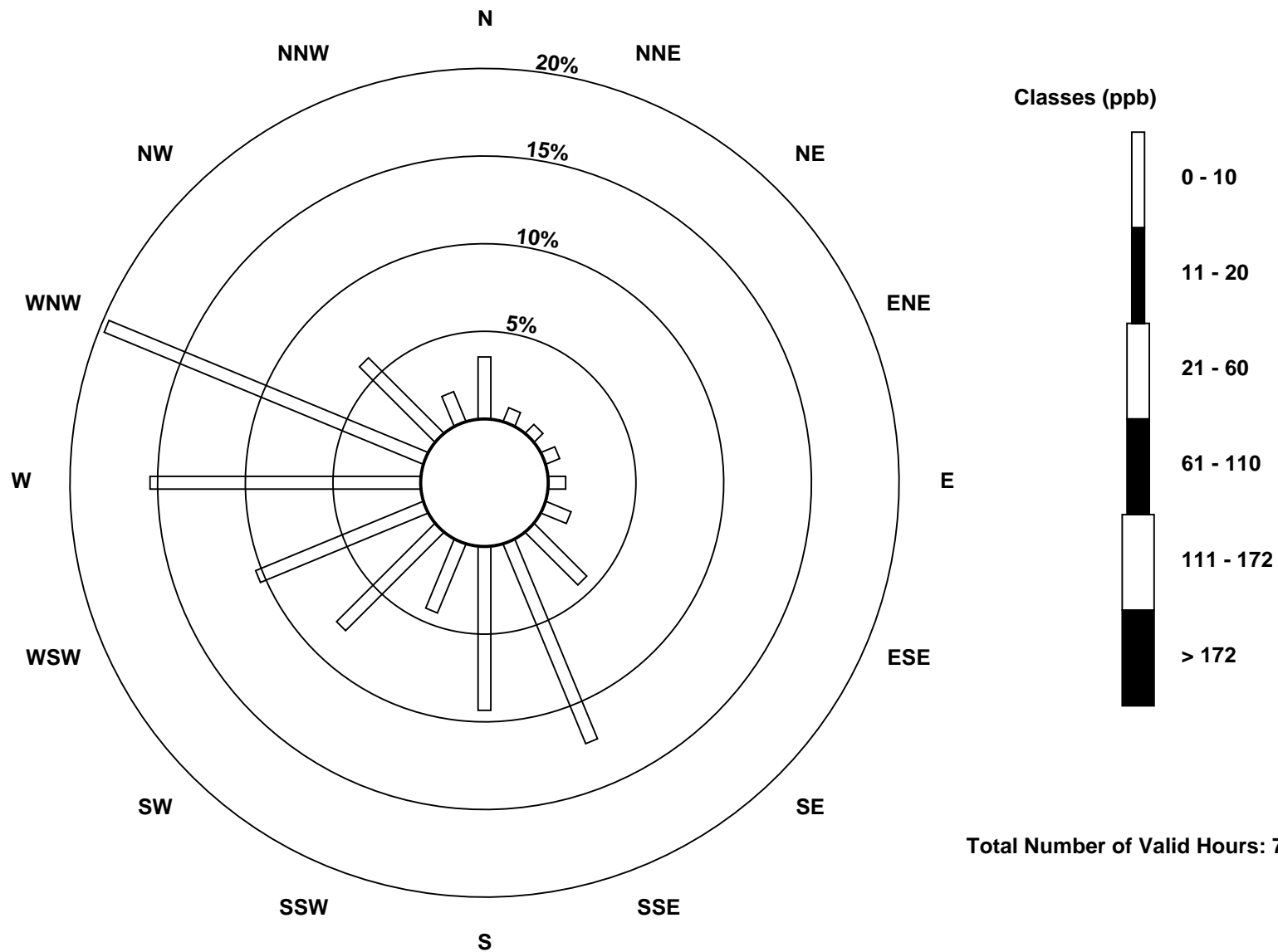
Total Number of Valid Hours: 706

Total Number of Hours: 744

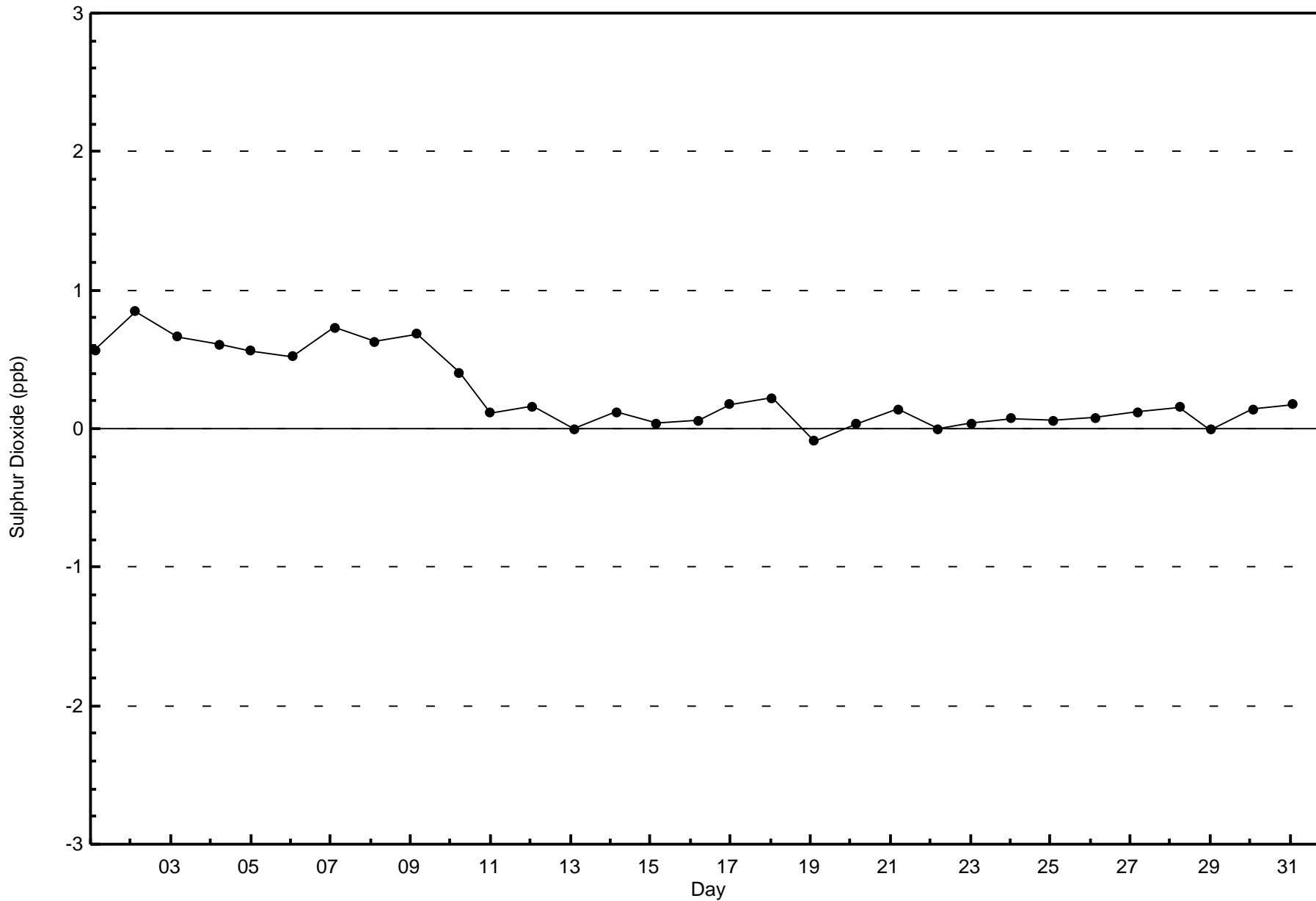


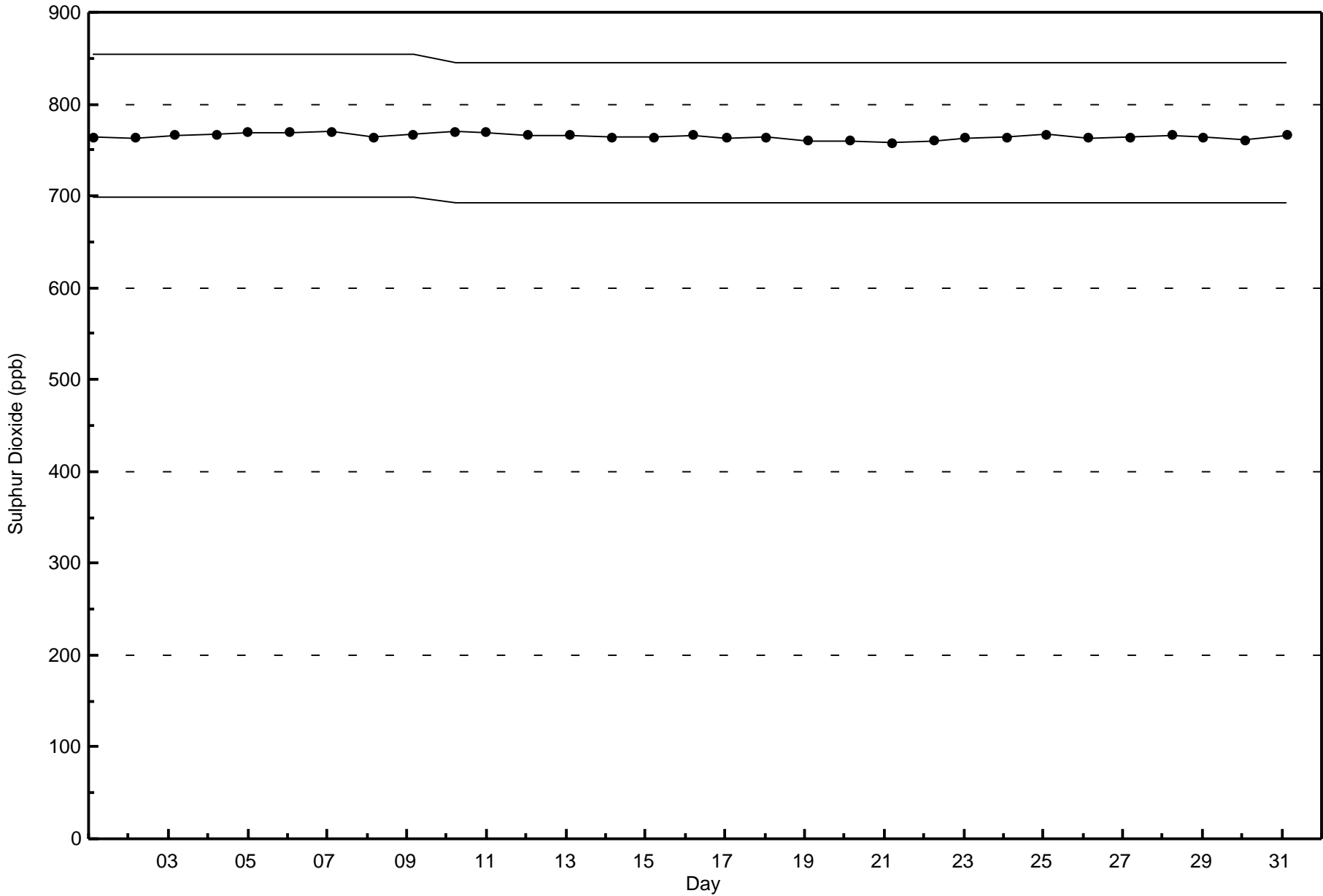
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Sulphur Dioxide (SO₂) - ppb
Anzac (AMS 14)



Total Number of Valid Hours: 706







Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

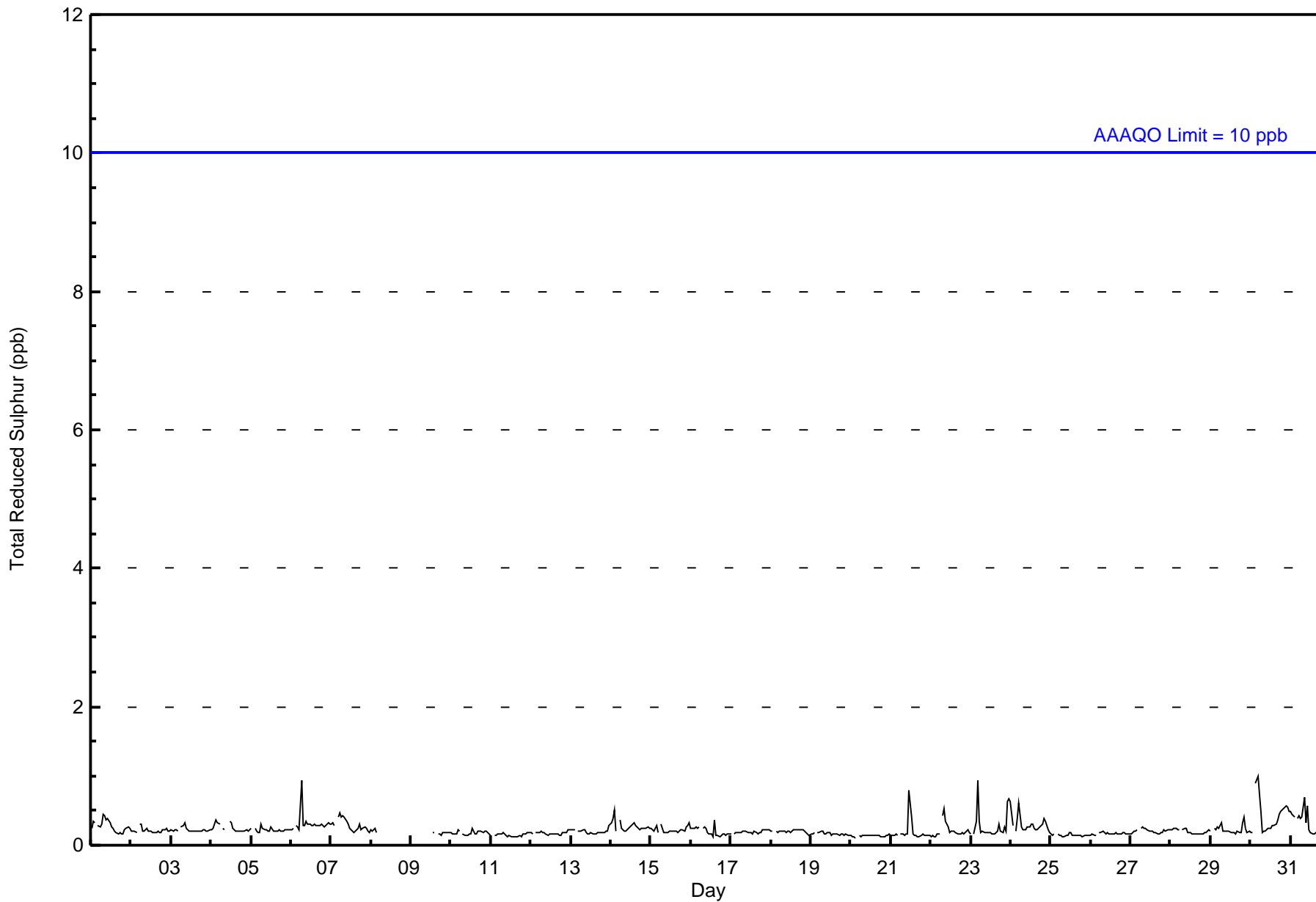
Anzac - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|--|----|----|----|----|----|----|----|----|----|--------------------------------|----|----|----|-----|---------------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|
| Maximum Value: 1 ppb on Aug 30 05:00 | | | | | | | | | | Maximum Daily Average: 0.4 ppb on Aug 30 | | | | | | | | | | Hours of Data: 679 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum Value: 0 ppb on Aug 20 04:00 | | | | | | | | | | Minimum Daily Average: 0.1 ppb on Aug 20 | | | | | | | | | | Hours of Missing Data: 65 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 0.3 ppb at hour 5 | | | | | | | | | | Minimum Diurnal Average: 0.2 ppb at hour 17 | | | | | | | | | | Hours of Calibration: 32 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 0.2 ppb | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1 | | | | | | | | | | Percent Operational Time: 95.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 0 | 0 | Z | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 0 | 0 | 0 | 0 | Z | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | M | M | M | 0 | 0 | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -- | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 0 | 0 | 1 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 0 | Z | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 1 | 0 | Z | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 0 | 0 | Z | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 0.2 | | | | | | | | | | | | | | | | | | | | | | | | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | Diurnal Average |
| 1 | | | | | | | | | | | | | | | | | | | | | | | | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | Diurnal Maximum |
| Z - zerospan C - Calibration M - Maintenance AF - Analyzer Failure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Anzac - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Anzac - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2 | 679 | 100.00 | 100.00 |
| 3 - 4 | 0 | 0.00 | 100.00 |
| 5 - 7 | 0 | 0.00 | 100.00 |
| 8 - 11 | 0 | 0.00 | 100.00 |
| > 11 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 679

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Anzac - August 2017

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2 | 25 | 5 | 5 | 7 | 8 | 11 | 26 | 90 | 62 | 27 | 53 | 73 | 105 | 128 | 38 | 14 | 677 |
| 3 - 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 - 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 - 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 25 | 5 | 5 | 7 | 8 | 11 | 26 | 90 | 62 | 27 | 53 | 73 | 105 | 128 | 38 | 14 | 677 |

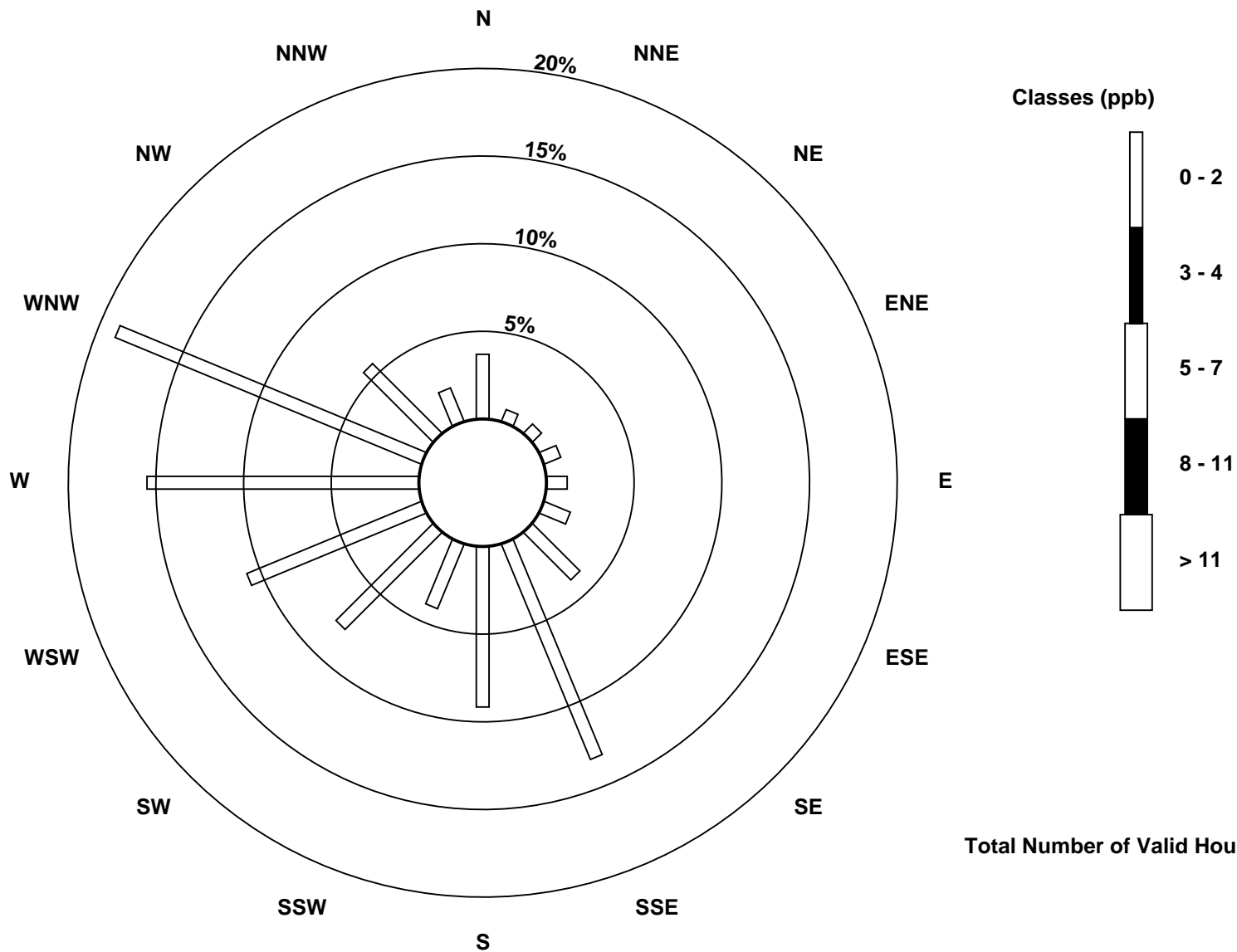
Total Number of Valid Hours: 677

Total Number of Hours: 744

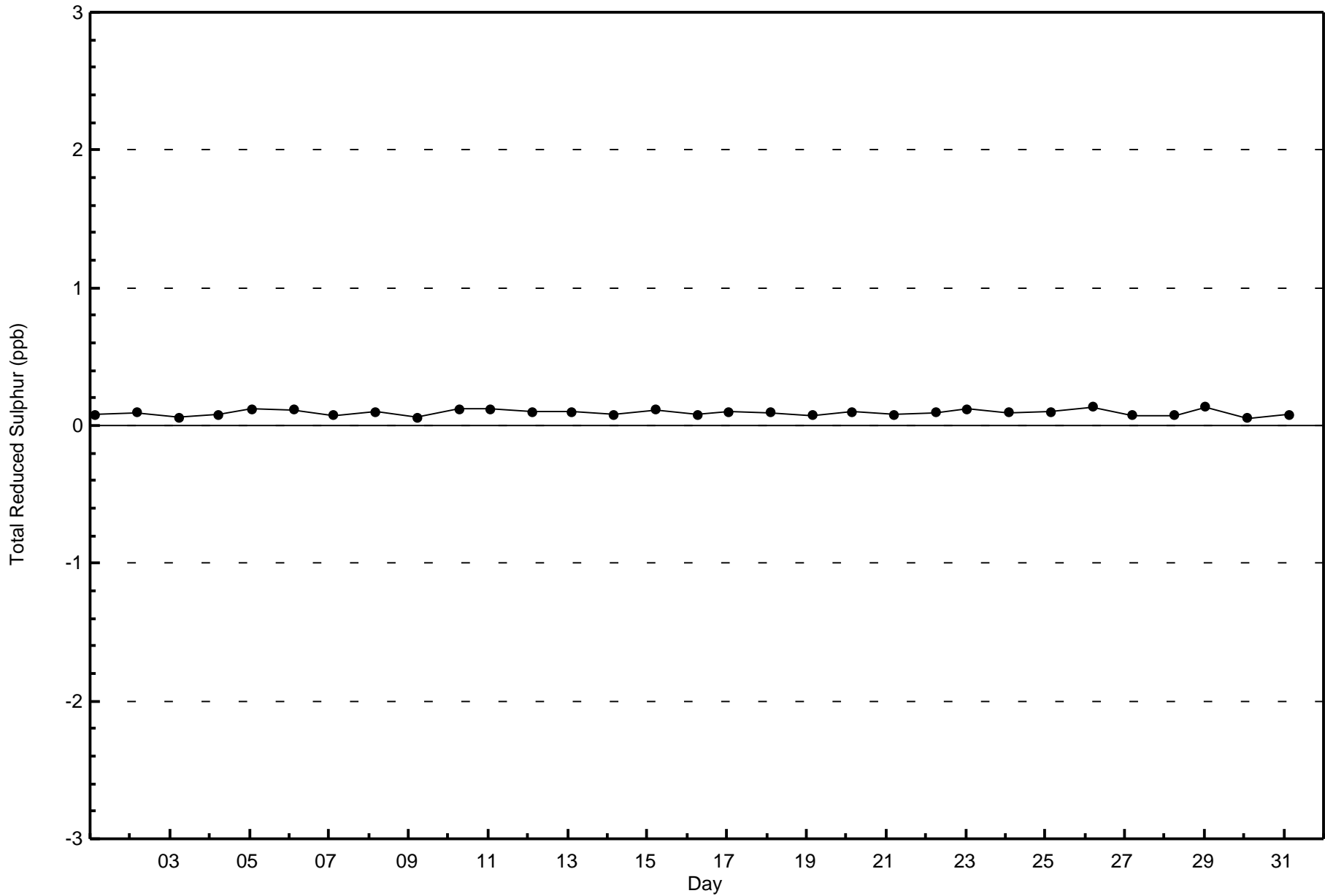


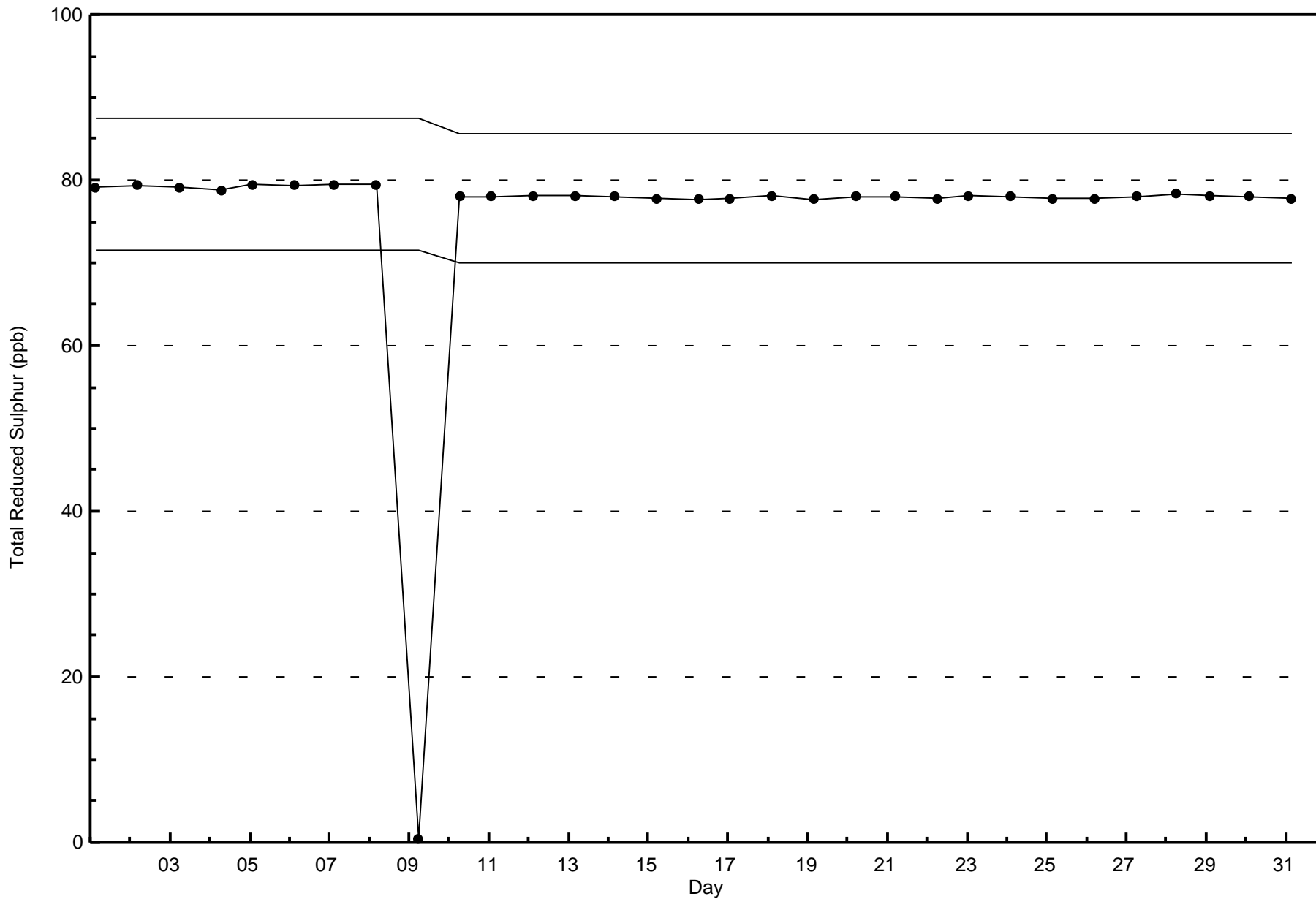
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Total Reduced Sulphur (TRS) - ppb
Anzac (AMS 14)



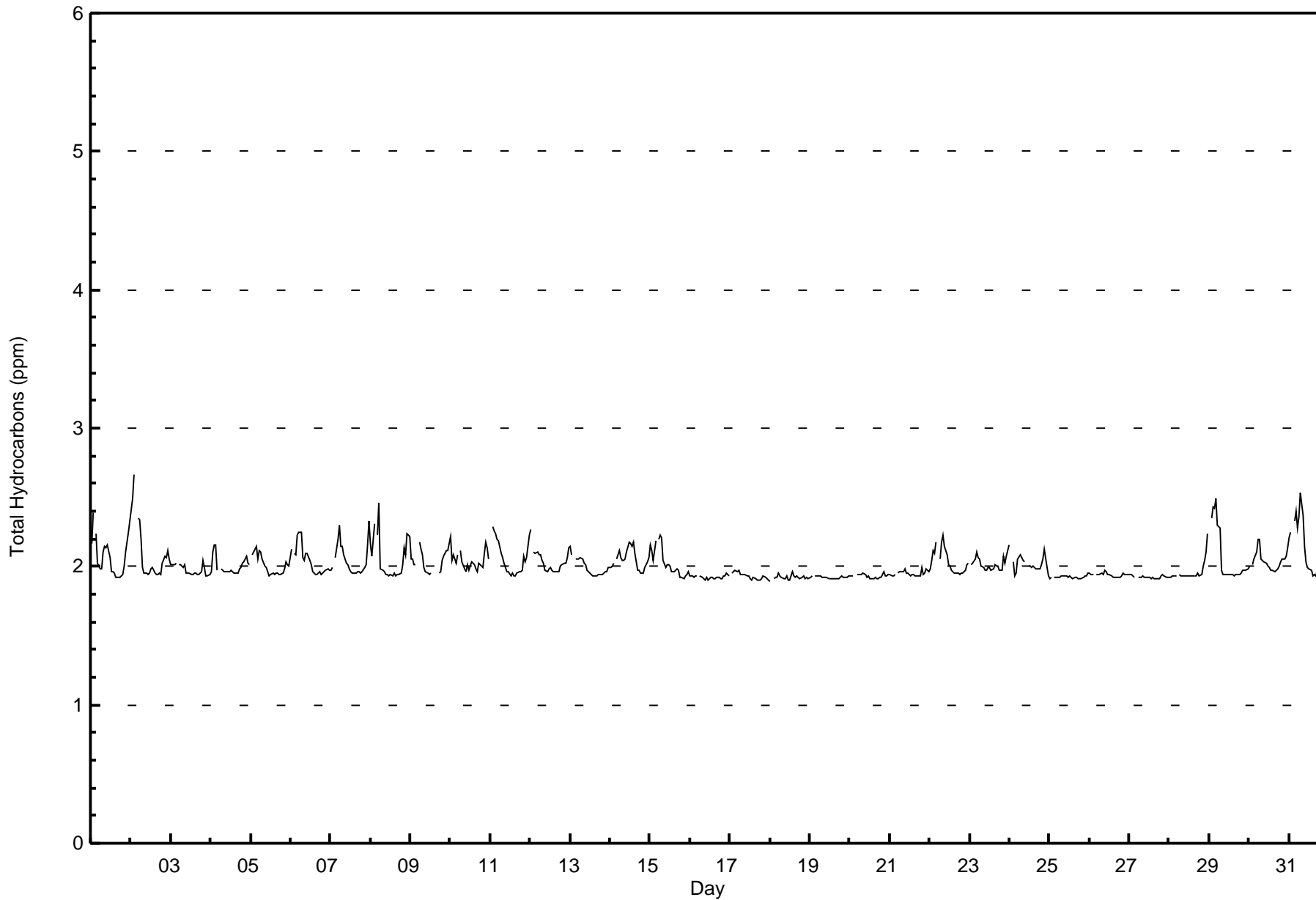
Total Number of Valid Hours: 677







| Maximum Value: 2.7 ppm on Aug 2 03:00 Maximum Daily Average: 2.1 ppm on Aug 31 | | Hours in Service: 744 Hours of Data: 708 Hours of Missing Data: 36 Hours of Calibration: 35 Percent Operational Time: 99.9 | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|---------------|---------------|-----|
| Minimum Value: 1.9 ppm on Aug 18 01:00 Maximum Diurnal Average: 2.1 ppm at hour 6 Monthly Average: 2.00 ppm | | Minimum Daily Average: 1.9 ppm on Aug 19 Minimum Diurnal Average: 1.9 ppm at hour 17 Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 2.0 Q ₃ = 2.0 P ₉₀ = 2.2 P ₉₉ = 2.4 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 2.2 | 2.4 | Z | 2.2 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.1 | 2.3 | 2.3 | 2.1 | 2.4 | |
| 2-Aug | 2.4 | 2.5 | 2.7 | Z | 2.3 | 2.3 | 2.2 | 2.0 | 2.0 | 2.0 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.7 |
| 3-Aug | 2.0 | 2.0 | 2.0 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | |
| 4-Aug | 2.0 | 2.1 | 2.2 | 2.2 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | 2.0 | 2.0 | 2.2 | |
| 5-Aug | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 2.0 | 1.9 | 2.0 | 2.0 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | |
| 6-Aug | 2.1 | Z | 2.1 | 2.1 | 2.2 | 2.2 | 2.3 | 2.1 | 2.0 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.3 | |
| 7-Aug | 2.0 | 2.0 | Z | 2.1 | 2.2 | 2.3 | 2.2 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.2 | 2.3 | 2.0 | 2.3 | |
| 8-Aug | 2.2 | 2.1 | 2.3 | Z | 2.2 | 2.5 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.1 | 2.1 | 2.2 | 2.2 | 2.1 | 2.5 | |
| 9-Aug | 2.1 | 2.1 | 2.0 | 2.0 | Z | 2.2 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 1.9 | 2.0 | C | C | C | C | 1.9 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.2 | 2.0 | 2.2 | |
| 10-Aug | 2.2 | 2.0 | 2.1 | 2.0 | 2.1 | Z | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.2 | 2.1 | 2.1 | 2.0 | 2.2 | |
| 11-Aug | Z | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | 2.1 | 2.2 | 2.1 | 2.3 | |
| 12-Aug | 2.3 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.0 | 2.3 | |
| 13-Aug | 2.1 | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | |
| 14-Aug | 2.0 | 2.0 | 2.0 | Z | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.2 | |
| 15-Aug | 2.2 | 2.1 | 2.0 | 2.2 | Z | 2.2 | 2.2 | 2.2 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.2 | |
| 16-Aug | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 2.0 | |
| 17-Aug | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | |
| 18-Aug | 1.9 | Z | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | |
| 19-Aug | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | |
| 20-Aug | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | |
| 21-Aug | 1.9 | 1.9 | 1.9 | 1.9 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 2.0 | 2.0 | 1.9 | 2.0 | |
| 22-Aug | 2.0 | 2.0 | 2.1 | 2.1 | 2.2 | Z | 2.1 | 2.2 | 2.2 | 2.2 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.2 | |
| 23-Aug | Z | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | 2.1 | 2.1 | 2.0 | 2.1 | |
| 24-Aug | 2.2 | Z | 2.0 | 1.9 | 2.0 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | M | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.0 | 1.9 | 2.0 | 2.2 | |
| 25-Aug | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 2.0 | |
| 26-Aug | 2.0 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | |
| 27-Aug | 1.9 | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | |
| 28-Aug | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 2.0 | 2.0 | 2.1 | 2.2 | 2.0 | |
| 29-Aug | Z | 2.4 | 2.4 | 2.4 | 2.5 | 2.3 | 2.3 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.5 | |
| 30-Aug | 2.0 | Z | 2.0 | 2.1 | 2.1 | 2.2 | 2.2 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.2 | |
| 31-Aug | 2.2 | 2.2 | Z | 2.3 | 2.4 | 2.3 | 2.4 | 2.5 | 2.4 | 2.2 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 2.0 | 2.1 | 2.5 | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | |
| Z - zerospan C - Calibration M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | | |





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Anzac - August 2017

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2.0 | 545 | 76.98 | 76.98 |
| 2.1 - 3.0 | 163 | 23.02 | 100.00 |
| 3.1 - 10.0 | 0 | 0.00 | 100.00 |
| > 10.0 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Anzac - August 2017

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---|-----------------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2.0 | 22 | 5 | 3 | 4 | 6 | 10 | 16 | 57 | 45 | 17 | 42 | 60 | 94 | 118 | 34 | 11 | 544 |
| 2.1 - 3.0 | 3 | 1 | 2 | 2 | 1 | 1 | 14 | 30 | 21 | 13 | 14 | 13 | 16 | 21 | 9 | 2 | 163 |
| 3.1 - 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 25 | 6 | 5 | 6 | 7 | 11 | 30 | 87 | 66 | 30 | 56 | 73 | 110 | 139 | 43 | 13 | 707 |

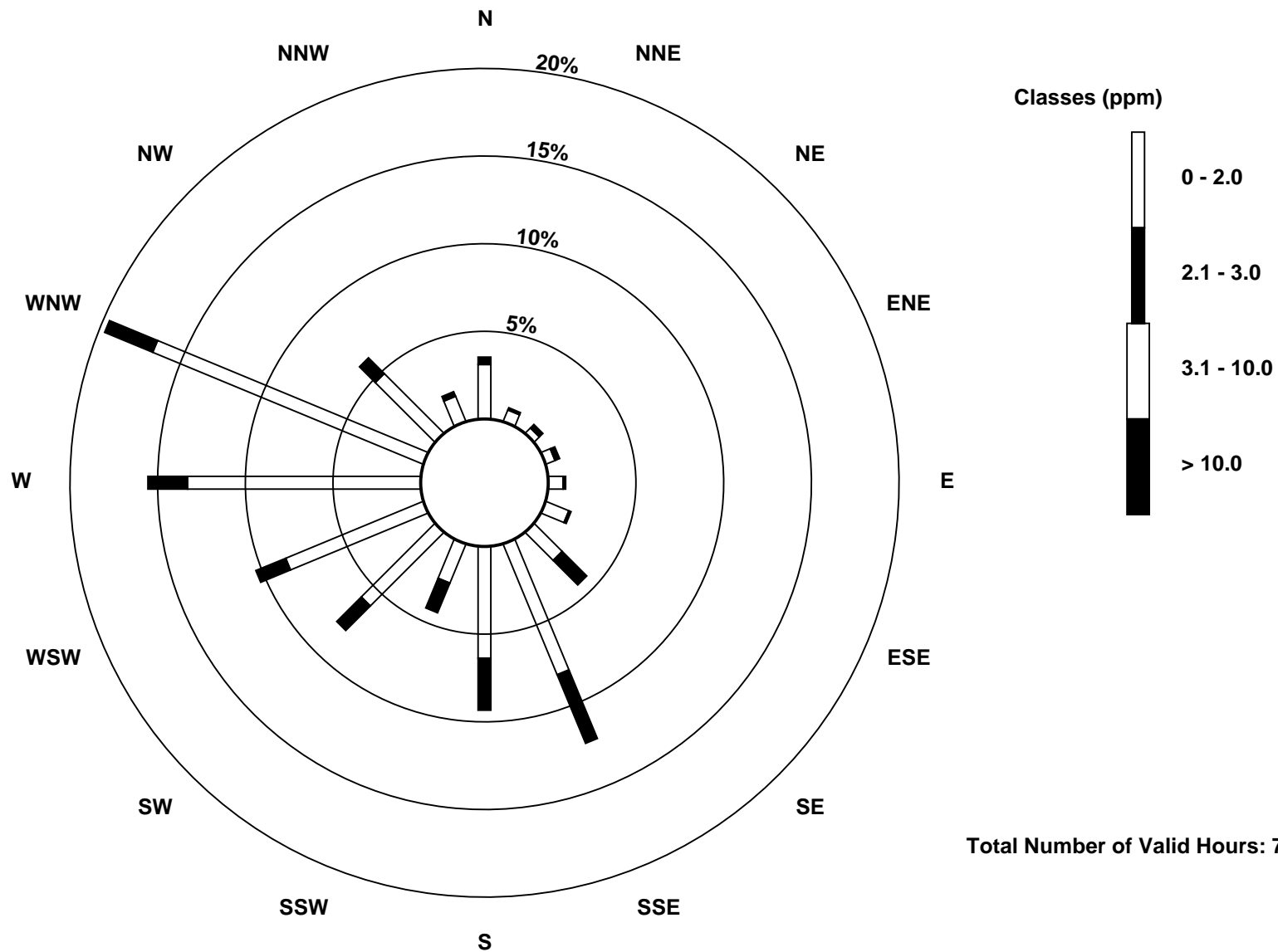
Total Number of Valid Hours: 707

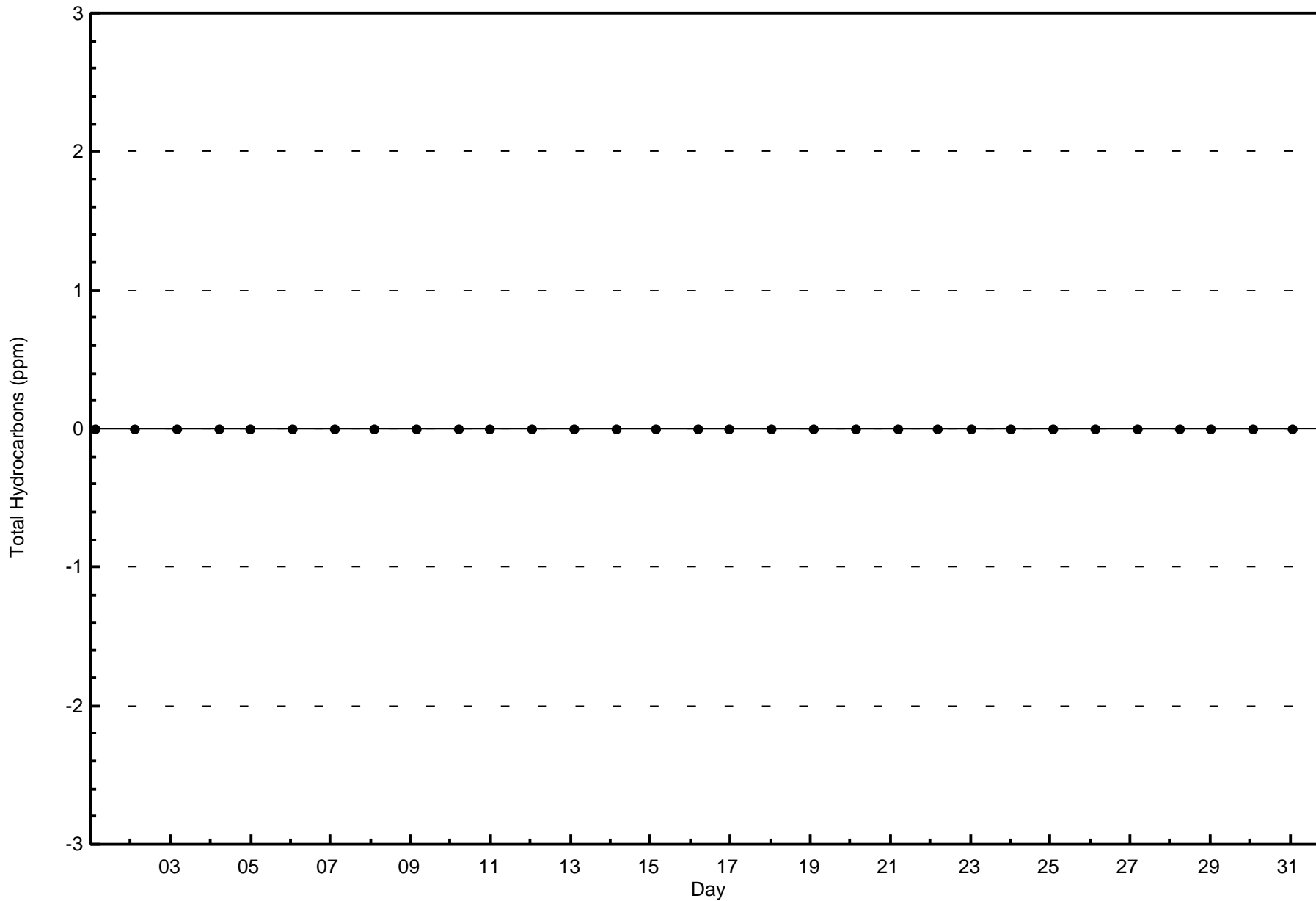
Total Number of Hours: 744

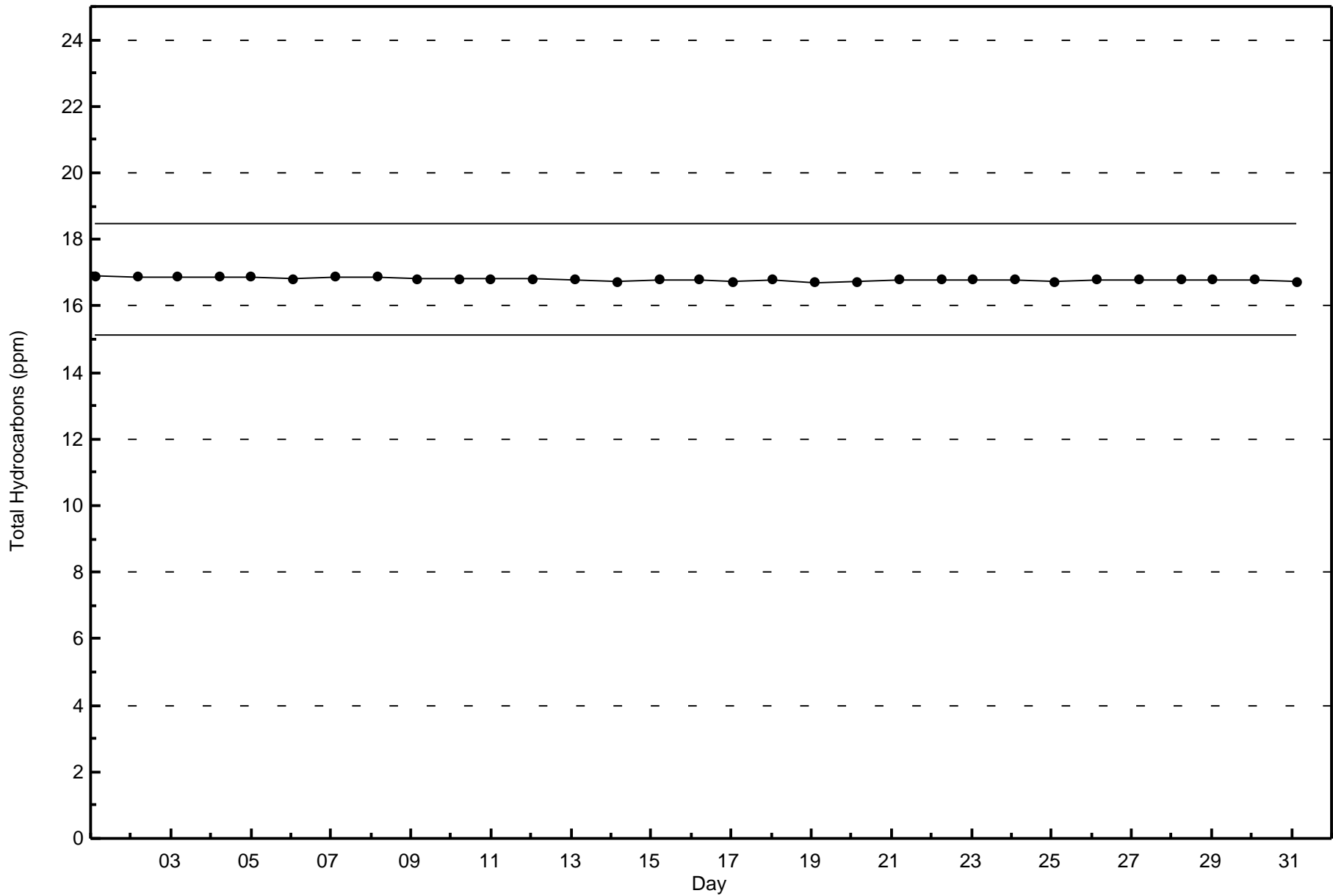


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Total Hydrocarbons (THC) - ppm
Anzac (AMS 14)





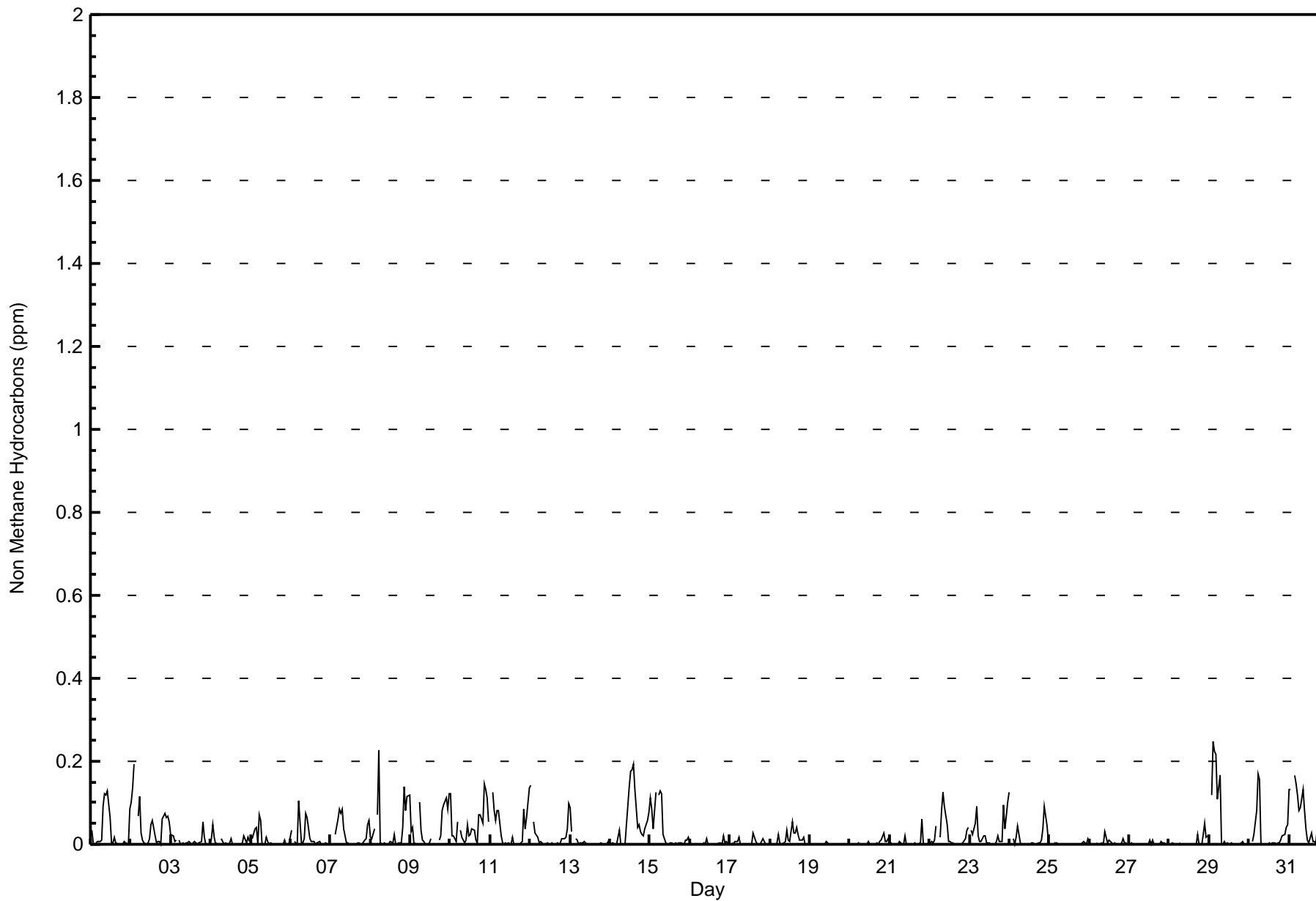




Summary of Hour Averages

Anzac - August 2017

| Maximum Value: 0.248 ppm on Aug 29 03:00 | | Maximum Daily Average: 0.056 ppm on Aug 31 | | Hours in Service: | 744 | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|--|-----------------|---------------------------|-------|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----------------|---------------|---|--|
| Minimum Value: 0.000 ppm on Aug 1 17:00 | | Minimum Daily Average: 0.001 ppm on Aug 19 | | Hours of Data: | 708 | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 0.056 ppm at hour 6 | | Minimum Diurnal Average: 0.004 ppm at hour 17 | | Hours of Missing Data: | 36 | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 0.021 ppm | | Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.1 P ₉₉ = 0.2 | | Hours of Calibration: | 35 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Percent Operational Time: | 99.9 | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 0.032 | 0.004 | Z | 0.003 | 0.006 | 0.008 | 0.009 | 0.093 | 0.121 | 0.119 | 0.128 | 0.064 | 0.004 | 0.003 | 0.018 | 0.002 | 0.000 | 0.000 | 0.000 | 0.001 | 0.005 | 0.002 | 0.002 | 0.083 | 0.031 | 0.128 | |
| 2-Aug | 0.102 | 0.134 | 0.194 | Z | 0.067 | 0.116 | 0.026 | 0.010 | 0.003 | 0.001 | 0.002 | 0.015 | 0.046 | 0.056 | 0.020 | 0.004 | 0.007 | 0.006 | 0.000 | 0.062 | 0.073 | 0.064 | 0.069 | 0.055 | 0.049 | 0.194 | |
| 3-Aug | 0.022 | 0.022 | 0.006 | 0.010 | Z | 0.012 | 0.000 | 0.002 | 0.000 | 0.004 | 0.005 | 0.007 | 0.000 | 0.002 | 0.006 | 0.004 | 0.001 | 0.002 | 0.006 | 0.054 | 0.017 | 0.000 | 0.000 | 0.000 | 0.008 | 0.054 | |
| 4-Aug | 0.015 | 0.047 | 0.016 | 0.000 | 0.002 | Z | 0.015 | 0.007 | 0.002 | 0.003 | 0.001 | 0.002 | 0.013 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.005 | 0.020 | 0.003 | 0.016 | 0.006 | 0.008 | 0.047 | |
| 5-Aug | Z | 0.015 | 0.038 | 0.039 | 0.000 | 0.072 | 0.057 | 0.000 | 0.001 | 0.018 | 0.006 | 0.000 | 0.003 | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 | 0.001 | 0.000 | 0.010 | 0.000 | 0.000 | 0.000 | 0.011 | 0.072 | |
| 6-Aug | 0.035 | Z | 0.007 | 0.002 | 0.000 | 0.104 | 0.003 | 0.004 | 0.014 | 0.073 | 0.066 | 0.012 | 0.008 | 0.008 | 0.007 | 0.000 | 0.003 | 0.007 | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 | 0.002 | 0.016 | 0.104 | |
| 7-Aug | 0.000 | 0.000 | Z | 0.025 | 0.062 | 0.083 | 0.074 | 0.084 | 0.039 | 0.003 | 0.003 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.002 | 0.004 | 0.000 | 0.002 | 0.009 | 0.014 | 0.047 | 0.058 | 0.022 | 0.084 | |
| 8-Aug | 0.017 | 0.014 | 0.036 | Z | 0.070 | 0.227 | 0.003 | 0.001 | 0.002 | 0.001 | 0.000 | 0.000 | 0.007 | 0.002 | 0.023 | 0.000 | 0.001 | 0.003 | 0.005 | 0.041 | 0.138 | 0.081 | 0.116 | 0.118 | 0.039 | 0.227 | |
| 9-Aug | 0.030 | 0.039 | 0.002 | 0.002 | Z | 0.103 | 0.033 | 0.010 | 0.006 | 0.001 | 0.001 | 0.002 | 0.014 | C | C | C | C | 0.010 | 0.020 | 0.081 | 0.094 | 0.113 | 0.086 | 0.121 | 0.040 | 0.121 | |
| 10-Aug | 0.122 | 0.019 | 0.021 | 0.005 | 0.054 | Z | 0.035 | 0.016 | 0.004 | 0.011 | 0.047 | 0.021 | 0.024 | 0.037 | 0.035 | 0.011 | 0.003 | 0.071 | 0.072 | 0.052 | 0.146 | 0.133 | 0.112 | 0.056 | 0.048 | 0.146 | |
| 11-Aug | Z | 0.125 | 0.080 | 0.058 | 0.080 | 0.080 | 0.021 | 0.003 | 0.001 | 0.004 | 0.001 | 0.003 | 0.000 | 0.016 | 0.000 | 0.001 | 0.000 | 0.000 | 0.003 | 0.006 | 0.085 | 0.038 | 0.065 | 0.135 | 0.035 | 0.135 | |
| 12-Aug | 0.144 | Z | 0.054 | 0.028 | 0.019 | 0.002 | 0.008 | 0.003 | 0.000 | 0.000 | 0.003 | 0.000 | 0.001 | 0.003 | 0.000 | 0.001 | 0.002 | 0.000 | 0.004 | 0.012 | 0.012 | 0.018 | 0.038 | 0.097 | 0.020 | 0.144 | |
| 13-Aug | 0.090 | 0.029 | Z | 0.014 | 0.010 | 0.001 | 0.003 | 0.004 | 0.007 | 0.005 | 0.001 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 | 0.002 | 0.000 | 0.000 | 0.006 | 0.008 | 0.090 | |
| 14-Aug | 0.001 | 0.003 | 0.003 | Z | 0.000 | 0.032 | 0.001 | 0.000 | 0.001 | 0.001 | 0.049 | 0.138 | 0.177 | 0.179 | 0.192 | 0.133 | 0.042 | 0.049 | 0.032 | 0.025 | 0.020 | 0.037 | 0.056 | 0.079 | 0.054 | 0.192 | |
| 15-Aug | 0.112 | 0.086 | 0.037 | 0.124 | Z | 0.118 | 0.130 | 0.122 | 0.024 | 0.003 | 0.000 | 0.000 | 0.002 | 0.004 | 0.002 | 0.002 | 0.002 | 0.002 | 0.004 | 0.004 | 0.002 | 0.011 | 0.009 | 0.016 | 0.035 | 0.130 | |
| 16-Aug | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.002 | 0.000 | 0.003 | 0.000 | 0.013 | 0.000 | 0.000 | 0.001 | 0.000 | 0.001 | 0.000 | 0.004 | 0.003 | 0.001 | 0.021 | 0.002 | 0.006 | 0.000 | 0.002 | 0.021 | |
| 17-Aug | Z | 0.003 | 0.000 | 0.005 | 0.008 | 0.017 | 0.001 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 | 0.028 | 0.008 | 0.000 | 0.000 | 0.000 | 0.008 | 0.013 | 0.000 | 0.001 | 0.001 | 0.004 | 0.028 | |
| 18-Aug | 0.000 | Z | 0.000 | 0.001 | 0.002 | 0.025 | 0.002 | 0.001 | 0.003 | 0.006 | 0.033 | 0.012 | 0.008 | 0.056 | 0.028 | 0.029 | 0.041 | 0.024 | 0.010 | 0.012 | 0.017 | 0.000 | 0.000 | 0.000 | 0.013 | 0.056 | |
| 19-Aug | 0.001 | 0.000 | Z | 0.000 | 0.000 | 0.002 | 0.002 | 0.000 | 0.000 | 0.000 | 0.006 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.006 | |
| 20-Aug | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.006 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 | 0.008 | 0.009 | 0.026 | 0.006 | 0.008 | 0.012 | 0.003 | 0.026 | |
| 21-Aug | 0.007 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.006 | 0.001 | 0.000 | 0.020 | 0.000 | 0.001 | 0.000 | 0.001 | 0.001 | 0.004 | 0.000 | 0.000 | 0.004 | 0.062 | 0.002 | 0.000 | 0.001 | 0.002 | 0.005 | 0.062 | |
| 22-Aug | 0.002 | 0.007 | 0.004 | 0.010 | 0.044 | Z | 0.016 | 0.081 | 0.125 | 0.090 | 0.048 | 0.007 | 0.007 | 0.005 | 0.003 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.003 | 0.014 | 0.036 | 0.042 | 0.024 | 0.125 | |
| 23-Aug | Z | 0.034 | 0.025 | 0.052 | 0.090 | 0.019 | 0.006 | 0.008 | 0.019 | 0.019 | 0.003 | 0.005 | 0.004 | 0.001 | 0.000 | 0.000 | 0.006 | 0.019 | 0.006 | 0.007 | 0.094 | 0.038 | 0.069 | 0.102 | 0.027 | 0.102 | |
| 24-Aug | 0.125 | Z | 0.013 | 0.000 | 0.016 | 0.044 | 0.002 | 0.000 | 0.000 | 0.000 | M | 0.000 | 0.000 | 0.002 | 0.004 | 0.000 | 0.000 | 0.004 | 0.005 | 0.011 | 0.036 | 0.092 | 0.043 | 0.003 | 0.018 | 0.125 | |
| 25-Aug | 0.000 | 0.000 | Z | 0.003 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.006 | 0.004 | 0.002 | 0.015 | 0.001 | 0.015 | |
| 26-Aug | 0.008 | 0.000 | 0.000 | Z | 0.003 | 0.000 | 0.001 | 0.003 | 0.000 | 0.032 | 0.017 | 0.004 | 0.009 | 0.004 | 0.000 | 0.003 | 0.000 | 0.000 | 0.000 | 0.004 | 0.015 | 0.005 | 0.004 | 0.000 | 0.005 | 0.032 | |
| 27-Aug | 0.000 | 0.002 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.002 | 0.000 | 0.011 | 0.000 | 0.011 | 0.000 | 0.000 | 0.000 | 0.000 | 0.008 | 0.004 | 0.002 | 0.000 | 0.000 | 0.002 | 0.011 | |
| 28-Aug | 0.000 | 0.000 | 0.002 | 0.000 | 0.000 | Z | 0.002 | 0.001 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.024 | 0.000 | 0.000 | 0.025 | 0.049 | 0.018 | 0.020 | 0.006 | 0.049 | |
| 29-Aug | Z | 0.119 | 0.248 | 0.224 | 0.217 | 0.109 | 0.166 | 0.000 | 0.000 | 0.008 | 0.000 | 0.005 | 0.001 | 0.003 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.007 | 0.000 | 0.000 | 0.000 | 0.048 | 0.248 | |
| 30-Aug | 0.000 | Z | 0.006 | 0.025 | 0.082 | 0.171 | 0.155 | 0.003 | 0.001 | 0.000 | 0.001 | 0.000 | 0.003 | 0.000 | 0.005 | 0.003 | 0.000 | 0.003 | 0.003 | 0.009 | 0.019 | 0.024 | 0.040 | 0.048 | 0.026 | 0.171 | |
| 31-Aug | 0.133 | 0.134 | Z | 0.165 | 0.147 | 0.118 | 0.082 | 0.089 | 0.133 | 0.082 | 0.036 | 0.012 | 0.004 | 0.028 | 0.006 | 0.007 | 0.003 | 0.036 | 0.000 | 0.004 | 0.016 | 0.031 | 0.007 | 0.014 | 0.056 | 0.165 | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | 0.038 0.032 0.032 0.031 0.038 0.056 0.028 0.018 0.016 0.016 0.016 0.010 0.011 0.014 0.013 0.007 0.004 0.009 0.006 0.016 0.030 0.025 0.027 0.035 | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | 0.144 0.134 0.248 0.224 0.217 0.227 0.166 0.122 0.133 0.119 0.128 0.138 0.177 0.179 0.192 0.133 0.042 0.071 0.072 0.081 0.146 0.133 0.116 0.135 | |
| Z - zerospan | | | C - Calibration | | | M - Maintenance | | | | | | | | | | | | | | | | | | | | | |





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Anzac - August 2017**

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 0.005 | 407 | 57.49 | 57.49 |
| 0.006 - 0.05 | 203 | 28.67 | 86.16 |
| 0.06 - 0.1 | 86 | 12.15 | 98.31 |
| > 0.1 | 12 | 1.69 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Anzac - August 2017

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---|-----------------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 0.005 | 20 | 4 | 3 | 5 | 5 | 10 | 8 | 50 | 31 | 13 | 29 | 41 | 71 | 81 | 26 | 9 | 406 |
| 0.006 - 0.05 | 5 | 2 | 1 | 1 | 2 | 1 | 14 | 24 | 22 | 7 | 19 | 22 | 29 | 40 | 11 | 3 | 203 |
| 0.06 - 0.1 | 0 | 0 | 1 | 0 | 0 | 0 | 5 | 13 | 13 | 10 | 8 | 9 | 7 | 13 | 6 | 1 | 86 |
| > 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 3 | 5 | 0 | 0 | 12 |
| Totals | 25 | 6 | 5 | 6 | 7 | 11 | 30 | 87 | 66 | 30 | 56 | 73 | 110 | 139 | 43 | 13 | 707 |

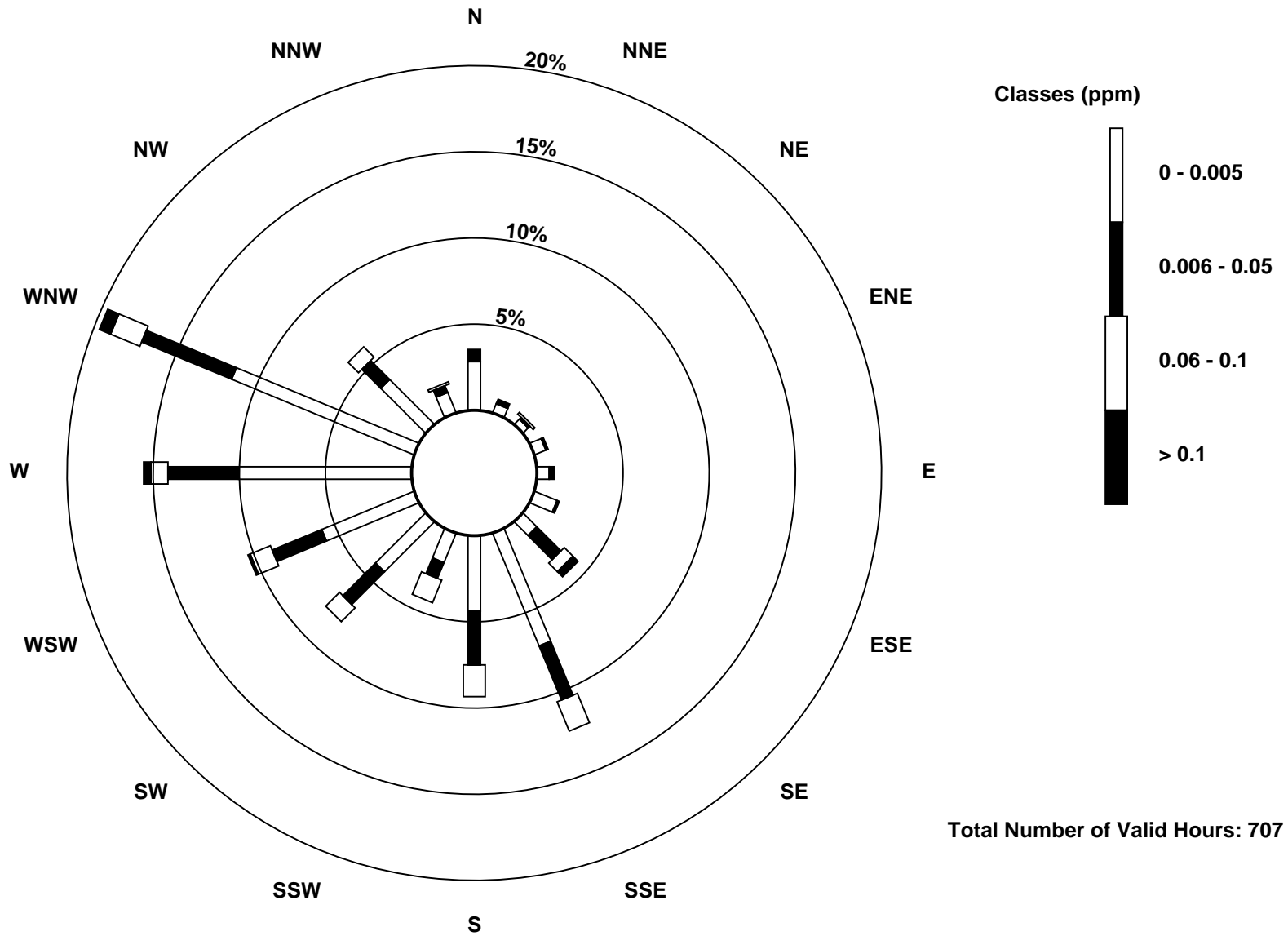
Total Number of Valid Hours: 707

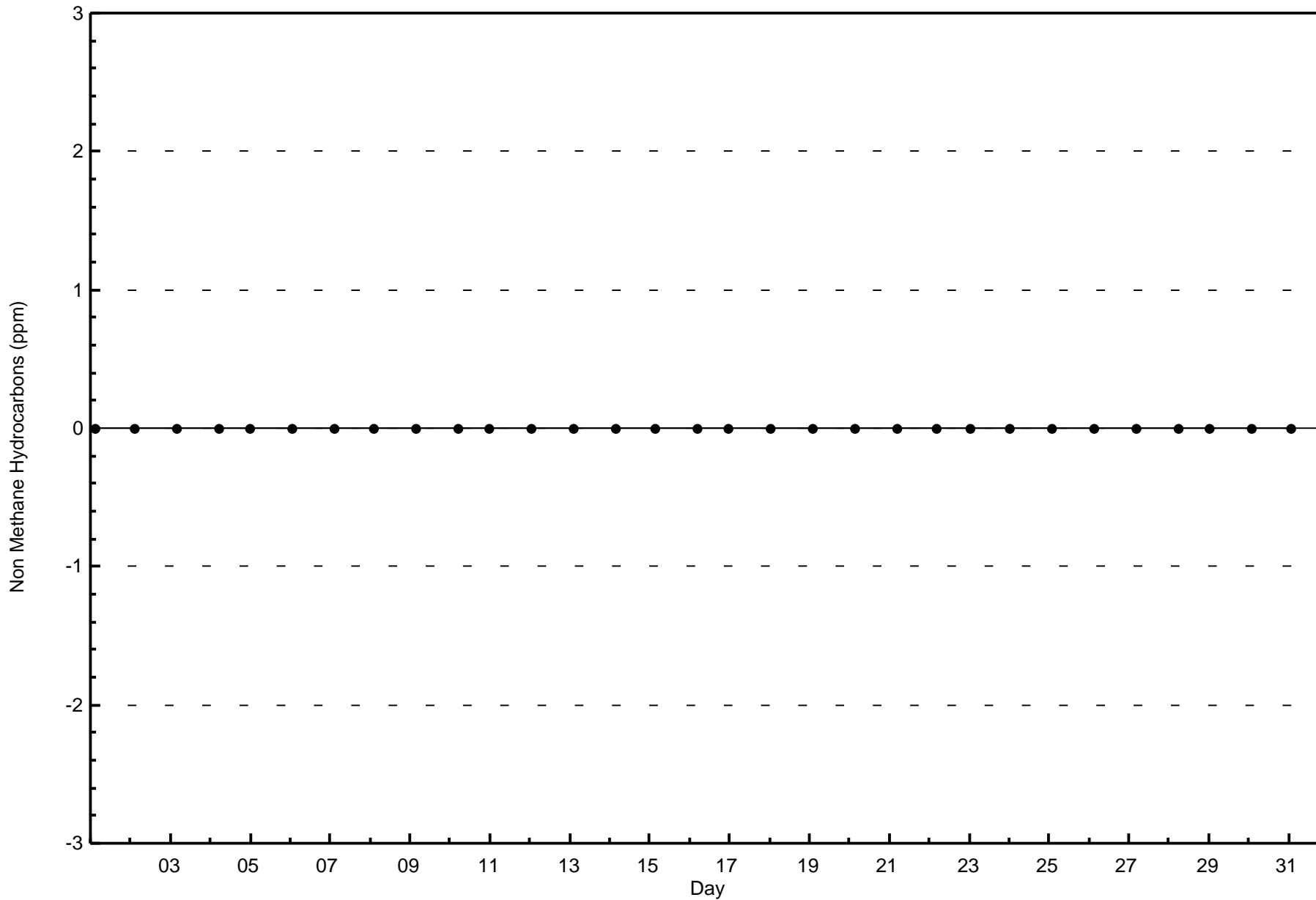
Total Number of Hours: 744

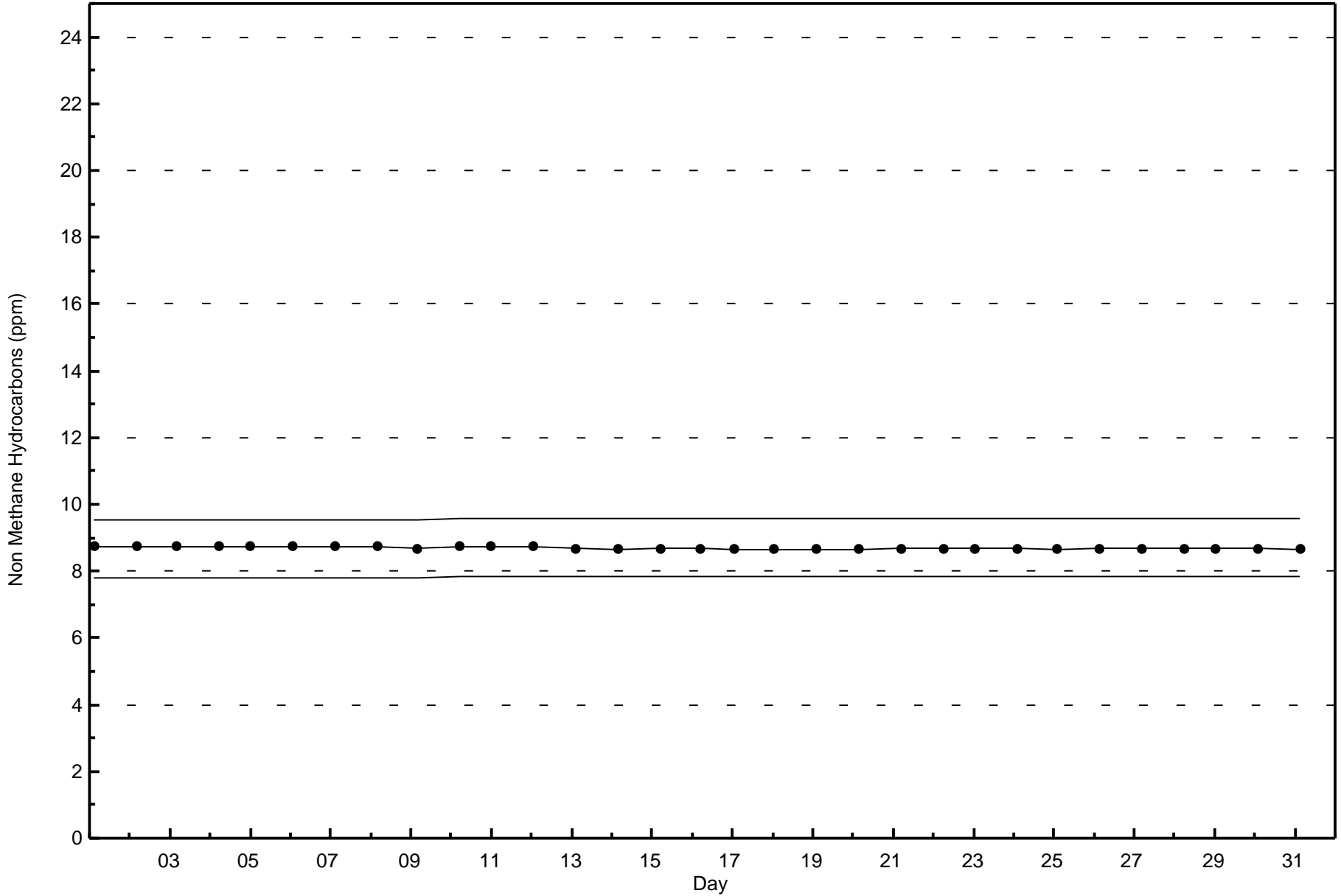


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Non Methane Hydrocarbons (NMHC) - ppm
Anzac (AMS 14)









Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH₄) - ppm

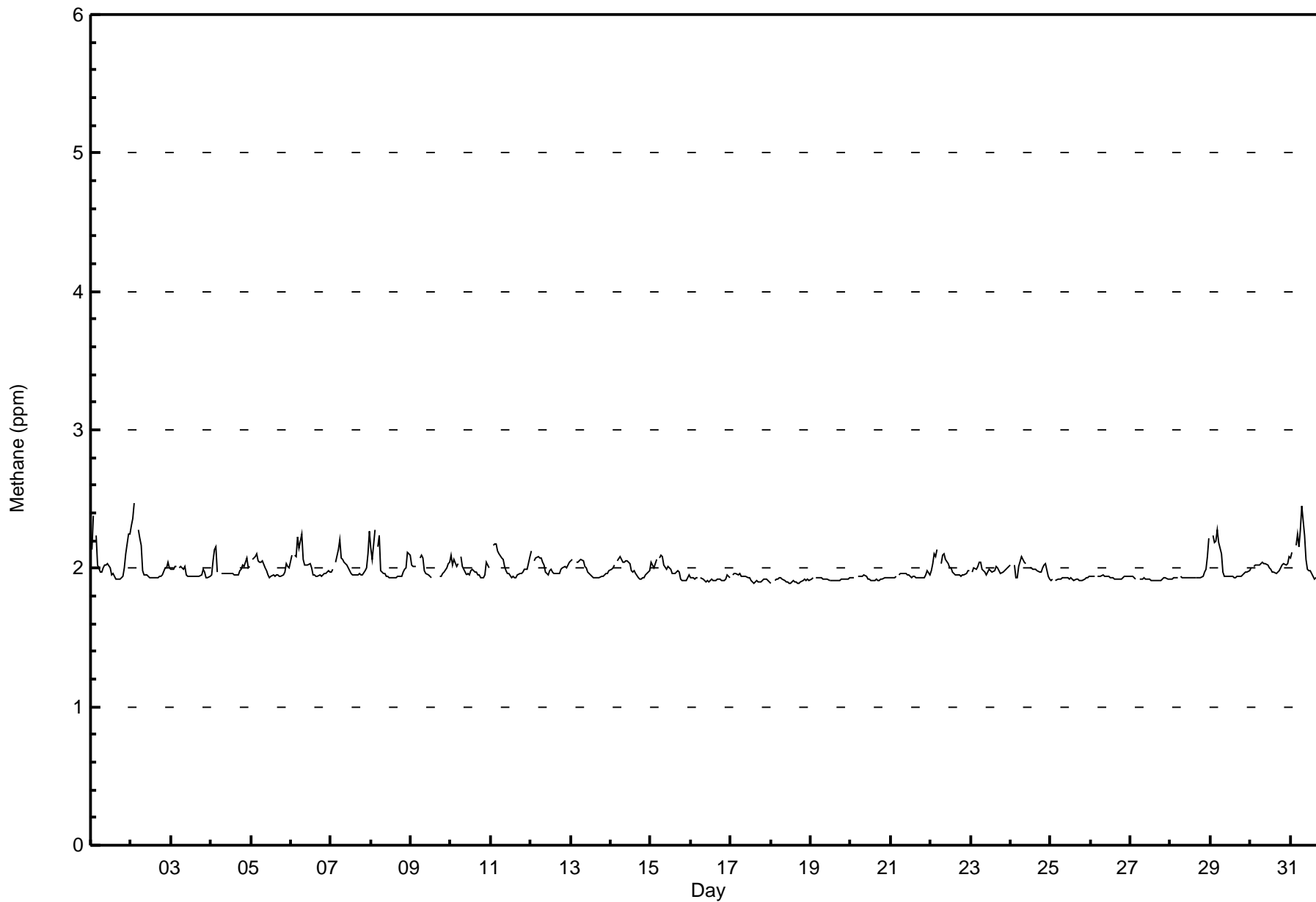
Anzac - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | | | | | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | |
|---|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|---------------|---------------|
| Maximum Value: 2.5 ppm on Aug 2 03:00 | | | | | | | | | | | | | | Maximum Daily Average: 2.0 ppm on Aug 2 | | | | | | | | | | | | |
| Minimum Value: 1.9 ppm on Aug 18 13:00 | | | | | | | | | | | | | | Minimum Daily Average: 1.9 ppm on Aug 18 | | | | | | | | | | | | |
| Maximum Diurnal Average: 2.0 ppm at hour 5 | | | | | | | | | | | | | | Minimum Diurnal Average: 1.9 ppm at hour 17 | | | | | | | | | | | | |
| Monthly Average: 1.98 ppm | | | | | | | | | | | | | | Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 2.0 Q ₃ = 2.0 P ₉₀ = 2.1 P ₉₉ = 2.3 | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 2.1 | 2.4 | Z | 2.2 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.1 | 2.3 | 2.2 | 2.0 | 2.4 | |
| 2-Aug | 2.3 | 2.4 | 2.5 | Z | 2.3 | 2.2 | 2.2 | 2.0 | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.5 |
| 3-Aug | 2.0 | 2.0 | 2.0 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 |
| 4-Aug | 2.0 | 2.1 | 2.1 | 2.2 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | 2.0 | 2.0 | 2.2 |
| 5-Aug | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.1 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 2.0 | 1.9 | 2.0 | 2.0 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 |
| 6-Aug | 2.1 | Z | 2.1 | 2.1 | 2.2 | 2.1 | 2.2 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.2 |
| 7-Aug | 2.0 | 2.0 | Z | 2.0 | 2.1 | 2.2 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.3 | 2.0 | 2.3 |
| 8-Aug | 2.1 | 2.1 | 2.3 | Z | 2.2 | 2.2 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.0 | 2.3 |
| 9-Aug | 2.0 | 2.0 | 2.0 | 2.0 | Z | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | C | C | C | C | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 |
| 10-Aug | 2.1 | 2.0 | 2.1 | 2.0 | 2.0 | Z | 2.1 | 2.0 | 2.0 | 1.9 | 2.0 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 |
| 11-Aug | Z | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | 2.2 |
| 12-Aug | 2.1 | Z | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 |
| 13-Aug | 2.1 | 2.1 | Z | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 |
| 14-Aug | 2.0 | 2.0 | 2.0 | Z | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 |
| 15-Aug | 2.0 | 2.0 | 2.0 | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.1 |
| 16-Aug | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 2.0 |
| 17-Aug | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 |
| 18-Aug | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| 19-Aug | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| 20-Aug | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| 21-Aug | 1.9 | 1.9 | 1.9 | 1.9 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 1.9 | 2.0 |
| 22-Aug | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | Z | 2.0 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 |
| 23-Aug | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| 24-Aug | 2.0 | Z | 2.0 | 1.9 | 1.9 | 2.0 | 2.1 | 2.1 | 2.0 | 2.0 | M | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | 2.1 |
| 25-Aug | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| 26-Aug | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| 27-Aug | 1.9 | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| 28-Aug | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.1 | 2.2 | 2.0 | 2.2 |
| 29-Aug | Z | 2.2 | 2.2 | 2.2 | 2.3 | 2.2 | 2.1 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.3 |
| 30-Aug | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | 2.1 |
| 31-Aug | 2.1 | 2.1 | Z | 2.2 | 2.3 | 2.2 | 2.3 | 2.4 | 2.2 | 2.1 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.4 |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| Z - zerospan C - Calibration M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Methane (CH₄) - ppm
Anzac - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Methane (CH₄) - ppm
Anzac - August 2017**

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2.0 | 609 | 86.02 | 86.02 |
| 2.1 - 3.0 | 99 | 13.98 | 100.00 |
| 3.1 - 10.0 | 0 | 0.00 | 100.00 |
| > 10.0 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Methane (CH₄) - ppm
Anzac - August 2017**

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2.0 | 22 | 6 | 3 | 4 | 6 | 10 | 24 | 71 | 57 | 21 | 46 | 65 | 97 | 127 | 36 | 13 | 608 |
| 2.1 - 3.0 | 3 | 0 | 2 | 2 | 1 | 1 | 6 | 16 | 9 | 9 | 10 | 8 | 13 | 12 | 7 | 0 | 99 |
| 3.1 - 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 25 | 6 | 5 | 6 | 7 | 11 | 30 | 87 | 66 | 30 | 56 | 73 | 110 | 139 | 43 | 13 | 707 |

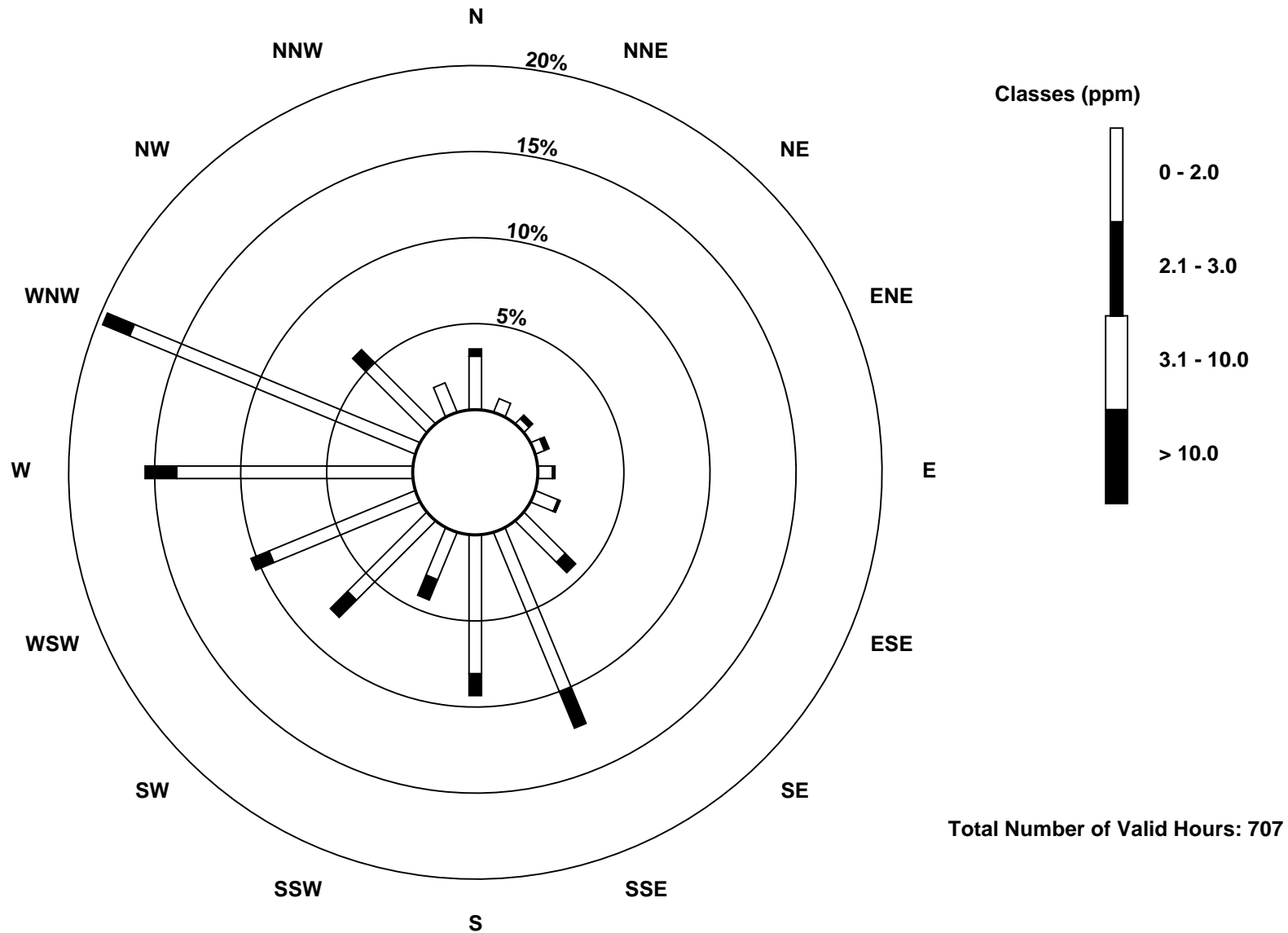
Total Number of Valid Hours: 707

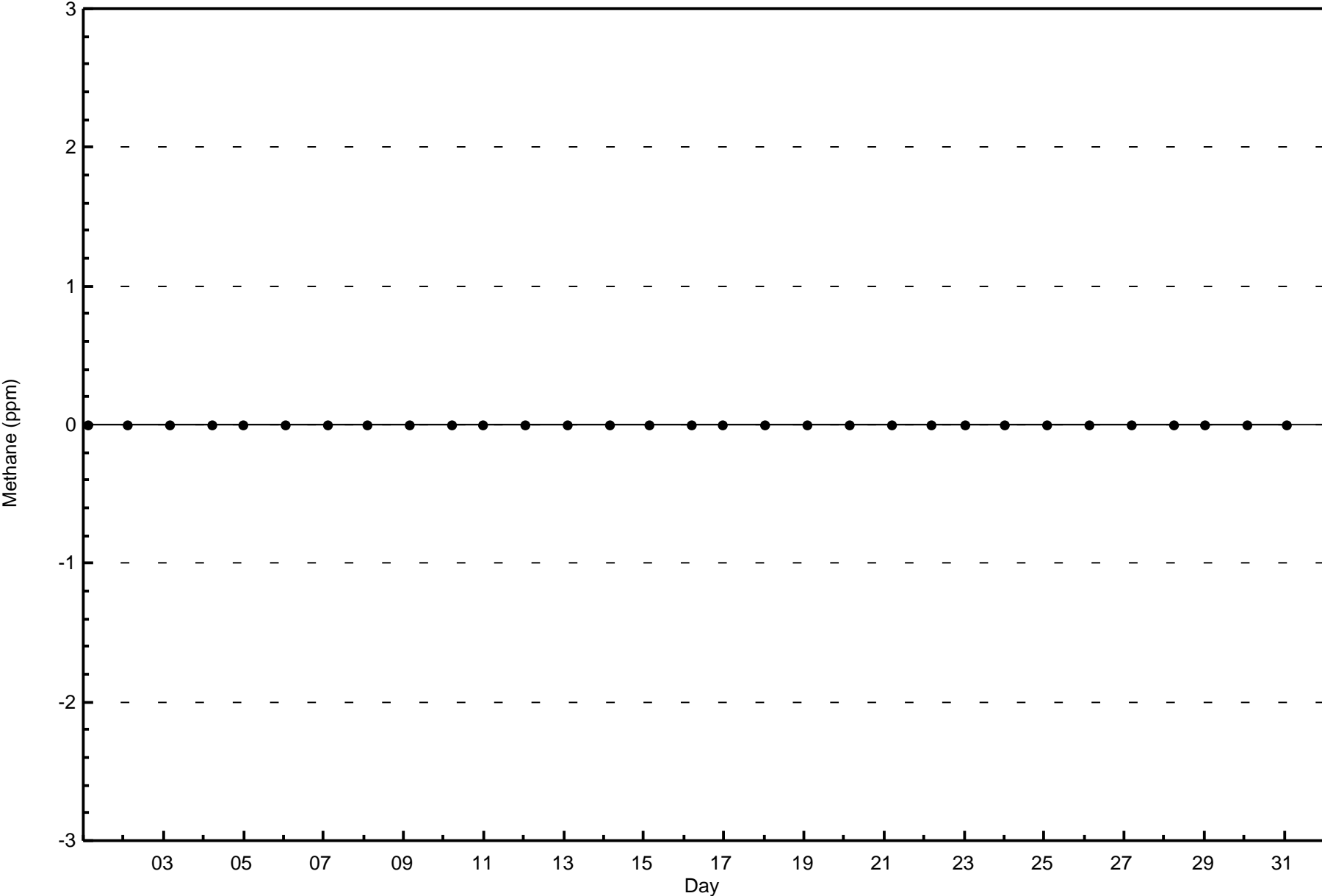
Total Number of Hours: 744

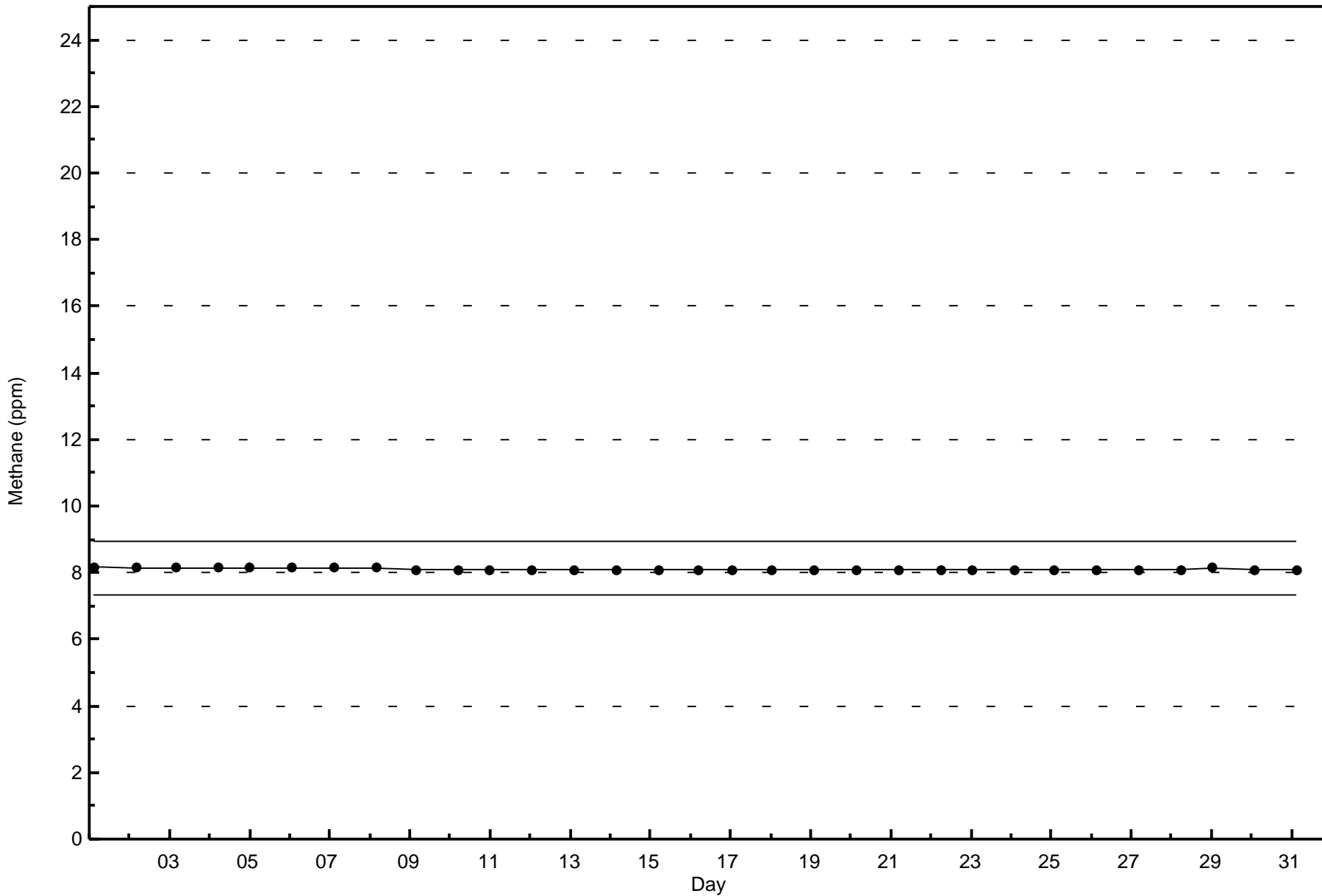


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Methane (CH₄) - ppm
Anzac (AMS 14)









Wood Buffalo Environmental Association
Summary of Hour Averages

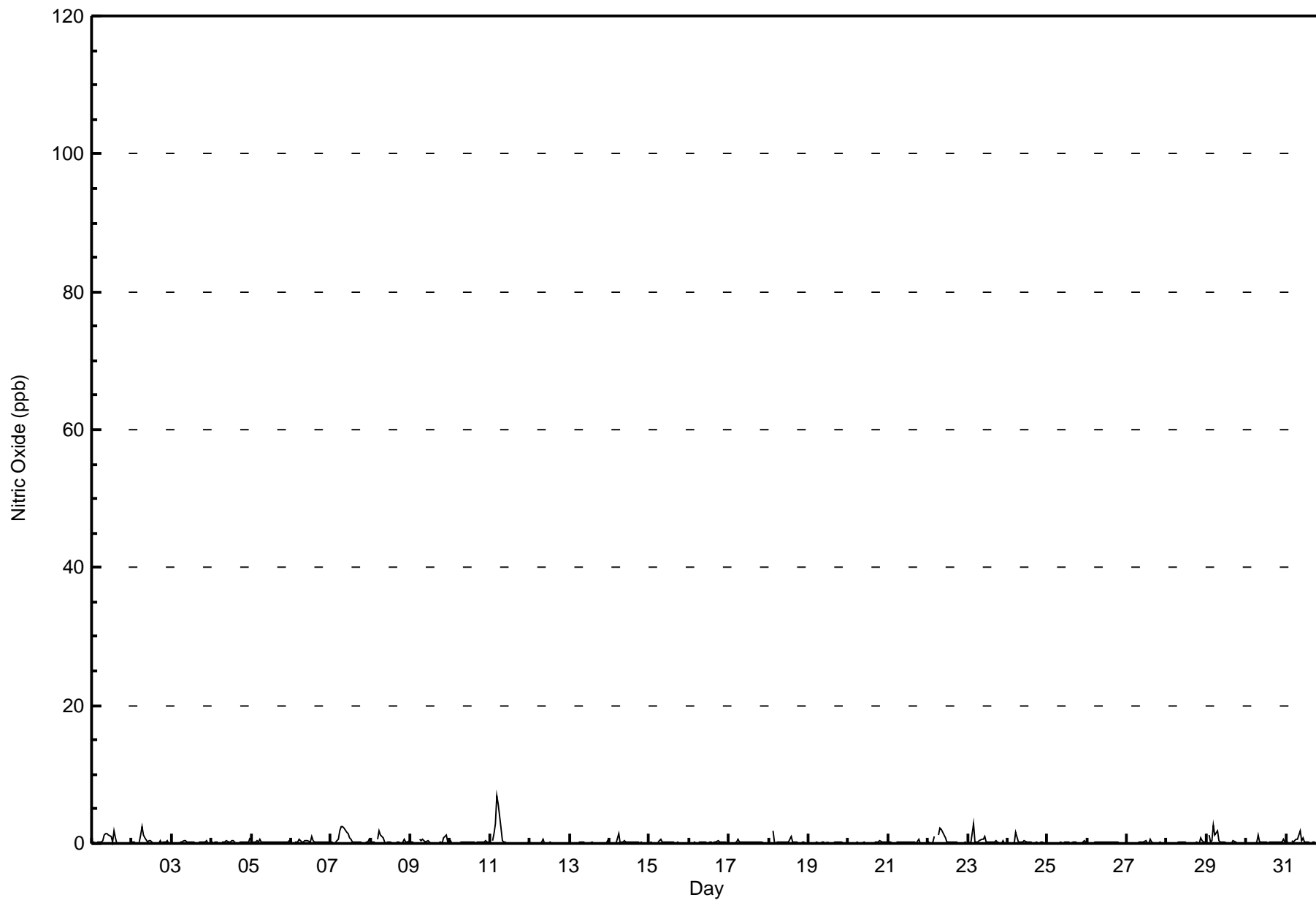
Nitric Oxide (NO) - ppb
Anzac - August 2017

| Maximum Value: 7 ppb on Aug 11 05:00 | | | | | | | | | | | | | | Maximum Daily Average: 0.9 ppb on Aug 11 | | | | | | | | | | | | | | Hours in Service: 744 | |
|---|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|--|----|----|----|----|----|----|----|----|----|-----------------|---------------|---------------|---|---------------------------|--|
| Minimum Value: 0 ppb on Aug 1 20:00 | | | | | | | | | | | | | | Minimum Daily Average: 0.1 ppb on Aug 12 | | | | | | | | | | | | | | Hours of Data: 709 | |
| Maximum Diurnal Average: 0.7 ppb at hour 6 | | | | | | | | | | | | | | Minimum Diurnal Average: 0.1 ppb at hour 1 | | | | | | | | | | | | | | Hours of Missing Data: 35 | |
| Monthly Average: 0.3 ppb | | | | | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 2 | | | | | | | | | | | | | | Hours of Calibration: 35 | |
| | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | |
| 1-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 2 | | |
| 2-Aug | 0 | 0 | 0 | Z | 0 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 2 | | |
| 3-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | |
| 4-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.2 | 1 | | | |
| 5-Aug | Z | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.2 | 1 | | | |
| 6-Aug | 0 | Z | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | |
| 7-Aug | 0 | 0 | Z | 0 | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.7 | 2 | | | |
| 8-Aug | 0 | 0 | 0 | Z | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0.3 | 2 | | | |
| 9-Aug | 0 | 0 | 0 | 0 | Z | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | C | C | C | C | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0.3 | 1 | | | |
| 10-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | |
| 11-Aug | Z | 0 | 1 | 3 | 7 | 6 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.9 | 7 | | | |
| 12-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 | | | |
| 13-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | |
| 14-Aug | 0 | 0 | 0 | Z | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 2 | | | |
| 15-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 | | | |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | |
| 17-Aug | Z | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | |
| 18-Aug | 0 | Z | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 2 | | | |
| 19-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | |
| 20-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | |
| 21-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | |
| 22-Aug | 0 | 0 | 0 | 0 | 1 | Z | 1 | 2 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 2 | | | |
| 23-Aug | Z | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 3 | | | |
| 24-Aug | 0 | Z | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 2 | | | |
| 25-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | |
| 26-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | |
| 27-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 | | | |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0.1 | 1 | | | |
| 29-Aug | Z | 1 | 0 | 0 | 3 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 3 | | | |
| 30-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0.2 | 1 | | | |
| 31-Aug | 0 | 0 | Z | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 2 | | | |
| 0.1 0.2 0.2 0.3 0.5 0.7 0.5 0.5 0.4 0.3 0.3 0.2 0.2 0.2 0.2 0.1 0.1 0.2 0.1 0.1 0.2 0.2 0.1 0.2 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | | |
| 0 1 2 3 7 6 2 2 2 2 1 1 1 2 1 0 0 0 1 0 1 1 1 1 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | |
| Z - zerospan C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Anzac - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Anzac - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 709 | 100.00 | 100.00 |
| 21 - 40 | 0 | 0.00 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Anzac - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 25 | 6 | 5 | 6 | 7 | 11 | 30 | 87 | 66 | 30 | 56 | 73 | 110 | 139 | 43 | 13 | 707 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 25 | 6 | 5 | 6 | 7 | 11 | 30 | 87 | 66 | 30 | 56 | 73 | 110 | 139 | 43 | 13 | 707 |

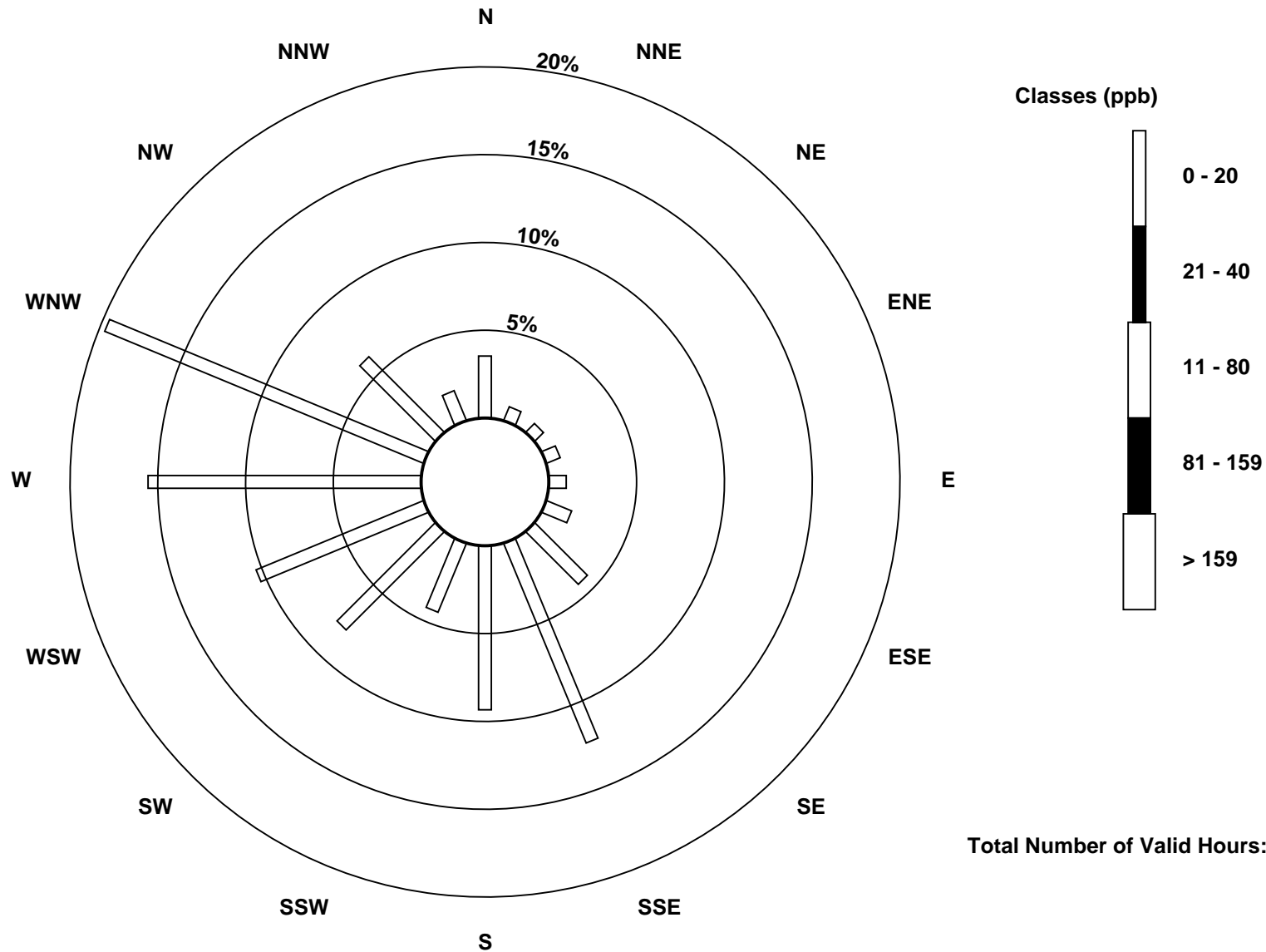
Total Number of Valid Hours: 707

Total Number of Hours: 744

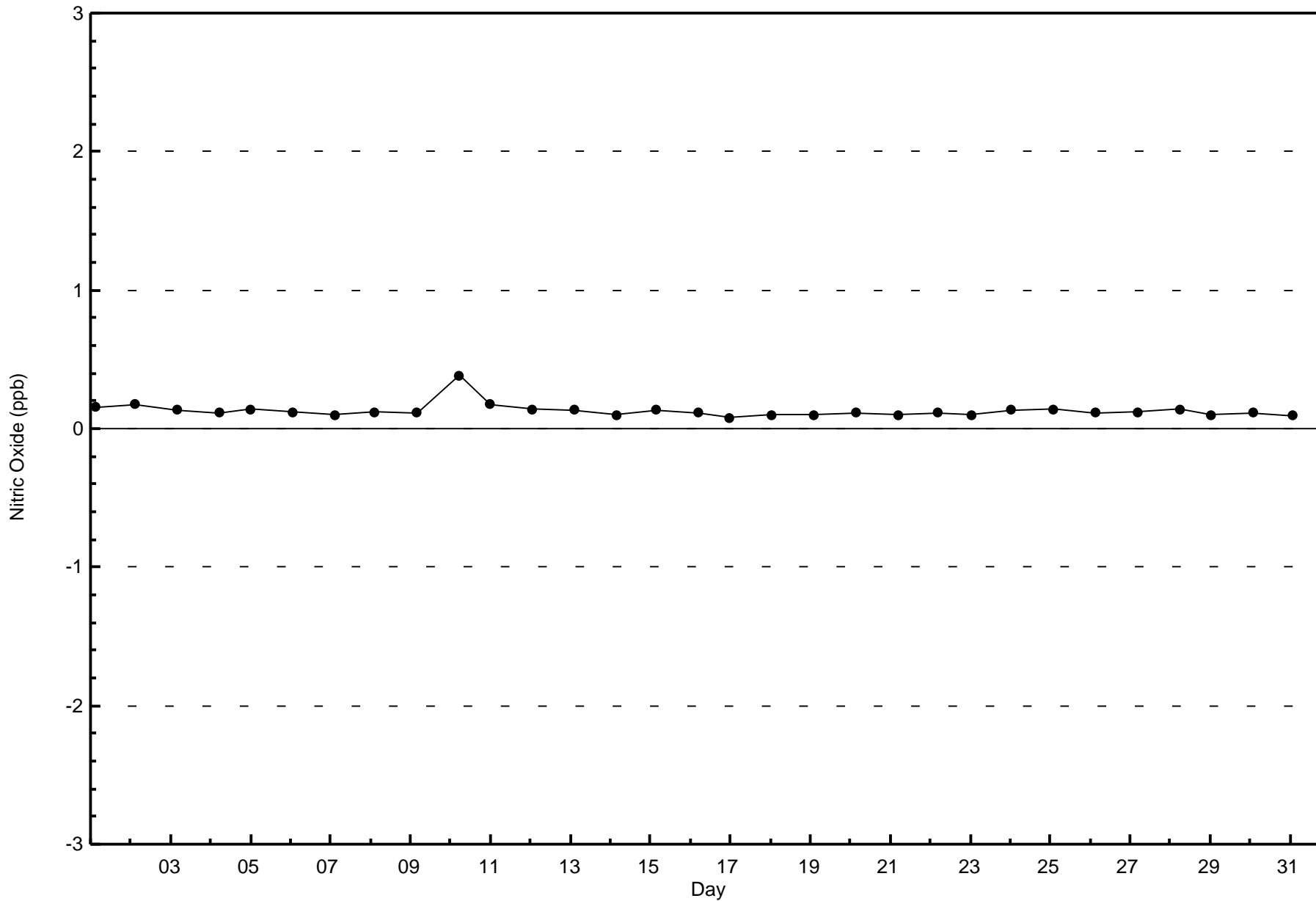


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitric Oxide (NO) - ppb
Anzac (AMS 14)



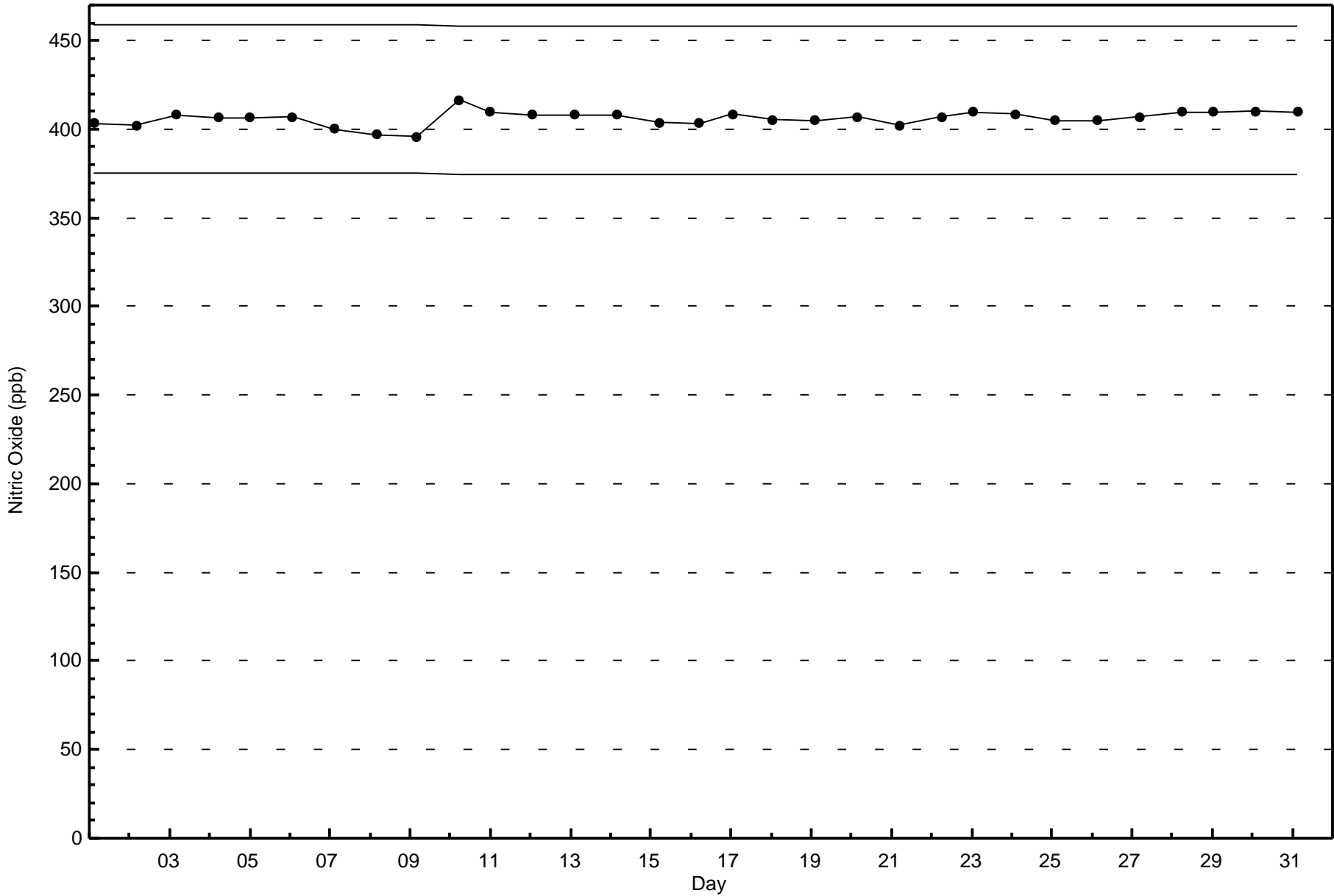
Total Number of Valid Hours: 707





Wood Buffalo Environmental Association
Span Responses

Nitric Oxide (NO) - ppb
Anzac - August 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Anzac - August 2017

| | | | | |
|--|--|----------|---------------------------|-------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 7 ppb on Aug 30 04:00 | Maximum Daily Average: 2.0 ppb on Aug 7 | | Hours of Data: | 709 |
| Minimum Value: 0 ppb on Aug 21 03:00 | Minimum Daily Average: 0.3 ppb on Aug 19 | | Hours of Missing Data: | 35 |
| Maximum Diurnal Average: 1.4 ppb at hour 6 | Minimum Diurnal Average: 0.5 ppb at hour 16 | | Hours of Calibration: | 35 |
| Monthly Average: 1.0 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 5 | | Percent Operational Time: | 100.0 |

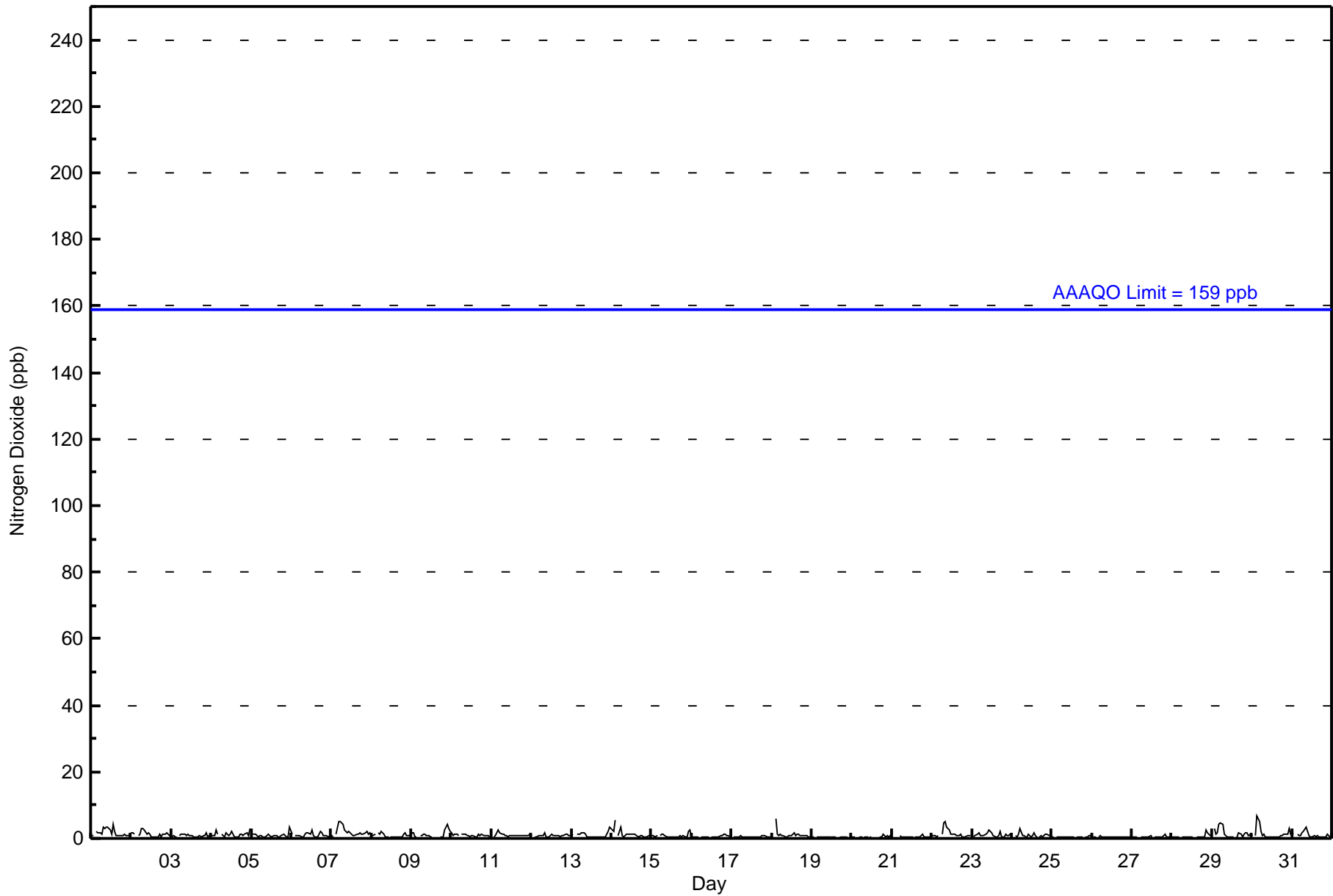
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
|--------|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|-----------------|--|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 1 | 1 | Z | 2 | 2 | 2 | 1 | 3 | 3 | 3 | 4 | 3 | 1 | 4 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.8 | 4 | |
| 2-Aug | 2 | 2 | 1 | Z | 1 | 1 | 3 | 3 | 2 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1.3 | 3 | |
| 3-Aug | 1 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 0.8 | 2 | |
| 4-Aug | 1 | 1 | 1 | 3 | 1 | Z | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 1 | 3 | 1.2 | 3 | |
| 5-Aug | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 3 | 0.9 | 3 | |
| 6-Aug | 1 | Z | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 2 | 2 | 1 | 3 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1.0 | 3 | |
| 7-Aug | 1 | 1 | Z | 1 | 5 | 5 | 5 | 4 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 1 | 2 | 2.0 | 5 | |
| 8-Aug | 1 | 1 | 1 | Z | 2 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 1 | 0.8 | 2 | |
| 9-Aug | 2 | 2 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | C | C | C | C | 1 | 1 | 1 | 2 | 4 | 3 | 2 | 1.3 | 4 | |
| 10-Aug | 2 | 1 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.0 | 2 | |
| 11-Aug | Z | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.0 | 2 | |
| 12-Aug | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.9 | 2 | |
| 13-Aug | 1 | 1 | Z | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 2 | 4 | 1.0 | 4 | |
| 14-Aug | 2 | 2 | 5 | Z | 1 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.3 | 5 | |
| 15-Aug | 1 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 0.8 | 3 | |
| 16-Aug | 0 | 0 | 0 | 1 | 0 | Z | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.6 | 1 | |
| 17-Aug | Z | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0.5 | 1 | |
| 18-Aug | 0 | Z | 6 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1.1 | 6 | |
| 19-Aug | 1 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | |
| 20-Aug | 1 | 0 | 0 | Z | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0.4 | 1 | |
| 21-Aug | 1 | 0 | 0 | 0 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0.4 | 1 | |
| 22-Aug | 1 | 1 | 1 | 1 | 1 | Z | 1 | 5 | 5 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.4 | 5 | |
| 23-Aug | Z | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1.1 | 3 | |
| 24-Aug | 1 | Z | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0.9 | 3 | |
| 25-Aug | 0 | 1 | Z | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0.4 | 1 | |
| 26-Aug | 0 | 0 | 0 | Z | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0.4 | 1 | |
| 27-Aug | 1 | 0 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0.5 | 1 | |
| 28-Aug | 0 | 0 | 0 | 0 | 1 | Z | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 2 | 1 | 1 | 0.6 | 3 | |
| 29-Aug | Z | 3 | 1 | 2 | 4 | 5 | 4 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 1 | 2 | 2 | 1 | 1 | 1.5 | 5 | |
| 30-Aug | 1 | Z | 1 | 7 | 5 | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 1 | 1.3 | 7 | |
| 31-Aug | 2 | 1 | Z | 1 | 1 | 1 | 2 | 2 | 3 | 2 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1.1 | 3 | |
| | 0.9 | 0.9 | 1.1 | 1.2 | 1.4 | 1.4 | 1.2 | 1.2 | 1.1 | 1.0 | 1.0 | 0.8 | 0.8 | 0.8 | 0.6 | 0.5 | 0.6 | 0.8 | 0.7 | 0.8 | 1.0 | 1.1 | 1.0 | 1.1 | Diurnal Average | | |
| | 2 | 3 | 6 | 7 | 5 | 5 | 5 | 5 | 5 | 3 | 4 | 3 | 3 | 4 | 2 | 1 | 2 | 2 | 2 | 2 | 1 | 3 | 4 | 3 | 4 | Diurnal Maximum | |

Z - zerospan C - Calibration
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Anzac - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Anzac - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 709 | 100.00 | 100.00 |
| 21 - 40 | 0 | 0.00 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Anzac - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 25 | 6 | 5 | 6 | 7 | 11 | 30 | 87 | 66 | 30 | 56 | 73 | 110 | 139 | 43 | 13 | 707 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 41 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 25 | 6 | 5 | 6 | 7 | 11 | 30 | 87 | 66 | 30 | 56 | 73 | 110 | 139 | 43 | 13 | 707 |

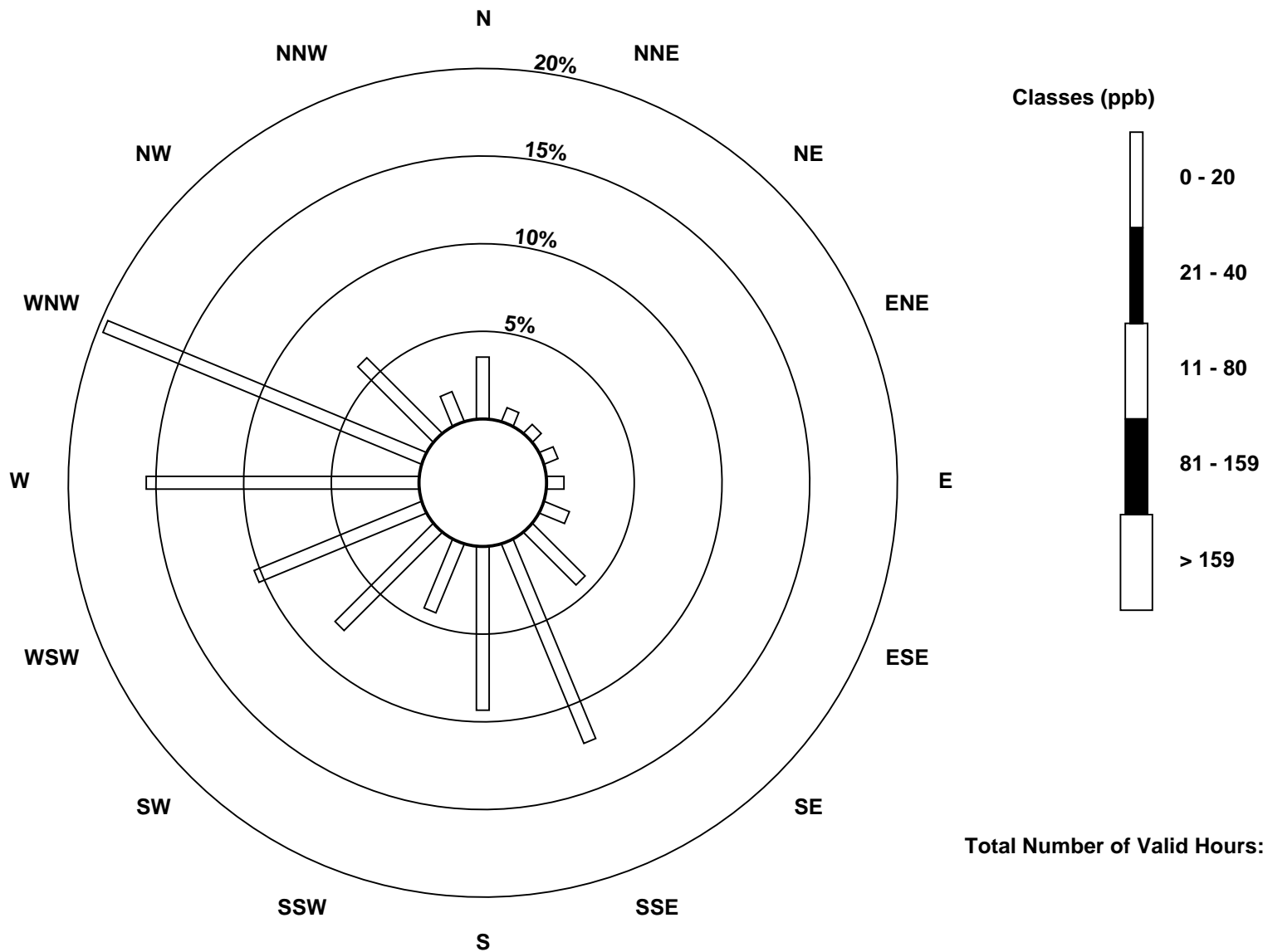
Total Number of Valid Hours: 707

Total Number of Hours: 744

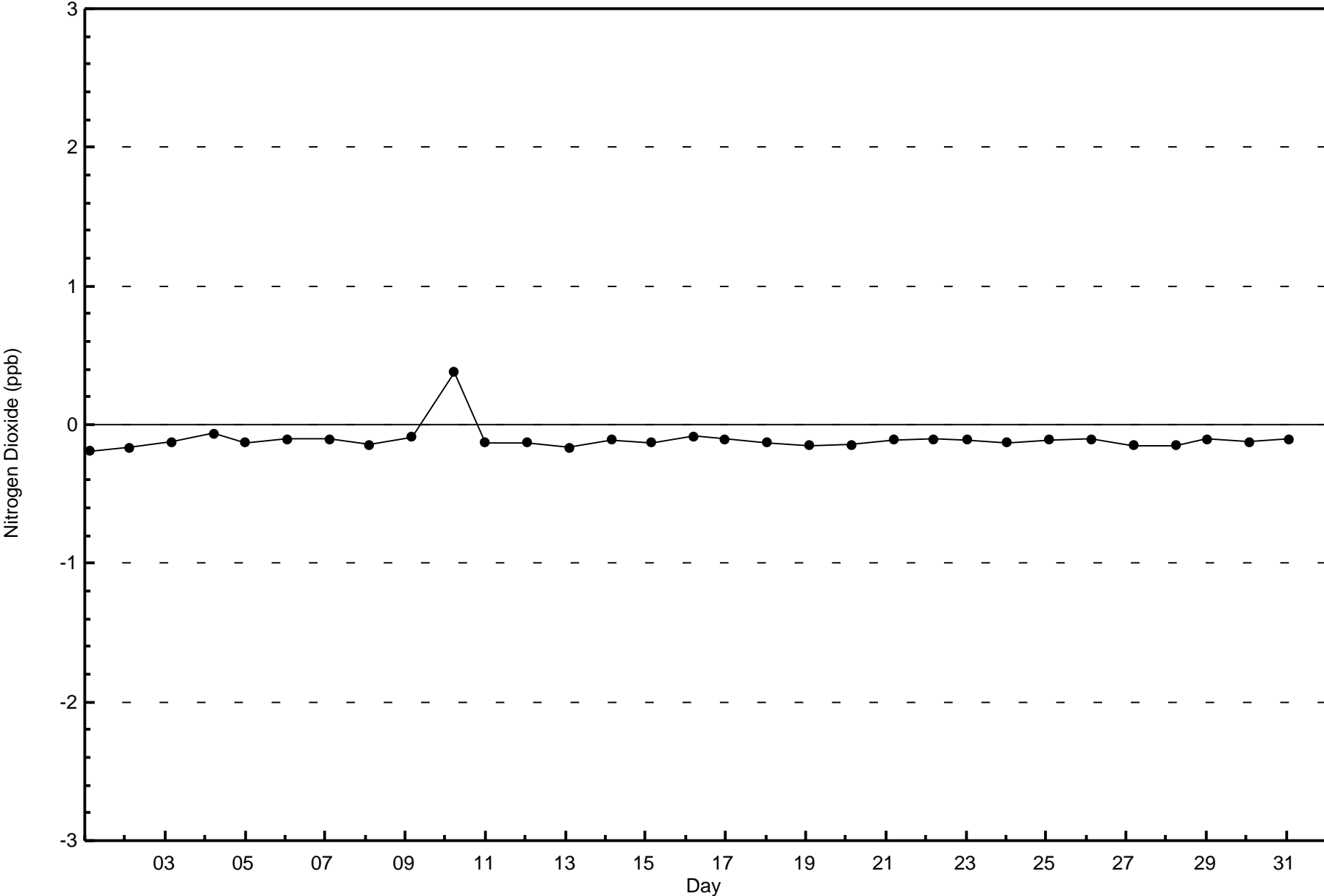


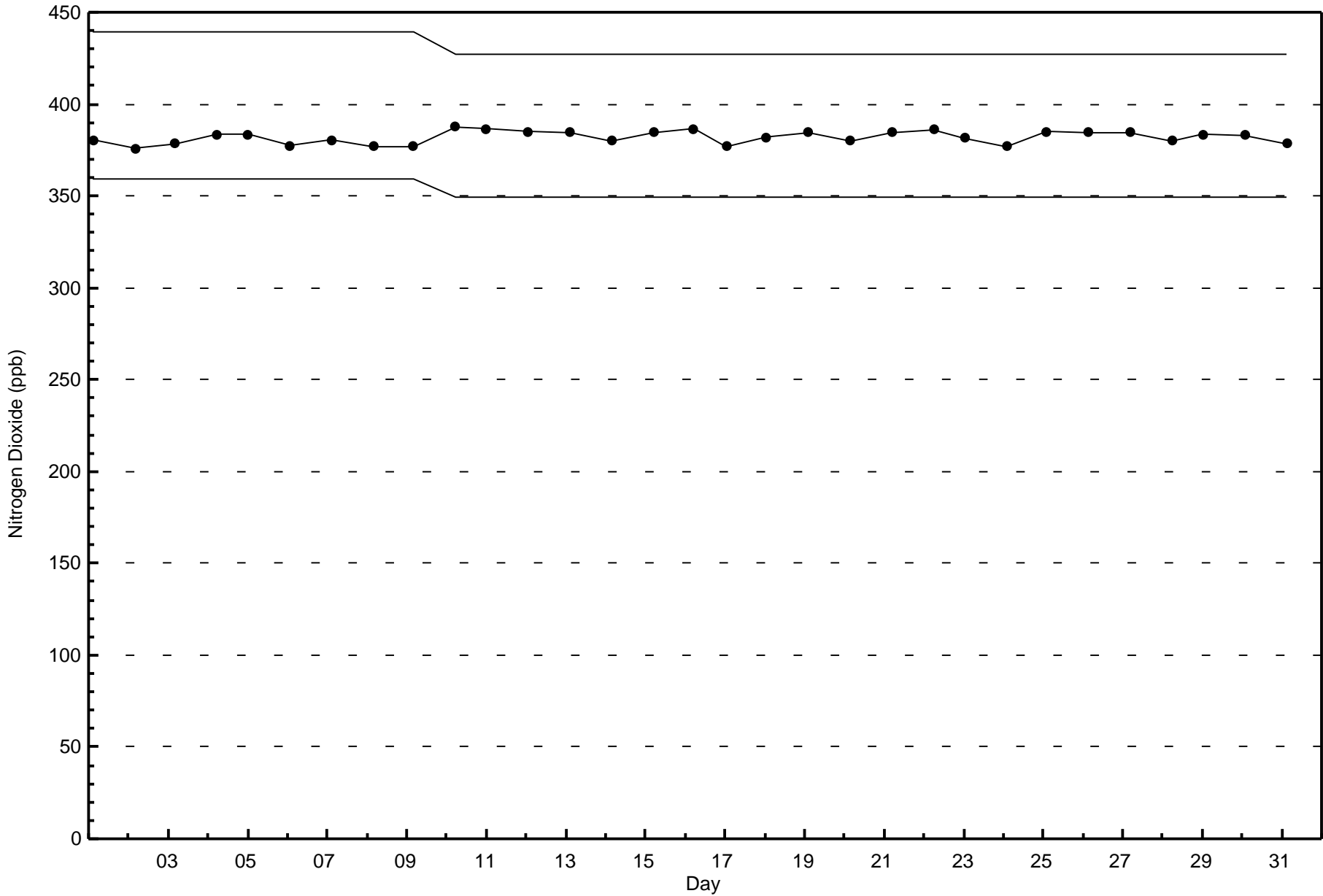
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Dioxide (NO₂) - ppb
Anzac (AMS 14)



Total Number of Valid Hours: 707







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb

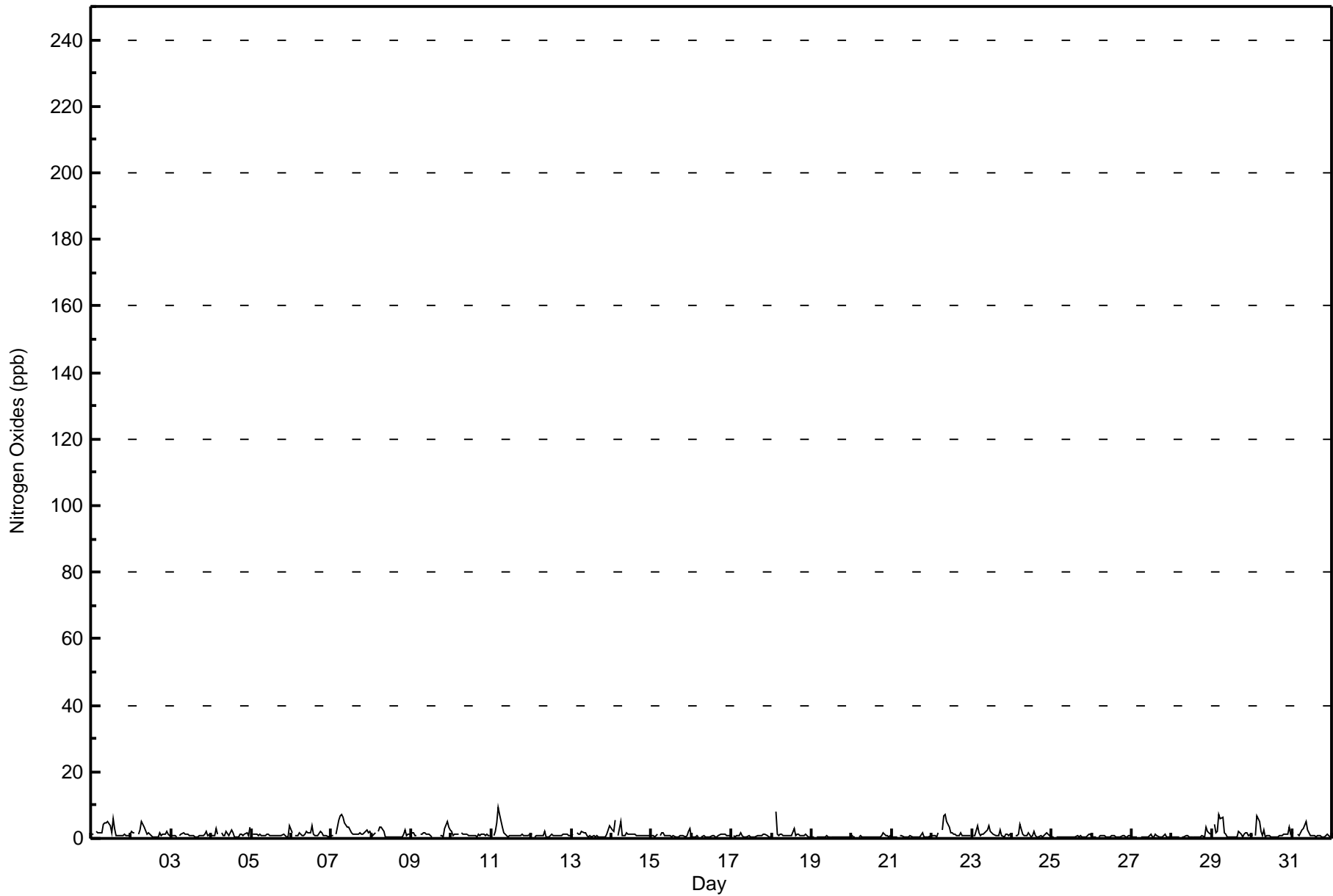
Anzac - August 2017

| Maximum Value: 9 ppb on Aug 11 05:00 | | | | | | | | | | | | | | | | | Maximum Daily Average: 2.7 ppb on Aug 7 | | | | | | | | | | | | | | | | | Hours in Service: 744 | |
|--|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|--|----|----|----|----|----|----|-----------------|---------------|---------------|---|--|--|--|--|--|--|---------------------------|--|
| Minimum Value: 0 ppb on Aug 21 03:00 | | | | | | | | | | | | | | | | | Minimum Daily Average: 0.4 ppb on Aug 19 | | | | | | | | | | | | | | | | | Hours of Data: 709 | |
| Maximum Diurnal Average: 2.2 ppb at hour 6 | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 0.7 ppb at hour 16 | | | | | | | | | | | | | | | | | Hours of Missing Data: 35 | |
| Monthly Average: 1.2 ppb | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 7 | | | | | | | | | | | | | | | | | Hours of Calibration: 35 | |
| | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | |
| 1-Aug | 1 | 1 | Z | 2 | 2 | 2 | 2 | 4 | 4 | 5 | 5 | 4 | 2 | 6 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2.2 | 6 | | | | | | | | |
| 2-Aug | 2 | 2 | 2 | Z | 1 | 2 | 5 | 4 | 3 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 1.6 | 5 | | | | | | | | | |
| 3-Aug | 1 | 1 | 1 | 1 | Z | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1.0 | 2 | | | | | | | | | |
| 4-Aug | 1 | 1 | 1 | 3 | 1 | Z | 2 | 1 | 1 | 2 | 1 | 2 | 3 | 2 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 1 | 4 | 1.4 | 4 | | | | | | | | | |
| 5-Aug | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 4 | 1.1 | 4 | | | | | | | | | |
| 6-Aug | 1 | Z | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 4 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1.3 | 4 | | | | | | | | | |
| 7-Aug | 1 | 1 | Z | 1 | 6 | 7 | 7 | 6 | 5 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 2.7 | 7 | | | | | | | | | |
| 8-Aug | 1 | 1 | 2 | Z | 2 | 3 | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 1 | 1 | 1 | 1.1 | 3 | | | | | | | | | |
| 9-Aug | 2 | 2 | 1 | 1 | Z | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 0 | C | C | C | C | 1 | 1 | 1 | 3 | 5 | 3 | 2 | 1.6 | 5 | | | | | | | | | |
| 10-Aug | 2 | 1 | 1 | 1 | 1 | Z | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.1 | 2 | | | | | | | | | |
| 11-Aug | Z | 1 | 2 | 5 | 9 | 7 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.9 | 9 | | | | | | | | | |
| 12-Aug | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.0 | 2 | | | | | | | | | |
| 13-Aug | 1 | 1 | Z | 2 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 4 | 1.1 | 4 | | | | | | | | | | |
| 14-Aug | 2 | 2 | 5 | Z | 1 | 5 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.5 | 5 | | | | | | | | | |
| 15-Aug | 1 | 1 | 1 | 1 | Z | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 1.0 | 3 | | | | | | | | | | |
| 16-Aug | 0 | 0 | 1 | 1 | 0 | Z | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.7 | 1 | | | | | | | | | |
| 17-Aug | Z | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0.7 | 2 | | | | | | | | | |
| 18-Aug | 0 | Z | 8 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1.4 | 8 | | | | | | | | | | |
| 19-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | |
| 20-Aug | 1 | 0 | 0 | Z | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 1 | 0.6 | 2 | | | | | | | | | | |
| 21-Aug | 1 | 0 | 0 | 0 | Z | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 2 | 1 | 1 | 1 | 1 | 0.6 | 2 | | | | | | | | | | |
| 22-Aug | 1 | 1 | 1 | 1 | 2 | Z | 2 | 7 | 7 | 5 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1.9 | 7 | | | | | | | | | | |
| 23-Aug | Z | 1 | 1 | 4 | 2 | 1 | 1 | 1 | 2 | 2 | 4 | 2 | 2 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1.5 | 4 | | | | | | | | | | |
| 24-Aug | 1 | Z | 1 | 1 | 1 | 4 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 2 | 1 | 1.1 | 4 | | | | | | | | | | |
| 25-Aug | 1 | 1 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0.6 | 1 | | | | | | | | | | |
| 26-Aug | 1 | 0 | 0 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0.6 | 1 | | | | | | | | | | |
| 27-Aug | 1 | 1 | 0 | 0 | Z | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0.6 | 1 | | | | | | | | | | |
| 28-Aug | 0 | 0 | 0 | 0 | 1 | Z | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 4 | 2 | 2 | 0.8 | 4 | | | | | | | | | | |
| 29-Aug | Z | 4 | 2 | 2 | 7 | 6 | 6 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 1 | 2 | 2 | 1 | 1.9 | 7 | | | | | | | | | | |
| 30-Aug | 1 | Z | 1 | 7 | 5 | 2 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 1.5 | 7 | | | | | | | | | | |
| 31-Aug | 2 | 2 | Z | 1 | 1 | 2 | 2 | 3 | 5 | 3 | 2 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1.4 | 5 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | | | | | | | |
| Z - zerospan C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Anzac - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Anzac - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 709 | 100.00 | 100.00 |
| 21 - 40 | 0 | 0.00 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Anzac - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 25 | 6 | 5 | 6 | 7 | 11 | 30 | 87 | 66 | 30 | 56 | 73 | 110 | 139 | 43 | 13 | 707 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 25 | 6 | 5 | 6 | 7 | 11 | 30 | 87 | 66 | 30 | 56 | 73 | 110 | 139 | 43 | 13 | 707 |

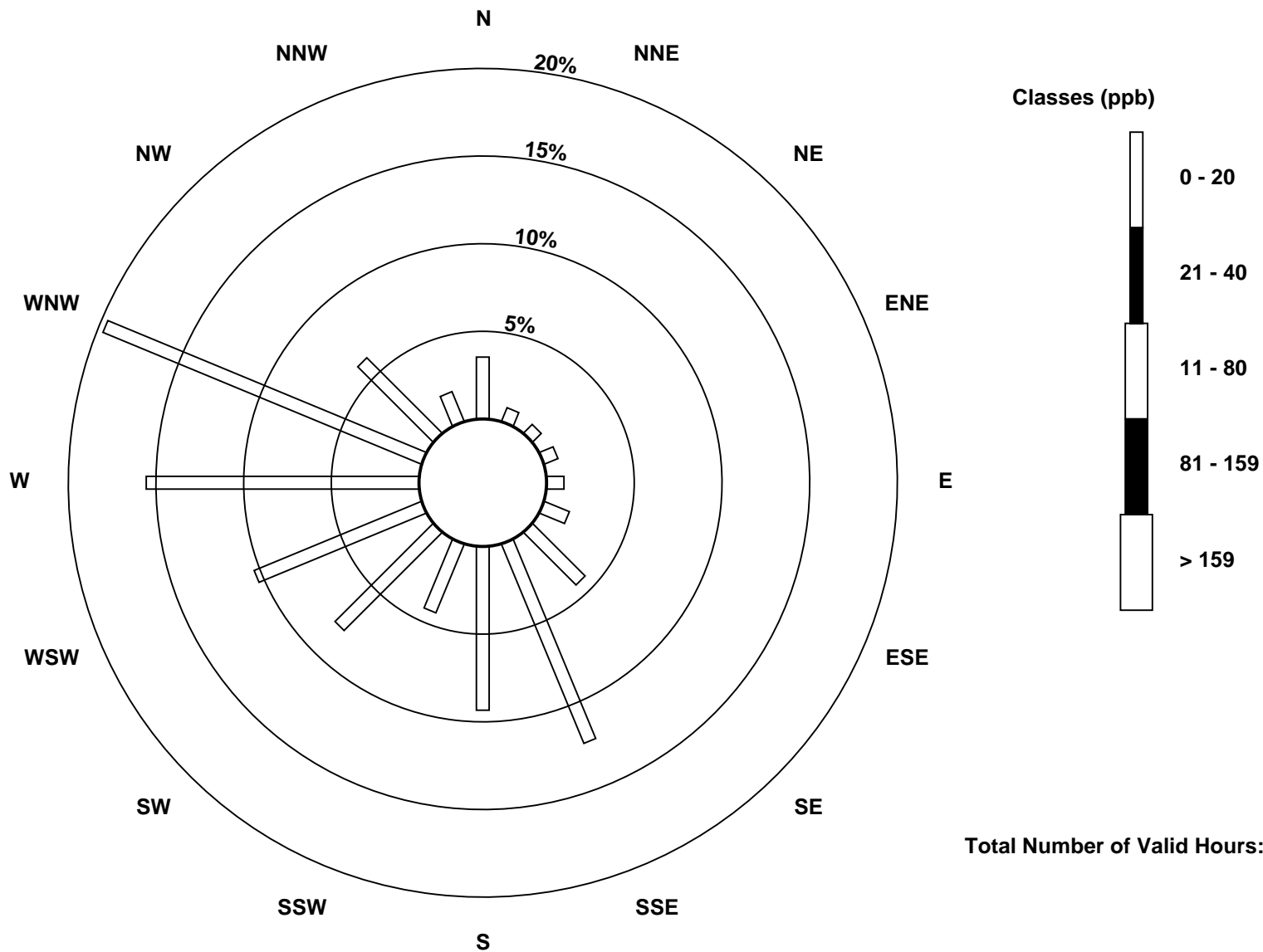
Total Number of Valid Hours: 707

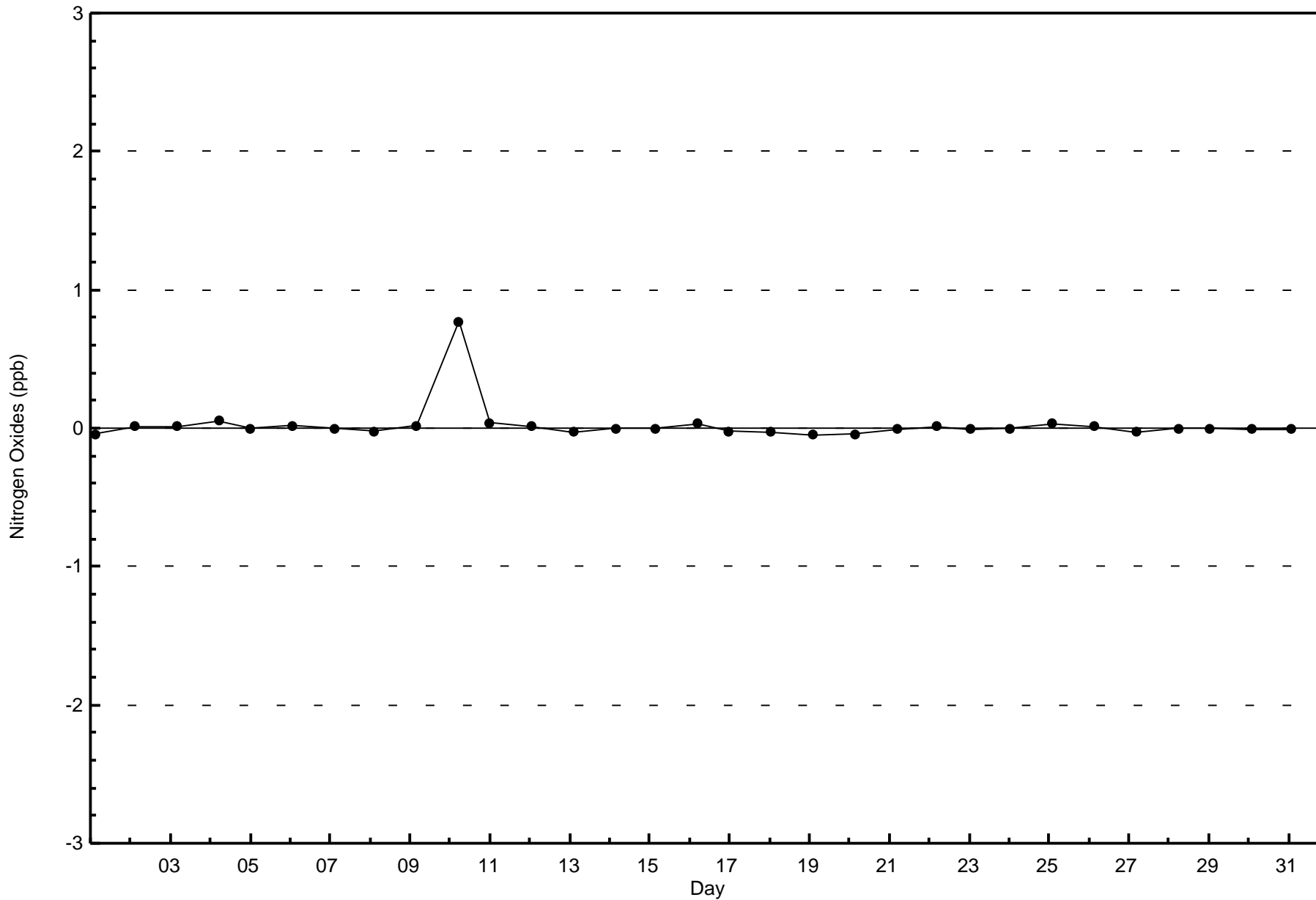
Total Number of Hours: 744

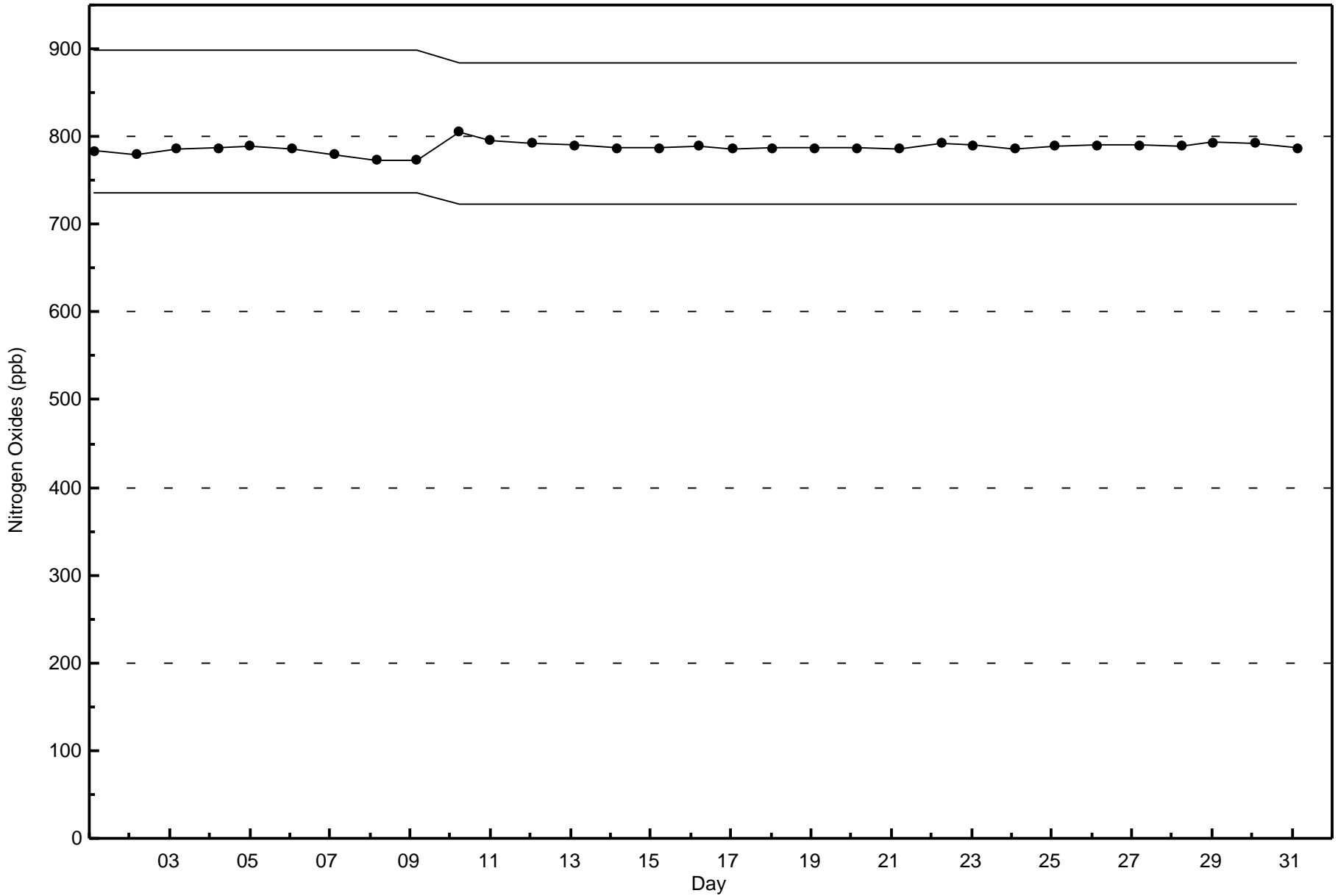


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Oxides (NO_x) - ppb
Anzac (AMS 14)









Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Anzac - August 2017

| | | | | |
|--|--|----------|---------------------------|------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 55 ppb on Aug 13 16:00 | Maximum Daily Average: 44.8 ppb on Aug 13 | | Hours of Data: | 709 |
| Minimum Value: 2 ppb on Aug 11 05:00 | Minimum Daily Average: 14.1 ppb on Aug 15 | | Hours of Missing Data: | 35 |
| Maximum Diurnal Average: 33.4 ppb at hour 15 | Minimum Diurnal Average: 17.5 ppb at hour 6 | | Hours of Calibration: | 34 |
| Monthly Average: 26.3 ppb | Percentiles: P ₁ = 5 P ₁₀ = 12 Q ₁ = 20 Median = 26 Q ₃ = 33 P ₉₀ = 38 P ₉₉ = 53 | | Percent Operational Time: | 99.9 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 8 | 7 | 7 | 7 | Z | 16 | 18 | 18 | 20 | 22 | 23 | 29 | 40 | 45 | 45 | 45 | 43 | 42 | 40 | 36 | 24 | 21 | 19 | 17 | 25.7 | 45 |
| 2-Aug | 11 | 10 | 9 | 6 | 9 | Z | 13 | 21 | 27 | 34 | 38 | 35 | 35 | 35 | 35 | 36 | 37 | 36 | 37 | 34 | 26 | 25 | 20 | 23 | 25.7 | 38 |
| 3-Aug | 24 | 23 | 21 | 19 | 20 | 18 | Z | 30 | 31 | 38 | 38 | 39 | 38 | 39 | 39 | 40 | 40 | 40 | 38 | 31 | 35 | 37 | 35 | 33 | 32.5 | 40 |
| 4-Aug | 29 | 19 | 15 | 21 | 28 | 26 | Z | 30 | 30 | 30 | 31 | C | C | C | 36 | 34 | 34 | 35 | 32 | 25 | 23 | 19 | 26 | 22 | 27.0 | 36 |
| 5-Aug | 22 | 15 | Z | 6 | 8 | 9 | 19 | 28 | 34 | 40 | 44 | 46 | 45 | 46 | 48 | 46 | 42 | 41 | 41 | 38 | 31 | 27 | 22 | 18 | 31.1 | 48 |
| 6-Aug | 13 | 21 | 21 | Z | 14 | 8 | 13 | 22 | 25 | 31 | 31 | 38 | 28 | 21 | 17 | 15 | 16 | 14 | 15 | 13 | 12 | 12 | 12 | 12 | 18.4 | 38 |
| 7-Aug | 12 | 10 | 9 | 8 | Z | 6 | 9 | 9 | 11 | 13 | 16 | 19 | 22 | 25 | 28 | 30 | 32 | 32 | 32 | 32 | 27 | 20 | 10 | 9 | 18.2 | 32 |
| 8-Aug | 15 | 14 | 8 | 6 | 6 | Z | 16 | 18 | 20 | 24 | 24 | 26 | 27 | 29 | 30 | 30 | 29 | 30 | 29 | 25 | 19 | 17 | 7 | 9 | 19.9 | 30 |
| 9-Aug | 18 | 18 | 20 | 19 | 14 | 9 | Z | 19 | 25 | 27 | 29 | 30 | 33 | 33 | 35 | M | 34 | 35 | 33 | 29 | 21 | 15 | 17 | 15 | 23.9 | 35 |
| 10-Aug | 18 | 30 | 27 | 27 | 18 | 14 | 19 | Z | 28 | 34 | 31 | 32 | 30 | 30 | 26 | 29 | 26 | 20 | 21 | 17 | 9 | 5 | 6 | 7 | 21.9 | 34 |
| 11-Aug | 4 | 4 | Z | 3 | 2 | 3 | 6 | 18 | 24 | 31 | 41 | 46 | 49 | 49 | 50 | 50 | 48 | 46 | 45 | 39 | 32 | 30 | 26 | 11 | 28.5 | 50 |
| 12-Aug | 10 | 14 | 23 | Z | 27 | 28 | 34 | 38 | 40 | 47 | 49 | 49 | 52 | 51 | 52 | 52 | 53 | 53 | 52 | 49 | 43 | 42 | 41 | 37 | 40.7 | 53 |
| 13-Aug | 38 | 38 | 38 | 38 | Z | 37 | 37 | 39 | 42 | 43 | 47 | 50 | 52 | 54 | 55 | 55 | 55 | 53 | 51 | 47 | 45 | 42 | 38 | 36 | 44.8 | 55 |
| 14-Aug | 36 | 36 | 33 | 35 | 32 | Z | 34 | 33 | 34 | 31 | 27 | 23 | 22 | 18 | 15 | 18 | 18 | 17 | 14 | 12 | 11 | 10 | 9 | 9 | 23.9 | 36 |
| 15-Aug | 8 | 7 | 7 | 8 | 8 | 6 | Z | 7 | 12 | 13 | 12 | 13 | 14 | 15 | 15 | 15 | 17 | 18 | 23 | 24 | 23 | 20 | 22 | 17 | 14.1 | 24 |
| 16-Aug | 15 | 18 | 18 | 17 | 19 | 20 | 22 | Z | 22 | 24 | 29 | 30 | 31 | 33 | 34 | 34 | 32 | 34 | 33 | 27 | 25 | 21 | 21 | 24 | 25.3 | 34 |
| 17-Aug | 20 | 23 | Z | 25 | 25 | 24 | 24 | 23 | 23 | 23 | 25 | 25 | 26 | 26 | 26 | 27 | 27 | 27 | 25 | 23 | 19 | 21 | 24 | 27 | 24.2 | 27 |
| 18-Aug | 26 | 23 | 13 | Z | 22 | 21 | 21 | 25 | 26 | 29 | 32 | 33 | 32 | 29 | 27 | 29 | 30 | 31 | 30 | 29 | 29 | 33 | 36 | 40 | 28.2 | 40 |
| 19-Aug | 37 | 33 | 31 | 30 | Z | 28 | 28 | 28 | 28 | 27 | 28 | 28 | 27 | 27 | 24 | 24 | 23 | 21 | 18 | 18 | 22 | 22 | 24 | 23 | 26.0 | 37 |
| 20-Aug | 21 | 21 | 25 | 25 | 25 | Z | 27 | 27 | 26 | 26 | 28 | 28 | 29 | 32 | 32 | 32 | 30 | 34 | 33 | 31 | 30 | 29 | 29 | 28 | 28.3 | 34 |
| 21-Aug | 28 | 27 | 27 | 26 | 27 | 25 | Z | 25 | 25 | 25 | 26 | 27 | 30 | 30 | 32 | 34 | 34 | 34 | 32 | 29 | 26 | 25 | 25 | 26 | 27.9 | 34 |
| 22-Aug | 18 | 13 | 13 | 11 | 14 | 15 | 11 | Z | 14 | 17 | 19 | 24 | 27 | 33 | 35 | 36 | 37 | 37 | 35 | 28 | 23 | 19 | 15 | 15 | 22.1 | 37 |
| 23-Aug | 14 | 18 | Z | 18 | 17 | 15 | 15 | 17 | 20 | 24 | 26 | 26 | 25 | 24 | 24 | 23 | 24 | 22 | 24 | 23 | 22 | 20 | 20 | 19 | 20.9 | 26 |
| 24-Aug | 19 | 19 | 22 | Z | 23 | 17 | 16 | 19 | 20 | 22 | 23 | 24 | 26 | 24 | 24 | 25 | 25 | 26 | 27 | 24 | 27 | 28 | 30 | 30 | 23.5 | 30 |
| 25-Aug | 31 | 29 | 29 | 27 | Z | 24 | 23 | 22 | 23 | 21 | 21 | 22 | 23 | 28 | 27 | 25 | 23 | 23 | 24 | 27 | 26 | 24 | 24 | 28 | 25.0 | 31 |
| 26-Aug | 28 | 27 | 27 | 27 | 26 | Z | 24 | 24 | 25 | 25 | 26 | 29 | 30 | 31 | 32 | 31 | 32 | 31 | 32 | 29 | 28 | 29 | 29 | 28 | 28.3 | 32 |
| 27-Aug | 28 | 28 | 26 | 26 | 25 | 24 | Z | 23 | 23 | 23 | 25 | 27 | 30 | 32 | 35 | 36 | 36 | 36 | 35 | 31 | 26 | 25 | 27 | 27 | 28.5 | 36 |
| 28-Aug | 27 | 26 | 25 | 25 | 25 | 24 | 24 | Z | 24 | 23 | 29 | 34 | 35 | 40 | 40 | 40 | 40 | 40 | 38 | 34 | 23 | 15 | 13 | 10 | 28.4 | 40 |
| 29-Aug | 8 | 6 | Z | 6 | 5 | 9 | 15 | 26 | 31 | 32 | 33 | 34 | 33 | 35 | 35 | 35 | 36 | 38 | 34 | 32 | 30 | 31 | 29 | 26 | 26.0 | 38 |
| 30-Aug | 25 | 25 | 24 | Z | 19 | 22 | 23 | 23 | 26 | 29 | 31 | 32 | 34 | 35 | 36 | 36 | 36 | 35 | 32 | 29 | 29 | 31 | 27 | 18 | 28.7 | 36 |
| 31-Aug | 16 | 11 | 9 | 8 | Z | 6 | 6 | 8 | 14 | 21 | 29 | 29 | 33 | 36 | 41 | 37 | 37 | 37 | 37 | 36 | 36 | 37 | 36 | 37 | 26.0 | 41 |

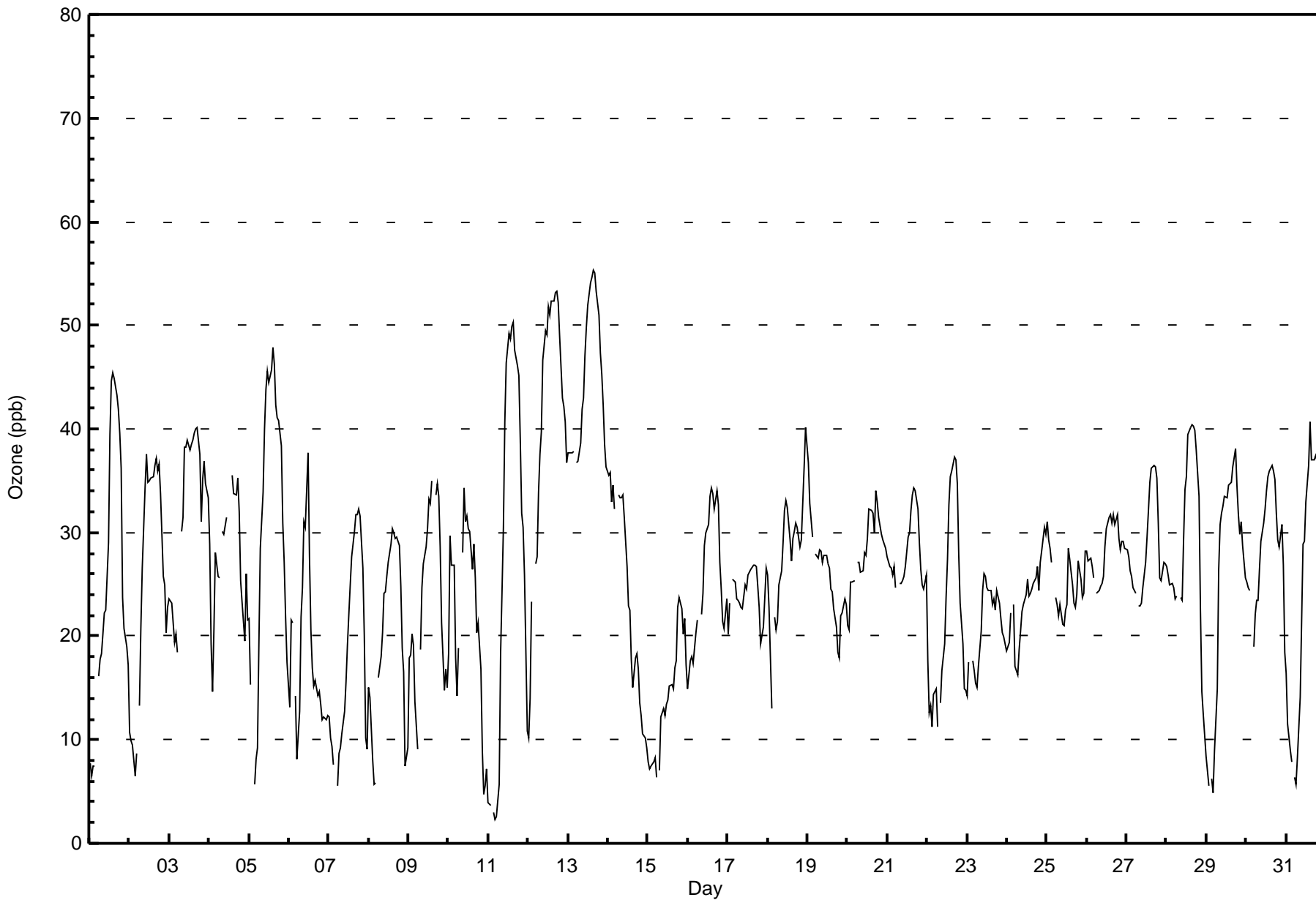
| | | | | | | | | | | | | | | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|--|
| 20.2 | 19.7 | 20.4 | 18.2 | 18.3 | 17.5 | 20.0 | 22.8 | 24.9 | 27.5 | 29.5 | 31.0 | 32.0 | 33.0 | 33.4 | 33.2 | 33.1 | 32.9 | 32.1 | 29.1 | 25.8 | 24.3 | 23.2 | 22.0 | Diurnal Average | |
| 38 | 38 | 38 | 38 | 32 | 37 | 37 | 39 | 42 | 47 | 49 | 50 | 52 | 54 | 55 | 55 | 55 | 53 | 52 | 49 | 45 | 42 | 41 | 40 | Diurnal Maximum | |

Z - zerospan C - Calibration M - Maintenance
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb



Wood Buffalo Environmental Association
Hourly Averages

Ozone (O₃) - ppb
Anzac - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ozone (O₃) - ppb
Anzac - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 188 | 26.52 | 26.52 |
| 21 - 50 | 507 | 71.51 | 98.03 |
| 51 - 82 | 14 | 1.97 | 100.00 |
| > 83 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Anzac - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 13 | 1 | 1 | 3 | 1 | 0 | 12 | 27 | 15 | 12 | 12 | 20 | 19 | 24 | 17 | 11 | 188 |
| 21 - 50 | 12 | 5 | 3 | 3 | 5 | 11 | 16 | 60 | 39 | 16 | 44 | 57 | 95 | 111 | 25 | 3 | 505 |
| 51 - 82 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 |
| > 83 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 25 | 6 | 4 | 6 | 6 | 11 | 28 | 90 | 65 | 28 | 56 | 77 | 114 | 135 | 42 | 14 | 707 |

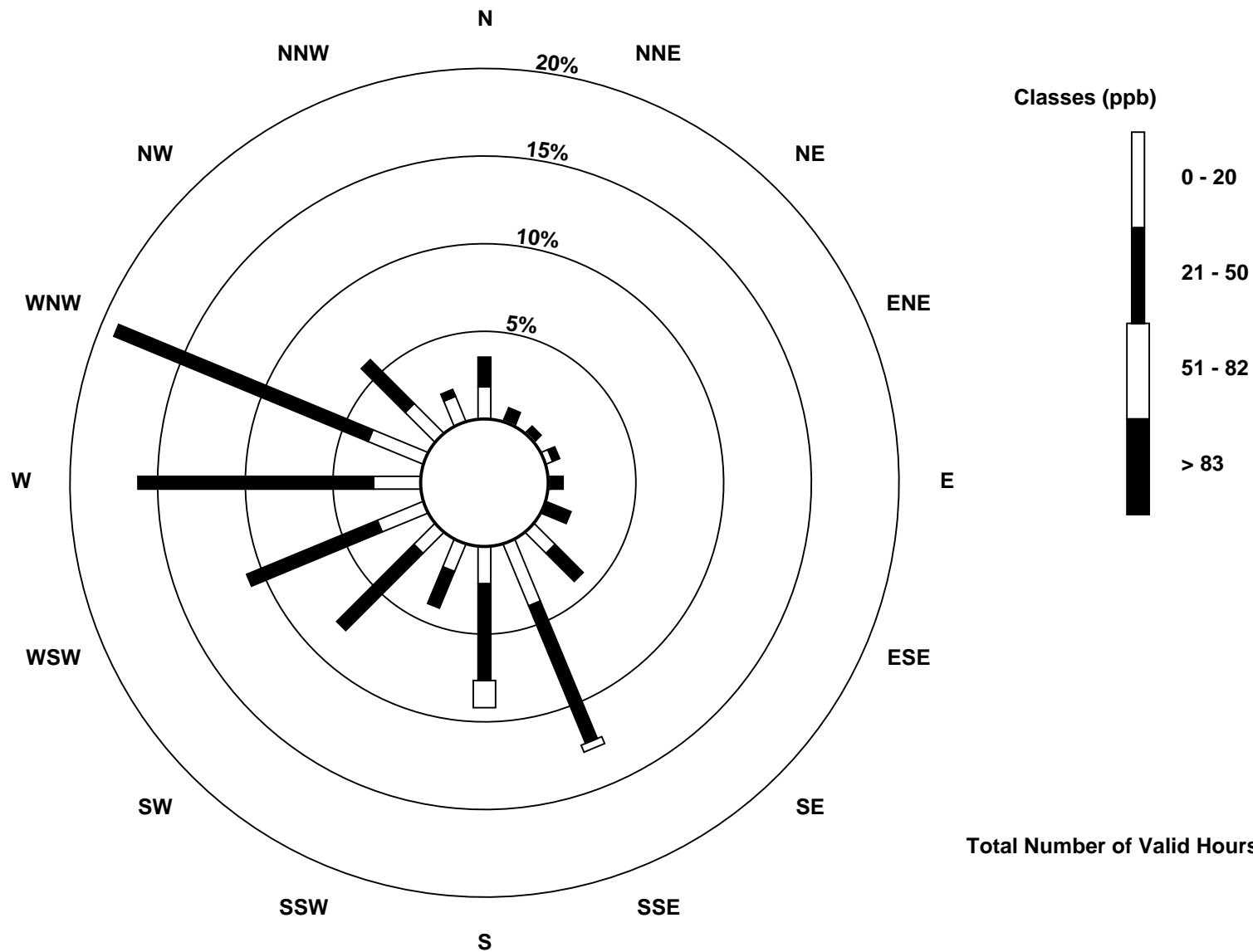
Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

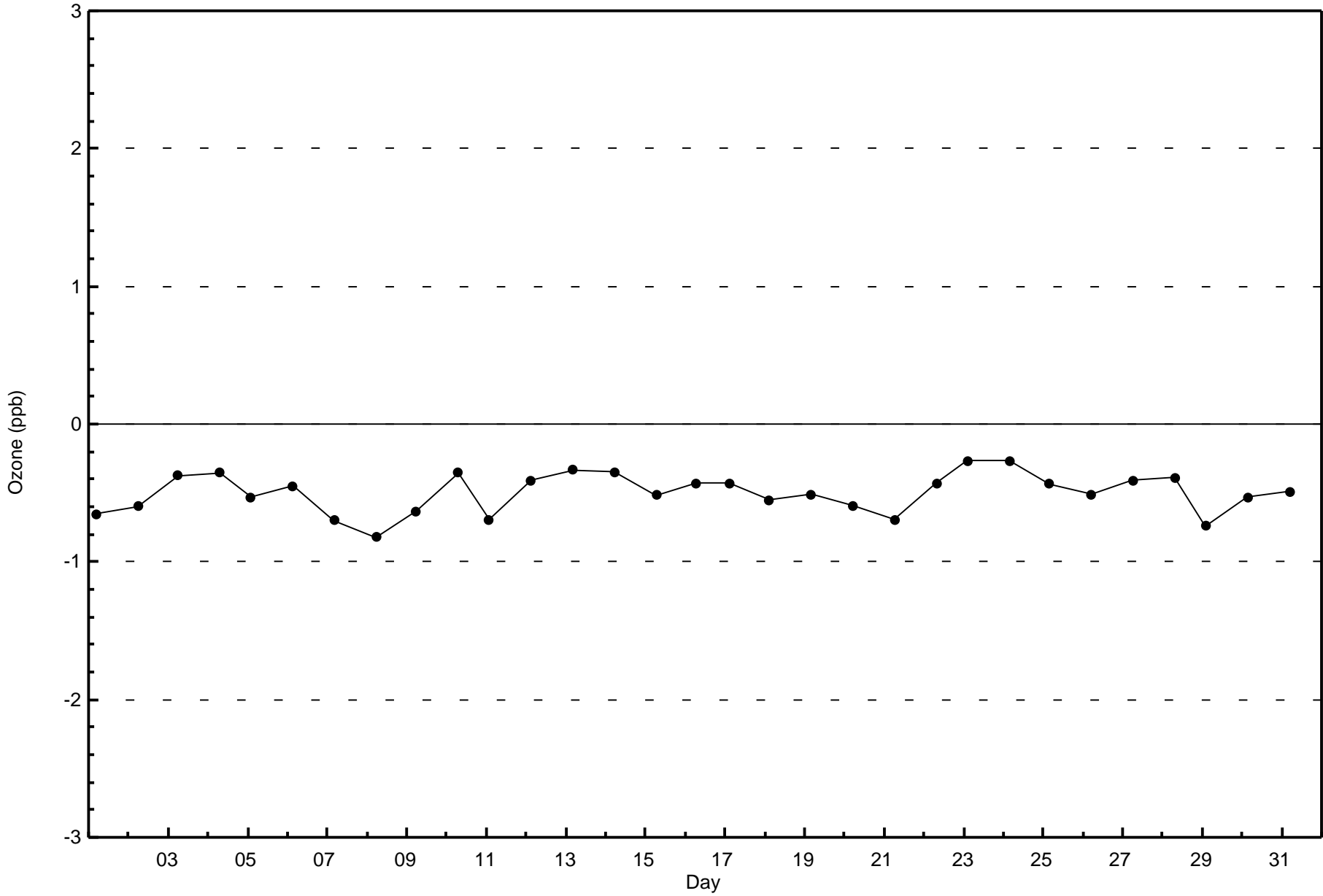
Ozone (O₃) - ppb
Anzac (AMS 14)





Wood Buffalo Environmental Association
Zero Responses

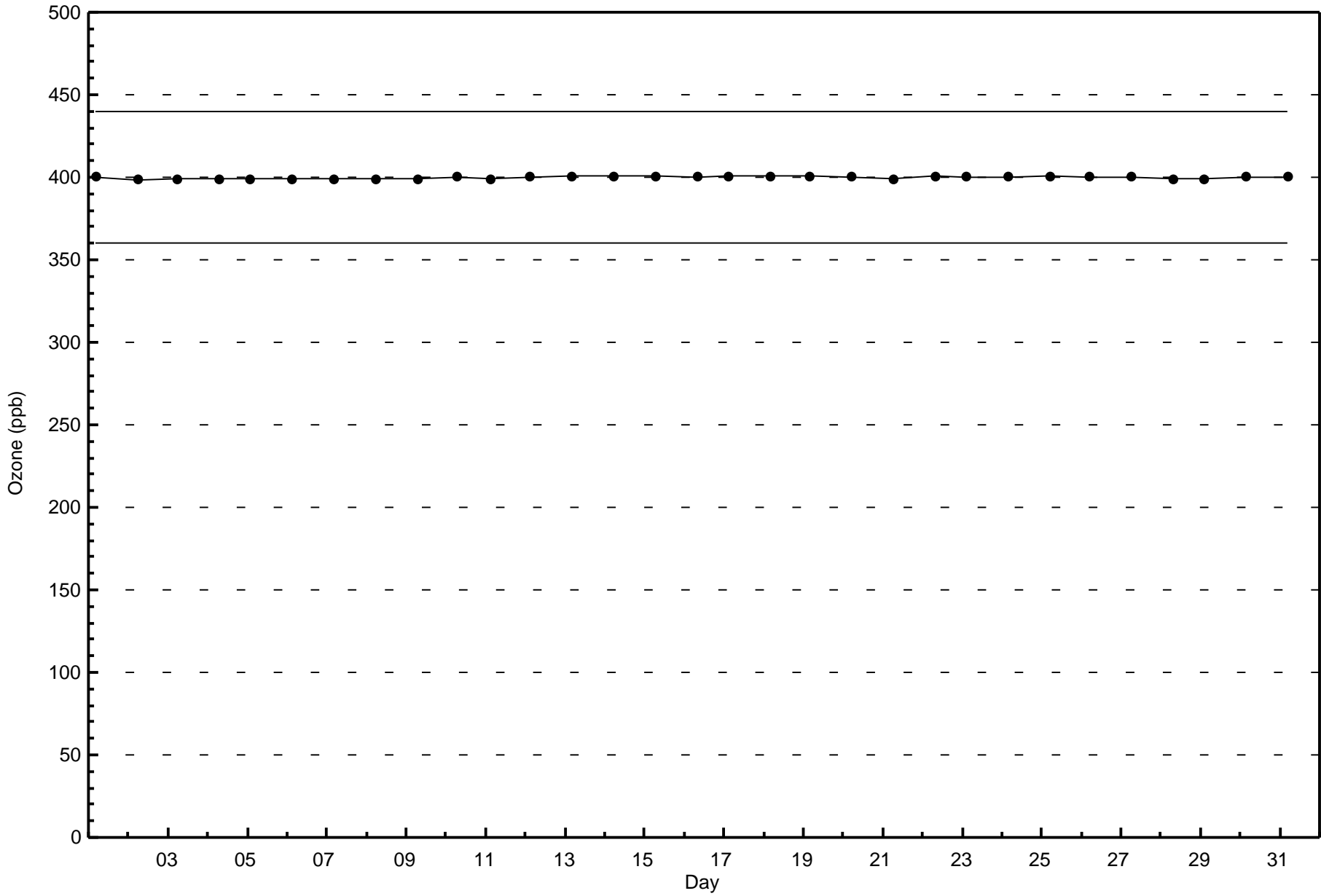
Ozone (O₃) - ppb
Anzac - August 2017





Wood Buffalo Environmental Association
Span Responses

Ozone (O₃) - ppb
Anzac - August 2017





Summary of Hour Averages

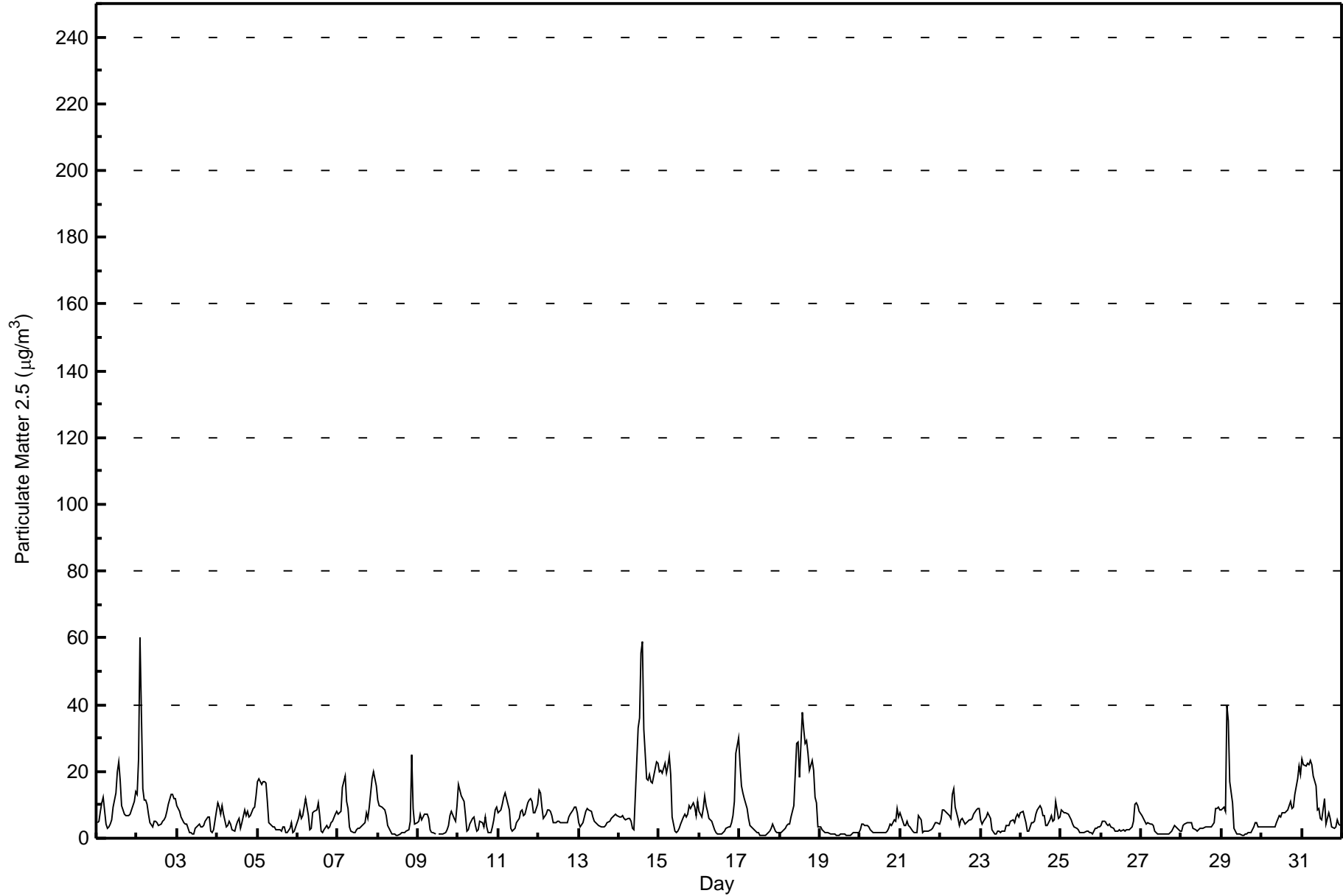
Anzac - August 2017

| Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 60.2 µg/m ³ on Aug 2 03:00 Minimum Value: 0.8 µg/m ³ on Aug 19 18:00 Maximum Diurnal Average: 9.7 µg/m ³ at hour 4 Monthly Average: 6.89 µg/m ³ | | Maximum Daily Average: 18.1 µg/m ³ on Aug 14 Minimum Daily Average: 1.5 µg/m ³ on Aug 19 Minimum Diurnal Average: 3.9 µg/m ³ at hour 10 Percentiles: P ₁ = 1.0 P ₁₀ = 1.7 Q ₁ = 2.8 Median = 5.0 Q ₃ = 8.3 P ₉₀ = 13.9 P ₉₉ = 33.9 | | Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 1 Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|--|------|---|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|---------------|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 4.7 | 5.1 | 7.9 | 10.7 | 12.1 | 4.4 | 2.9 | 3.6 | 4.1 | 5.3 | 9.3 | 13.5 | 19.8 | 22.9 | 17.2 | 9.7 | 7.3 | 6.7 | 6.6 | 6.8 | 7.4 | 8.3 | 11.0 | 13.8 | 9.2 | 22.9 |
| 2-Aug | 13.2 | 23.6 | 60.2 | 14.8 | 11.4 | 11.3 | 10.2 | 7.2 | 4.7 | 3.4 | 4.9 | 4.9 | 4.5 | 4.0 | 4.3 | 5.2 | 5.4 | 6.3 | 7.9 | 10.3 | 13.0 | 13.0 | 12.1 | 11.8 | 11.1 | 60.2 |
| 3-Aug | 9.6 | 7.9 | 6.3 | 5.3 | 4.6 | 4.4 | 4.2 | 1.9 | 1.5 | 1.1 | 1.4 | 2.9 | 3.9 | 4.1 | 3.5 | 3.4 | 3.8 | 5.2 | 6.5 | 6.4 | 2.1 | 1.6 | 2.7 | 8.0 | 4.3 | 9.6 |
| 4-Aug | 10.7 | 9.2 | 7.4 | 9.9 | 7.3 | 3.4 | 3.9 | 5.2 | 4.4 | 2.7 | 1.9 | 3.7 | 5.3 | 6.0 | 2.8 | 4.7 | 8.4 | 6.7 | 8.0 | 6.2 | 7.0 | 8.7 | 9.5 | 12.6 | 6.5 | 12.6 |
| 5-Aug | 17.2 | 17.9 | 16.2 | 16.8 | 16.9 | 16.6 | 11.1 | 4.6 | 4.0 | 3.3 | 3.5 | 2.4 | 2.4 | 2.7 | 2.2 | 3.2 | 3.5 | 1.8 | 1.6 | 2.9 | 4.7 | 1.8 | 1.9 | 3.3 | 6.8 | 17.9 |
| 6-Aug | 6.1 | 8.2 | 5.8 | 6.8 | 9.4 | 11.9 | 6.9 | 2.6 | 2.8 | 7.7 | 8.1 | 8.7 | 10.4 | 6.9 | 2.1 | 1.6 | 2.7 | 3.9 | 3.1 | 3.6 | 4.7 | 5.3 | 7.1 | 7.9 | 6.0 | 11.9 |
| 7-Aug | 7.2 | 7.4 | 7.9 | 15.1 | 18.7 | 10.8 | 8.9 | 3.5 | 2.0 | 1.8 | 1.8 | 2.6 | 2.8 | 3.1 | 3.5 | 4.1 | 4.7 | 7.5 | 5.9 | 9.2 | 17.8 | 19.9 | 17.8 | 15.6 | 8.3 | 19.9 |
| 8-Aug | 11.6 | 9.7 | 9.2 | 8.9 | 8.3 | 6.7 | 3.7 | 2.1 | 1.3 | 1.1 | 1.1 | 1.0 | 1.0 | 1.3 | 1.7 | 1.5 | 1.9 | 2.1 | 2.7 | 5.2 | 25.0 | 8.7 | 4.3 | 4.6 | 5.2 | 25.0 |
| 9-Aug | 5.3 | 7.1 | 5.6 | 6.2 | 7.3 | 7.2 | 6.1 | 2.6 | 1.8 | 1.7 | 1.4 | C | 1.4 | 1.4 | 1.5 | 1.5 | 1.8 | 2.7 | 3.8 | 6.6 | 7.9 | 6.0 | 5.2 | 9.6 | 4.4 | 9.6 |
| 10-Aug | 16.3 | 14.3 | 12.8 | 11.1 | 6.9 | 2.3 | 2.6 | 4.3 | 5.8 | 6.4 | 3.8 | 1.9 | 2.7 | 5.1 | 4.7 | 3.2 | 6.2 | 3.4 | 1.8 | 1.6 | 3.4 | 5.7 | 8.3 | 9.5 | 6.0 | 16.3 |
| 11-Aug | 7.6 | 8.3 | 10.4 | 12.5 | 13.6 | 12.1 | 8.4 | 3.0 | 2.1 | 2.4 | 3.0 | 4.8 | 5.8 | 7.9 | 8.6 | 6.6 | 7.3 | 10.5 | 11.5 | 11.9 | 11.1 | 7.8 | 7.6 | 10.0 | 8.1 | 13.6 |
| 12-Aug | 14.2 | 13.7 | 9.3 | 6.1 | 7.0 | 8.7 | 8.4 | 7.9 | 6.7 | 4.6 | 4.7 | 5.0 | 5.2 | 4.6 | 4.6 | 4.8 | 4.7 | 4.7 | 6.2 | 7.1 | 8.6 | 9.4 | 9.1 | 7.7 | 7.2 | 14.2 |
| 13-Aug | 4.9 | 3.5 | 4.7 | 6.5 | 8.0 | 8.9 | 8.6 | 7.9 | 6.2 | 5.0 | 4.5 | 4.2 | 3.9 | 3.6 | 3.4 | 3.3 | 4.0 | 4.9 | 5.2 | 5.8 | 6.3 | 6.7 | 7.1 | 6.7 | 5.6 | 8.9 |
| 14-Aug | 6.4 | 6.5 | 6.7 | 6.0 | 5.4 | 6.0 | 6.0 | 5.2 | 2.8 | 2.6 | 12.7 | 33.2 | 36.2 | 55.6 | 58.8 | 32.6 | 17.8 | 17.2 | 19.1 | 16.8 | 16.4 | 18.5 | 22.9 | 22.5 | 18.1 | 58.8 |
| 15-Aug | 19.9 | 20.3 | 19.5 | 22.4 | 19.7 | 21.6 | 24.4 | 19.0 | 6.3 | 2.0 | 1.9 | 2.2 | 2.9 | 4.1 | 6.1 | 7.1 | 6.4 | 7.3 | 9.9 | 9.1 | 10.4 | 9.2 | 6.7 | 11.0 | 11.2 | 24.4 |
| 16-Aug | 7.9 | 6.5 | 8.8 | 12.9 | 9.7 | 8.1 | 6.0 | 5.1 | 3.8 | 2.4 | 1.5 | 1.4 | 1.3 | 1.5 | 1.8 | 2.3 | 2.9 | 3.2 | 3.5 | 4.8 | 6.8 | 11.1 | 25.2 | 30.0 | 7.0 | 30.0 |
| 17-Aug | 22.2 | 15.8 | 13.5 | 12.0 | 9.1 | 5.7 | 3.8 | 3.4 | 2.8 | 2.4 | 1.9 | 1.6 | 1.1 | 0.8 | 0.9 | 0.8 | 1.3 | 1.5 | 2.2 | 2.8 | 4.1 | 2.2 | 1.8 | 1.9 | 4.8 | 22.2 |
| 18-Aug | 1.8 | 1.6 | 2.7 | 3.1 | 3.7 | 4.1 | 4.3 | 6.2 | 9.5 | 19.1 | 28.6 | 28.9 | 18.2 | 37.9 | 32.8 | 28.6 | 29.0 | 25.2 | 20.5 | 23.4 | 20.4 | 12.5 | 10.7 | 3.4 | 15.7 | 37.9 |
| 19-Aug | 3.2 | 2.7 | 2.1 | 1.9 | 1.6 | 1.6 | 1.4 | 1.3 | 1.2 | 1.1 | 1.0 | 1.1 | 1.1 | 1.2 | 1.4 | 1.3 | 0.9 | 0.8 | 1.0 | 1.3 | 1.5 | 1.6 | 1.7 | 1.8 | 1.5 | 3.2 |
| 20-Aug | 2.5 | 4.2 | 4.2 | 3.7 | 3.8 | 3.5 | 2.7 | 2.0 | 1.9 | 1.8 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.7 | 2.3 | 3.0 | 4.2 | 3.9 | 5.4 | 5.2 | 9.1 | 6.5 | 3.3 | 9.1 |
| 21-Aug | 7.5 | 5.1 | 4.0 | 3.9 | 5.1 | 4.0 | 3.4 | 2.1 | 1.8 | 1.8 | 1.8 | 6.6 | 5.7 | 1.9 | 2.0 | 2.1 | 2.1 | 2.2 | 2.5 | 3.0 | 3.8 | 4.6 | 4.5 | 4.2 | 3.6 | 7.5 |
| 22-Aug | 5.4 | 8.5 | 8.5 | 8.2 | 7.4 | 6.7 | 6.0 | 13.0 | 14.9 | 9.3 | 5.9 | 3.9 | 5.3 | 6.1 | 5.3 | 4.3 | 5.1 | 5.4 | 5.6 | 6.1 | 7.1 | 8.3 | 9.1 | 8.9 | 7.3 | 14.9 |
| 23-Aug | 5.7 | 4.4 | 5.3 | 6.3 | 7.5 | 6.8 | 5.9 | 2.5 | 1.3 | 1.4 | 2.3 | 2.1 | 1.8 | 2.1 | 2.2 | 3.9 | 3.8 | 3.8 | 5.2 | 5.3 | 4.5 | 6.3 | 7.0 | 6.6 | 4.3 | 7.5 |
| 24-Aug | 7.7 | 8.0 | 6.1 | 4.7 | 2.1 | 2.2 | 4.5 | 4.8 | 5.2 | 7.1 | 8.4 | 9.9 | 9.0 | 6.6 | 6.6 | 3.8 | 3.9 | 5.6 | 6.8 | 5.1 | 5.7 | 11.1 | 5.8 | 6.3 | 6.1 | 11.1 |
| 25-Aug | 8.3 | 8.1 | 7.6 | 7.7 | 7.3 | 6.5 | 5.7 | 4.4 | 3.4 | 3.0 | 2.3 | 1.7 | 1.6 | 1.9 | 1.8 | 2.1 | 2.1 | 1.6 | 1.6 | 1.5 | 3.1 | 2.8 | 3.3 | 3.3 | 3.9 | 8.3 |
| 26-Aug | 3.6 | 5.0 | 5.1 | 4.2 | 4.0 | 4.0 | 3.6 | 3.1 | 2.3 | 2.2 | 2.3 | 2.4 | 2.3 | 2.4 | 2.3 | 2.4 | 2.5 | 2.5 | 3.5 | 5.0 | 10.1 | 10.8 | 9.7 | 8.0 | 4.3 | 10.8 |
| 27-Aug | 6.8 | 6.0 | 5.3 | 4.2 | 4.7 | 4.3 | 4.2 | 3.6 | 2.3 | 1.8 | 1.5 | 1.5 | 1.2 | 1.1 | 1.4 | 1.3 | 1.3 | 1.6 | 2.2 | 2.9 | 3.6 | 3.6 | 2.5 | 2.1 | 3.0 | 6.8 |
| 28-Aug | 2.3 | 3.7 | 4.4 | 4.6 | 4.8 | 4.6 | 4.5 | 2.9 | 2.5 | 2.1 | 2.5 | 3.1 | 3.1 | 3.0 | 3.2 | 3.3 | 3.4 | 3.2 | 3.2 | 4.7 | 8.8 | 8.8 | 9.4 | 8.5 | 4.4 | 9.4 |
| 29-Aug | 8.4 | 9.1 | 8.3 | 39.8 | 35.0 | 16.9 | 10.5 | 2.9 | 2.0 | 1.1 | 1.1 | 1.2 | 1.0 | 1.0 | 1.1 | 1.2 | 1.5 | 1.9 | 2.4 | 3.5 | 4.4 | 4.5 | 3.6 | 3.5 | 6.9 | 39.8 |
| 30-Aug | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.4 | 3.3 | 3.2 | 4.5 | 6.7 | 6.5 | 7.4 | 7.8 | 7.8 | 8.4 | 9.8 | 11.0 | 8.9 | 9.2 | 13.2 | 17.9 | 21.8 | 19.1 | 7.9 | 21.8 |
| 31-Aug | 23.8 | 21.9 | 21.6 | 22.4 | 21.9 | 23.3 | 22.2 | 18.5 | 15.9 | 8.7 | 8.8 | 6.1 | 5.7 | 11.8 | 4.2 | 5.8 | 7.4 | 6.1 | 3.2 | 2.8 | 3.3 | 5.3 | 4.2 | 3.9 | 11.6 | 23.8 |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| 8.9 8.9 9.7 9.7 9.3 7.8 6.7 5.2 4.2 3.9 4.6 5.7 5.7 7.2 6.5 5.4 5.3 5.5 5.7 6.3 8.1 8.0 8.5 8.8 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| 23.8 23.6 60.2 39.8 35.0 23.3 24.4 19.0 15.9 19.1 28.6 33.2 36.2 55.6 58.8 32.6 29.0 25.2 20.5 23.4 25.0 19.9 25.2 30.0 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³ | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac - August 2017

| Concentration Ranges ($\mu\text{g}/\text{m}^3$) | Number of Hours | % | Cumulative % |
|---|------------------------|----------|---------------------|
| 1 - 5 | 402 | 54.10 | 54.11 |
| 6 - 15 | 263 | 35.40 | 89.50 |
| 16 - 25 | 55 | 7.40 | 96.90 |
| 26 - 80 | 15 | 2.02 | 98.92 |
| > 81.0 | 0 | 0.00 | 98.92 |

Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac - August 2017

| Concentration Ranges ($\mu\text{g}/\text{m}^3$) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|--|----------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 1 - 5 | 10 | 3 | 2 | 2 | 4 | 6 | 14 | 38 | 32 | 16 | 24 | 47 | 79 | 99 | 20 | 6 | 402 |
| 6 - 15 | 14 | 2 | 3 | 4 | 3 | 5 | 8 | 48 | 31 | 12 | 30 | 20 | 33 | 23 | 17 | 8 | 261 |
| 16 - 25 | 1 | 1 | 0 | 1 | 1 | 0 | 8 | 7 | 5 | 4 | 4 | 8 | 5 | 7 | 3 | 0 | 55 |
| 26 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 2 | 8 | 0 | 0 | 15 |
| > 81.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 25 | 6 | 5 | 7 | 8 | 11 | 30 | 93 | 68 | 32 | 59 | 79 | 119 | 137 | 40 | 14 | 733 |

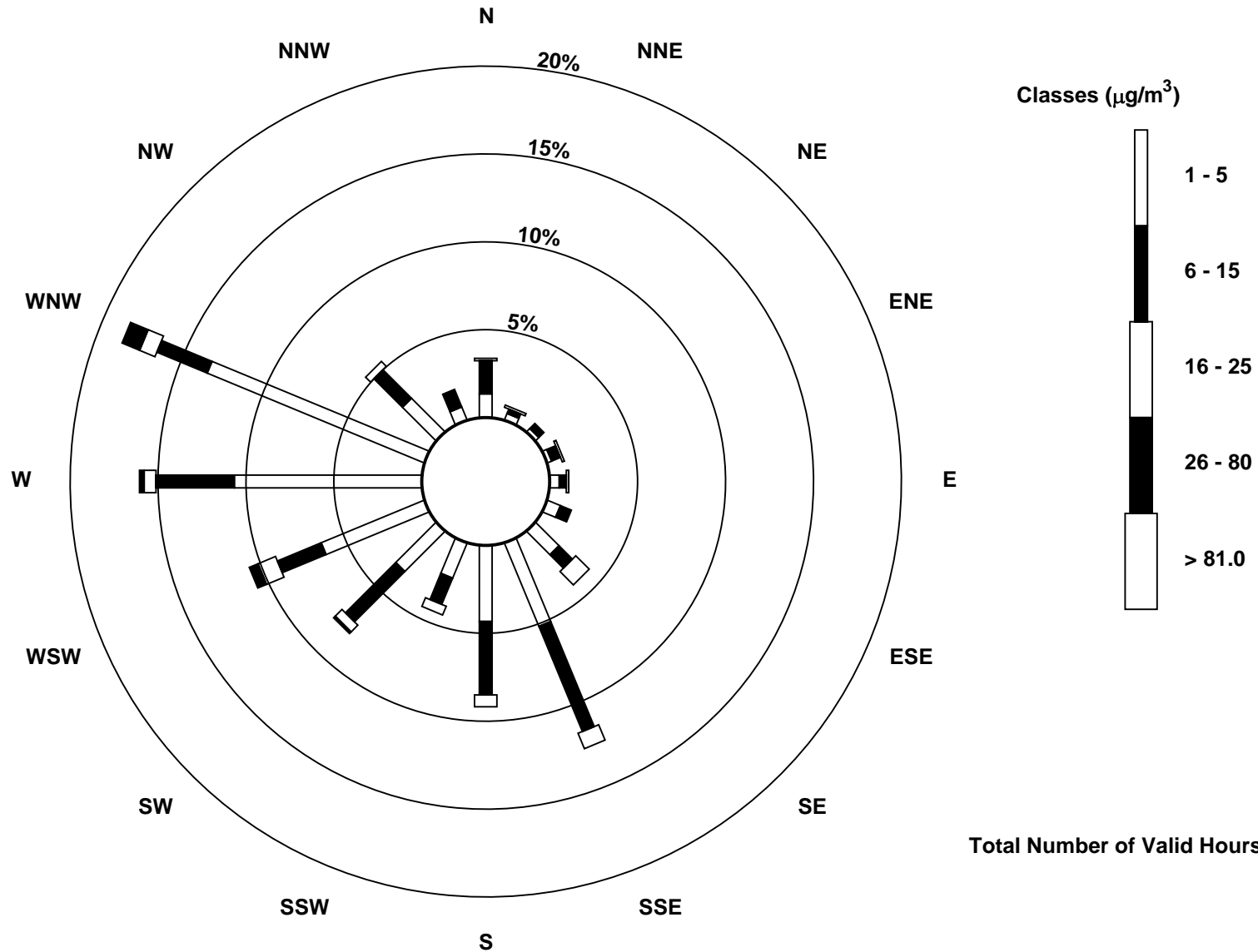
Total Number of Valid Hours: 741

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac (AMS 14)



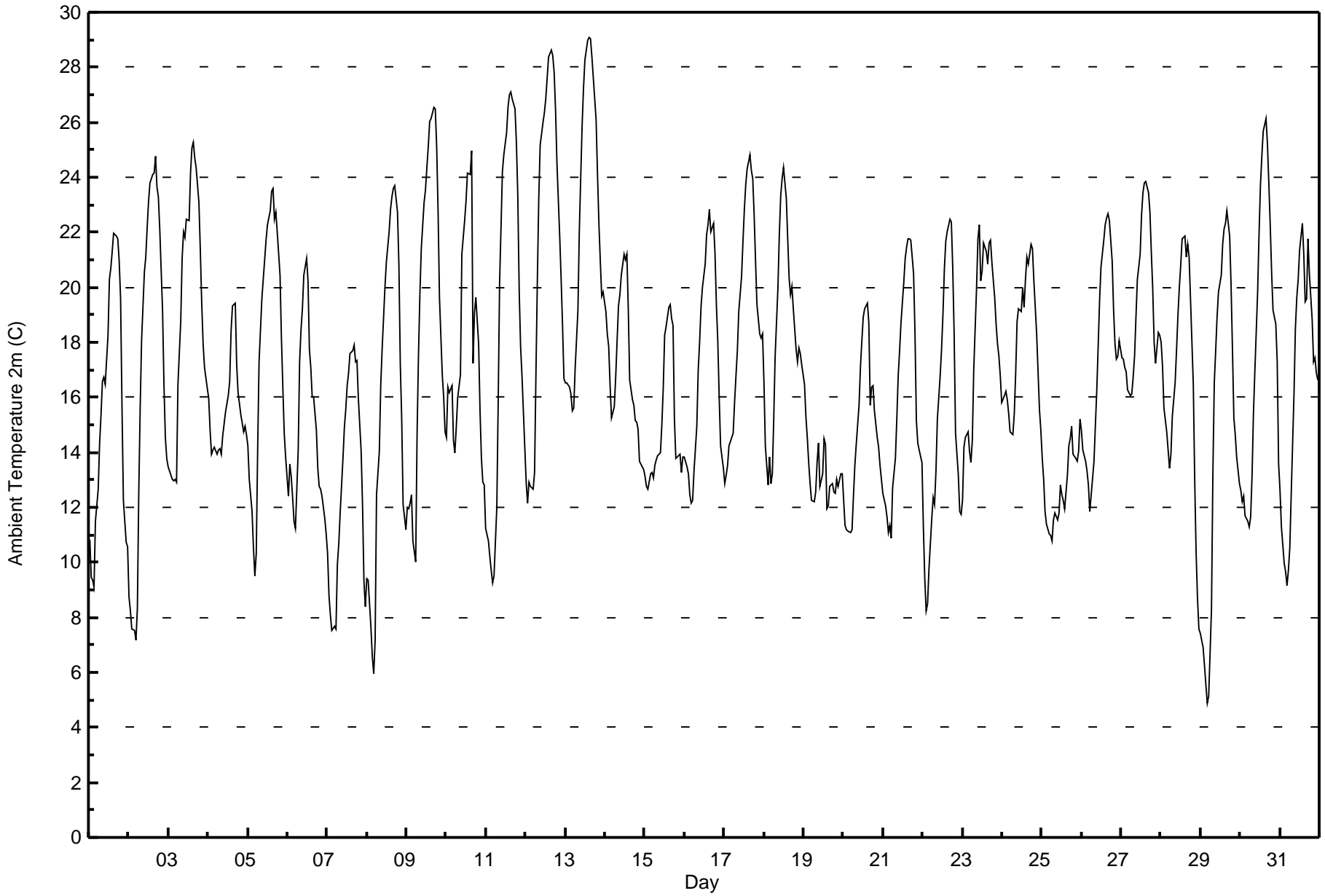


| Maximum Value: 29.1 C on Aug 13 15:00 Maximum Daily Average: 22.4 C on Aug 13 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: | 744 | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------------------|-------|------|---------------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Minimum Value: 4.9 C on Aug 29 05:00 Minimum Daily Average: 12.8 C on Aug 25 Maximum Diurnal Average: 21.8 C at hour 15 Minimum Diurnal Average: 11.8 C at hour 5 Monthly Average: 17.00 C Percentiles: P ₁ = 7.2 P ₁₀ = 11.4 Q ₁ = 13.3 Median = 16.6 Q ₃ = 20.7 P ₉₀ = 23.3 P ₉₉ = 28.4 | | | | | | | | | | | | | | | | | | | | | | Hours of Data: | 744 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | Hours of Calibration: | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: | 100.0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 10.9 | 9.5 | 9.4 | 9.1 | 11.5 | 12.7 | 14.3 | 15.4 | 16.6 | 16.7 | 16.5 | 18.3 | 20.3 | 20.7 | 21.3 | 22.0 | 21.9 | 21.8 | 20.9 | 19.6 | 15.6 | 12.3 | 10.7 | 10.6 | 15.8 | 22.0 | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 8.8 | 8.2 | 7.6 | 7.5 | 7.2 | 8.3 | 12.5 | 15.6 | 18.0 | 20.6 | 21.1 | 22.1 | 23.1 | 23.8 | 24.1 | 24.2 | 24.8 | 23.6 | 23.3 | 22.1 | 19.2 | 16.5 | 14.5 | 13.8 | 17.1 | 24.8 | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 13.5 | 13.2 | 13.0 | 13.0 | 13.0 | 12.9 | 16.5 | 18.8 | 21.0 | 22.0 | 21.8 | 22.5 | 22.4 | 24.1 | 25.1 | 25.3 | 24.7 | 24.4 | 23.1 | 21.4 | 19.4 | 18.0 | 17.1 | 16.3 | 19.3 | 25.3 | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 15.9 | 14.8 | 13.9 | 14.1 | 14.2 | 13.9 | 14.1 | 14.1 | 13.9 | 14.6 | 15.5 | 15.8 | 16.1 | 16.6 | 18.4 | 19.3 | 19.4 | 17.2 | 16.2 | 15.8 | 15.3 | 14.8 | 14.9 | 14.6 | 15.6 | 19.4 | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 14.2 | 13.0 | 11.9 | 10.5 | 9.5 | 10.3 | 14.1 | 17.3 | 19.6 | 20.3 | 21.0 | 21.7 | 22.3 | 22.8 | 23.5 | 23.6 | 22.5 | 22.7 | 22.0 | 20.4 | 18.1 | 16.4 | 14.7 | 13.8 | 17.8 | 23.6 | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 12.4 | 13.6 | 13.1 | 12.4 | 11.5 | 11.3 | 14.1 | 17.3 | 18.5 | 19.2 | 20.4 | 21.1 | 20.3 | 17.7 | 17.1 | 16.0 | 16.0 | 14.8 | 13.4 | 12.8 | 12.7 | 12.4 | 11.6 | 11.0 | 15.0 | 21.1 | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 10.3 | 8.8 | 8.1 | 7.5 | 7.7 | 7.6 | 9.9 | 10.7 | 11.8 | 13.8 | 14.9 | 15.5 | 16.4 | 16.9 | 17.6 | 17.7 | 17.9 | 17.3 | 17.3 | 16.0 | 14.0 | 12.0 | 9.3 | 8.4 | 12.8 | 17.9 | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 9.4 | 9.3 | 7.6 | 6.6 | 5.9 | 7.2 | 12.4 | 14.0 | 16.4 | 17.7 | 18.9 | 20.0 | 20.9 | 22.0 | 22.8 | 23.3 | 23.6 | 23.7 | 22.7 | 20.8 | 17.2 | 15.2 | 12.1 | 11.2 | 15.9 | 23.7 | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 12.0 | 11.9 | 12.2 | 12.4 | 10.8 | 10.0 | 14.7 | 17.5 | 19.7 | 21.4 | 23.1 | 23.5 | 24.4 | 25.1 | 26.1 | 26.1 | 26.5 | 26.5 | 25.1 | 22.8 | 19.6 | 16.8 | 16.0 | 14.7 | 19.1 | 26.5 | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 14.6 | 16.4 | 16.2 | 16.4 | 14.5 | 14.0 | 14.9 | 16.0 | 16.8 | 21.2 | 21.8 | 22.4 | 23.2 | 24.2 | 24.1 | 25.0 | 17.2 | 19.0 | 19.6 | 18.0 | 15.5 | 13.8 | 12.9 | 12.8 | 17.9 | 25.0 | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 11.2 | 10.8 | 10.2 | 9.7 | 9.3 | 9.5 | 12.0 | 15.9 | 20.2 | 22.2 | 24.2 | 24.8 | 25.6 | 26.5 | 27.0 | 27.1 | 26.8 | 26.5 | 25.3 | 23.3 | 19.9 | 17.8 | 16.8 | 14.2 | 19.0 | 27.1 | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 12.9 | 12.2 | 12.9 | 12.7 | 12.6 | 13.3 | 17.0 | 20.3 | 23.2 | 25.2 | 26.0 | 26.3 | 26.8 | 27.6 | 28.4 | 28.6 | 28.4 | 27.8 | 26.5 | 24.5 | 21.8 | 20.3 | 18.6 | 16.7 | 21.3 | 28.6 | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 16.5 | 16.5 | 16.3 | 16.1 | 15.5 | 15.6 | 17.0 | 19.2 | 22.1 | 24.0 | 25.9 | 27.3 | 28.3 | 29.0 | 29.1 | 29.0 | 28.4 | 27.6 | 26.1 | 24.1 | 22.3 | 20.9 | 19.7 | 19.8 | 22.4 | 29.1 | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 19.1 | 18.3 | 17.9 | 16.4 | 15.3 | 15.7 | 16.7 | 18.0 | 19.3 | 19.8 | 20.4 | 21.2 | 21.0 | 21.2 | 19.2 | 16.6 | 15.9 | 15.7 | 15.2 | 15.1 | 14.8 | 13.7 | 13.5 | 13.4 | 17.2 | 21.2 | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 13.1 | 12.8 | 12.7 | 13.2 | 13.3 | 13.1 | 13.5 | 13.7 | 13.9 | 14.0 | 15.0 | 16.3 | 18.2 | 18.5 | 19.3 | 19.4 | 18.9 | 18.6 | 15.2 | 13.8 | 13.9 | 14.0 | 13.2 | 13.8 | 15.1 | 19.4 | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 13.8 | 13.5 | 13.2 | 12.5 | 12.1 | 12.3 | 13.3 | 14.9 | 17.0 | 18.0 | 19.3 | 20.0 | 20.8 | 21.9 | 22.3 | 22.8 | 22.0 | 22.3 | 21.3 | 19.4 | 18.1 | 16.0 | 14.2 | 13.4 | 17.3 | 22.8 | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 12.9 | 13.1 | 13.5 | 14.3 | 14.5 | 14.7 | 15.8 | 16.8 | 17.7 | 19.1 | 20.4 | 21.7 | 22.8 | 23.8 | 24.3 | 24.8 | 24.3 | 23.9 | 22.6 | 20.9 | 19.4 | 18.3 | 18.1 | 18.3 | 19.0 | 24.8 | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 16.6 | 14.2 | 12.8 | 13.8 | 12.8 | 13.2 | 15.2 | 17.5 | 20.0 | 21.9 | 23.4 | 24.0 | 24.4 | 23.2 | 21.8 | 20.3 | 19.7 | 20.0 | 19.2 | 17.7 | 17.3 | 17.8 | 17.6 | 17.2 | 18.4 | 24.4 | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 16.5 | 15.3 | 14.6 | 13.6 | 12.9 | 12.3 | 12.2 | 12.5 | 13.6 | 14.3 | 12.7 | 13.2 | 14.5 | 14.3 | 12.0 | 12.1 | 12.8 | 12.9 | 12.6 | 12.5 | 13.0 | 12.7 | 13.2 | 13.2 | 13.3 | 16.5 | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 12.3 | 11.4 | 11.2 | 11.1 | 11.1 | 11.2 | 12.4 | 13.5 | 14.3 | 15.7 | 17.1 | 18.0 | 18.9 | 19.2 | 19.4 | 18.7 | 15.7 | 16.4 | 16.4 | 15.5 | 14.5 | 14.2 | 13.5 | 13.0 | 14.8 | 19.4 | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 12.5 | 12.1 | 11.7 | 11.1 | 11.3 | 10.9 | 12.7 | 13.8 | 15.2 | 16.8 | 17.7 | 18.7 | 20.2 | 21.1 | 21.4 | 21.8 | 21.8 | 21.7 | 20.5 | 18.4 | 15.2 | 14.3 | 14.1 | 13.6 | 16.2 | 21.8 | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 11.3 | 9.4 | 8.3 | 8.5 | 9.8 | 11.6 | 12.4 | 12.1 | 13.3 | 15.2 | 16.8 | 17.8 | 19.0 | 20.6 | 21.7 | 22.0 | 22.5 | 22.4 | 20.7 | 18.3 | 14.7 | 13.2 | 11.9 | 11.7 | 15.2 | 22.5 | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 12.2 | 14.2 | 14.5 | 14.7 | 14.0 | 13.6 | 14.5 | 17.0 | 19.9 | 21.7 | 22.3 | 20.2 | 20.6 | 21.6 | 21.3 | 20.8 | 21.6 | 21.7 | 20.9 | 19.6 | 18.6 | 18.0 | 17.5 | 16.8 | 18.2 | 22.3 | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 15.8 | 16.1 | 16.2 | 15.9 | 15.4 | 14.8 | 14.7 | 15.4 | 16.9 | 18.8 | 19.2 | 19.1 | 20.0 | 19.3 | 20.3 | 21.1 | 20.9 | 21.6 | 21.4 | 20.3 | 19.3 | 18.3 | 15.6 | 14.8 | 18.0 | 21.6 | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 13.8 | 13.0 | 11.9 | 11.4 | 11.0 | 11.0 | 10.8 | 11.5 | 11.8 | 11.5 | 11.8 | 12.8 | 12.5 | 12.3 | 11.9 | 13.2 | 14.2 | 14.5 | 15.0 | 13.9 | 13.8 | 13.7 | 14.0 | 15.2 | 12.8 | 15.2 | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 14.8 | 14.1 | 13.7 | 13.3 | 12.8 | 11.8 | 12.5 | 13.7 | 15.0 | 16.3 | 17.9 | 19.5 | 20.8 | 21.7 | 22.3 | 22.5 | 22.7 | 22.4 | 20.9 | 19.2 | 18.0 | 17.4 | 17.5 | 18.1 | 17.4 | 22.7 | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 17.5 | 17.4 | 17.1 | 16.9 | 16.3 | 16.0 | 16.1 | 16.7 | 17.5 | 18.9 | 20.3 | 21.2 | 22.6 | 23.4 | 23.8 | 23.9 | 23.5 | 22.7 | 21.3 | 20.0 | 18.0 | 17.2 | 18.4 | 18.2 | 19.4 | 23.9 | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 18.0 | 17.1 | 15.6 | 14.7 | 14.1 | 13.4 | 13.9 | 15.3 | 16.5 | 17.7 | 19.0 | 20.0 | 20.8 | 21.8 | 21.8 | 21.1 | 21.6 | 21.1 | 19.6 | 16.5 | 13.0 | 10.4 | 8.7 | 7.6 | 16.6 | 21.8 | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 7.4 | 6.9 | 6.3 | 5.5 | 4.9 | 5.2 | 8.3 | 13.2 | 16.5 | 17.7 | 18.9 | 19.8 | 20.4 | 21.5 | 22.1 | 22.3 | 22.8 | 21.9 | 20.1 | 17.7 | 15.2 | 14.6 | 13.8 | 12.9 | 14.8 | 22.8 | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 12.6 | 12.2 | 12.4 | 11.7 | 11.5 | 11.3 | 11.6 | 13.1 | 15.4 | 16.9 | 19.8 | 21.9 | 23.7 | 24.7 | 25.7 | 26.2 | 25.2 | 23.8 | 22.3 | 20.6 | 19.2 | 18.7 | 17.3 | 13.6 | 18.0 | 26.2 | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 12.6 | 11.3 | 9.9 | 9.6 | 9.1 | 9.7 | 10.5 | 12.5 | 16.1 | 18.5 | 19.6 | 20.3 | 21.3 | 22.3 | 21.2 | 19.5 | 19.6 | 21.7 | 20.5 | 18.8 | 17.3 | 17.5 | 16.9 | 16.6 | 16.4 | 22.3 | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | 13.4 | 12.9 | 12.4 | 12.1 | 11.8 | 11.9 | 13.6 | 15.3 | 17.0 | 18.4 | 19.4 | 20.2 | 21.1 | 21.6 | 21.8 | 21.8 | 21.4 | 21.2 | 20.2 | 18.7 | 16.9 | 15.7 | 14.8 | 14.2 |
| | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | 19.1 | 18.3 | 17.9 | 16.9 | 16.3 | 16.0 | 17.0 | 20.3 | 23.2 | 25.2 | 26.0 | 27.3 | 28.3 | 29.0 | 29.1 | 29.0 | 28.4 | 27.8 | 26.5 | 24.5 | 22.3 | 20.9 | 19.7 | 19.8 |



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 2m (AT 2m) - C
Anzac - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C
Anzac - August 2017**

| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 44 | 5.91 | 5.91 |
| 10 - 20 | 486 | 65.32 | 71.24 |
| > 20 | 214 | 28.76 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

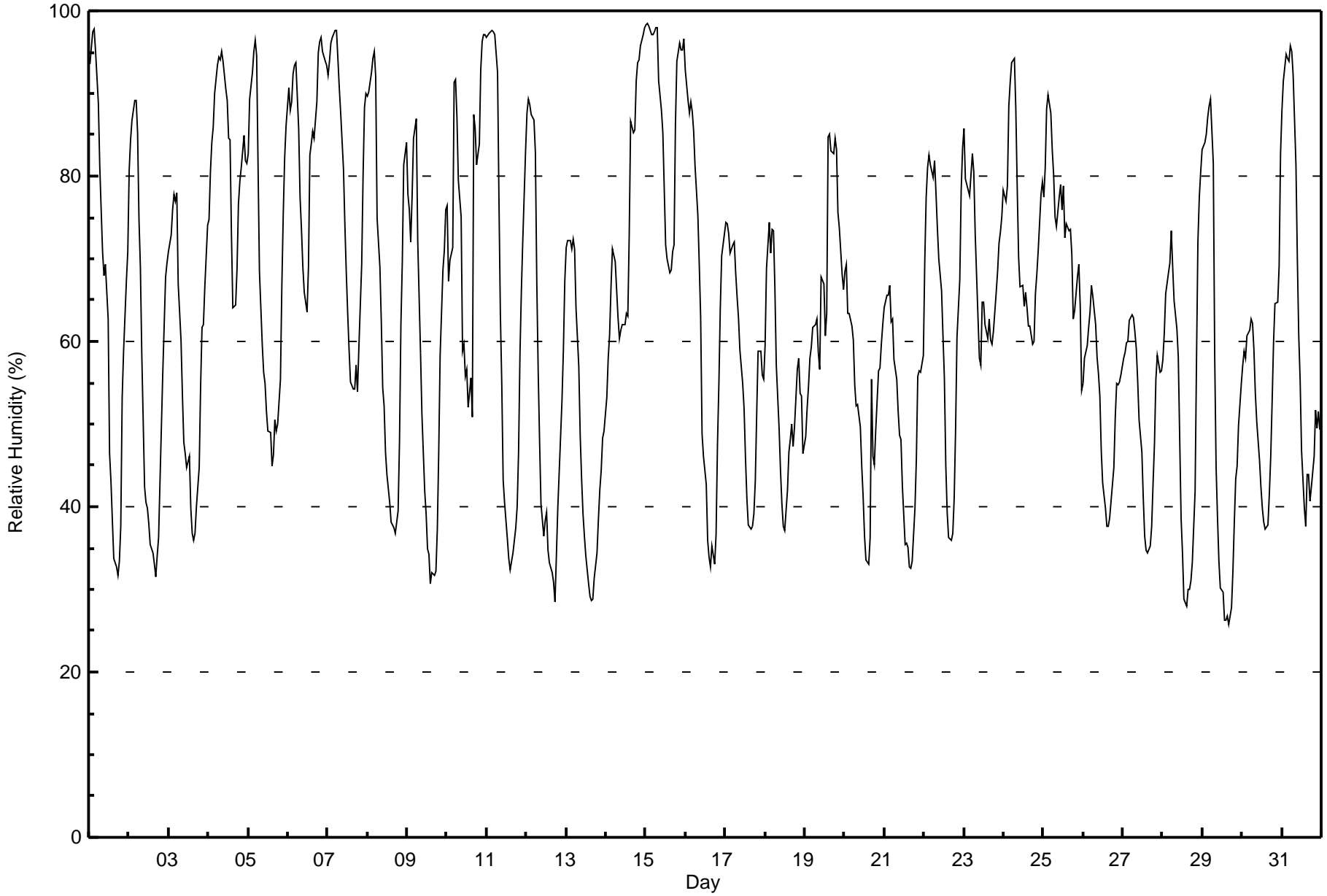
Anzac - August 2017

| Maximum Value: 98 % on Aug 15 02:00 Maximum Daily Average: 87.9 % on Aug 15 | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|-----------------|---------------|---------------|
| Minimum Value: 26 % on Aug 29 17:00 Minimum Daily Average: 48.3 % on Aug 13 Maximum Diurnal Average: 81.7 % at hour 5 Minimum Diurnal Average: 46.4 % at hour 15 Monthly Average: 63.5 % Percentiles: P ₁ = 29 P ₁₀ = 37 Q ₁ = 48 Median = 63 O ₃ = 79 P ₉₀ = 91 P ₉₉ = 98 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 94 | 96 | 97 | 98 | 95 | 89 | 81 | 76 | 71 | 68 | 69 | 63 | 46 | 43 | 38 | 34 | 33 | 32 | 33 | 38 | 53 | 59 | 67 | 71 | 64.3 | 98 |
| 2-Aug | 81 | 84 | 87 | 89 | 89 | 85 | 75 | 69 | 59 | 42 | 40 | 40 | 38 | 35 | 34 | 33 | 31 | 34 | 36 | 43 | 56 | 62 | 68 | 70 | 57.6 | 89 |
| 3-Aug | 71 | 73 | 76 | 78 | 77 | 78 | 67 | 60 | 53 | 48 | 46 | 45 | 46 | 40 | 37 | 36 | 37 | 40 | 45 | 55 | 62 | 62 | 67 | 74 | 57.1 | 78 |
| 4-Aug | 75 | 81 | 84 | 86 | 90 | 93 | 94 | 94 | 95 | 94 | 91 | 89 | 85 | 84 | 73 | 64 | 64 | 69 | 77 | 79 | 81 | 85 | 82 | 82 | 82.9 | 95 |
| 5-Aug | 83 | 89 | 92 | 95 | 96 | 95 | 81 | 68 | 60 | 56 | 55 | 51 | 49 | 49 | 45 | 46 | 50 | 49 | 50 | 55 | 67 | 75 | 82 | 86 | 67.8 | 96 |
| 6-Aug | 91 | 88 | 89 | 92 | 93 | 94 | 86 | 77 | 74 | 69 | 66 | 64 | 69 | 83 | 84 | 85 | 85 | 89 | 95 | 96 | 97 | 95 | 94 | 93 | 85.3 | 97 |
| 7-Aug | 92 | 94 | 96 | 97 | 98 | 98 | 94 | 91 | 88 | 81 | 74 | 68 | 63 | 59 | 55 | 54 | 54 | 57 | 54 | 59 | 69 | 80 | 88 | 90 | 77.3 | 98 |
| 8-Aug | 90 | 90 | 93 | 94 | 95 | 92 | 75 | 69 | 62 | 54 | 52 | 47 | 44 | 41 | 38 | 38 | 37 | 37 | 40 | 48 | 62 | 70 | 81 | 84 | 63.8 | 95 |
| 9-Aug | 78 | 76 | 72 | 78 | 85 | 87 | 72 | 65 | 59 | 51 | 42 | 39 | 35 | 34 | 31 | 32 | 32 | 32 | 37 | 47 | 58 | 69 | 71 | 76 | 56.5 | 87 |
| 10-Aug | 77 | 67 | 70 | 71 | 91 | 92 | 87 | 79 | 75 | 59 | 60 | 56 | 57 | 52 | 56 | 51 | 87 | 86 | 81 | 84 | 93 | 96 | 97 | 97 | 75.9 | 97 |
| 11-Aug | 97 | 97 | 97 | 98 | 97 | 97 | 93 | 77 | 63 | 55 | 43 | 40 | 36 | 34 | 32 | 33 | 34 | 38 | 40 | 47 | 58 | 66 | 72 | 83 | 63.7 | 98 |
| 12-Aug | 88 | 89 | 89 | 87 | 87 | 83 | 67 | 57 | 48 | 40 | 36 | 38 | 39 | 35 | 33 | 32 | 31 | 28 | 34 | 40 | 49 | 53 | 59 | 67 | 54.6 | 89 |
| 13-Aug | 71 | 72 | 72 | 71 | 72 | 71 | 64 | 57 | 49 | 43 | 39 | 36 | 34 | 31 | 29 | 29 | 29 | 31 | 34 | 39 | 42 | 44 | 48 | 49 | 48.3 | 72 |
| 14-Aug | 53 | 58 | 61 | 67 | 71 | 70 | 66 | 63 | 60 | 61 | 62 | 62 | 63 | 63 | 73 | 87 | 85 | 86 | 91 | 94 | 94 | 96 | 97 | 98 | 74.2 | 98 |
| 15-Aug | 98 | 98 | 98 | 97 | 97 | 97 | 98 | 98 | 92 | 88 | 85 | 79 | 72 | 70 | 68 | 69 | 71 | 72 | 86 | 94 | 96 | 95 | 95 | 97 | 87.9 | 98 |
| 16-Aug | 93 | 89 | 88 | 89 | 88 | 85 | 81 | 75 | 69 | 63 | 49 | 46 | 43 | 36 | 34 | 33 | 35 | 33 | 37 | 47 | 55 | 64 | 70 | 73 | 61.5 | 93 |
| 17-Aug | 74 | 74 | 73 | 71 | 72 | 72 | 68 | 65 | 63 | 59 | 55 | 52 | 46 | 41 | 38 | 37 | 38 | 39 | 43 | 51 | 59 | 59 | 56 | 55 | 56.7 | 74 |
| 18-Aug | 60 | 69 | 74 | 71 | 74 | 73 | 66 | 57 | 49 | 44 | 40 | 38 | 37 | 42 | 47 | 48 | 50 | 47 | 50 | 57 | 58 | 54 | 53 | 46 | 54.4 | 74 |
| 19-Aug | 48 | 52 | 54 | 58 | 59 | 62 | 62 | 63 | 59 | 57 | 68 | 67 | 61 | 63 | 85 | 85 | 83 | 83 | 85 | 83 | 76 | 74 | 68 | 66 | 67.5 | 85 |
| 20-Aug | 68 | 69 | 63 | 63 | 62 | 60 | 55 | 52 | 52 | 50 | 45 | 41 | 37 | 34 | 33 | 36 | 55 | 46 | 45 | 49 | 56 | 57 | 60 | 62 | 52.2 | 69 |
| 21-Aug | 64 | 66 | 66 | 67 | 62 | 63 | 58 | 55 | 52 | 49 | 48 | 43 | 35 | 36 | 35 | 33 | 33 | 33 | 40 | 46 | 56 | 56 | 56 | 58 | 50.4 | 67 |
| 22-Aug | 70 | 77 | 81 | 82 | 81 | 80 | 82 | 78 | 74 | 70 | 66 | 61 | 56 | 45 | 39 | 36 | 36 | 37 | 41 | 49 | 61 | 67 | 78 | 83 | 63.8 | 83 |
| 23-Aug | 86 | 80 | 79 | 78 | 80 | 83 | 80 | 73 | 63 | 58 | 57 | 65 | 65 | 62 | 60 | 63 | 60 | 60 | 61 | 66 | 68 | 72 | 73 | 75 | 69.4 | 86 |
| 24-Aug | 78 | 77 | 79 | 88 | 91 | 94 | 94 | 88 | 79 | 70 | 67 | 67 | 64 | 66 | 64 | 62 | 62 | 60 | 60 | 66 | 68 | 71 | 78 | 79 | 73.8 | 94 |
| 25-Aug | 78 | 81 | 88 | 90 | 88 | 83 | 80 | 75 | 74 | 77 | 79 | 76 | 79 | 73 | 74 | 73 | 74 | 71 | 63 | 64 | 68 | 69 | 64 | 54 | 74.7 | 90 |
| 26-Aug | 55 | 58 | 60 | 62 | 64 | 67 | 65 | 62 | 58 | 56 | 53 | 47 | 43 | 40 | 38 | 38 | 39 | 41 | 45 | 51 | 55 | 55 | 55 | 56 | 52.5 | 67 |
| 27-Aug | 58 | 59 | 60 | 60 | 63 | 63 | 63 | 61 | 59 | 55 | 51 | 47 | 41 | 37 | 35 | 34 | 35 | 38 | 43 | 48 | 55 | 58 | 56 | 56 | 51.4 | 63 |
| 28-Aug | 58 | 61 | 66 | 68 | 69 | 73 | 69 | 65 | 62 | 58 | 48 | 39 | 34 | 29 | 28 | 30 | 30 | 31 | 33 | 42 | 58 | 72 | 78 | 80 | 53.4 | 80 |
| 29-Aug | 83 | 84 | 85 | 87 | 88 | 89 | 81 | 58 | 45 | 39 | 33 | 30 | 30 | 26 | 26 | 27 | 26 | 28 | 32 | 38 | 43 | 45 | 50 | 55 | 51.2 | 89 |
| 30-Aug | 57 | 59 | 58 | 61 | 61 | 63 | 62 | 59 | 54 | 50 | 46 | 42 | 40 | 38 | 37 | 38 | 41 | 46 | 53 | 60 | 65 | 65 | 69 | 83 | 54.4 | 83 |
| 31-Aug | 88 | 92 | 95 | 94 | 94 | 96 | 95 | 92 | 81 | 70 | 61 | 55 | 47 | 40 | 38 | 44 | 44 | 41 | 42 | 46 | 52 | 49 | 52 | 49 | 64.9 | 96 |
| | | | | | | | | | | | | | | | | | | 76.0 77.4 78.8 80.2 81.7 81.5 76.3 70.4 64.5 59.2 55.7 52.6 49.5 47.1 46.4 46.4 48.4 48.8 51.8 57.4 64.2 67.6 70.5 72.6 | | | | | | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | 98 98 98 98 98 98 98 98 98 95 94 91 89 85 84 85 87 87 89 95 96 97 96 97 98 | | | | | | Diurnal Maximum | | |



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Anzac - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Anzac - August 2017

| Concentration Ranges (%) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 0 | 0.00 | 0.00 |
| 20 - 40 | 120 | 16.13 | 16.13 |
| 40 - 60 | 210 | 28.23 | 44.35 |
| 60 - 80 | 232 | 31.18 | 75.54 |
| 80 - 100 | 182 | 24.46 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Leaf Wetness (SW) - %

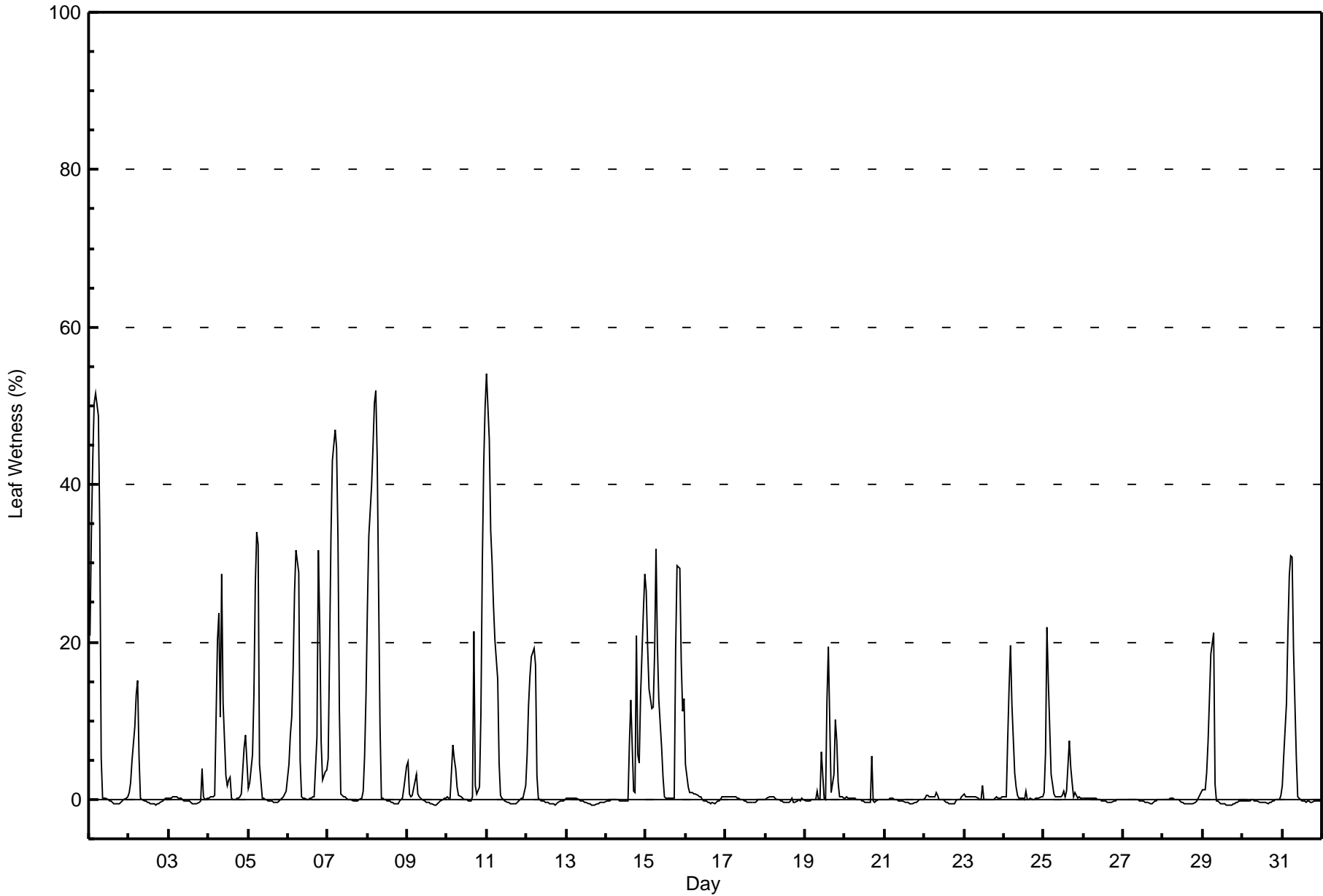
Anzac - August 2017

| Maximum Value: 54 % on Aug 11 01:00 | | | | | | | | | | | | | | | | | Maximum Daily Average: 12.5 % on Aug 8 | | | | | | | | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|------|---------------|---------------|--|--|--|--|--|--|--|---------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|-----------------|--|
| Minimum Value: -1 % on Aug 29 18:00 | | | | | | | | | | | | | | | | | Minimum Daily Average: -0.2 % on Aug 13 | | | | | | | | | | | | | | | | | Hours of Data: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 12.1 % at hour 6 | | | | | | | | | | | | | | | | | Minimum Diurnal Average: -0.1 % at hour 13 | | | | | | | | | | | | | | | | | Hours of Missing Data: 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 3.6 % | | | | | | | | | | | | | | | | | Percentiles: P ₁ = -1 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 13 P ₉₉ = 48 | | | | | | | | | | | | | | | | | Hours of Calibration: 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 21 | 34 | 43 | 50 | 52 | 49 | 35 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | 0 | 0 | 0 | 0 | 0 | 11.9 | 52 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 1 | 2 | 5 | 9 | 13 | 15 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | 0 | 0 | 0 | 0 | 0 | 1.9 | 15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0.1 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 0 | 0 | 0 | 0 | 0 | 20 | 24 | 10 | 29 | 12 | 3 | 2 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 7 | 8 | 5 | 5.3 | 29 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 1 | 2 | 6 | 13 | 27 | 34 | 32 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5.0 | 34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 4 | 8 | 11 | 17 | 26 | 32 | 29 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 32 | 22 | 7 | 2 | 3 | 4 | 8.8 | 32 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 5 | 19 | 33 | 43 | 47 | 45 | 33 | 11 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 13 | 10.7 | 47 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 24 | 33 | 40 | 45 | 50 | 52 | 43 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | 0 | 0 | 0 | 1 | 4 | 12.5 | 52 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 5 | 1 | 0 | 0 | 1 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | 0 | 0 | 0 | 0 | 0 | 0.3 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 0 | 0 | 0 | 7 | 5 | 4 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 2 | 1 | 2 | 11 | 30 | 43 | 50 | 7.4 | 50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 54 | 46 | 34 | 30 | 25 | 20 | 15 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | 0 | 0 | 0 | 0 | 0 | 2 | 9.5 | 54 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 6 | 12 | 16 | 18 | 19 | 17 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | 0 | 0 | 0 | 0 | 0 | 3.6 | 19 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | 0 | 0 | 0 | 0 | 0 | -0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 13 | 1 | 1 | 21 | 6 | 5 | 13 | 24 | 29 | 4.9 | 29 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 27 | 19 | 14 | 12 | 12 | 19 | 32 | 19 | 13 | 7 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 30 | 29 | 17 | 11 | 13 | 12.3 | 32 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 4 | 2 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 6 | 0 | 0 | 13 | 19 | 10 | 1 | 3 | 10 | 8 | 2 | 0 | 0 | 0 | 3.0 | 19 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | 0 | 0 | 0 | 0 | 0 | 0 | -0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | 0 | 0 | 0 | 0 | 1 | 0.0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 0 | 0 | 8 | 14 | 20 | 12 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.6 | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 1 | 6 | 22 | 15 | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 7 | 4 | 2 | 0 | 1 | 0 | 0 | 0 | 2.9 | 22 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | 0 | 0 | 1 | 1 | -0.1 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 1 | 1 | 3 | 7 | 13 | 18 | 21 | 2 | 0 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | 0 | 0 | 0 | 0 | 2.5 | 21 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | -0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 2 | 6 | 12 | 21 | 29 | 31 | 31 | 19 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6.4 | 31 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.1 | | | | | | | | | | | | | | | | | 6.2 | | | | | | | | | | | | | | | | | 8.1 | | | | | | | | | | | | | | | | | 9.9 | | | | | | | | | | | | | | | | | 11.1 | | | | | | | | | | | | | | | | | 12.1 | | | | | | | | | | | | | | | | | 10.1 | | | | | | | | | | | | | | | | | 3.1 | | | | | | | | | | | | | | | | | 1.6 | | | | | | | | | | | | | | | | | 0.6 | | | | | | | | | | | | | | | | | 0.3 | | | | | | | | | | | | | | | | | 0.0 | | | | | | | | | | | | | | | | | -0.1 | | | | | | | | | | | | | | | | | 0.3 | | | | | | | | | | | | | | | | | 0.6 | | | | | | | | | | | | | | | | | 0.7 | | | | | | | | | | | | | | | | | 0.8 | | | | | | | | | | | | | | | | | 0.2 | | | | | | | | | | | | | | | | | 2.4 | | | | | | | | | | | | | | | | | 2.0 | | | | | | | | | | | | | | | | | 1.8 | | | | | | | | | | | | | | | | | 2.3 | | | | | | | | | | | | | | | | | 3.2 | | | | | | | | | | | | | | | | | 4.0 | | | | | | | | | | | | | | | | | Diurnal Average | |
| 54 | | | | | | | | | | | | | | | | | 46 | | | | | | | | | | | | | | | | | 43 | | | | | | | | | | | | | | | | | 50 | | | | | | | | | | | | | | | | | 52 | | | | | | | | | | | | | | | | | 52 | | | | | | | | | | | | | | | | | 43 | | | | | | | | | | | | | | | | | 19 | | | | | | | | | | | | | | | | | 29 | | | | | | | | | | | | | | | | | 12 | | | | | | | | | | | | | | | | | 6 | | | | | | | | | | | | | | | | | 2 | | | | | | | | | | | | | | | | | 2 | | | | | | | | | | | | | | | | | 13 | | | | | | | | | | | | | | | | | 19 | | | | | | | | | | | | | | | | | 13 | | | | | | | | | | | | | | | | | 21 | | | | | | | | | | | | | | | | | 8 | | | | | | | | | | | | | | | | | 32 | | | | | | | | | | | | | | | | | 30 | | | | | | | | | | | | | | | | | 29 | | | | | | | | | | | | | | | | | 30 | | | | | | | | | | | | | | | | | 43 | | | | | | | | | | | | | | | | | 50 | | | | | | | | | | | | | | | | | Diurnal Maximum | |



Wood Buffalo Environmental Association
Hourly Averages

Leaf Wetness (SW) - %
Anzac - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Leaf Wetness (SW) - %
Anzac - August 2017

| Concentration Ranges (%) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 0.3 | 202 | 47.31 | 47.31 |
| 0.4 - 0.5 | 27 | 6.32 | 53.63 |
| 0.6 - 0.7 | 10 | 2.34 | 55.97 |
| 0.8 - 1.4 | 24 | 5.62 | 61.59 |
| 1.5 - 10 | 69 | 16.16 | 77.75 |
| > 10 | 94 | 22.01 | 99.77 |

Total Number of Valid Hours: 427

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Anzac - August 2017

| | | |
|--|---|---------------------------------|
| Maximum Speed: 29 km/h on Aug 25 14:00 | Maximum Daily Speed Average: 16.2 km/h on Aug 25 | Hours in Service: 744 |
| Minimum Speed Value: 0 km/h on Aug 22 09:00 | Minimum Daily Speed Average: 0.7 km/h on Aug 22 | Hours of Data: 742 |
| Maximum Diurnal Speed Average: 7.0 km/h at hour 12 | Minimum Diurnal Speed Average: 3.6 km/h at hour 6 | Hours of Missing Data: 2 |
| Monthly Average Velocity: 4.7 km/h 245.2 deg | Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 6 Median = 9 Q ₃ = 12 P ₉₀ = 16 P ₉₉ = 21 | Percent Operational Time: 100.0 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
|--------|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|---------------|-------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | NW5 | NW6 | WNW6 | WNW6 | WNW8 | WNW8 | WNW8 | WNW8 | NNW8 | NW8 | WNW9 | W8 | WNW7 | NNE6 | N9 | N10 | N10 | N10 | NNW9 | NNW7 | NNW5 | N5 | N5 | NW3 | NW6.2 | N10 | |
| 2-Aug | WNW4 | WNW3 | WNW4 | W3 | WSW4 | NW3 | W4 | W6 | W7 | NW6 | WSW9 | W9 | WNW7 | WNW7 | WNW7 | WNW7 | W6 | WSW7 | SW5 | S6 | SW5 | WSW4 | WSW4 | SW5 | W4.7 | WSW9 | |
| 3-Aug | SW5 | SW6 | SW6 | WSW7 | WSW7 | SSW7 | SW5 | SSW5 | SSW7 | SSW9 | SW8 | SW8 | WSW4 | SSW8 | SW11 | SW9 | SW8 | S11 | S8 | SW4 | NW5 | NNE8 | NNE4 | E8 | SW4.8 | S11 | |
| 4-Aug | SE4 | SSW1 | ENE3 | N8 | N9 | E5 | SSW2 | E4 | NE4 | WNW2 | SE3 | SSE3 | E4 | ENE5 | ENE8 | E8 | ESE8 | S12 | SSE6 | WNW1 | ESE4 | ENE5 | NE2 | SE5 | E2.6 | S12 | |
| 5-Aug | SSW6 | SSW5 | S5 | SSW4 | E3 | SE3 | S7 | SSE6 | SSE8 | S10 | S11 | S14 | S12 | S11 | S12 | SSW11 | SSW11 | SSW10 | SW9 | SW7 | S6 | S6 | SSW5 | SSW6 | S7.3 | S14 | |
| 6-Aug | WSW4 | SW8 | SW7 | SW5 | WSW3 | S2 | NE3 | ESE1 | WNW5 | WNW4 | WNW4 | N9 | N14 | N13 | N12 | N10 | N9 | NNW10 | N8 | N7 | NNW6 | N7 | N5 | N6 | NNW4.5 | N14 | |
| 7-Aug | N6 | N6 | NNW5 | NW4 | WNW6 | NW6 | NW6 | NW6 | NNW6 | N7 | N9 | NNW8 | N8 | N7 | NW7 | WNW10 | WNW9 | WNW9 | WNW8 | NW8 | NW5 | W6 | WNW4 | WNW6 | NW6.0 | WNW10 | |
| 8-Aug | W7 | W6 | WSW6 | W5 | W6 | W7 | W5 | W6 | WNW7 | WNW7 | WNW8 | NW8 | NW8 | NW8 | NW9 | WNW8 | WNW7 | WNW6 | WNW5 | WNW3 | S3 | S6 | SSW4 | WSW6 | WNW5.2 | NW9 | |
| 9-Aug | WSW5 | SW7 | SW8 | SW9 | SW5 | S2 | SSW4 | W3 | WNW7 | W6 | W5 | W3 | WNW6 | WSW5 | WSW5 | WNW4 | WSW2 | W5 | SW5 | SSW9 | SSW5 | S6 | SSW5 | SSW4 | WSW4.3 | SW9 | |
| 10-Aug | SW5 | WSW8 | SW6 | NNE5 | S4 | S6 | S6 | S10 | SSW9 | SW11 | WSW8 | WNW7 | W4 | W7 | SW9 | S8 | W5 | SW5 | WSW4 | W2 | S3 | WSW4 | SSW3 | S7 | SW4.6 | SW11 | |
| 11-Aug | SSW3 | SW4 | SSW3 | SW2 | S2 | SSE2 | SSE5 | SSE5 | S5 | SSW6 | S9 | S10 | S9 | S10 | SSE10 | S11 | SSE12 | SSE12 | S10 | SSE6 | SSE5 | S6 | S6 | SSW4 | S6.3 | SSE12 | |
| 12-Aug | SSW5 | S5 | S7 | S8 | S7 | SSE8 | S8 | S9 | S11 | S13 | S15 | S17 | S17 | S17 | SSE17 | S16 | S17 | S16 | S13 | S9 | S8 | S9 | SSE8 | SSE7 | S11.0 | S17 | |
| 13-Aug | SSE9 | SSE9 | SSE11 | SSE11 | SSE11 | SSE11 | SSE14 | SSE14 | SSE14 | SSE16 | SSE17 | SSE17 | SSE19 | S20 | S21 | S20 | S21 | S20 | SSE16 | SSE11 | SSE13 | S11 | SSE9 | SE11 | SSE14.2 | S21 | |
| 14-Aug | SSE13 | SE12 | SSE13 | SSE9 | SSE7 | SE10 | SSE11 | SSE11 | SSE9 | S8 | NW4 | WNW10 | WNW9 | WNW9 | WNW11 | WNW12 | WNW13 | NW7 | NW2 | SE3 | SE4 | SE5 | S6 | SSE7 | S3.0 | WNW13 | |
| 15-Aug | S7 | WSW4 | SSE4 | SSE7 | SSE6 | SE4 | SSW2 | WSW3 | WNW8 | NW9 | NW10 | WNW10 | WNW12 | WNW9 | NW9 | NNW9 | NNW9 | NNW9 | NNW9 | NW15 | NW13 | NW10 | NNW11 | NW9 | NW9 | NW5.5 | NW15 |
| 16-Aug | NW10 | NW11 | NW11 | NW11 | WNW10 | WNW10 | WNW9 | WNW8 | WNW8 | WNW10 | WNW8 | NW8 | W8 | WNW10 | WNW8 | WNW11 | W10 | W9 | WSW8 | WSW6 | WSW7 | WSW5 | W5 | WSW6 | WNW8.2 | WNW11 | |
| 17-Aug | WSW7 | W8 | W8 | W9 | WNW8 | W8 | WNW11 | WNW13 | WNW12 | WNW11 | WNW11 | WNW10 | WNW11 | WNW10 | WNW10 | WNW10 | WNW10 | WNW8 | W5 | W4 | WSW6 | WSW6 | W9 | W7 | WNW8.4 | WNW13 | |
| 18-Aug | WSW5 | SW5 | SW5 | WSW9 | SW5 | SW5 | SW5 | SW9 | SW13 | WSW11 | WSW12 | WSW16 | WSW16 | W18 | WNW18 | W16 | SW9 | SW13 | WSW13 | WSW11 | WSW13 | W16 | W16 | WSW13 | WSW10.7 | WNW18 | |
| 19-Aug | WSW14 | W16 | W17 | W16 | WNW17 | WNW16 | WNW17 | WNW16 | WNW17 | W17 | W21 | W21 | W23 | WNW19 | NW14 | NW13 | NW10 | WNW6 | NNW3 | NW7 | WNW10 | W7 | WNW10 | W8 | WNW13.5 | W23 | |
| 20-Aug | WSW6 | WSW6 | W7 | W9 | W10 | W12 | W15 | W16 | WNW15 | W15 | WNW17 | WNW18 | WNW19 | WNW19 | WNW20 | W20 | WNW15 | NW16 | WNW17 | WNW12 | WNW10 | WNW15 | WNW14 | WNW12 | WNW13.5 | W20 | |
| 21-Aug | WNW11 | WNW10 | WNW8 | W9 | W10 | WSW9 | WNW13 | WNW12 | WNW11 | WNW10 | WNW7 | W12 | W13 | W14 | WNW13 | WNW11 | WNW10 | WNW10 | WNW8 | WSW5 | WSW6 | SW8 | WSW6 | WSW6 | W9.2 | W14 | |
| 22-Aug | WSW6 | WSW5 | SW3 | WSW4 | WNW4 | W6 | NNE2 | NE3 | SSE0 | SW4 | W2 | W3 | NNE1 | E5 | ENE3 | W3 | W4 | NW4 | ENE7 | E5 | ESE5 | SSE5 | SSE7 | SW0.7 | ENE7 | | |
| 23-Aug | SSE7 | SSE7 | SSE7 | SSE8 | SE9 | SSE11 | SSE11 | SSE12 | SSE14 | SSE13 | SSE12 | S13 | SSE9 | S12 | SSE13 | SSE11 | SSE12 | SE12 | SSE10 | SSE9 | SSE11 | SSE10 | SSE10 | SSE10 | SSE10.4 | SSE14 | |
| 24-Aug | SSE9 | SSE11 | S12 | SSW7 | SE8 | SE12 | SE10 | SSE14 | SSE12 | SE9 | C | C | ESE16 | SE10 | ESE10 | ESE13 | ESE14 | SE13 | SSE11 | SSW6 | SW7 | W11 | W13 | W15 | SSE7.3 | ESE16 | |
| 25-Aug | W16 | W14 | WSW13 | WSW12 | SW12 | WSW11 | SW12 | SW18 | SW19 | SW15 | SW17 | WSW22 | WSW25 | W29 | WSW21 | WSW13 | WSW17 | W15 | WSW16 | WSW20 | SW16 | SW15 | SW16 | WSW18 | WSW16.2 | W29 | |
| 26-Aug | W18 | W16 | W17 | W16 | W13 | WSW11 | WSW13 | W12 | W13 | WNW12 | WNW13 | W16 | W15 | W15 | W16 | W16 | WSW18 | WSW15 | WSW13 | SW10 | SW10 | SW12 | SW12 | SW13 | W13.3 | W18 | |
| 27-Aug | SW13 | WSW13 | WSW14 | WSW16 | W13 | W14 | W14 | W13 | W14 | W14 | W14 | W17 | W18 | W18 | WNW17 | WNW16 | W13 | WNW14 | WNW10 | WSW5 | WSW5 | WSW6 | W9 | W8 | W12.5 | W18 | |
| 28-Aug | W12 | WNW13 | WNW12 | WNW11 | W11 | W10 | W10 | WNW12 | WNW11 | WNW11 | WNW10 | WNW10 | W10 | WNW13 | WNW13 | WNW12 | WNW13 | WNW12 | NW7 | NW6 | WNW2 | WSW6 | W4 | W5 | WNW9.7 | WNW13 | |
| 29-Aug | W6 | W5 | W4 | WSW6 | WNW5 | WNW7 | W6 | NW4 | NW5 | WNW7 | W7 | W7 | WNW4 | WSW4 | WNW3 | NE5 | ESE7 | ESE9 | ESE9 | SE8 | SE8 | SSE9 | SSE11 | SSE11 | SW1.8 | SSE11 | |
| 30-Aug | SE11 | SSE15 | SE16 | SE12 | SE13 | SE15 | SE15 | SE14 | SSE18 | SSE18 | SSE18 | SSE20 | SSE21 | SSE22 | SSE21 | SSE20 | SSE20 | SSE20 | SSE19 | SSE14 | S12 | S10 | S10 | SSE8 | SE4 | SSE15.1 | SSE22 |
| 31-Aug | SSE5 | SSE3 | ENE2 | SE2 | W3 | SE2 | SW3 | SW6 | W4 | WNW7 | W12 | WNW14 | W13 | W14 | W16 | WSW12 | WSW11 | W12 | WNW16 | W13 | WNW10 | W13 | WNW15 | WNW15 | W8.2 | WNW16 | |

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|--------|--------|--------|--------|-------|-------|-------|--------|--------|--------|--------|-------|------|-------|--------|--------|--------|--------|--------|-------|-------|--------|-------|-----------------|--|
| SW4.8 | WSW5.0 | WSW4.7 | WSW4.7 | WSW4.1 | SW3.6 | SW4.4 | SW4.6 | WSW4.9 | WSW5.6 | WSW6.3 | WSW7.0 | W6.0 | W5.8 | W5.5 | WSW5.1 | WSW4.8 | WSW4.8 | WSW4.1 | WSW3.6 | SW3.7 | SW4.1 | WSW4.2 | SW4.4 | Diurnal Average | |
| W18 | W16 | W17 | WSW16 | WNW17 | WNW16 | WNW17 | SW18 | SW19 | SSE18 | W21 | WSW22 | WSW25 | W29 | WSW21 | S20 | S21 | S20 | WNW17 | WSW20 | SW16 | W16 | SW16 | WSW18 | Diurnal Maximum | |

C - Calibration
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

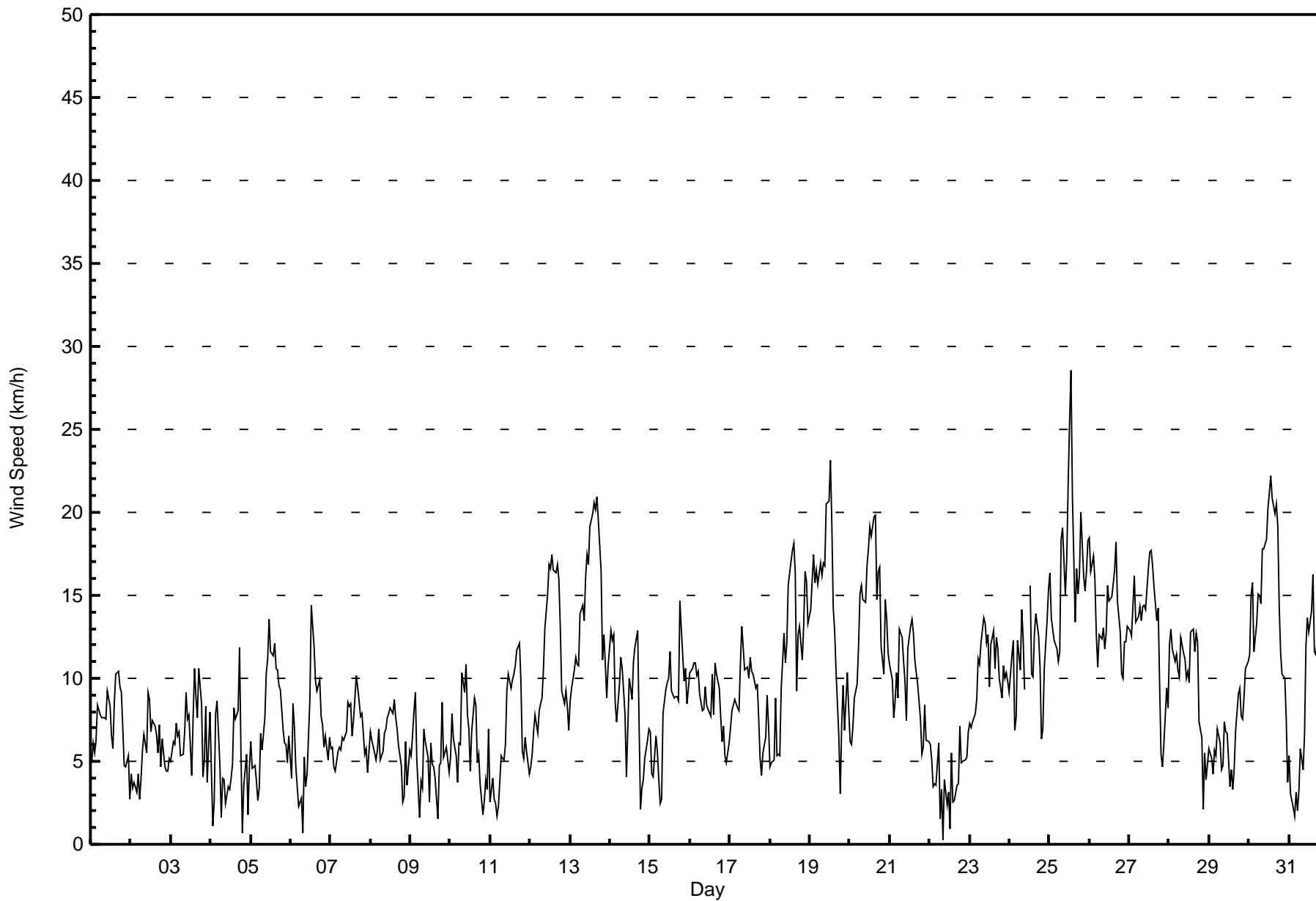
Wind Speed (WS) - km/h
Anzac - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Aug 25 14:00 Minimum Value: 0 km/h on Aug 11 06:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 7 | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 2 Percent Operational Time: 100.0 | | | | | | | | | |
|--|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|---------------|--|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 3 | 4 | 4 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 4 | |
| 2-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 3 | |
| 3-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 1 | 2 | 3 | 3 | 2 | 4 | | |
| 4-Aug | 2 | 1 | 1 | 3 | 3 | 3 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 2 | 4 | 4 | 2 | 1 | 2 | 3 | 3 | 3 | 4 | |
| 5-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 4 | |
| 6-Aug | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 2 | 5 | 5 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 5 | |
| 7-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 3 | |
| 8-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 3 | 2 | 1 | 1 | 3 | |
| 9-Aug | 1 | 2 | 1 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 1 | 1 | 1 | 1 | 3 | |
| 10-Aug | 2 | 2 | 2 | 3 | 2 | 2 | 4 | 3 | 3 | 4 | 4 | 2 | 2 | 2 | 2 | 3 | 4 | 2 | 2 | 2 | 1 | 2 | 3 | 2 | 4 | |
| 11-Aug | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 4 | |
| 12-Aug | 1 | 1 | 1 | 2 | 2 | 1 | 2 | 2 | 3 | 4 | 6 | 5 | 5 | 5 | 5 | 6 | 5 | 5 | 4 | 3 | 2 | 2 | 1 | 2 | 6 | |
| 13-Aug | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 4 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 7 | 7 | 6 | 4 | 3 | 3 | 3 | 2 | 3 | 7 | |
| 14-Aug | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 4 | 4 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 4 | |
| 15-Aug | 2 | 1 | 2 | 2 | 2 | 2 | 1 | 2 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 4 | 5 | 3 | 3 | 3 | 2 | 3 | 5 | |
| 16-Aug | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 4 | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 4 | |
| 17-Aug | 1 | 1 | 2 | 2 | 2 | 2 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 2 | 2 | 3 | 2 | 4 | |
| 18-Aug | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 3 | 4 | 3 | 4 | 5 | 6 | 6 | 6 | 6 | 4 | 4 | 5 | 3 | 4 | 6 | 6 | 5 | 6 | |
| 19-Aug | 5 | 6 | 6 | 6 | 5 | 5 | 6 | 5 | 5 | 6 | 7 | 7 | 8 | 7 | 4 | 4 | 4 | 3 | 2 | 3 | 3 | 2 | 4 | 3 | 8 | |
| 20-Aug | 2 | 2 | 2 | 3 | 3 | 5 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 7 | 9 | 5 | 6 | 4 | 4 | 5 | 4 | 4 | 9 | |
| 21-Aug | 4 | 3 | 3 | 2 | 3 | 2 | 4 | 4 | 3 | 3 | 3 | 4 | 4 | 5 | 4 | 4 | 4 | 3 | 2 | 2 | 1 | 2 | 2 | 1 | 5 | |
| 22-Aug | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | |
| 23-Aug | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 3 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 4 | |
| 24-Aug | 2 | 3 | 3 | 4 | 2 | 4 | 3 | 4 | 3 | 3 | 3 | C | C | 5 | 4 | 3 | 4 | 4 | 4 | 2 | 2 | 6 | 5 | 5 | 6 | |
| 25-Aug | 6 | 5 | 4 | 4 | 3 | 3 | 4 | 6 | 5 | 5 | 5 | 5 | 7 | 9 | 10 | 8 | 6 | 6 | 6 | 6 | 4 | 4 | 5 | 6 | 10 | |
| 26-Aug | 6 | 5 | 6 | 5 | 4 | 3 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 6 | 6 | 5 | 6 | 2 | 2 | 3 | 3 | 3 | 6 | |
| 27-Aug | 3 | 4 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 4 | 5 | 5 | 6 | 6 | 6 | 5 | 5 | 5 | 4 | 1 | 1 | 1 | 4 | 3 | 6 | |
| 28-Aug | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 4 | 3 | 3 | 5 | 4 | 4 | 4 | 4 | 2 | 1 | 1 | 1 | 1 | 1 | 5 | |
| 29-Aug | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 2 | 3 | |
| 30-Aug | 3 | 3 | 4 | 3 | 3 | 4 | 3 | 4 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 5 | 4 | 3 | 2 | 2 | 3 | 1 | 6 | |
| 31-Aug | 1 | 2 | 1 | 1 | 2 | 2 | 3 | 2 | 2 | 2 | 5 | 4 | 4 | 5 | 5 | 4 | 4 | 4 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | |
| | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | | | | | |
| C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Anzac - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Anzac - August 2017**

| Wind Speed Ranges (km/h) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 5 | 172 | 23.18 | 23.18 |
| 6 - 11 | 353 | 47.57 | 70.75 |
| 12 - 19 | 196 | 26.42 | 97.17 |
| 20 - 28 | 20 | 2.70 | 99.87 |
| 29 - 38 | 1 | 0.13 | 100.00 |
| > 38 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 742

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Anzac - August 2017**

| Wind Speed Ranges (km/h) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-----------------------------|----------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 5 | 3 | 4 | 5 | 5 | 6 | 3 | 11 | 11 | 9 | 17 | 20 | 23 | 24 | 17 | 11 | 3 | 172 |
| 6 - 11 | 19 | 2 | 0 | 2 | 2 | 5 | 9 | 47 | 38 | 15 | 24 | 31 | 40 | 81 | 27 | 11 | 353 |
| 12 - 19 | 3 | 0 | 0 | 0 | 0 | 3 | 10 | 29 | 16 | 0 | 15 | 21 | 51 | 43 | 5 | 0 | 196 |
| 20 - 28 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 5 | 0 | 0 | 4 | 4 | 1 | 0 | 0 | 20 |
| 29 - 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| > 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 25 | 6 | 5 | 7 | 8 | 11 | 30 | 93 | 68 | 32 | 59 | 79 | 120 | 142 | 43 | 14 | 742 |

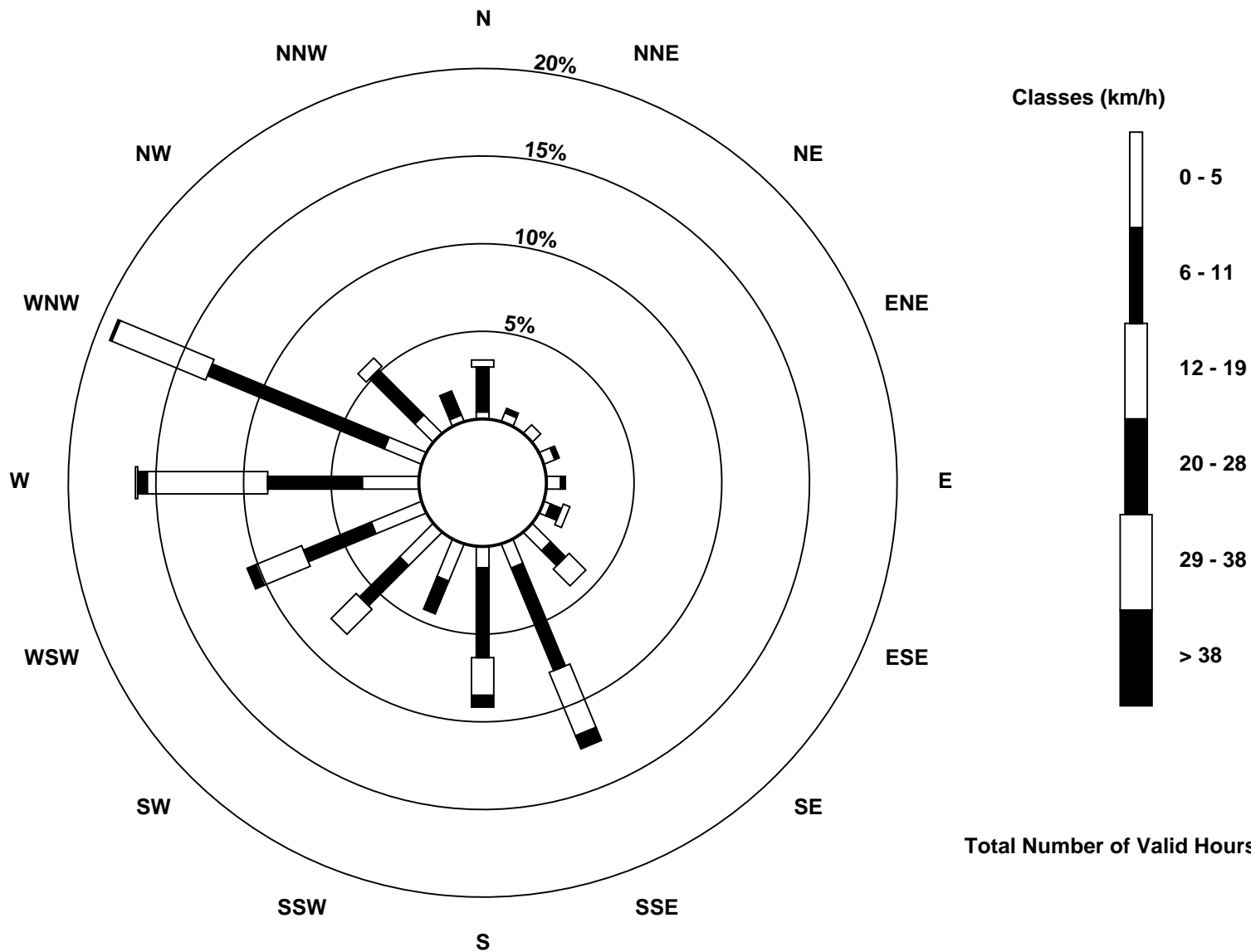
Total Number of Valid Hours: 742

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Wind Speed (WS) - km/h
Anzac (AMS 14)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Anzac - August 2017

| | | | |
|---|--|---------------------------|-------|
| Direction of Maximum Speed: 268 deg on Aug 25 14:00 | | Hours in Service: | 744 |
| Direction of Maximum Daily Speed Average: 244.5 deg on Aug 25 | | Hours of Data: | 742 |
| Direction of Minimum Speed: 153 deg on Aug 22 09:00 | | Hours of Missing Data: | 2 |
| Direction of Minimum Daily Speed Average: 0.7 deg on Aug 22 | | Percent Operational Time: | 100.0 |
| Monthly Average Direction: 261.7 deg | | | |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average |
|--------|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 317 | 304 | 293 | 301 | 296 | 301 | 301 | 303 | 334 | 319 | 290 | 271 | 296 | 23 | 349 | 5 | 2 | 353 | 344 | 344 | 338 | 349 | 5 | 326 | 325.4 |
| 2-Aug | 285 | 291 | 283 | 275 | 246 | 324 | 260 | 267 | 274 | 305 | 257 | 269 | 301 | 299 | 295 | 300 | 276 | 237 | 214 | 191 | 230 | 240 | 247 | 227 | 266.8 |
| 3-Aug | 230 | 224 | 223 | 239 | 244 | 211 | 224 | 207 | 203 | 212 | 231 | 227 | 245 | 199 | 221 | 223 | 224 | 178 | 184 | 223 | 325 | 32 | 31 | 82 | 216.9 |
| 4-Aug | 138 | 196 | 74 | 350 | 360 | 98 | 205 | 89 | 40 | 297 | 138 | 154 | 95 | 72 | 84 | 106 | 175 | 165 | 295 | 117 | 62 | 48 | 145 | 96.1 | |
| 5-Aug | 204 | 204 | 189 | 198 | 98 | 143 | 169 | 162 | 156 | 183 | 174 | 176 | 181 | 183 | 179 | 198 | 202 | 200 | 217 | 214 | 182 | 185 | 199 | 204 | 186.4 |
| 6-Aug | 243 | 229 | 223 | 218 | 246 | 184 | 44 | 103 | 303 | 285 | 290 | 7 | 358 | 3 | 354 | 354 | 352 | 338 | 6 | 352 | 347 | 356 | 353 | 355 | 338.9 |
| 7-Aug | 350 | 354 | 340 | 306 | 298 | 316 | 323 | 312 | 342 | 350 | 353 | 346 | 353 | 3 | 305 | 293 | 301 | 303 | 287 | 324 | 306 | 270 | 288 | 284 | 319.9 |
| 8-Aug | 279 | 277 | 247 | 261 | 267 | 280 | 272 | 274 | 301 | 299 | 300 | 309 | 306 | 306 | 305 | 301 | 295 | 290 | 298 | 291 | 169 | 179 | 200 | 240 | 282.8 |
| 9-Aug | 237 | 228 | 224 | 233 | 235 | 173 | 212 | 271 | 282 | 274 | 278 | 275 | 293 | 246 | 256 | 287 | 248 | 262 | 231 | 201 | 206 | 180 | 192 | 195 | 238.1 |
| 10-Aug | 236 | 240 | 229 | 32 | 189 | 181 | 178 | 174 | 209 | 233 | 247 | 284 | 266 | 276 | 218 | 170 | 272 | 228 | 243 | 273 | 178 | 255 | 198 | 185 | 221.9 |
| 11-Aug | 210 | 228 | 210 | 221 | 177 | 158 | 163 | 168 | 189 | 201 | 179 | 185 | 191 | 177 | 165 | 172 | 168 | 165 | 169 | 156 | 168 | 178 | 180 | 199 | 178.2 |
| 12-Aug | 200 | 179 | 175 | 170 | 170 | 167 | 173 | 169 | 173 | 182 | 189 | 179 | 170 | 171 | 168 | 169 | 181 | 190 | 182 | 184 | 172 | 173 | 163 | 152 | 175.5 |
| 13-Aug | 155 | 156 | 159 | 160 | 157 | 153 | 156 | 157 | 160 | 167 | 168 | 158 | 154 | 172 | 173 | 178 | 178 | 172 | 166 | 164 | 164 | 170 | 164 | 145 | 164.2 |
| 14-Aug | 148 | 143 | 150 | 154 | 152 | 144 | 152 | 156 | 167 | 176 | 306 | 302 | 301 | 302 | 297 | 297 | 297 | 305 | 307 | 132 | 131 | 141 | 169 | 153 | 186.4 |
| 15-Aug | 177 | 242 | 147 | 154 | 160 | 126 | 213 | 256 | 295 | 308 | 307 | 299 | 298 | 291 | 322 | 332 | 348 | 329 | 316 | 321 | 308 | 336 | 314 | 309 | 306.6 |
| 16-Aug | 307 | 307 | 305 | 307 | 302 | 291 | 283 | 288 | 293 | 288 | 292 | 304 | 279 | 288 | 302 | 287 | 268 | 262 | 256 | 251 | 246 | 251 | 260 | 257 | 285.4 |
| 17-Aug | 249 | 263 | 263 | 268 | 287 | 281 | 289 | 298 | 299 | 298 | 294 | 289 | 289 | 296 | 296 | 289 | 295 | 302 | 266 | 260 | 244 | 249 | 268 | 264 | 282.5 |
| 18-Aug | 254 | 228 | 236 | 242 | 221 | 225 | 233 | 230 | 230 | 238 | 250 | 241 | 257 | 280 | 294 | 277 | 223 | 232 | 240 | 239 | 245 | 260 | 268 | 251 | 250.6 |
| 19-Aug | 253 | 263 | 270 | 281 | 282 | 286 | 287 | 285 | 282 | 279 | 280 | 265 | 275 | 292 | 315 | 311 | 304 | 288 | 337 | 311 | 297 | 275 | 299 | 278 | 283.5 |
| 20-Aug | 245 | 247 | 265 | 270 | 268 | 277 | 277 | 281 | 287 | 279 | 293 | 292 | 294 | 299 | 296 | 278 | 302 | 307 | 296 | 293 | 294 | 292 | 295 | 294 | 287.7 |
| 21-Aug | 291 | 293 | 297 | 263 | 267 | 258 | 284 | 288 | 296 | 282 | 284 | 273 | 276 | 274 | 286 | 282 | 293 | 300 | 286 | 258 | 240 | 233 | 253 | 245 | 277.7 |
| 22-Aug | 245 | 250 | 235 | 241 | 303 | 281 | 22 | 40 | 153 | 229 | 277 | 265 | 26 | 83 | 65 | 264 | 281 | 315 | 74 | 86 | 119 | 160 | 160 | 165 | 214.7 |
| 23-Aug | 163 | 160 | 158 | 148 | 144 | 161 | 162 | 164 | 162 | 158 | 163 | 169 | 166 | 169 | 167 | 159 | 147 | 143 | 148 | 147 | 151 | 149 | 147 | 156 | 157.1 |
| 24-Aug | 151 | 154 | 177 | 213 | 130 | 129 | 144 | 154 | 149 | 146 | C | C | 123 | 143 | 106 | 102 | 111 | 130 | 149 | 192 | 217 | 268 | 280 | 266 | 153.9 |
| 25-Aug | 265 | 262 | 257 | 246 | 235 | 237 | 222 | 225 | 225 | 218 | 221 | 238 | 251 | 268 | 250 | 257 | 255 | 271 | 245 | 244 | 236 | 228 | 236 | 255 | 244.5 |
| 26-Aug | 265 | 270 | 270 | 269 | 261 | 252 | 253 | 262 | 272 | 288 | 296 | 280 | 275 | 264 | 259 | 250 | 255 | 255 | 231 | 235 | 225 | 226 | 227 | 260.4 | |
| 27-Aug | 229 | 248 | 255 | 257 | 265 | 263 | 267 | 271 | 276 | 275 | 276 | 273 | 277 | 279 | 282 | 289 | 280 | 286 | 283 | 244 | 252 | 238 | 274 | 263 | 269.2 |
| 28-Aug | 280 | 284 | 293 | 289 | 281 | 281 | 277 | 293 | 293 | 292 | 294 | 284 | 279 | 301 | 286 | 282 | 287 | 294 | 309 | 325 | 303 | 249 | 259 | 267 | 287.5 |
| 29-Aug | 262 | 264 | 272 | 252 | 283 | 286 | 273 | 310 | 313 | 286 | 264 | 270 | 289 | 253 | 288 | 50 | 122 | 105 | 116 | 131 | 138 | 148 | 154 | 151 | 214.5 |
| 30-Aug | 143 | 151 | 144 | 131 | 137 | 141 | 143 | 146 | 153 | 151 | 155 | 157 | 150 | 148 | 154 | 163 | 163 | 163 | 161 | 170 | 171 | 169 | 163 | 146 | 153.1 |
| 31-Aug | 165 | 159 | 59 | 136 | 266 | 130 | 220 | 235 | 267 | 283 | 278 | 283 | 274 | 273 | 274 | 256 | 246 | 262 | 283 | 280 | 287 | 275 | 289 | 286 | 271.0 |

236.2 239.8 236.4 246.1 247.3 232.1 233.8 236.1 246.3 246.9 253.9 253.7 259.8 262.2 262.6 257.6 247.4 242.2 239.1 238.9 227.7 230.6 243.5 235.2
 Diurnal Average

C - Calibration
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

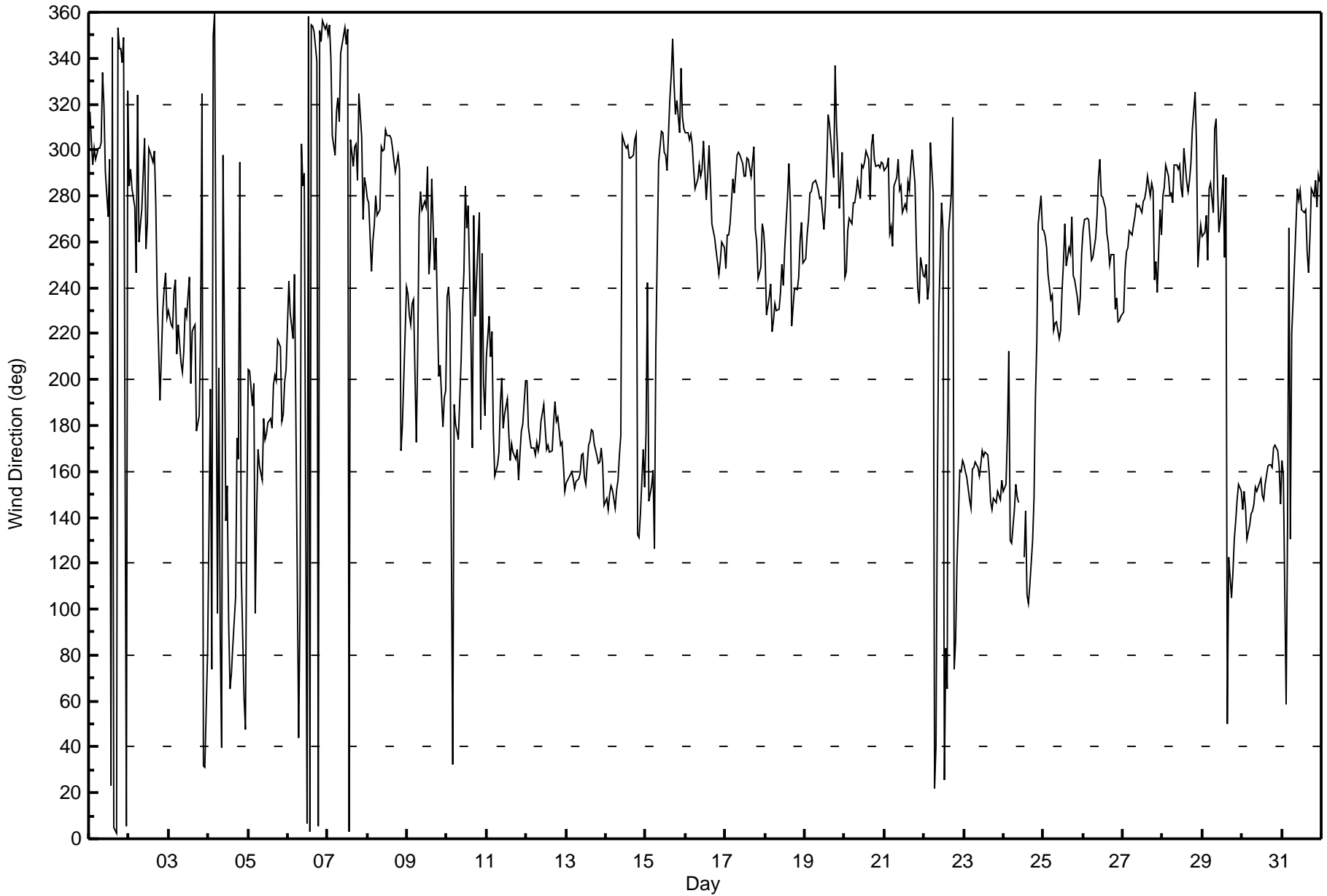
Wind Direction (WD) - deg
Anzac - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 94 deg on Aug 9 17:00 Minimum Value: 8 deg on Aug 1 21:00 Percentiles: P ₁ = 9 P ₁₀ = 14 Q ₁ = 17 Median = 22 Q ₃ = 27 P ₉₀ = 43 P ₉₉ = 85 | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 2 Percent Operational Time: 100.0 | | | | | | | | |
|--|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 19 | 14 | 15 | 18 | 15 | 15 | 16 | 18 | 25 | 35 | 19 | 27 | 44 | 55 | 42 | 28 | 28 | 22 | 22 | 15 | 8 | 8 | 8 | 46 | 55 |
| 2-Aug | 12 | 15 | 12 | 19 | 14 | 53 | 25 | 30 | 27 | 31 | 23 | 31 | 37 | 28 | 34 | 60 | 43 | 20 | 29 | 18 | 29 | 20 | 16 | 14 | 60 |
| 3-Aug | 12 | 11 | 13 | 12 | 13 | 16 | 22 | 32 | 35 | 35 | 31 | 43 | 69 | 40 | 30 | 34 | 30 | 22 | 19 | 43 | 52 | 19 | 75 | 16 | 75 |
| 4-Aug | 35 | 87 | 50 | 16 | 16 | 65 | 90 | 56 | 55 | 64 | 53 | 48 | 28 | 49 | 24 | 24 | 39 | 24 | 23 | 76 | 41 | 23 | 90 | 47 | 90 |
| 5-Aug | 17 | 17 | 12 | 8 | 33 | 23 | 13 | 21 | 35 | 27 | 30 | 26 | 32 | 27 | 25 | 37 | 27 | 30 | 28 | 19 | 16 | 17 | 18 | 17 | 37 |
| 6-Aug | 19 | 15 | 16 | 16 | 61 | 38 | 64 | 83 | 40 | 72 | 60 | 26 | 19 | 17 | 19 | 17 | 19 | 16 | 18 | 14 | 16 | 14 | 14 | 12 | 83 |
| 7-Aug | 14 | 11 | 18 | 16 | 16 | 16 | 19 | 18 | 25 | 27 | 23 | 21 | 26 | 43 | 47 | 27 | 30 | 21 | 21 | 16 | 19 | 13 | 12 | 13 | 47 |
| 8-Aug | 12 | 13 | 14 | 9 | 8 | 14 | 22 | 27 | 23 | 27 | 23 | 25 | 27 | 30 | 26 | 27 | 29 | 25 | 23 | 33 | 84 | 11 | 22 | 11 | 84 |
| 9-Aug | 17 | 15 | 11 | 9 | 49 | 64 | 16 | 48 | 29 | 31 | 44 | 75 | 44 | 57 | 56 | 69 | 94 | 43 | 46 | 24 | 23 | 12 | 15 | 16 | 94 |
| 10-Aug | 19 | 15 | 41 | 56 | 69 | 34 | 76 | 28 | 22 | 26 | 36 | 24 | 63 | 31 | 27 | 35 | 61 | 26 | 42 | 74 | 40 | 32 | 51 | 10 | 76 |
| 11-Aug | 28 | 22 | 43 | 50 | 68 | 16 | 11 | 18 | 37 | 38 | 28 | 29 | 33 | 34 | 26 | 31 | 23 | 19 | 18 | 19 | 14 | 11 | 15 | 11 | 68 |
| 12-Aug | 10 | 14 | 12 | 13 | 13 | 11 | 15 | 18 | 19 | 23 | 27 | 25 | 26 | 25 | 24 | 26 | 26 | 24 | 19 | 17 | 14 | 13 | 14 | 15 | 27 |
| 13-Aug | 15 | 16 | 15 | 15 | 15 | 17 | 16 | 17 | 23 | 21 | 23 | 23 | 23 | 22 | 21 | 23 | 20 | 19 | 19 | 18 | 16 | 17 | 17 | 17 | 23 |
| 14-Aug | 16 | 18 | 17 | 17 | 17 | 17 | 18 | 20 | 23 | 31 | 71 | 17 | 19 | 23 | 20 | 19 | 19 | 22 | 72 | 23 | 15 | 19 | 21 | 19 | 72 |
| 15-Aug | 22 | 16 | 57 | 18 | 18 | 33 | 47 | 38 | 24 | 18 | 19 | 21 | 23 | 23 | 27 | 19 | 18 | 22 | 17 | 15 | 20 | 21 | 16 | 17 | 57 |
| 16-Aug | 16 | 17 | 17 | 16 | 17 | 18 | 22 | 23 | 27 | 25 | 29 | 24 | 36 | 30 | 27 | 26 | 29 | 26 | 21 | 18 | 15 | 18 | 19 | 12 | 36 |
| 17-Aug | 11 | 12 | 13 | 15 | 17 | 17 | 19 | 18 | 20 | 20 | 22 | 25 | 24 | 26 | 24 | 27 | 23 | 24 | 34 | 22 | 15 | 21 | 22 | 26 | 34 |
| 18-Aug | 18 | 15 | 20 | 18 | 20 | 18 | 18 | 23 | 20 | 24 | 28 | 23 | 25 | 23 | 22 | 24 | 34 | 21 | 23 | 17 | 22 | 22 | 24 | 21 | 34 |
| 19-Aug | 22 | 25 | 23 | 24 | 21 | 21 | 23 | 22 | 23 | 25 | 24 | 24 | 24 | 27 | 18 | 22 | 21 | 32 | 68 | 27 | 22 | 22 | 25 | 23 | 68 |
| 20-Aug | 22 | 25 | 22 | 22 | 23 | 23 | 22 | 23 | 23 | 25 | 22 | 22 | 24 | 22 | 21 | 24 | 26 | 19 | 21 | 20 | 23 | 22 | 21 | 19 | 26 |
| 21-Aug | 19 | 19 | 21 | 21 | 16 | 17 | 21 | 22 | 23 | 24 | 27 | 24 | 25 | 30 | 24 | 24 | 22 | 24 | 24 | 17 | 13 | 13 | 18 | 11 | 30 |
| 22-Aug | 8 | 24 | 50 | 39 | 44 | 19 | 37 | 27 | 89 | 43 | 58 | 48 | 87 | 61 | 86 | 83 | 65 | 60 | 18 | 18 | 29 | 12 | 16 | 14 | 89 |
| 23-Aug | 11 | 15 | 13 | 15 | 17 | 14 | 14 | 16 | 19 | 21 | 22 | 19 | 20 | 21 | 20 | 21 | 20 | 19 | 20 | 16 | 17 | 18 | 17 | 16 | 22 |
| 24-Aug | 15 | 16 | 26 | 36 | 27 | 24 | 19 | 17 | 18 | 23 | C | C | 21 | 24 | 23 | 23 | 18 | 23 | 18 | 33 | 25 | 28 | 23 | 25 | 36 |
| 25-Aug | 23 | 23 | 23 | 22 | 17 | 22 | 21 | 20 | 18 | 21 | 20 | 21 | 25 | 24 | 23 | 28 | 25 | 28 | 22 | 21 | 19 | 17 | 20 | 23 | 28 |
| 26-Aug | 23 | 24 | 22 | 22 | 22 | 19 | 20 | 21 | 21 | 21 | 20 | 22 | 24 | 24 | 26 | 25 | 24 | 24 | 22 | 14 | 16 | 13 | 15 | 15 | 26 |
| 27-Aug | 15 | 22 | 22 | 22 | 23 | 23 | 23 | 25 | 22 | 23 | 26 | 23 | 24 | 23 | 23 | 23 | 24 | 21 | 21 | 19 | 20 | 16 | 26 | 24 | 26 |
| 28-Aug | 23 | 21 | 19 | 21 | 17 | 17 | 19 | 19 | 17 | 20 | 25 | 30 | 30 | 26 | 24 | 24 | 23 | 20 | 19 | 16 | 50 | 9 | 12 | 12 | 50 |
| 29-Aug | 11 | 8 | 12 | 11 | 14 | 13 | 15 | 35 | 33 | 21 | 32 | 38 | 79 | 78 | 78 | 59 | 50 | 25 | 19 | 15 | 16 | 16 | 15 | 16 | 79 |
| 30-Aug | 16 | 15 | 16 | 17 | 17 | 17 | 16 | 18 | 16 | 18 | 20 | 20 | 21 | 20 | 20 | 22 | 19 | 18 | 19 | 16 | 15 | 15 | 24 | 16 | 24 |
| 31-Aug | 13 | 21 | 29 | 35 | 56 | 67 | 74 | 21 | 47 | 29 | 22 | 21 | 22 | 24 | 23 | 25 | 24 | 24 | 22 | 20 | 23 | 23 | 21 | 21 | 74 |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |
| C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Anzac - August 2017



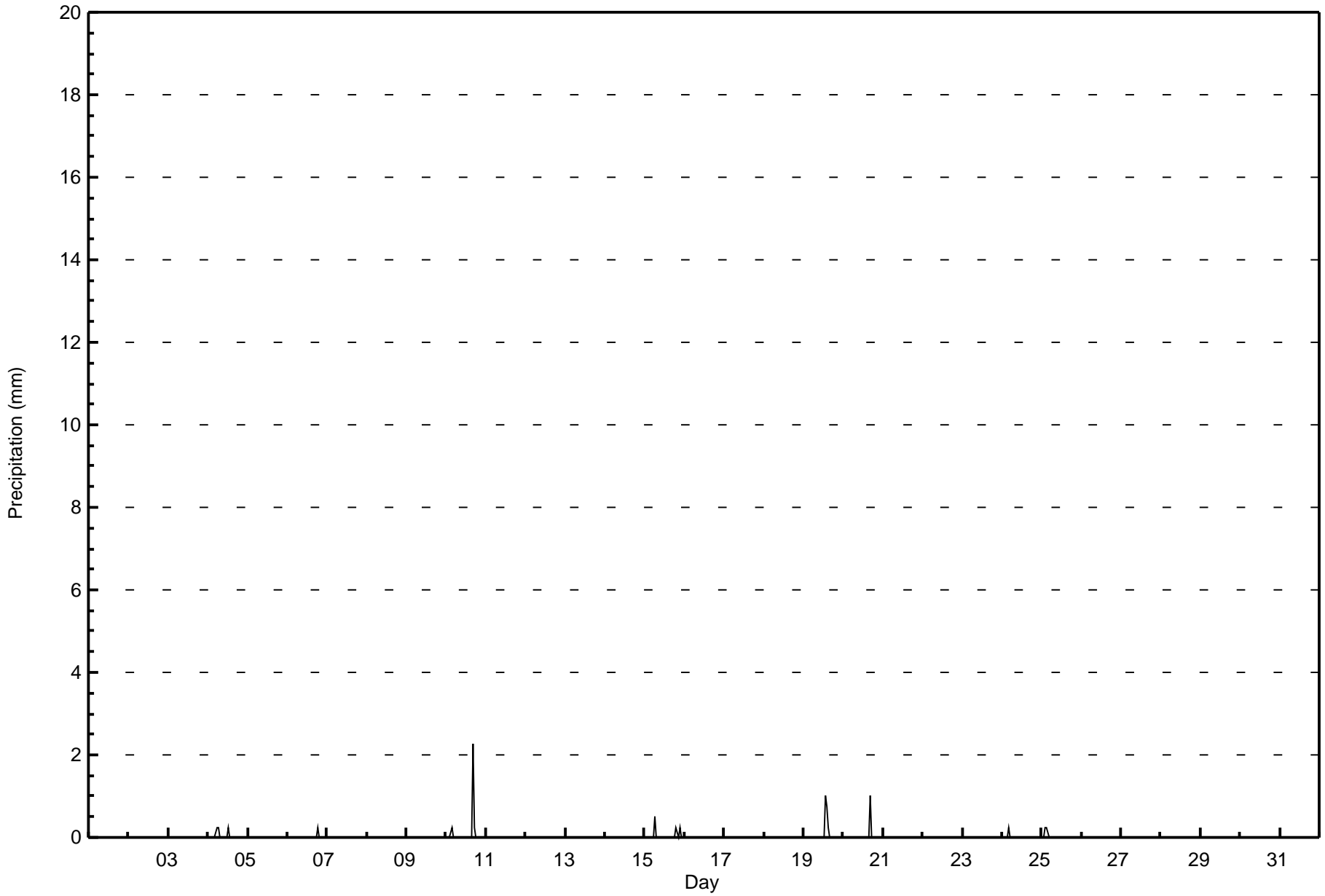


| Maximum Value: 2.3 mm on Aug 10 17:00 Maximum Daily Total: 2.8 mm on Aug 10 | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|---------------|---------------|-----|
| Minimum Value: 0.0 mm on Aug 1 01:00 Maximum Diurnal Total: 3.3 mm at hour 17 Monthly Total: 8.64 mm | | Minimum Daily Total: 0.0 mm on Aug 1 Minimum Diurnal Total: 0.0 mm at hour 1 Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.3 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 3-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 4-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.8 |
| 5-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 6-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 |
| 7-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 8-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 9-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 10-Aug | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.3 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.8 | 2.3 |
| 11-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 12-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 13-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 14-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 15-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.3 | 0.0 | 0.0 | 1.0 | 0.5 | |
| 16-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 17-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 18-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 19-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.8 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 1.0 | |
| 20-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 1.0 | |
| 21-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 22-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 23-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 24-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.3 | |
| 25-Aug | 0.0 | 0.0 | 0.3 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 | 0.3 | |
| 26-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 27-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 28-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 29-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 30-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 31-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | |



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Anzac - August 2017





Wood Buffalo Environmental Association

SO₂ Calibration Summary

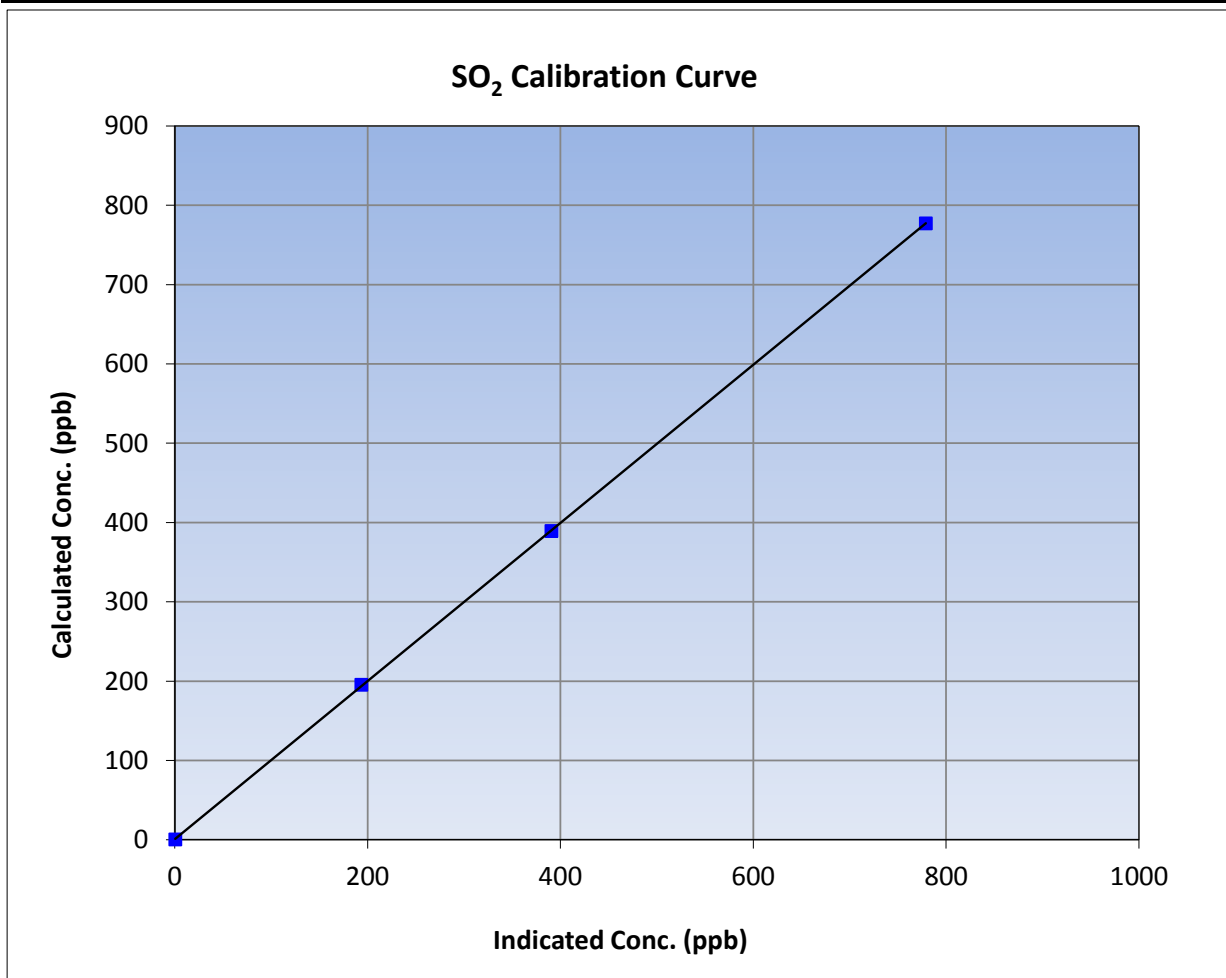
Version-03-2017

Station Information

| | | | |
|------------------|----------------|----------------------|---------------|
| Calibration Date | August 9, 2017 | Previous Calibration | July 10, 2017 |
| Station Name | Anzac | Station Number | AMS 14 |
| Start Time (MST) | 12:48 | End Time (MST) | 17:11 |
| Analyzer make | Thermo 43i | Analyzer serial # | 1152430005 |

Calibration Data

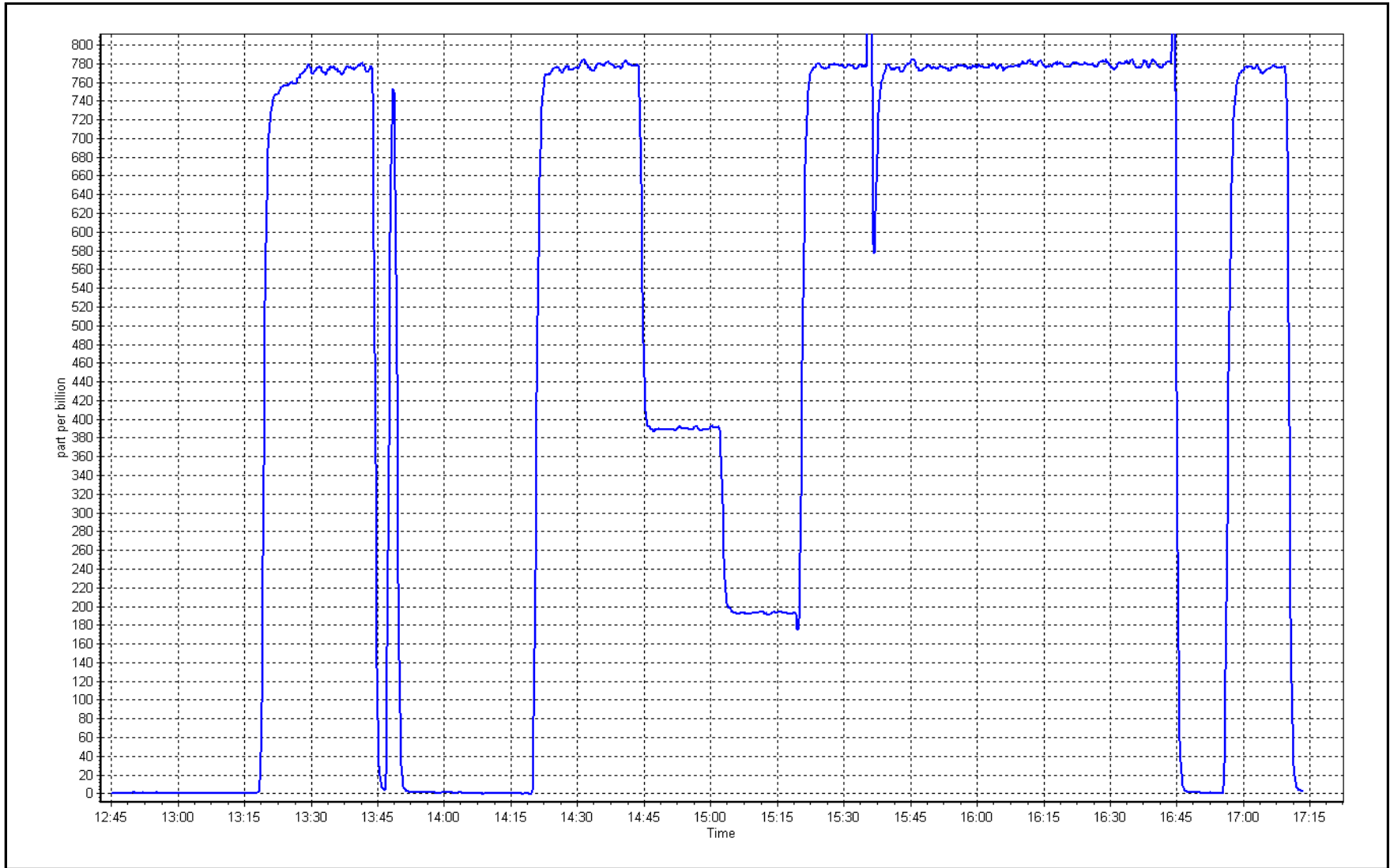
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-------------|
| 0.0 | 0.1 | ---- | Correlation Coefficient | ≥0.995 |
| 777.0 | 778.6 | 0.9979 | | |
| 389.1 | 390.4 | 0.9967 | Slope | 0.90 - 1.10 |
| 195.0 | 193.3 | 1.0086 | | |
| | | | Intercept | +/-30 |



SO2 Calibration Plot

Date: August 9, 2017

Location: Anzac





Wood Buffalo Environmental Association

TRS Calibration Summary

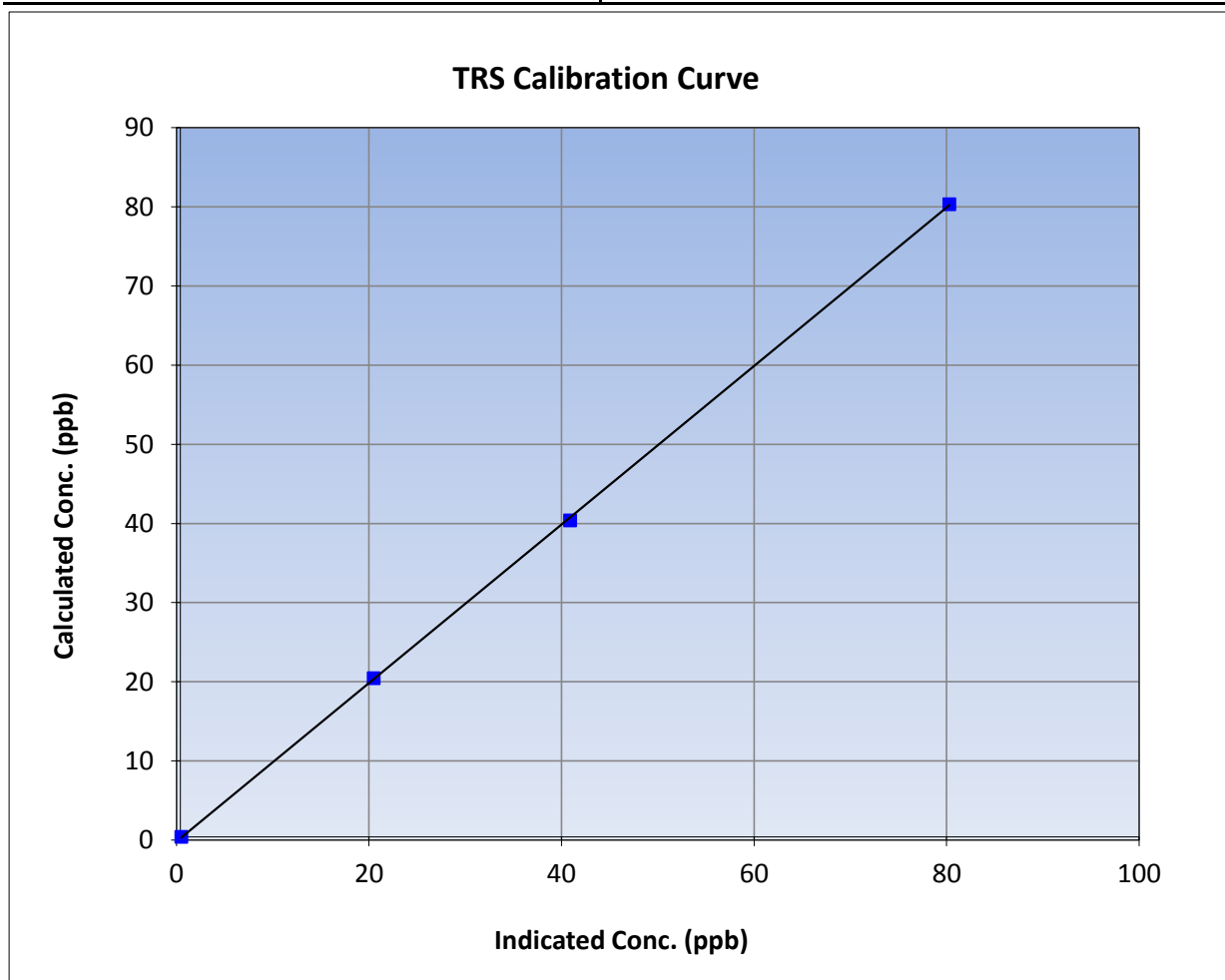
Version-03-2017

Station Information

| | | | |
|------------------|----------------|----------------------|--------------|
| Calibration Date | August 4, 2017 | Previous Calibration | July 5, 2017 |
| Station Name | Anzac | Station Number | AMS 14 |
| Start Time (MST) | 8:51 | End Time (MST) | 10:55 |
| Analyzer make | Thermo 43i-TLE | Analyzer serial # | 1300156232 |

Calibration Data

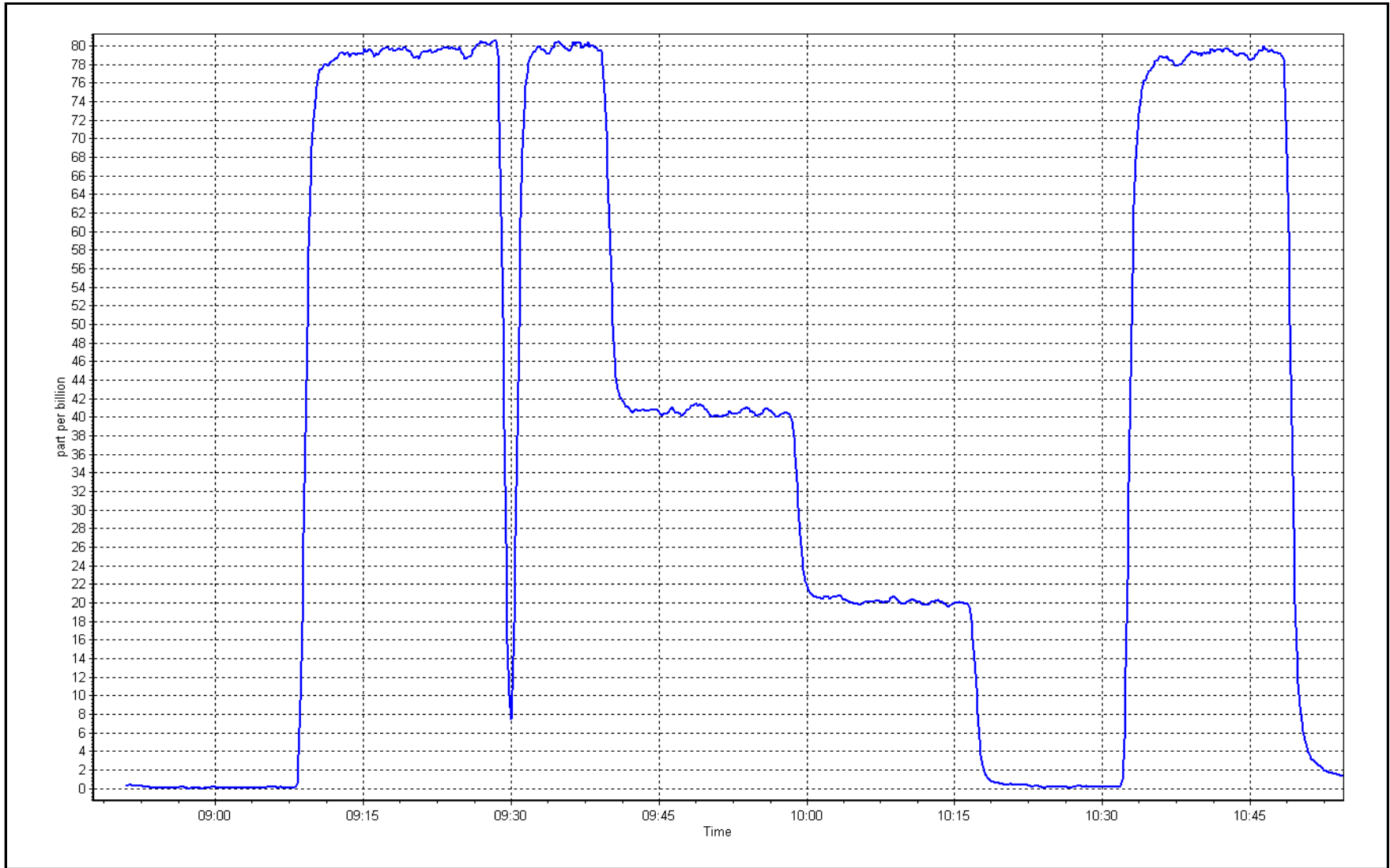
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|-------------|
| 0.0 | 0.1 | ---- | Correlation Coefficient | 0.999951 | |
| 79.9 | 79.9 | 1.0006 | | | ≥0.995 |
| 40.0 | 40.5 | 0.9875 | Slope | 1.001010 | |
| 20.1 | 20.1 | 0.9976 | | | 0.90 - 1.10 |
| | | | Intercept | -0.187756 | +/-3 |



TRS Calibration Plot

Date: August 4, 2017

Location: Anzac





Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|----------------|-----------------|---------------|
| Station Name: | Anzac | Station number: | AMS 14 |
| Calibration Date: | August 9, 2017 | Last Cal Date: | July 10, 2017 |
| Start time (MST): | 12:48 | End time (MST): | 17:11 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|--------------------|-------------------|---------------------|----------------|
| Gas Cert Reference | EY0000647 | Cal Gas Expiry Date | November-04-19 |
| CH4 Cal Gas Conc. | <u>513.0</u> ppm | CH4 Equiv Conc. | 1060.3 ppm |
| C3H8 Cal Gas Conc. | <u>199.0</u> ppm | Station temp. | 22 Deg C |
| Calibrator Model | Teledyne API T700 | Serial Number | 2659 |
| ZAG make/model | Teledyne API 701 | Serial Number | 4764 |

Analyzer Information

Analyzer make: Thermo 55i

Analyzer serial #: 1218153355

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|--------------------|--------------|---------------|------------------|--------------|---------------|
| THC Range (ppm) | 0 - 50 ppm | | Column Temp | 75.1 | 75.1 |
| NMHC Range (ppm) | 0 - 25 ppm | | Detector Temp | 175.0 | 175.0 |
| CH4 SP Ratio | 0.000201 | 0.000201 | Flame Temp | 405.0 | 405.0 |
| CH4 Retention time | 11.6 | 11.6 | Carrier Pressure | 33.4 | 33.4 |
| NMHC SP Ratio | 3.89E-05 | 3.89E-05 | Fuel Pressure | 48.0 | 47.9 |
| NMHC Peak Area | 222859 | 222859 | Air Pressure | 36.6 | 36.6 |

Calibration Statistics

| | <u>Start</u> | <u>Finish</u> |
|-----------------|--------------|---------------|
| THC Cal Slope | 0.998332 | 0.995253 |
| THC Cal Offset | 0.015534 | 0.015506 |
| CH4 Cal Slope | 0.996548 | 0.996507 |
| CH4 Cal Offset | 0.028821 | 0.028221 |
| NMHC Cal Slope | 1.000056 | 0.994023 |
| NMHC Cal Offset | -0.014535 | -0.012445 |

Notes: Sample inlet filter replaced after as founds. No adjustments made.

Calibration Performed By:

Asad Hidayat



Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Version-02-2017

THC Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|--|
| as found zero | 5005 | 0.0 | 0.00 | 0.00 | ---- |
| as found span | 4931 | 79.3 | 16.78 | 16.83 | 0.997 |
| calibrator zero | 5005 | 0.0 | 0.00 | 0.00 | ---- |
| high point | 4932 | 79.3 | 16.78 | 16.85 | 0.996 |
| second point | 4972 | 39.7 | 8.40 | 8.42 | 0.998 |
| third point | 4992 | 19.9 | 4.21 | 4.20 | 1.003 |
| as left zero | 5005 | 0.0 | 0.00 | 0.00 | ---- |
| as left span | 4931 | 79.3 | 16.78 | 16.79 | 0.999 |
| Average Correction Factor | | | | | 0.999 |
| Corrected As found | 16.83 | Prev response | 16.79 | *% change | -0.2% |

NMHC Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|--|
| as found zero | 5005 | 0 | 0.00 | 0.00 | ---- |
| as found span | 4931 | 79.3 | 8.66 | 8.71 | 0.995 |
| calibrator zero | 5005 | 0 | 0.00 | 0.00 | ---- |
| high point | 4932 | 79.3 | 8.66 | 8.72 | 0.994 |
| second point | 4972 | 39.7 | 4.34 | 4.39 | 0.988 |
| third point | 4992 | 19.9 | 2.17 | 2.21 | 0.985 |
| as left zero | 5005 | 0 | 0.00 | 0.00 | ---- |
| as left span | 4931 | 79.3 | 8.66 | 8.68 | 0.998 |
| Average Correction Factor | | | | | 0.989 |
| Corrected As found | 8.71 | Prev response | 8.68 | *% change | -0.4% |

CH4 Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|--|
| as found zero | 5005 | 0.0 | 0.00 | 0.00 | ---- |
| as found span | 4931 | 79.3 | 8.12 | 8.12 | 1.000 |
| calibrator zero | 5005 | 0.0 | 0.00 | 0.00 | ---- |
| high point | 4932 | 79.3 | 8.12 | 8.13 | 0.998 |
| second point | 4972 | 39.7 | 4.06 | 4.03 | 1.009 |
| third point | 4992 | 19.9 | 2.04 | 1.99 | 1.023 |
| as left zero | 5005 | 0.0 | 0.00 | 0.00 | ---- |
| as left span | 4931 | 79.3 | 8.12 | 8.11 | 1.001 |
| Average Correction Factor | | | | | 1.010 |
| Corrected As found | 8.12 | Prev response | 8.12 | *% change | 0.0% |

* = > +/-5% change initiates investigation



Wood Buffalo Environmental Association

THC Calibration Summary

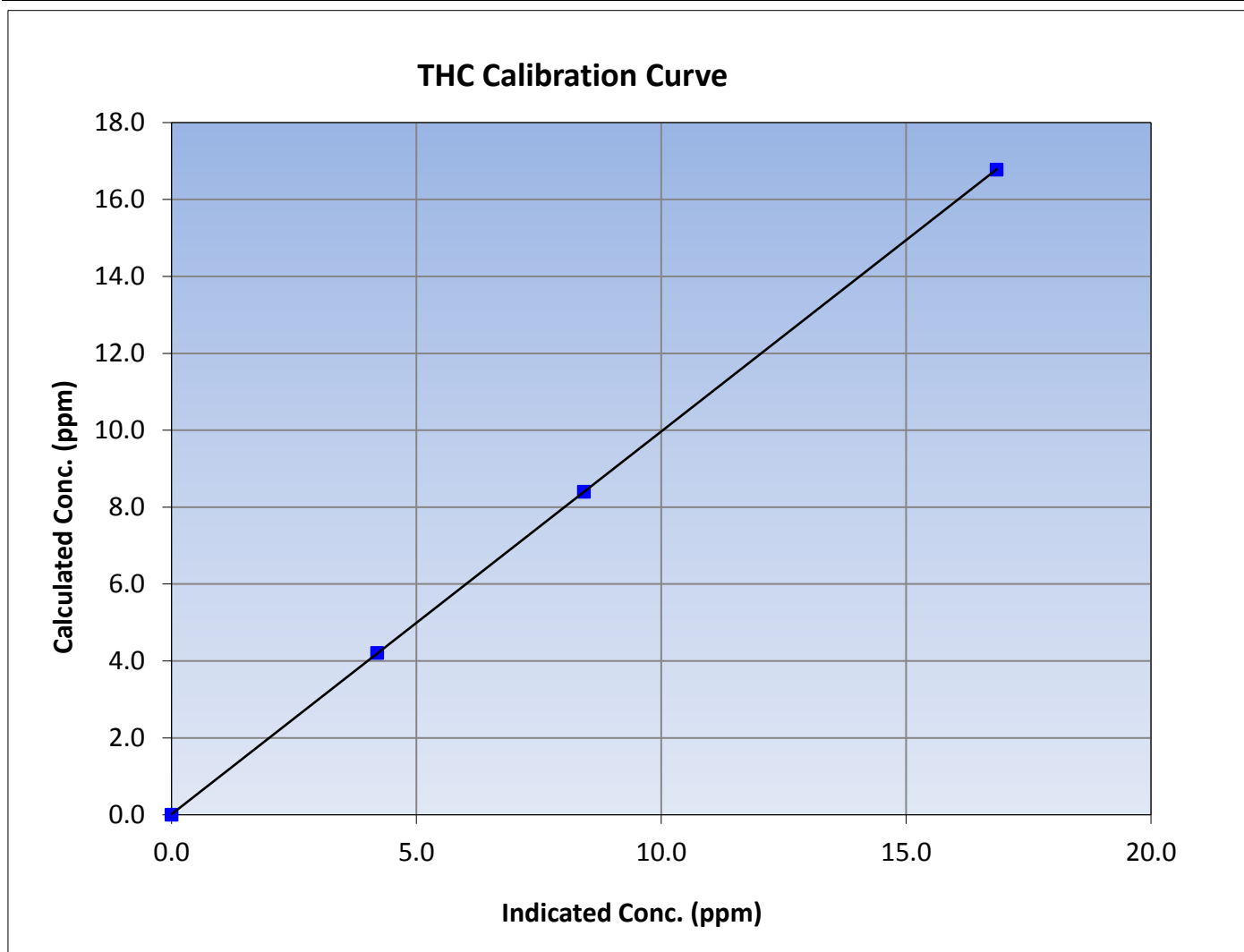
Version-02-2017

Station Information

| | | | |
|------------------|----------------|----------------------|---------------|
| Calibration Date | August 9, 2017 | Previous Calibration | July 10, 2017 |
| Station Name | Anzac | Station Number | AMS 14 |
| Start Time (MST) | 12:48 | End Time (MST) | 17:11 |
| Analyzer make | Thermo 55i | Analyzer serial # | 1218153355 |

Calibration Data

| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> | | | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|---------------|-------|----------|-------------|
| 0.00 | 0.00 | ---- | Correlation Coefficient | 0.999996 | ≥ 0.995 | | | |
| 16.78 | 16.85 | 0.9958 | | | | | | |
| 8.40 | 8.42 | 0.9977 | | | | Slope | 0.995253 | 0.90 - 1.10 |
| 4.21 | 4.20 | 1.0030 | | | | | | |
| | | | Intercept | 0.015506 | ± 0.5 | | | |





Wood Buffalo Environmental Association

CH₄ Calibration Summary

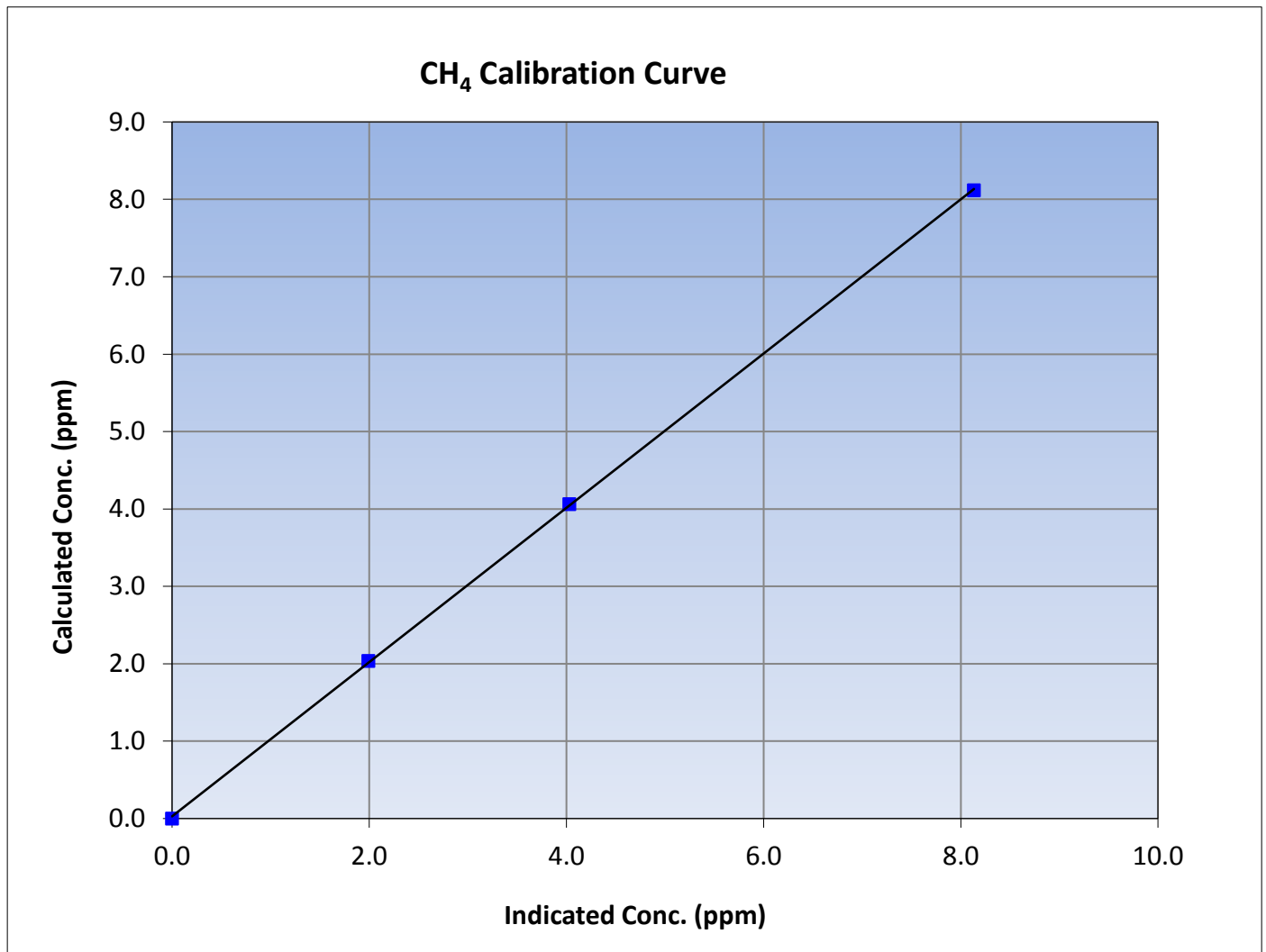
Version-02-2017

Station Information

| | | | |
|------------------|----------------|----------------------|---------------|
| Calibration Date | August 9, 2017 | Previous Calibration | July 10, 2017 |
| Station Name | Anzac | Station Number | AMS 14 |
| Start Time (MST) | 12:48 | End Time (MST) | 17:11 |
| Analyzer make | Thermo 55i | Analyzer serial # | 1218153355 |

Calibration Data

| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> | | | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|---------------|-------|----------|-------------|
| 0.00 | 0.00 | ---- | Correlation Coefficient | 0.999944 | ≥ 0.995 | | | |
| 8.12 | 8.13 | 0.9980 | | | | | | |
| 4.06 | 4.03 | 1.0086 | | | | Slope | 0.996507 | 0.90 - 1.10 |
| 2.04 | 1.99 | 1.0225 | | | | | | |
| | | | Intercept | 0.028221 | ± 0.5 | | | |





Wood Buffalo Environmental Association

NMHC Calibration Summary

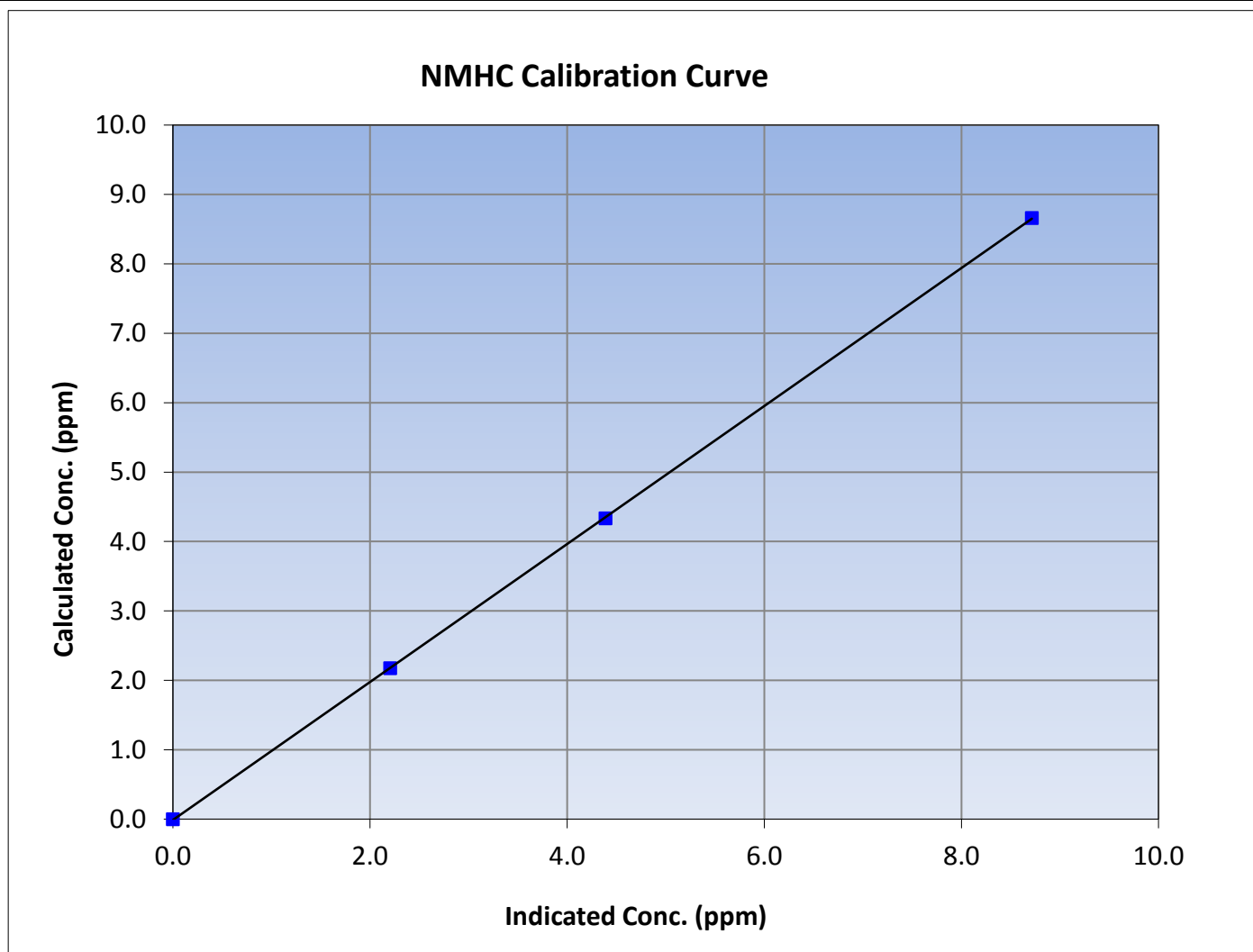
Version-02-2017

Station Information

| | | | |
|------------------|----------------|----------------------|---------------|
| Calibration Date | August 9, 2017 | Previous Calibration | July 10, 2017 |
| Station Name | Anzac | Station Number | AMS 14 |
| Start Time (MST) | 12:48 | End Time (MST) | 17:11 |
| Analyzer make | Thermo 55i | Analyzer serial # | 1218153355 |

Calibration Data

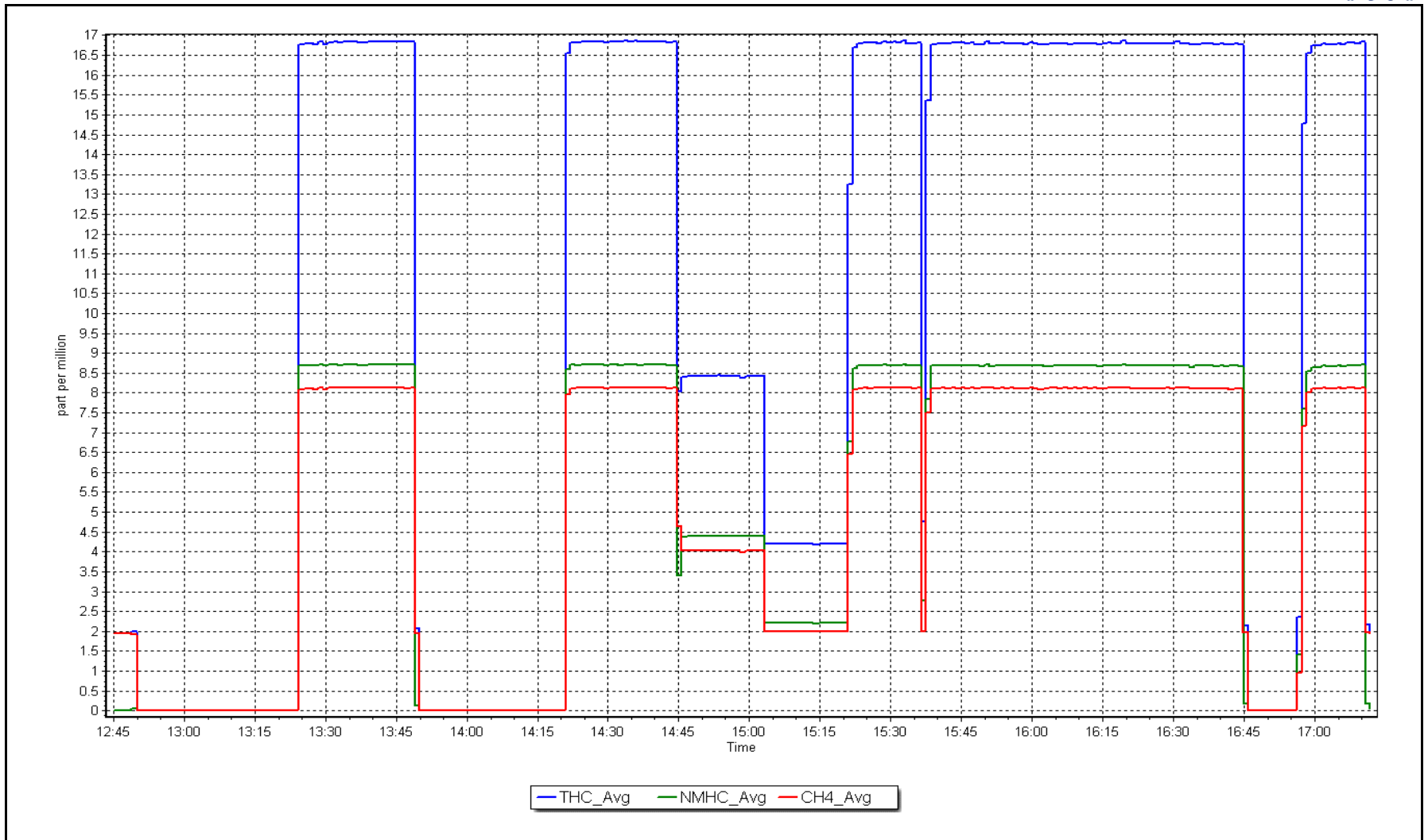
| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|---------------|
| 0.00 | 0.00 | ---- | Correlation Coefficient | 0.999987 | ≥ 0.995 |
| 8.66 | 8.72 | 0.9937 | | | |
| 4.34 | 4.39 | 0.9877 | | | |
| 2.17 | 2.21 | 0.9854 | | | |
| | | | Slope | 0.994023 | 0.90 - 1.10 |
| | | | Intercept | -0.012445 | +/-0.5 |



NMHC Calibration Plot

Date: August 9, 2017

Location: Anzac





Wood Buffalo Environmental Association

O₃ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|----------------|-----------------|--------------|
| Station Name: | Anzac | Station number: | AMS 14 |
| Calibration Date: | August 4, 2017 | Last Cal Date: | July 7, 2017 |
| Start time (MST): | 10:50 | End time (MST): | 13:27 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|---------------------------------|------------|--------------------------------|------|
| O ₃ generation mode: | Photometer | O ₃ reference Date: | NA |
| Calibrator Make/Model: | API T700 | Serial Number: | 2659 |
| ZAG Make/Model: | API 701 | Serial Number: | 4764 |

Analyzer Information

| | | | |
|----------------|------------|--------------------|------------|
| Analyzer make: | Thermo 49i | Analyzer serial #: | 1426262595 |
|----------------|------------|--------------------|------------|

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|----------------------|--------------|---------------|------------------|--------------|---------------|
| Analyzer Range | 0 - 500 ppb | | Pressure | 658 | 666 |
| Calculated slope | 1.001958 | 1.006421 | Flow cell A | 0.706 | 0.711 |
| Calculated intercept | -1.820576 | -2.029379 | Flow cell B | 0.718 | 0.717 |
| Analyzer Background | -1.0 | -1.0 | Cell A Intensity | 87165 | 87154 |
| Analyzer Coefficient | 1.017 | 1.017 | Cell B Intensity | 102802 | 102788 |

O₃ Calibration Data

| Set Point | Total air flow rate (scm) | Calibrator Lamp Voltage Drive | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|---------------------------|---------------------------|-------------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5000 | 800.0 | 0.0 | -0.1 | ---- |
| as found span | 5000 | 970.5 | 400.0 | 399.1 | 1.002 |
| calibrator zero | 5000 | 800.0 | 0.0 | -0.1 | ---- |
| high point | 5000 | 970.8 | 400.0 | 398.5 | 1.004 |
| second point | 5000 | 790.2 | 200.0 | 201.4 | 0.993 |
| third point | 5000 | 681.4 | 100.0 | 103.8 | 0.963 |
| as left zero | 5000 | 800.0 | 0.0 | 1.1 | ---- |
| as left span | 5000 | 970.5 | 400.0 | 400.1 | 1.000 |
| Average Correction Factor | | | | | 0.987 |

| | | | | | |
|--------------------|--------|-------------------|--------|-----------|------|
| Corrected As found | 399.20 | Previous response | 401.04 | *% change | 0.5% |
|--------------------|--------|-------------------|--------|-----------|------|

* = > +/-8% change initiates investigation

Notes:

Sample inlet filter replaced after as founds.No adjustments made.

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

O₃ Calibration Summary

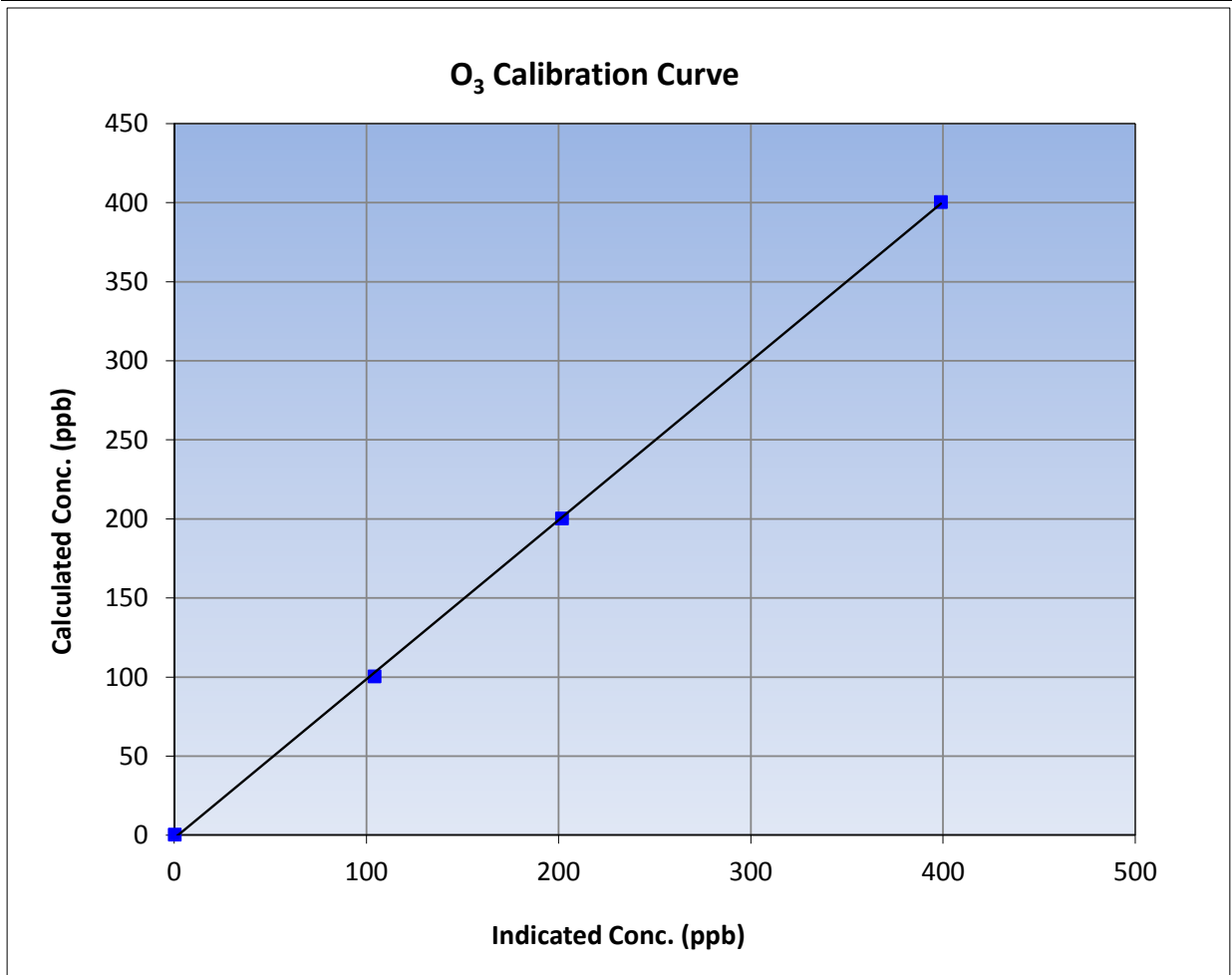
Version-03-2017

Station Information

| | | | |
|------------------|----------------|----------------------|--------------|
| Calibration Date | August 4, 2017 | Previous Calibration | July 7, 2017 |
| Station Name | Anzac | Station Number | AMS 14 |
| Start Time (MST) | 10:50 | End Time (MST) | 13:27 |
| Analyzer make | Thermo 49i | Analyzer serial # | 1426262595 |

Calibration Data

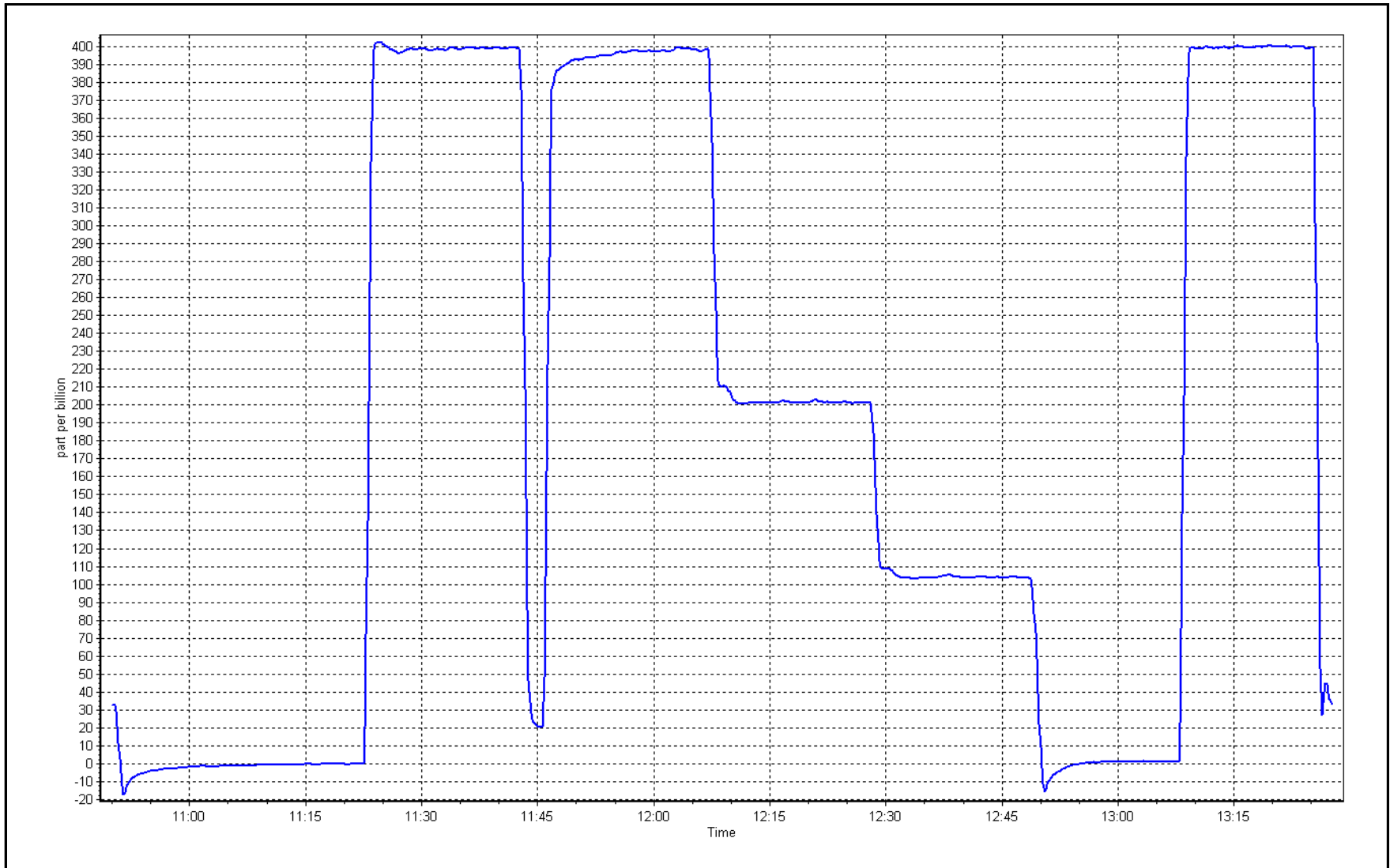
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|
| 0.0 | -0.1 | ---- | Correlation Coefficient | ≥0.995 |
| 400.0 | 398.5 | 1.0038 | | |
| 200.0 | 201.4 | 0.9930 | Slope | 0.90 - 1.10 |
| 100.0 | 103.8 | 0.9634 | | |
| | | | Intercept | +/- 10 |



O₃ Calibration Plot

Date: August 4, 2017

Location: Anzac





Wood Buffalo Environmental Association

NO_x - NO - NO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|----------------|-----------------|---------------|
| Station Name: | Anzac | Station number: | AMS 14 |
| Calibration Date: | August 9, 2017 | Last Cal Date: | July 10, 2017 |
| Start time (MST): | 12:48 | End time (MST): | 17:11 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|-------------------|-------------------|---------------------|------------------|
| NO Gas Cylinder # | EY0000647 | Cal Gas Expiry Date | November 4, 2019 |
| NOX Cal Gas Conc. | <u>50.5</u> ppb | NO Cal Gas Conc. | <u>50.5</u> ppb |
| Calibrator Model | Teledyne API T700 | Serial Number | 2659 |
| ZAG make/model | Teledyne API 701 | Serial Number | 4764 |

Analyzer Information

| | | | | | |
|---------------------------|--------------|---------------|-------------------------------|--------------|---------------|
| Analyzer make: Thermo 42i | | | Analyzer serial #: 1426262592 | | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| NO coefficient | 1.171 | 1.104 | NOX Range (ppb) | 0 - 1000 ppb | |
| NOX coefficient | 1.002 | 1.001 | PMT Temperature | 322.1 | 321.8 |
| NO2 coefficient | 1.000 | 1.000 | Reaction cell Press | 187.7 | 177.1 |
| NO bkgrnd | 4.4 | 4.1 | Sample Flow | 0.640 | 0.721 |
| NOX bkgrnd | 4.6 | 4.3 | PMT Voltage | -808.4 | -807.7 |

Calibration Statistics

| | | |
|----------------------------|--------------|---------------|
| | <u>Start</u> | <u>Finish</u> |
| NO _x Cal Slope | 0.992045 | 0.997577 |
| NO _x Cal Offset | -0.199896 | 0.291992 |
| NO Cal Slope | 0.992754 | 0.996834 |
| NO Cal Offset | -0.201751 | 0.452739 |
| NO ₂ Cal Slope | 1.000786 | 0.999441 |
| NO ₂ Cal Offset | 0.138948 | 1.070191 |



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Version-03-2017

Dilution Calibration Data

| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|----------------------------------|---------------------------|-----------------------------|---|--|---|--|---------------------------------------|--|---|--|
| as found zero | 5005 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | ---- | ---- |
| as found span | 4932 | 79.3 | 799.1 | 799.1 | 0.0 | 776.6 | 775.4 | 1.2 | 1.0290 | 1.0306 |
| calibrator zero | 5005 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.2 | 0.1 | ---- | ---- |
| high point | 4932 | 79.3 | 799.1 | 799.1 | 0.0 | 800.5 | 800.9 | -0.4 | 0.9983 | 0.9978 |
| second point | 4972 | 39.7 | 400.0 | 400.0 | 0.0 | 402.1 | 402.4 | -0.3 | 0.9949 | 0.9941 |
| third point | 4992 | 19.9 | 200.5 | 200.5 | 0.0 | 199.0 | 198.8 | 0.2 | 1.0076 | 1.0086 |
| as left zero | 5005 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.2 | 0.0 | ---- | ---- |
| as left span | 4931 | 79.3 | 799.3 | 407.4 | 391.9 | 801.2 | 415.3 | 386.0 | 0.9976 | 0.9810 |
| Average Correction Factor | | | | | | | | | 1.0002 | 1.0002 |

| | | | | | |
|--|-----------------------------|----------------|--|-----------------|------------------------|
| Corrected As found | NO _x = 776.5 ppb | NO = 775.3 ppb | | *Percent Change | NO _x = 3.8% |
| Previous Response | NO _x = 805.7 ppb | NO = 805.2 ppb | | *Percent Change | NO = 3.9% |
| <i>* = > +/-5% change initiates investigation</i> | | | | | |

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO drop conc (ppb) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | Converter Efficiency <i>Limit = 96-104%</i> |
|----------------------------------|------------------------------|---|--|---------------------------------------|--|---|--|---|--|
| 1st NO ref point | | 0.0 | 795.9 | 793.9 | 2.1 | 1.0041 | 1.0066 | ---- | ---- |
| 1st NO2 (400 ppb O3) | 407.4 | 386.5 | 793.5 | 407.4 | 386.1 | 1.0071 | ---- | 1.0010 | 99.9% |
| 2nd NO2 (200 ppb O3) | 597.2 | 196.7 | 792.8 | 597.2 | 195.6 | 1.0080 | ---- | 1.0056 | 99.4% |
| 3rd NO2 (100 ppb O3) | 691.5 | 102.4 | 791.3 | 691.5 | 99.9 | 1.0099 | ---- | 1.0250 | 97.6% |
| 2nd NO ref point | ---- | 0.0 | 791.0 | 788.0 | 3.0 | 1.0103 | 1.0141 | ---- | ---- |
| Average Correction Factor | | | | | | 1.0088 | 1.0103 | 1.0106 | 99.0% |

Notes: Sample pump and charcoal material were replaced after as founds for preventative maintenance. Sample filter replaced after as founds. Adjusted span only.

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

NO_x Calibration Summary

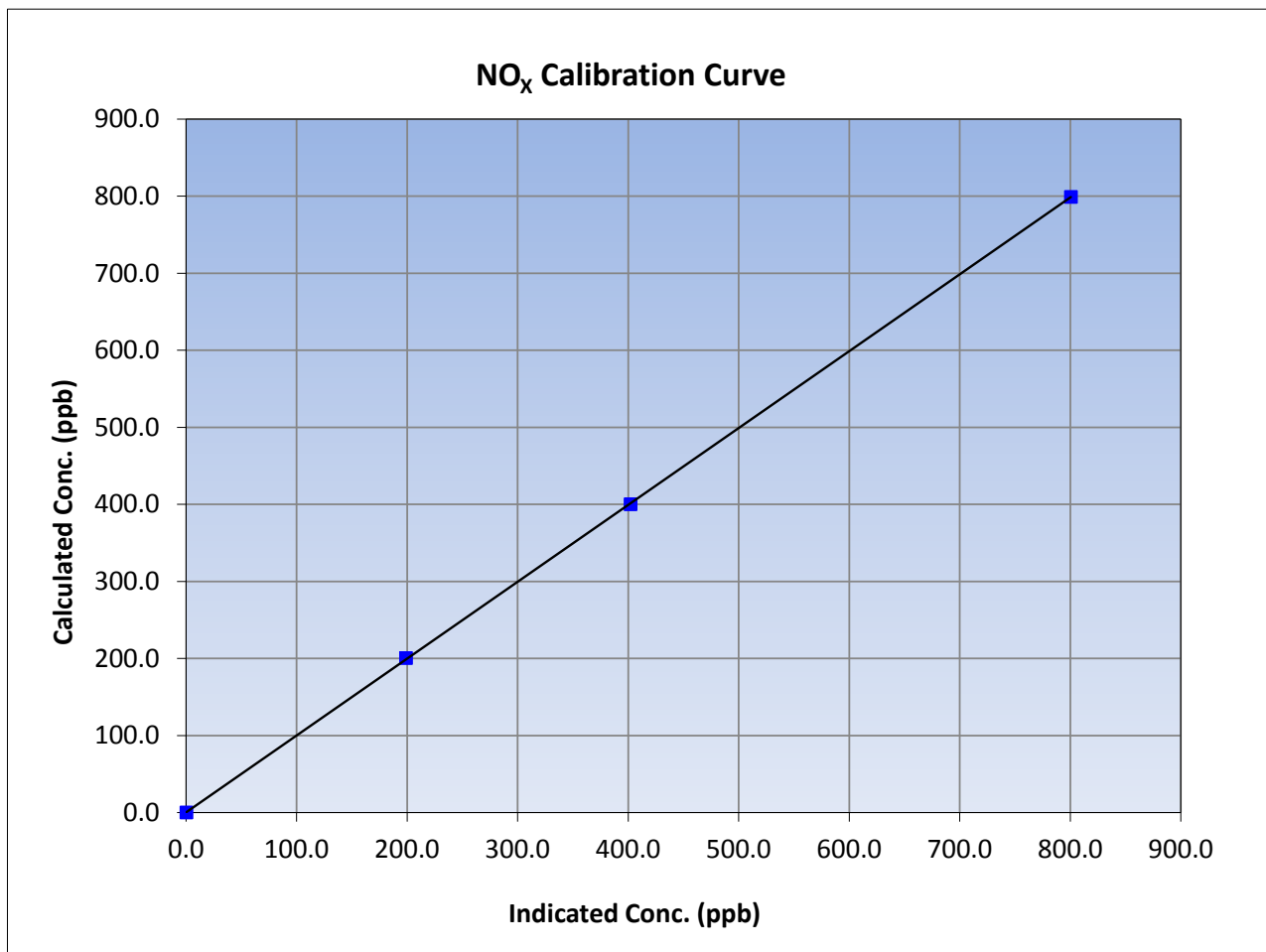
Version-03-2017

Station Information

| | | | |
|------------------|----------------|----------------------|---------------|
| Calibration Date | August 9, 2017 | Previous Calibration | July 10, 2017 |
| Station Name | Anzac | Station Number | AMS 14 |
| Start Time (MST) | 12:48 | End Time (MST) | 17:11 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1426262592 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.3 | ---- | Correlation Coefficient | ≥0.995 | |
| 799.1 | 800.5 | 0.9983 | | | |
| 400.0 | 402.1 | 0.9949 | | | |
| 200.5 | 199.0 | 1.0076 | | | |
| | | | Slope | 0.997577 | 0.90 - 1.10 |
| | | | Intercept | 0.291992 | +/-20 |





Wood Buffalo Environmental Association

NO Calibration Summary

Version-03-2017

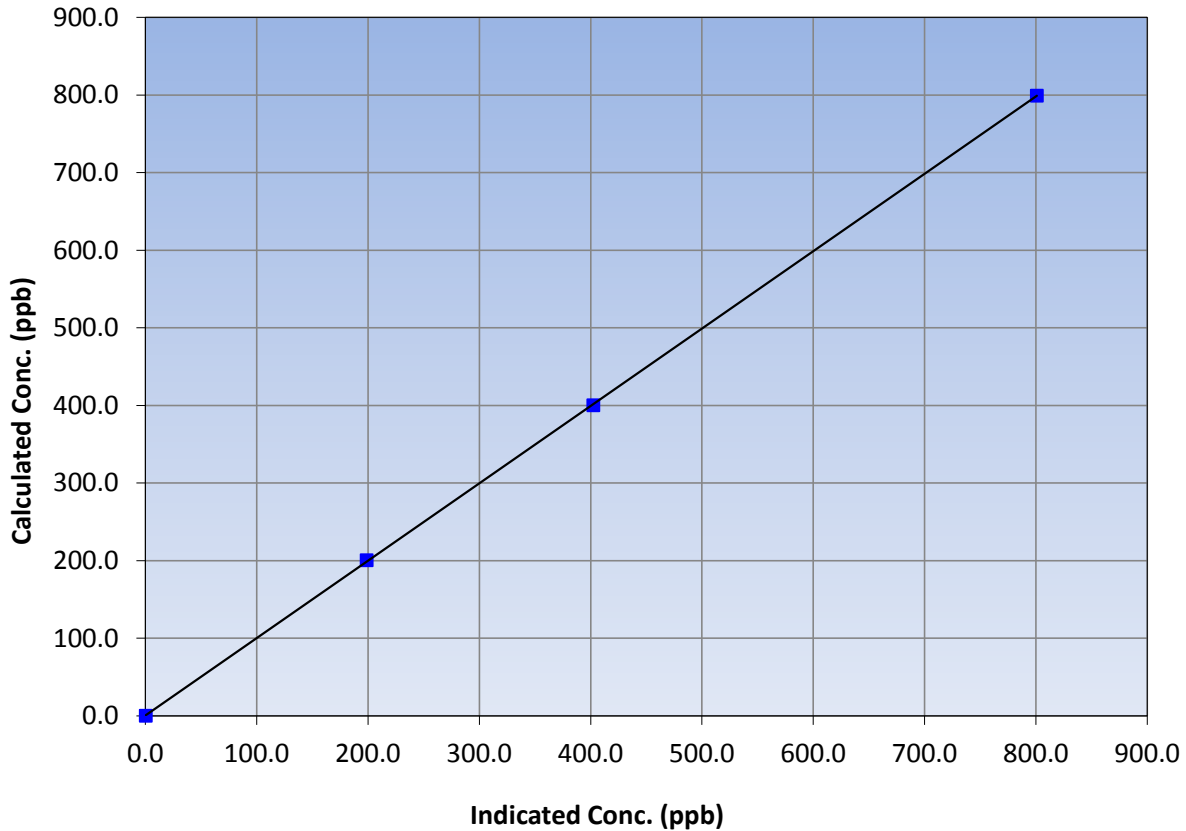
Station Information

| | | | |
|------------------|----------------|----------------------|---------------|
| Calibration Date | August 9, 2017 | Previous Calibration | July 10, 2017 |
| Station Name | Anzac | Station Number | AMS 14 |
| Start Time (MST) | 12:48 | End Time (MST) | 17:11 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1426262592 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.2 | ---- | Correlation Coefficient | ≥0.995 | |
| 799.1 | 800.9 | 0.9978 | | | |
| 400.0 | 402.4 | 0.9941 | | | |
| 200.5 | 198.8 | 1.0086 | | | |
| | | | Slope | 0.996834 | 0.90 - 1.10 |
| | | | Intercept | 0.452739 | +/-20 |

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

Version-03-2017

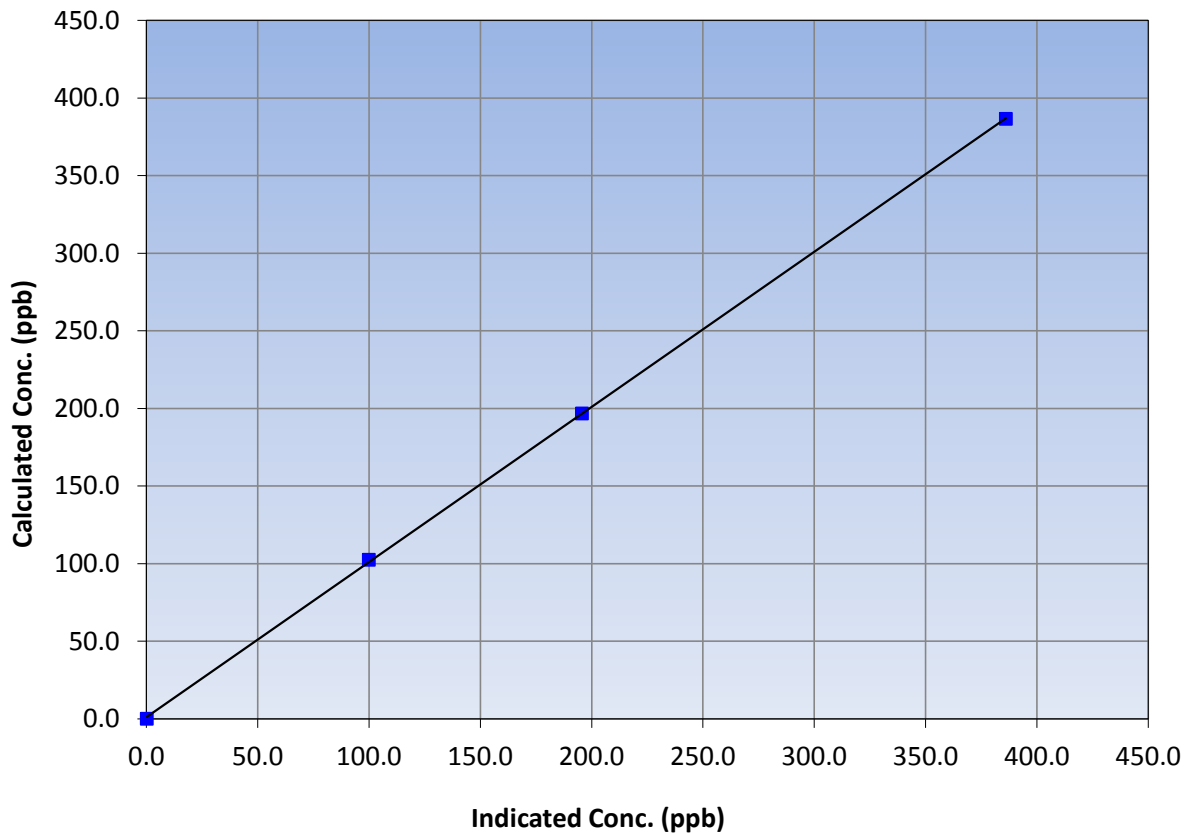
Station Information

| | | | |
|------------------|----------------|----------------------|---------------|
| Calibration Date | August 9, 2017 | Previous Calibration | July 10, 2017 |
| Station Name | Anzac | Station Number | AMS 14 |
| Start Time (MST) | 12:48 | End Time (MST) | 17:11 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1426262592 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.1 | ---- | Correlation Coefficient | ≥0.995 | |
| 386.5 | 386.1 | 1.0010 | | | |
| 196.7 | 195.6 | 1.0056 | | | |
| 102.4 | 99.9 | 1.0250 | | | |
| | | | Slope | 0.999441 | 0.90 - 1.10 |
| | | | Intercept | 1.070191 | +/-20 |

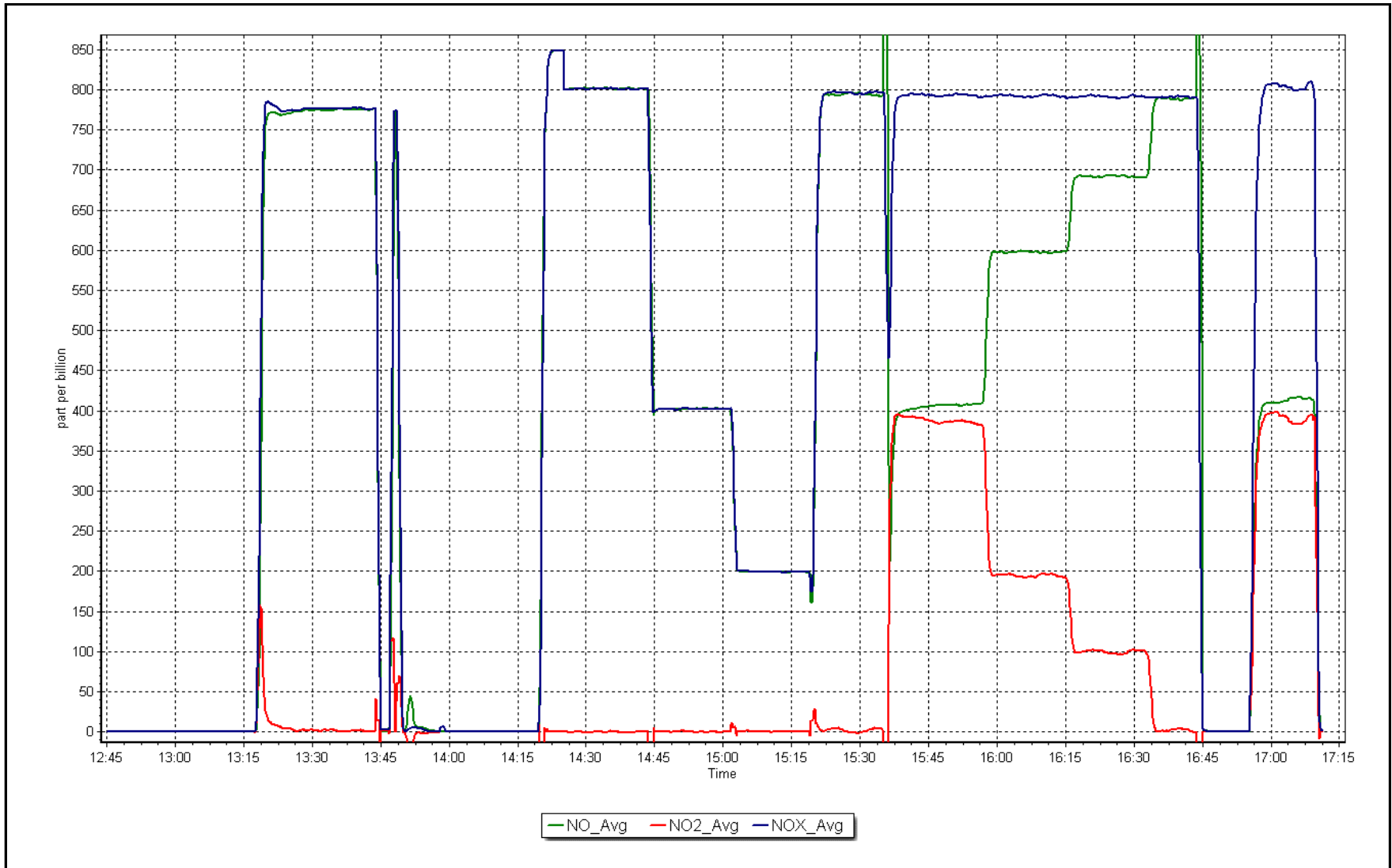
NO₂ Calibration Curve



NO_x Calibration Plot

Date: August 9, 2017

Location: Anzac





Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-02-2017

Station Information

| | | | |
|------------------------|----------------|-----------------|---------------|
| Station Name: | Anzac | Station number: | AMS 14 |
| Calibration Date: | August 9, 2017 | Last Cal Date: | July 25, 2017 |
| Start time (MST): | 10:55 | End time (MST): | 11:48 |
| Sharp Model: | 5030 | S/N: | E1093 |
| Particulate Fraction: | PM2.5 | C14 Source S/N: | 4933 |
| Flow Meter Make/Model: | Delta cal | S/N: | 1451 |
| Temp/RH standard: | NA | S/N: | NA |

Monthly Calibration Test

| <u>Parameter</u> | <u>As found</u> | <u>Measured</u> | <u>As left</u> | <u>Adjusted</u> | (Limits) |
|-----------------------------|-----------------|-------------------------------------|----------------|-------------------------------------|-----------------|
| T1 (°C) | 28 | 25 | 25 | <input checked="" type="checkbox"/> | +/- 2 °C |
| P3 (hPa) | 959 | 959 | 959 | <input type="checkbox"/> | +/- 13 hPa |
| flow (LPH) | 1000 | 990 | 1000 | <input type="checkbox"/> | +/- 50 LPH |
| Nephelometer zero | 0 | ----- | 0 | <input type="checkbox"/> | +/- 0.5 ug/m3 |
| Instrument Clock: | Verified | <input type="checkbox"/> | | | |
| Cyclone cleaning : | PM10 Cyclone | <input checked="" type="checkbox"/> | PM2.5 Cyclone | <input checked="" type="checkbox"/> | |
| Date Filter Tape Installed: | | | | | |

Quarterly Calibration Test

Leak Test: Date of check: June 7, 2017 Last Cal Date: April 5, 2017
 Flow w/o adaptor: 16.8 Flow w/ adaptor: 16.67

(Limit) 0.4 LPM

| <u>Adjusted</u> | <u>Current Test</u> | <u>Previous Test</u> | <u>% Change</u> |
|-----------------------------------|---------------------------------------|---|-----------------|
| <input type="checkbox"/> | Foil S/N: <u>2520</u> | Foil S/N: <u>2520</u> | |
| Foil Calibration | Foil Mass: <u>1278</u> | Foil Mass: <u>1278</u> | |
| | Calibration Date: <u>June 7, 2017</u> | Calibration Date: <u>October 10, 2016</u> | |
| (Limit) +/- 5% of previous | Correction Factor: <u>7140</u> | Correction Factor: <u>7068</u> | 1.02% |

Annual Calibration Test

| <u>Parameter</u> | <u>As found</u> | <u>Measured</u> | <u>As left</u> | <u>Adjusted</u> | (Limits) |
|-----------------------------|-----------------|-----------------|----------------|--------------------------|-----------------|
| T2 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| T3 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| T4 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| RH (%) | | | | <input type="checkbox"/> | +/- 10% |
| Date Sample Tube Cleaned: | | | | | |
| Date Pump Rebuilt/Replaced: | | | | | |

Notes: Cyclone head cleaned. Adjusted T1 only.

Calibration by: Asad Hidayat



Wood Buffalo Environmental Association

Wind Speed/Direction Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|-------------------|
| Station Name: | Anzac | Station Number: | AMS 14 |
| Calibration Date: | August 24, 2017 | Prev Cal Date: | February 22, 2016 |
| Start Time (MST): | 9:50 | End Time (MST): | 11:50 |
| Barometric Press: | 710 | Station Temp: | 22 Deg C |
| Reason: | Routine | | |

Wind Speed Information

| | | | |
|--------------------|----------------|----------------|--------|
| Sensor make/model: | Met One 010C-1 | Serial Number: | D6359 |
| WS Calibrator: | MetOne 053 | Serial Number: | K13090 |

| Shaft RPM | Actual Speed (K/hr) (Cv) | Indicated Speed (K/hr) (Iv) | Correction factor (Cv/Iv) <i>Limit = 0.95-1.05</i> |
|----------------------------------|--------------------------|-----------------------------|---|
| 0 | 0.0 | 0.0 | n/a |
| 200 | 20.2 | 20.2 | 0.9981 |
| 400 | 39.4 | 39.4 | 0.9990 |
| 600 | 58.6 | 58.6 | 0.9992 |
| 800 | 77.8 | 77.8 | 0.9994 |
| Average Correction Factor | | | 0.9989 |

| | <u>Start</u> | <u>Finish</u> | <u>Limits</u> |
|--------------------------------|--------------|---------------|---------------|
| Correl Coeff (r ²) | NA | 1.000000 | ≥0.995 |
| Calculated slope | 0.988633 | 0.999465 | 0.90 - 1.10 |
| Calculated intercept | 0.173902 | -0.013446 | +/- 2 |

Wind Direction Information

| | | | |
|--|----------------|---|-----------|
| Sensor make/model: | Met One 020C-1 | Serial Number: | Z1048 |
| As Found Declination (deg west of North) | <u>16</u> | As Left Declination (deg west of North) | <u>16</u> |

| Physical Direction (Degrees) (Cv) | Indicated Direction (Degrees) (Iv) | Correction factor (Cv/Iv) <i>Limit = 0.95-1.05</i> |
|-----------------------------------|------------------------------------|---|
| 0 | 0.2 | n/a |
| 90 | 89.3 | 1.0081 |
| 180 | 180.4 | 0.9978 |
| 270 | 269.2 | 1.0029 |
| 357 | 356.0 | 1.0029 |
| Average Correction Factor | | 1.0029 |

| | <u>Start</u> | <u>Finish</u> | <u>Limits</u> |
|--------------------------------|--------------|---------------|---------------|
| Correl Coeff (r ²) | NA | 0.999994 | ≥0.995 |
| Calculated slope | 0.996830 | 1.002932 | 0.90 - 1.10 |
| Calculated intercept | -1.201723 | -0.142968 | +/- 7 |

Notes: No issues. All points within specified limits.

Calibration Performed By: Asad Hidayat & Aswin Sasi Kumar



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

**CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT**

**AMS 15
HORIZON
AUGUST 2017**

Operations, Data Collection,
QA/QC, Data Validation and Reporting by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

September 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - HORIZON (AMS 15)
AUGUST 2017

MONTHLY SUMMARY for
AMD SECTION III.B.1(c)

| Parameter | Hours of Data | Hours of Calibration | Hours without Data | Operational Time | Maximum 1-Hour Value | 1-Hour Exceedances | Maximum 24-Hour Value | 24-Hour Exceedances |
|---------------------------------------|---------------|----------------------|--------------------|------------------|----------------------|--------------------|-----------------------|---------------------|
| SO2 (ppb) Average | 704 | 37 | 40 | 99.6 | 48 | 0 | 6 | 0 |
| TRS (ppb) Average | 708 | 34 | 36 | 99.73 | 3 | 0 | 1 | 0 |
| THC (ppm) Average | 705 | 37 | 39 | 99.73 | 5.5 | - | 2.6 | - |
| NO2 (ppb) Average | 703 | 37 | 41 | 99.46 | 30 | 0 | 8 | - |
| NO (ppb) Average | 703 | 37 | 41 | 99.46 | 37 | - | 4 | - |
| NOX (ppb) Average | 703 | 37 | 41 | 99.46 | 60 | - | 11 | - |
| PM2.5 (ug/m3) Average | 743 | 1 | 1 | 100 | 85.5 | - | 21.5 | 0 |
| Temperature 2 m (C) Average | 744 | 0 | 0 | 100 | 31.6 | - | 23.6 | - |
| Wind Speed 10 m (km/h) Average | 742 | 1 | 2 | 99.87 | 37 | - | 19 | - |
| Wind Direction 10 m (deg) Average | 742 | 1 | 2 | 99.87 | - | - | - | - |
| Precipitation (mm) Total | 744 | 0 | 0 | 100 | 3.8 | - | 8.1 | - |
| Relative Humidity (%) Average | 744 | 0 | 0 | 100 | 99 | - | 90 | - |
| Global Solar Radiation (W/m2) Average | 744 | 0 | 0 | 100 | 835 | - | 313 | - |

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - HORIZON (AMS 15)
AUGUST 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

| Parameter | Number | Mean | StnDev | Total | Percentile | | | | | | |
|---------------------------------------|--------|-------|--------|-------|------------|-----|------|--------|------|------|------|
| | | | | | Min | P10 | Q1 | Median | Q3 | P90 | Max |
| SO2 (ppb) Average | 704 | 1 | 3 | - | 0 | 0 | 0 | 0 | 1 | 2 | 48 |
| TRS (ppb) Average | 708 | 0.3 | 0 | - | 0 | 0 | 0 | 0 | 0 | 1 | 3 |
| THC (ppm) Average | 705 | 2.2 | 0.3 | - | 1.9 | 2 | 2 | 2.1 | 2.2 | 2.4 | 5.5 |
| NO2 (ppb) Average | 703 | 3 | 5 | - | 0 | 0 | 0 | 1 | 4 | 9 | 30 |
| NO (ppb) Average | 703 | 1 | 4 | - | 0 | 0 | 0 | 0 | 0 | 1 | 37 |
| NOX (ppb) Average | 703 | 4 | 7 | - | 0 | 0 | 0 | 1 | 4 | 10 | 60 |
| PM2.5 (ug/m3) Average | 743 | 8.68 | 7.8 | - | 0.8 | 2.2 | 3.6 | 6.6 | 11.1 | 18.4 | 85.5 |
| Temperature 2 m (C) Average | 744 | 17.61 | 6.1 | - | 3.1 | 9.9 | 12.8 | 17 | 22.4 | 26 | 31.6 |
| Wind Speed 10 m (km/h) Average | 742 | 9.7 | 6 | - | 0 | 4 | 6 | 8 | 12 | 17 | 37 |
| Wind Direction 10 m (deg) Average | 742 | - | - | - | - | - | - | - | - | - | - |
| Precipitation (mm) Total | 744 | - | - | 19.05 | - | - | - | - | - | - | - |
| Relative Humidity (%) Average | 744 | 62.3 | 22 | - | 21 | 31 | 41 | 65 | 82 | 92 | 99 |
| Global Solar Radiation (W/m2) Average | 744 | 211.4 | 257 | - | 0 | 0 | 0 | 74 | 416 | 647 | 835 |

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -HORIZON (AMS 15)
AUGUST 2017

OPERATIONAL NOTES

| Parameter | Period Start | Period End | Duration (Hours) | Notes |
|--------------|-------------------|-------------------|------------------|--|
| NO2, NO, NOX | 25 Aug 2017 13:00 | 25 Aug 2017 13:00 | 1 | Maintenance - reinitiated daily QA check |
| NO2, NO, NOX | 02 Aug 2017 10:00 | 02 Aug 2017 12:00 | 3 | Maintenance - WBEA internal audit |
| SO2 | 01 Aug 2017 13:00 | 01 Aug 2017 15:00 | 3 | Maintenance - WBEA internal audit |
| TRS | 01 Aug 2017 12:00 | 01 Aug 2017 13:00 | 2 | Maintenance - WBEA internal audit |
| THC | 01 Aug 2017 15:00 | 01 Aug 2017 16:00 | 2 | Maintenance - WBEA internal audit |



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

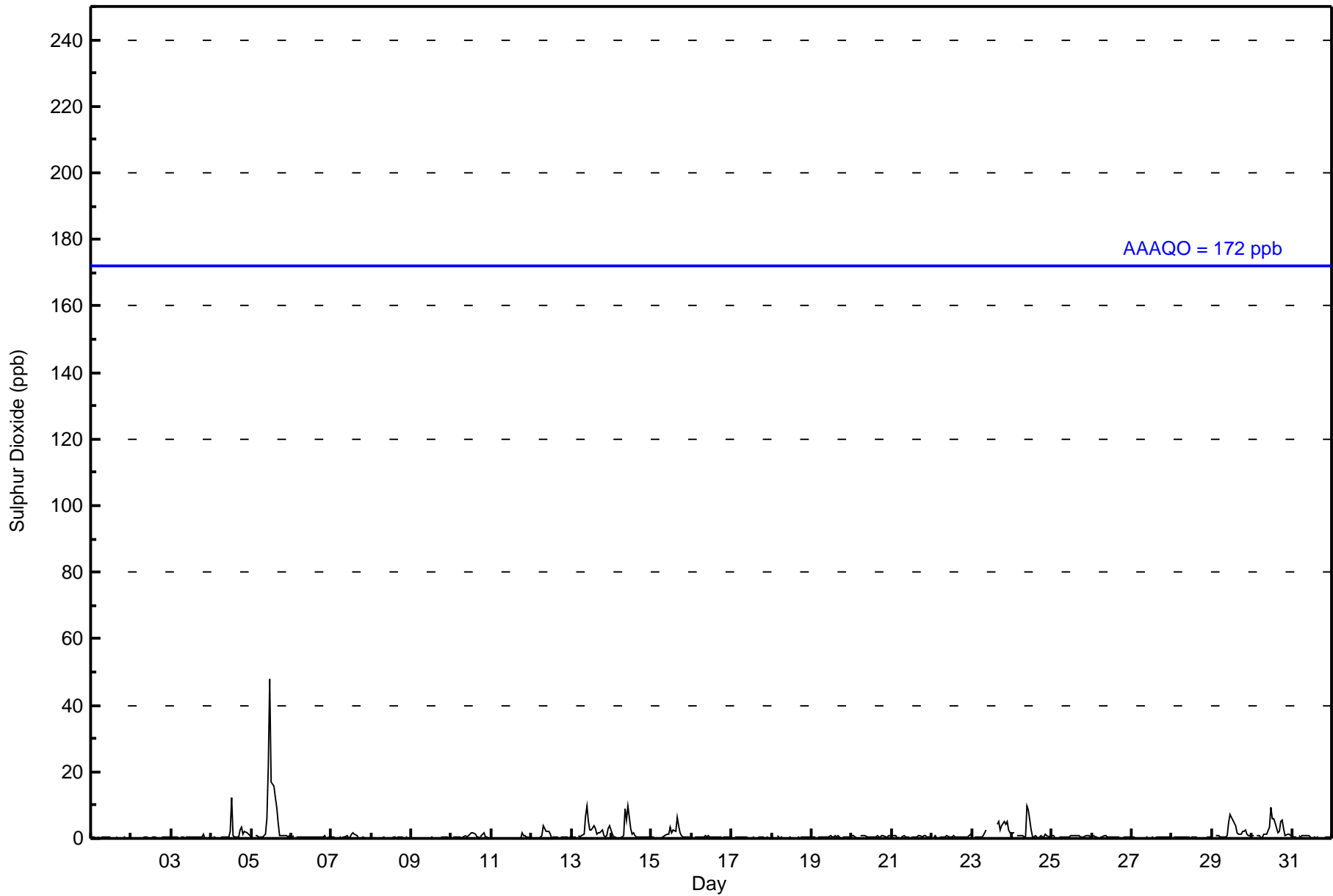
Horizon - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | | | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|---|---|---|---|---|---|---|---|----|----|--|----|----|----|----|----|----|----|----|----|----|----|-----|---------------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|
| Maximum Value: 48 ppb on Aug 5 12:00 | | | | | | | | | | | | Maximum Daily Average: 6.3 ppb on Aug 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum Value: 0 ppb on Aug 2 01:00 | | | | | | | | | | | | Hours of Data: 704 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 2.9 ppb at hour 12 | | | | | | | | | | | | Hours of Missing Data: 40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 1.0 ppb | | | | | | | | | | | | Hours of Calibration: 37 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | Percent Operational Time: 99.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | Minimum Daily Average: 0.1 ppb on Aug 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | Minimum Diurnal Average: 0.3 ppb at hour 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 O ₃ = 1 P ₉₀ = 2 P ₉₉ = 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | M | M | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 12 | 1 | 1 | 0 | 0 | 2 | 3 | 1 | 2 | 2 | 1 | 1 | 1.4 | 12 | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 1 | Z | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 6 | 22 | 48 | 17 | 16 | 12 | 9 | 5 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 6.3 | 48 | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 1 | 1 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 2 | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0.1 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | Z | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 2 | 2 | 1 | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 0.7 | 2 | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 0 | 0 | 0.2 | 2 | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 0 | 0 | Z | 0 | 0 | 0 | 1 | 4 | 3 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 4 | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 0 | 0 | 1 | Z | 1 | 0 | 1 | 1 | 7 | 10 | 5 | 3 | 2 | 4 | 3 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 3 | 4 | 2.4 | 10 | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 1 | 0 | 0 | 0 | Z | 0 | 1 | 1 | 9 | 6 | 10 | 3 | 1 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1.7 | 10 | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 1 | 1 | 1 | 1 | 3 | 2 | 3 | 2 | 6 | 4 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 1.3 | 6 | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 0 | 0 | 0 | Z | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0.5 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 1 | 1 | 1 | 0 | Z | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0.6 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 1 | 1 | 1 | 0 | 0 | Z | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.5 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | Z | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0.5 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 1 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 3 | C | C | C | C | C | C | 4 | 5 | 3 | 4 | 5 | 4 | 5 | 3 | 2 | -- | 5 | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 2 | 2 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 10 | 8 | 3 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1.6 | 10 | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 1 | 1 | 0 | Z | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0.6 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 1 | 1 | 0 | 0 | Z | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | Z | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 0 | Z | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 5 | 7 | 5 | 5 | 4 | 2 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 2.0 | 7 | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 1 | 1 | Z | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 3 | 9 | 6 | 6 | 4 | 2 | 2 | 5 | 6 | 3 | 1 | 1 | 1 | 1 | 2.5 | 9 | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.5 | 0.5 | 0.4 | 0.3 | 0.4 | 0.3 | 0.4 | 0.6 | 1.1 | 1.5 | 2.1 | 2.9 | 1.9 | 1.6 | 1.3 | 1.1 | 0.9 | 0.8 | 0.9 | 0.8 | 0.7 | 0.6 | 0.6 | 0.6 | Diurnal Average |
| | | | | | | | | | | | | | | | | | | | | | | | | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 4 | 9 | 10 | 22 | 48 | 17 | 16 | 12 | 9 | 5 | 5 | 6 | 5 | 4 | 5 | 3 | 4 | Diurnal Maximum |
| Z - zerospan C - Calibration M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Horizon - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Horizon - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 10 | 698 | 99.15 | 99.15 |
| 11 - 20 | 4 | 0.57 | 99.72 |
| 21 - 60 | 2 | 0.28 | 100.00 |
| 61 - 110 | 0 | 0.00 | 100.00 |
| 111 - 172 | 0 | 0.00 | 100.00 |
| > 172 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 704

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Horizon - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|---|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 10 | 12 | 42 | 30 | 22 | 8 | 16 | 11 | 40 | 64 | 133 | 155 | 58 | 31 | 55 | 8 | 11 | 696 |
| 11 - 20 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 21 - 60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 61 - 110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 111 - 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 12 | 42 | 30 | 23 | 8 | 16 | 11 | 40 | 65 | 137 | 155 | 58 | 31 | 55 | 8 | 11 | 702 |

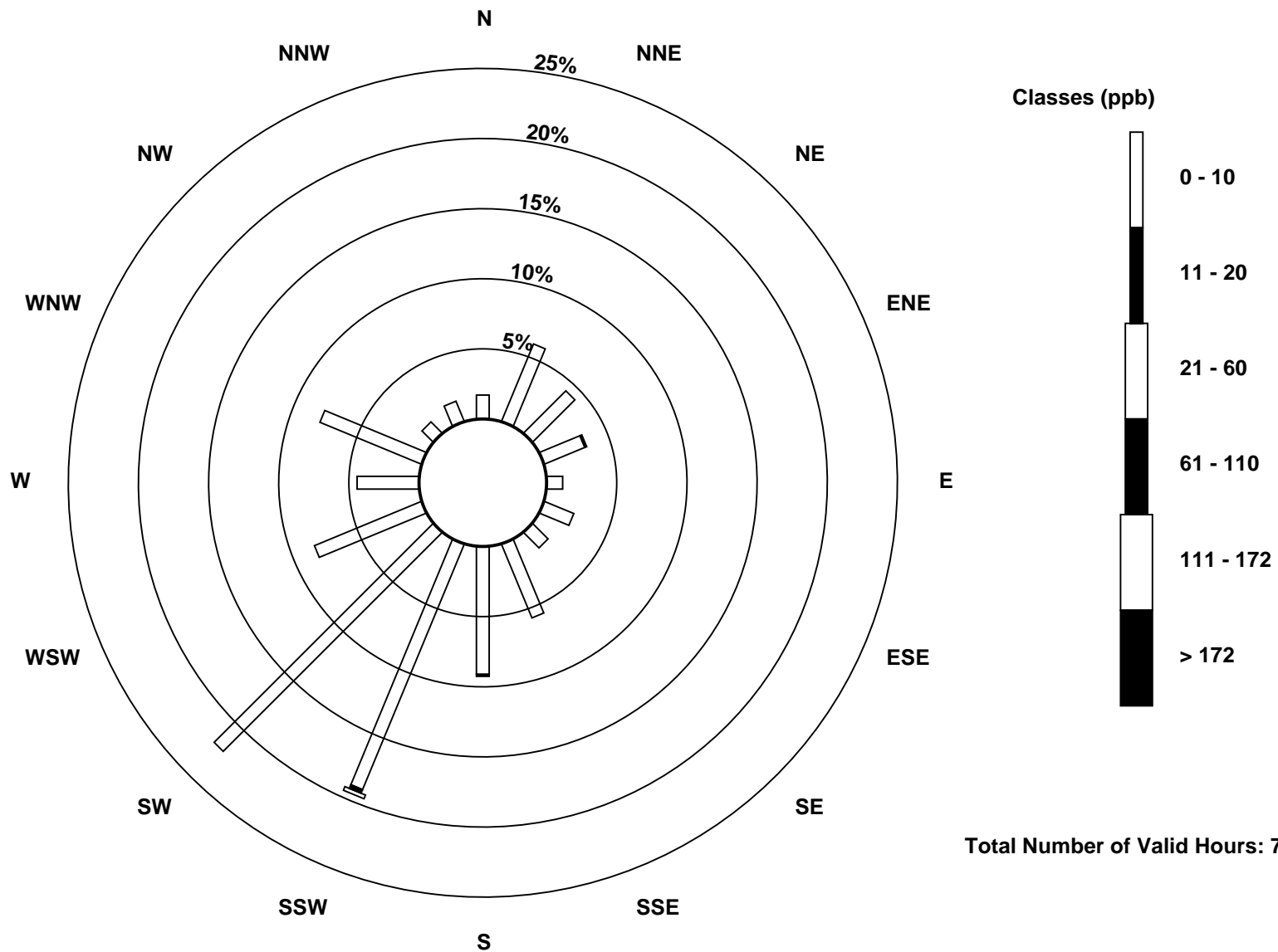
Total Number of Valid Hours: 702

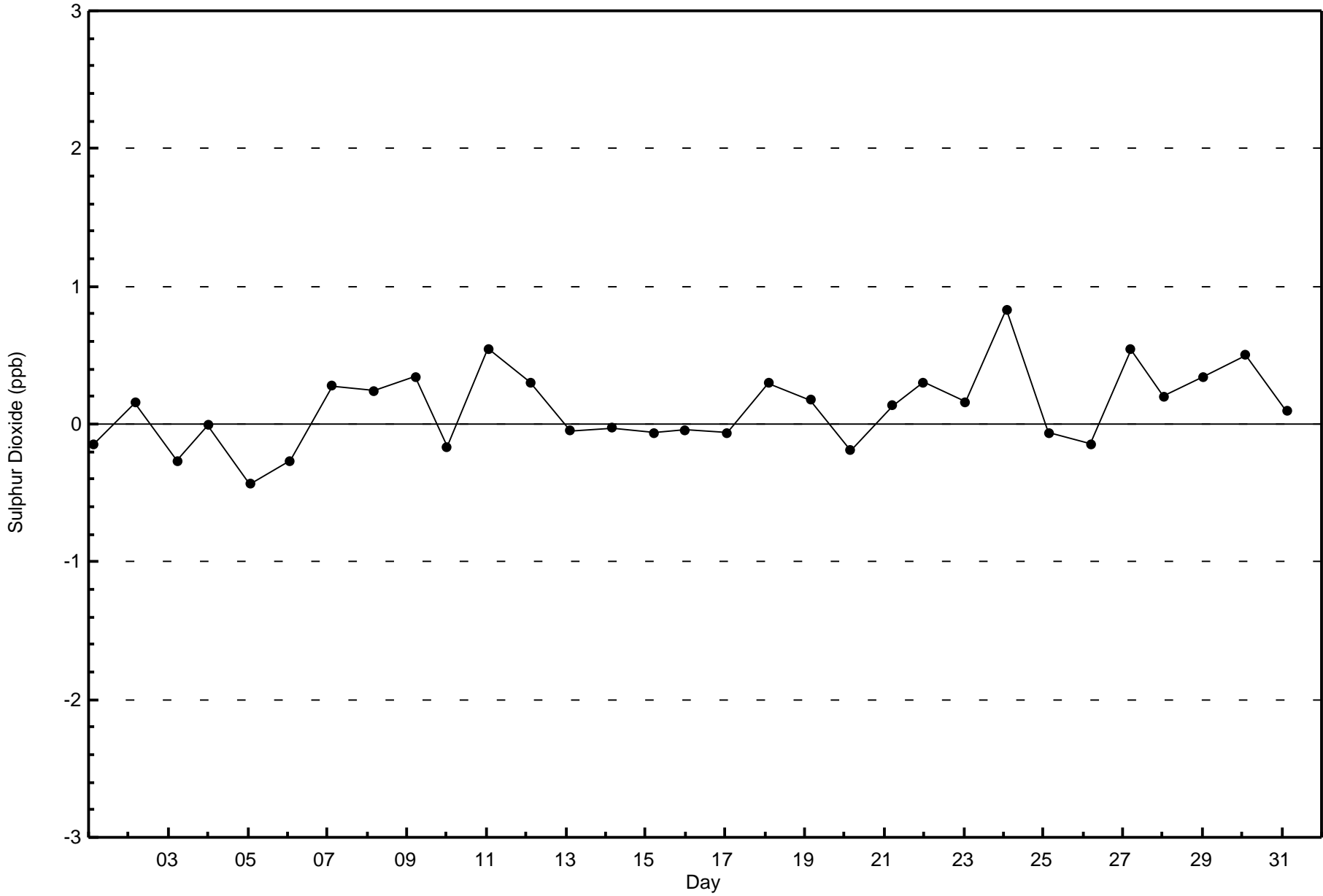
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Sulphur Dioxide (SO₂) - ppb
Horizon (AMS 15)

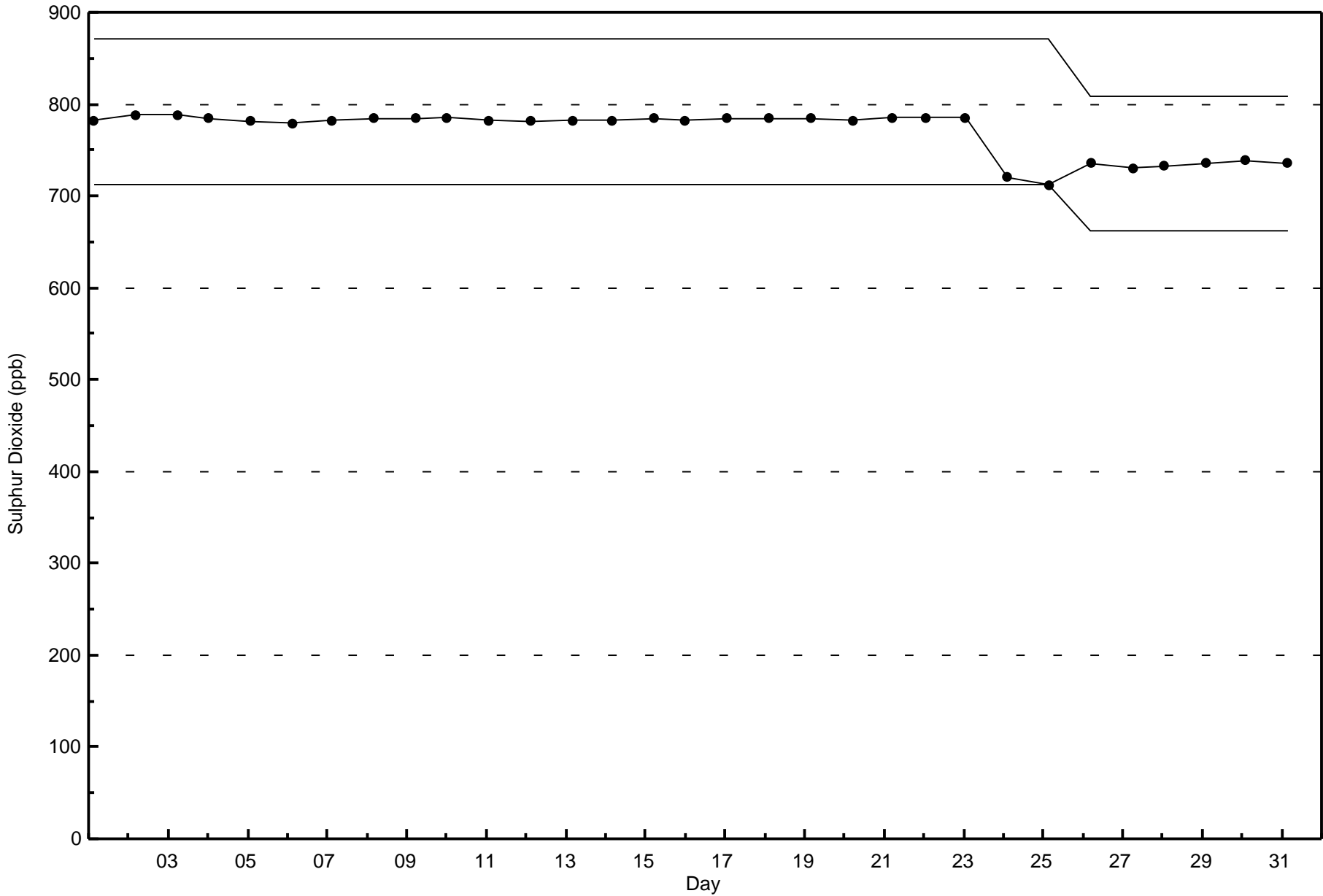






Wood Buffalo Environmental Association
Span Responses

Sulphur Dioxide (SO₂) - ppb
Horizon - August 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

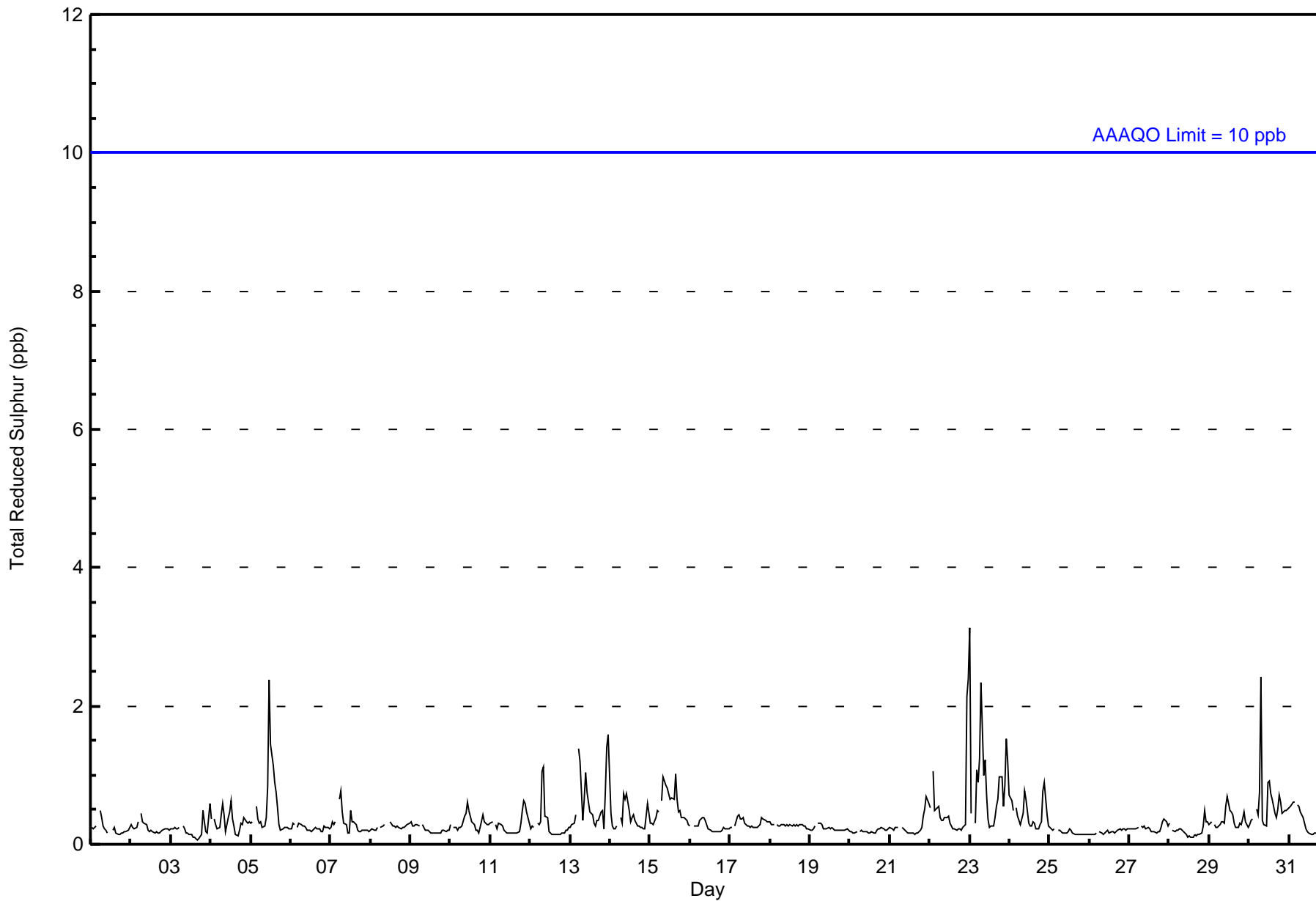
Horizon - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | |
|---|-------------------------------|---|---|---|---|---|---|---|---|--|----|----|----|----|----|----|----|----|----|--------------------------------|----|----|----|-----------------|---------------|---------------|
| Maximum Value: 3 ppb on Aug 23 01:00 | | | | | | | | | | Maximum Daily Average: 0.9 ppb on Aug 23 | | | | | | | | | | Hours of Data: 708 | | | | | | |
| Minimum Value: 0 ppb on Aug 3 17:00 | | | | | | | | | | Minimum Daily Average: 0.2 ppb on Aug 25 | | | | | | | | | | Hours of Missing Data: 36 | | | | | | |
| Maximum Diurnal Average: 0.5 ppb at hour 8 | | | | | | | | | | Minimum Diurnal Average: 0.2 ppb at hour 18 | | | | | | | | | | Hours of Calibration: 34 | | | | | | |
| Monthly Average: 0.3 ppb | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 1 | | | | | | | | | | Percent Operational Time: 99.7 | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | M | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 2-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.2 | 1 |
| 4-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 5-Aug | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 2 |
| 6-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 7-Aug | 0 | 0 | 0 | 0 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 8-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 9-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 10-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 11-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0.3 | 1 |
| 12-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 13-Aug | 0 | 0 | 0 | 0 | Z | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 0.6 | 2 |
| 14-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0.4 | 1 |
| 15-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 1 |
| 16-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 17-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 18-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 19-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 20-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0.3 | 1 |
| 22-Aug | 1 | Z | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0.5 | 2 |
| 23-Aug | 3 | 0 | Z | 0 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 0.9 | 3 |
| 24-Aug | 1 | 1 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0.4 | 1 |
| 25-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 26-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 28-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 29-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 30-Aug | 0 | 0 | 0 | Z | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0.6 | 2 |
| 31-Aug | 1 | 1 | 1 | 1 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 0.4 0.3 0.3 0.3 0.3 0.4 0.4 0.5 0.4 0.4 0.4 0.4 0.3 0.3 0.3 0.3 0.2 0.2 0.3 0.3 0.3 0.3 0.4 0.4 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| 3 1 1 1 1 1 1 2 1 1 1 2 1 1 1 1 1 1 1 1 1 1 2 2 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| Z - zerospan C - Calibration M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Horizon - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Horizon - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2 | 707 | 99.86 | 99.86 |
| 3 - 4 | 1 | 0.14 | 100.00 |
| 5 - 7 | 0 | 0.00 | 100.00 |
| 8 - 11 | 0 | 0.00 | 100.00 |
| > 11 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Horizon - August 2017

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---|-----------------------|-----|----|-----|---|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2 | 12 | 41 | 31 | 22 | 8 | 16 | 11 | 40 | 65 | 141 | 155 | 59 | 32 | 55 | 9 | 10 | 707 |
| 3 - 4 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 5 - 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 - 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 12 | 42 | 31 | 22 | 8 | 16 | 11 | 40 | 65 | 141 | 155 | 59 | 32 | 55 | 9 | 10 | 708 |

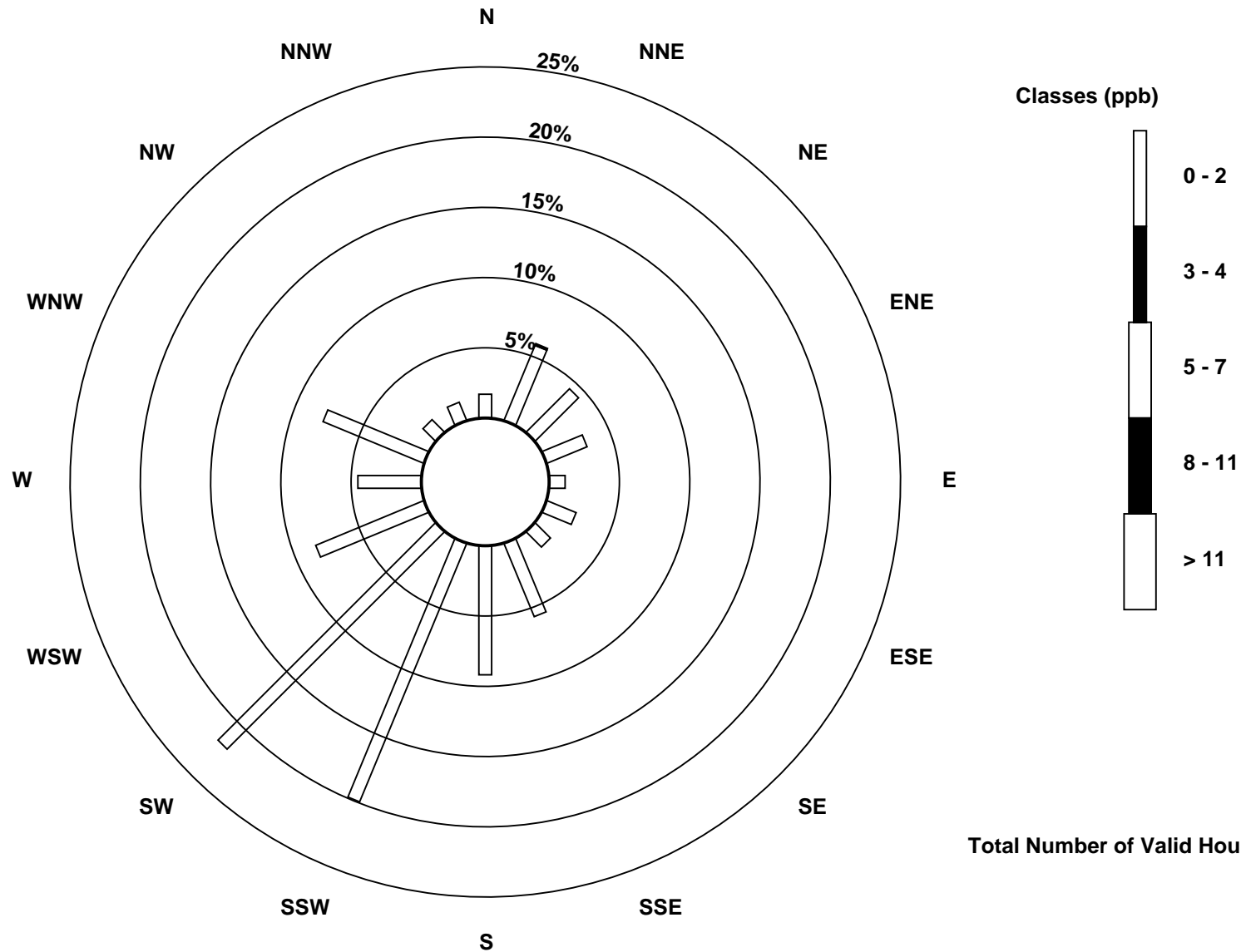
Total Number of Valid Hours: 708

Total Number of Hours: 744

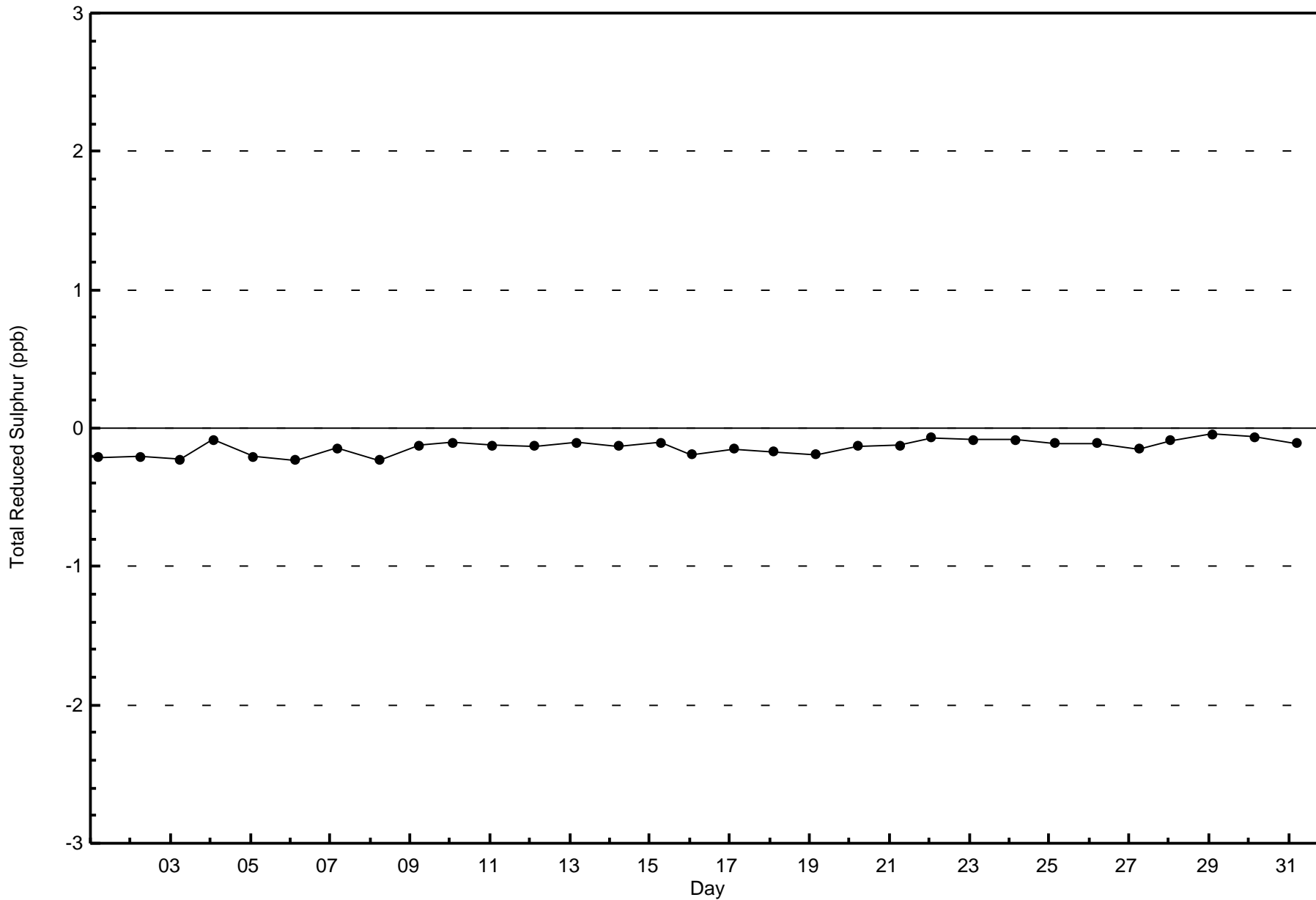


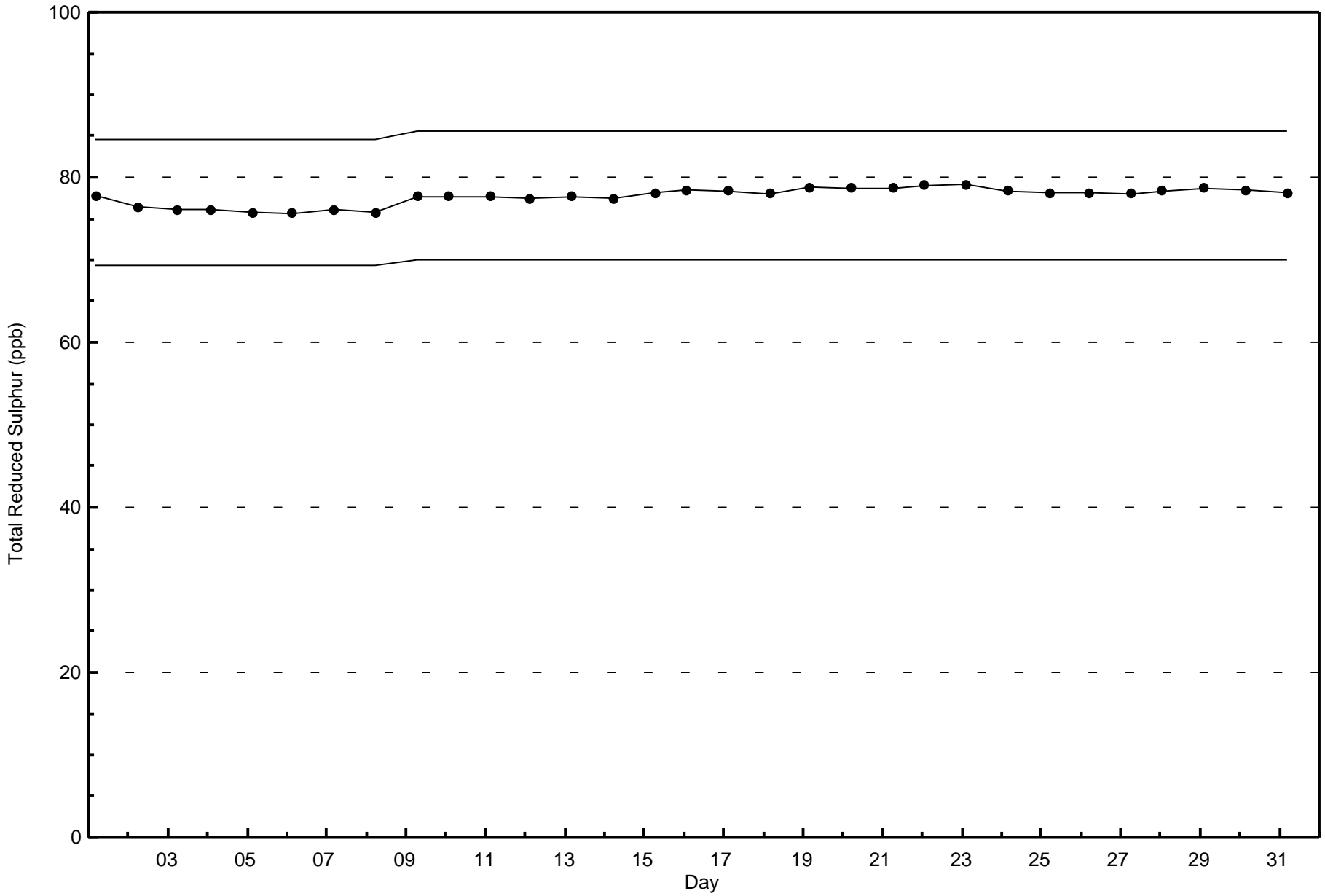
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Total Reduced Sulphur (TRS) - ppb
Horizon (AMS 15)



Total Number of Valid Hours: 708







Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

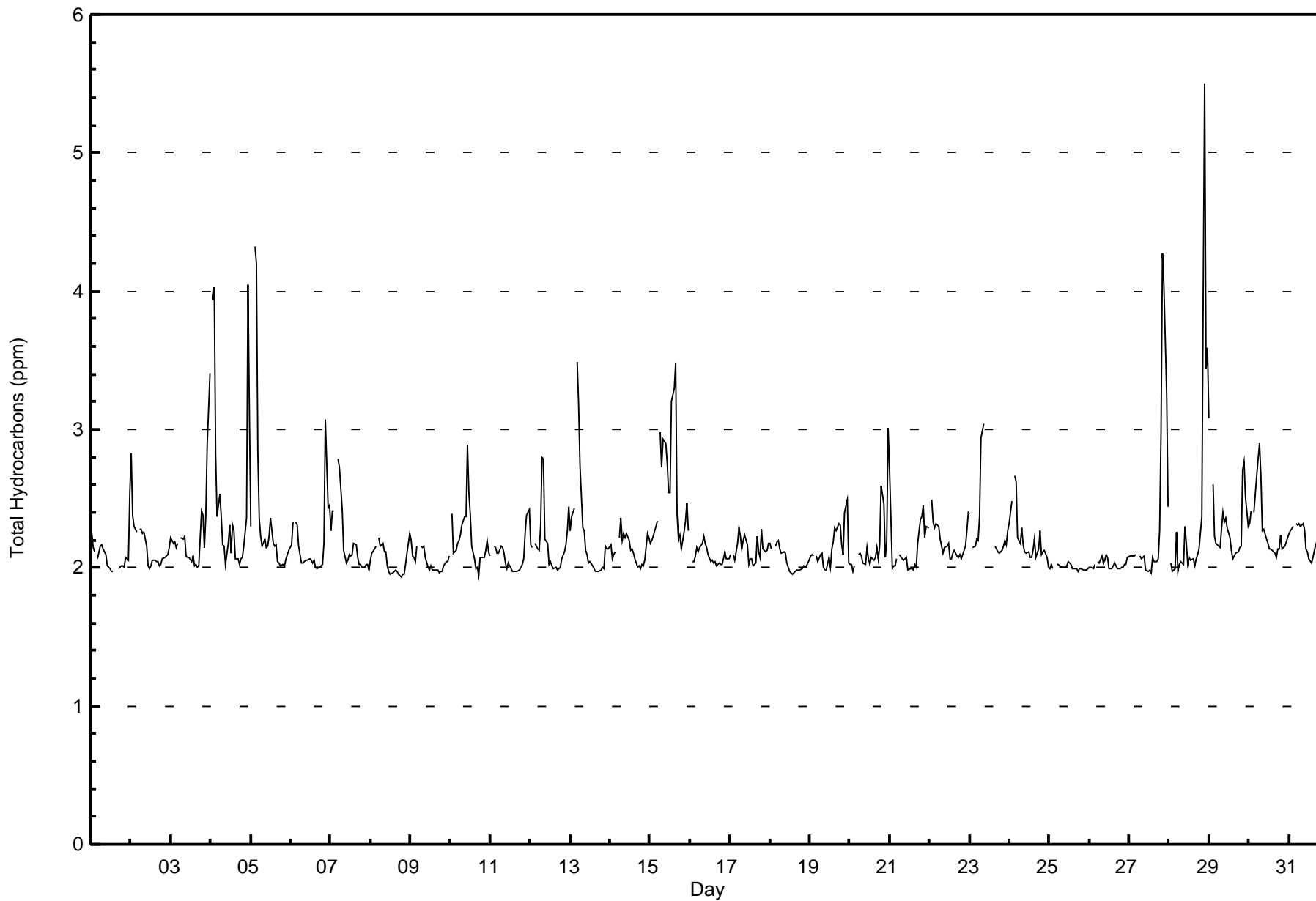
Horizon - August 2017

| Maximum Value: 5.5 ppm on Aug 28 22:00 | | | | | | | | | | | | | | | | | | | | Maximum Daily Average: 2.6 ppm on Aug 15 | | | | | Hours in Service: 744 | |
|--|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|-----|-----|-----|-----------------|--------------------------------|---------------|
| Minimum Value: 1.9 ppm on Aug 8 19:00 | | | | | | | | | | | | | | | | | | | | Minimum Daily Average: 2.0 ppm on Aug 25 | | | | | Hours of Data: 705 | |
| Maximum Diurnal Average: 2.4 ppm at hour 22 | | | | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 2.1 ppm at hour 18 | | | | | Hours of Missing Data: 39 | |
| Monthly Average: 2.20 ppm | | | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 2.0 P ₁₀ = 2.0 Q ₁ = 2.0 Median = 2.1 Q ₃ = 2.2 P ₉₀ = 2.4 P ₉₉ = 4.0 | | | | | Hours of Calibration: 37 | |
| | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 99.7 | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 2.3 | 2.1 | 2.1 | Z | 2.1 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | M | M | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | 2.5 | 2.1 | 2.5 |
| 2-Aug | 2.8 | 2.4 | 2.3 | Z | Z | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.8 |
| 3-Aug | 2.2 | 2.2 | 2.2 | 2.1 | 2.2 | Z | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.0 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.4 | 2.4 | 2.2 | 2.4 | 2.9 | 3.4 | 2.2 | 3.4 |
| 4-Aug | Z | 3.9 | 4.0 | 2.8 | 2.4 | 2.5 | 2.4 | 2.2 | 2.2 | 2.0 | 2.2 | 2.3 | 2.1 | 2.3 | 2.3 | 2.1 | 2.1 | 2.0 | 2.1 | 2.0 | 2.1 | 2.2 | 4.1 | 3.1 | 2.5 | 4.1 |
| 5-Aug | 2.3 | Z | 4.3 | 4.2 | 2.8 | 2.4 | 2.2 | 2.2 | 2.2 | 2.1 | 2.2 | 2.2 | 2.4 | 2.2 | 2.2 | 2.2 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.4 | 4.3 |
| 6-Aug | 2.2 | 2.3 | Z | Z | 2.3 | 2.3 | 2.2 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.2 | 3.1 | 2.4 | 2.5 | 2.2 | 3.1 |
| 7-Aug | 2.3 | 2.4 | 2.4 | Z | 2.8 | 2.7 | 2.6 | 2.4 | 2.1 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.2 | 2.8 |
| 8-Aug | 2.1 | 2.1 | 2.1 | 2.2 | Z | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.1 | 2.2 | 2.1 | 2.2 |
| 9-Aug | 2.2 | 2.1 | 2.1 | 2.0 | 2.2 | Z | 2.2 | 2.1 | 2.2 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | 2.2 |
| 10-Aug | Z | 2.4 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.3 | 2.4 | 2.4 | 2.9 | 2.5 | 2.4 | 2.2 | 2.1 | 2.0 | 2.0 | 1.9 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.2 | 2.9 |
| 11-Aug | 2.1 | Z | 2.2 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.2 | 2.4 | 2.4 | 2.1 | 2.4 |
| 12-Aug | 2.2 | 2.1 | Z | 2.2 | 2.1 | 2.1 | 2.3 | 2.8 | 2.8 | 2.2 | 2.2 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.2 | 2.3 | 2.4 | 2.2 | 2.8 |
| 13-Aug | 2.3 | 2.4 | 2.4 | Z | 3.5 | 3.2 | 2.7 | 2.3 | 2.3 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.2 | 2.1 | 2.1 | 2.2 | 3.5 |
| 14-Aug | 2.2 | 2.1 | 2.1 | 2.1 | Z | 2.2 | 2.4 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.3 | 2.2 | 2.1 | 2.4 |
| 15-Aug | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | Z | 3.0 | 2.7 | 2.9 | 2.9 | 2.8 | 2.5 | 2.5 | 3.2 | 3.3 | 3.5 | 2.4 | 2.2 | 2.2 | 2.1 | 2.3 | 2.3 | 2.5 | 2.3 | 2.6 | 3.5 |
| 16-Aug | Z | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.0 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 |
| 17-Aug | 2.1 | Z | 2.1 | 2.1 | 2.2 | 2.3 | 2.2 | 2.1 | 2.2 | 2.2 | 2.2 | 2.0 | 2.1 | 2.1 | 2.0 | 2.0 | 2.2 | 2.1 | 2.1 | 2.3 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.3 |
| 18-Aug | 2.2 | 2.1 | Z | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.2 |
| 19-Aug | 2.1 | 2.1 | 2.1 | Z | 2.1 | 2.0 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | 2.1 | 2.2 | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.1 | 2.4 | 2.5 | 2.0 | 2.1 | 2.5 |
| 20-Aug | 2.0 | 2.0 | 2.0 | 2.0 | Z | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.1 | 2.1 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.6 | 2.5 | 2.1 | 2.2 | 3.0 | 2.2 | 3.0 |
| 21-Aug | 2.7 | 2.0 | 2.0 | 2.0 | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.2 | 2.4 | 2.4 | 2.5 | 2.2 | 2.3 | 2.3 | 2.1 | 2.7 |
| 22-Aug | Z | 2.5 | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.3 | 2.4 | 2.2 | 2.5 |
| 23-Aug | 2.4 | Z | 2.1 | 2.2 | 2.2 | 2.2 | 2.4 | 2.9 | 3.0 | C | C | C | C | C | C | C | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.3 | -- | 3.0 |
| 24-Aug | 2.3 | 2.5 | Z | 2.7 | 2.6 | 2.2 | 2.2 | 2.3 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.1 | 2.3 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.2 | 2.7 |
| 25-Aug | 2.0 | 2.0 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| 26-Aug | 2.0 | 2.0 | 2.0 | 2.0 | Z | 2.0 | 2.0 | 2.1 | 2.0 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | 2.1 |
| 27-Aug | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | 2.0 | 2.1 | 2.3 | 3.0 | 4.3 | 4.0 | 3.2 | 2.4 | 2.4 | 4.3 |
| 28-Aug | Z | 2.0 | 2.0 | 2.0 | 2.3 | 2.0 | 2.0 | 2.0 | 2.0 | 2.3 | 2.2 | 2.0 | 2.1 | 2.1 | 2.1 | 2.0 | 2.1 | 2.1 | 2.1 | 2.4 | 4.0 | 5.5 | 3.4 | 3.6 | 2.4 | 5.5 |
| 29-Aug | 3.1 | Z | 2.6 | 2.2 | 2.2 | 2.2 | 2.1 | 2.3 | 2.4 | 2.3 | 2.4 | 2.3 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.7 | 2.8 | 2.5 | 2.3 | 2.3 | 3.1 |
| 30-Aug | 2.3 | 2.4 | Z | 2.4 | 2.7 | 2.8 | 2.9 | 2.7 | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.2 | 2.2 | 2.2 | 2.3 | 2.9 |
| 31-Aug | 2.2 | 2.3 | 2.3 | Z | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.1 | 2.1 | 2.1 | 2.0 | 2.1 | 2.1 | 2.2 | 2.2 | 2.5 | 2.8 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.8 |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| Z - zerospan C - Calibration M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Horizon - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Horizon - August 2017

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2.0 | 215 | 30.50 | 30.50 |
| 2.1 - 3.0 | 469 | 66.52 | 97.02 |
| 3.1 - 10.0 | 21 | 2.98 | 100.00 |
| > 10.0 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 705

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Horizon - August 2017

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---|-----------------------|-----|----|-----|---|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2.0 | 1 | 5 | 14 | 4 | 0 | 1 | 1 | 11 | 17 | 50 | 69 | 26 | 10 | 5 | 1 | 0 | 215 |
| 2.1 - 3.0 | 10 | 36 | 15 | 18 | 8 | 15 | 10 | 29 | 48 | 84 | 85 | 32 | 17 | 46 | 6 | 8 | 467 |
| 3.1 - 10.0 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 4 | 4 | 1 | 3 | 21 |
| > 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 12 | 43 | 30 | 23 | 8 | 16 | 11 | 40 | 65 | 137 | 155 | 58 | 31 | 55 | 8 | 11 | 703 |

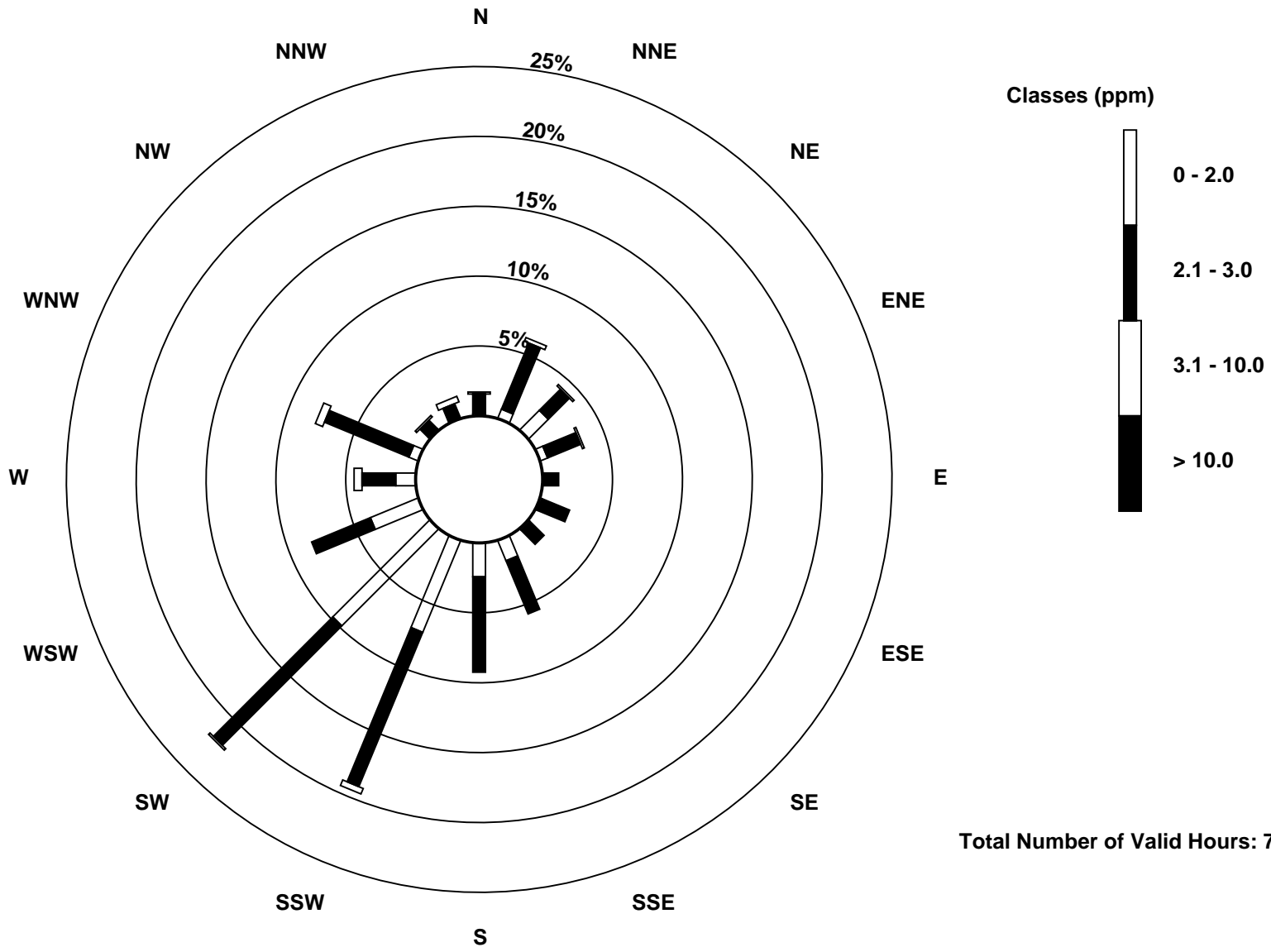
Total Number of Valid Hours: 703

Total Number of Hours: 744

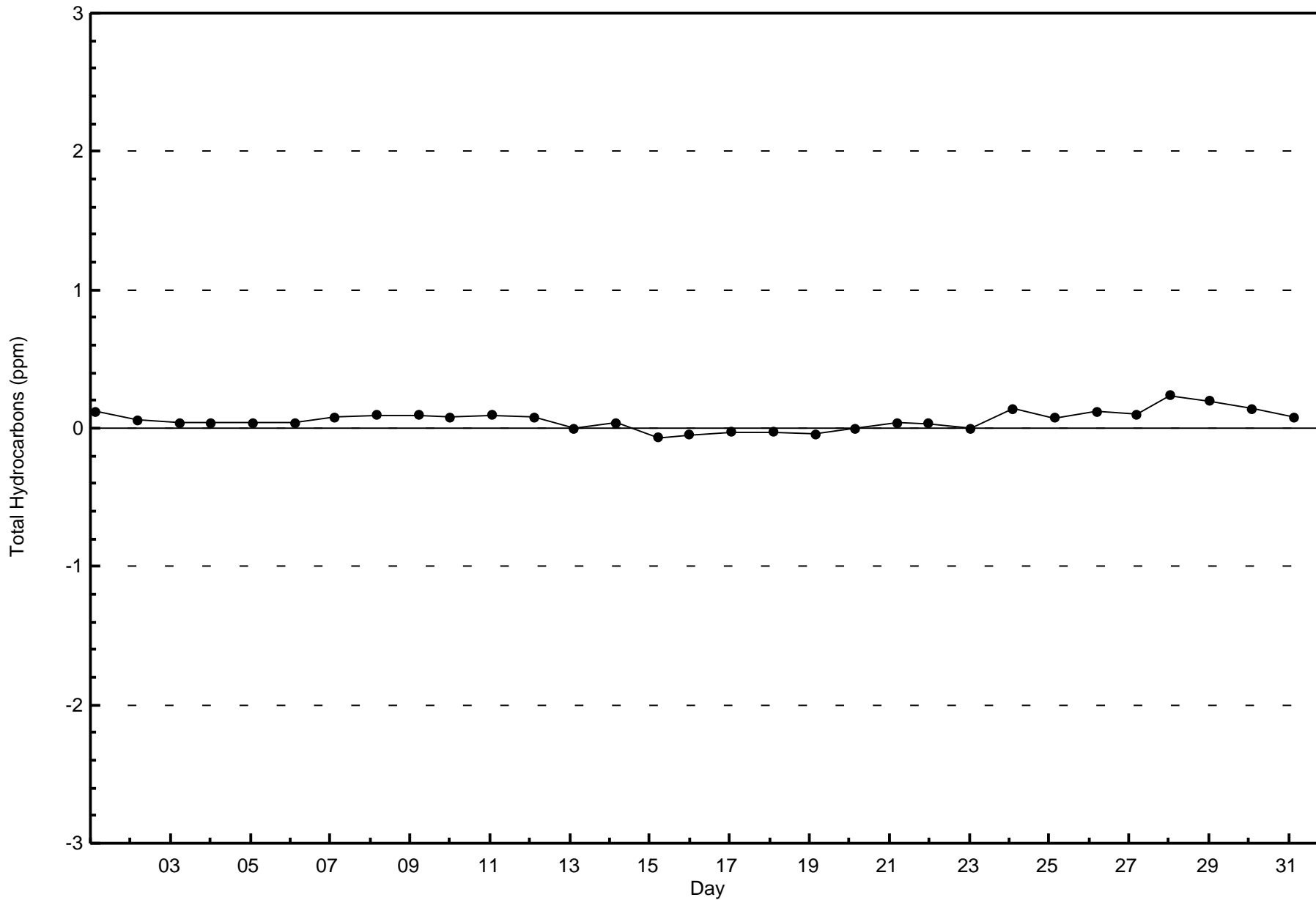


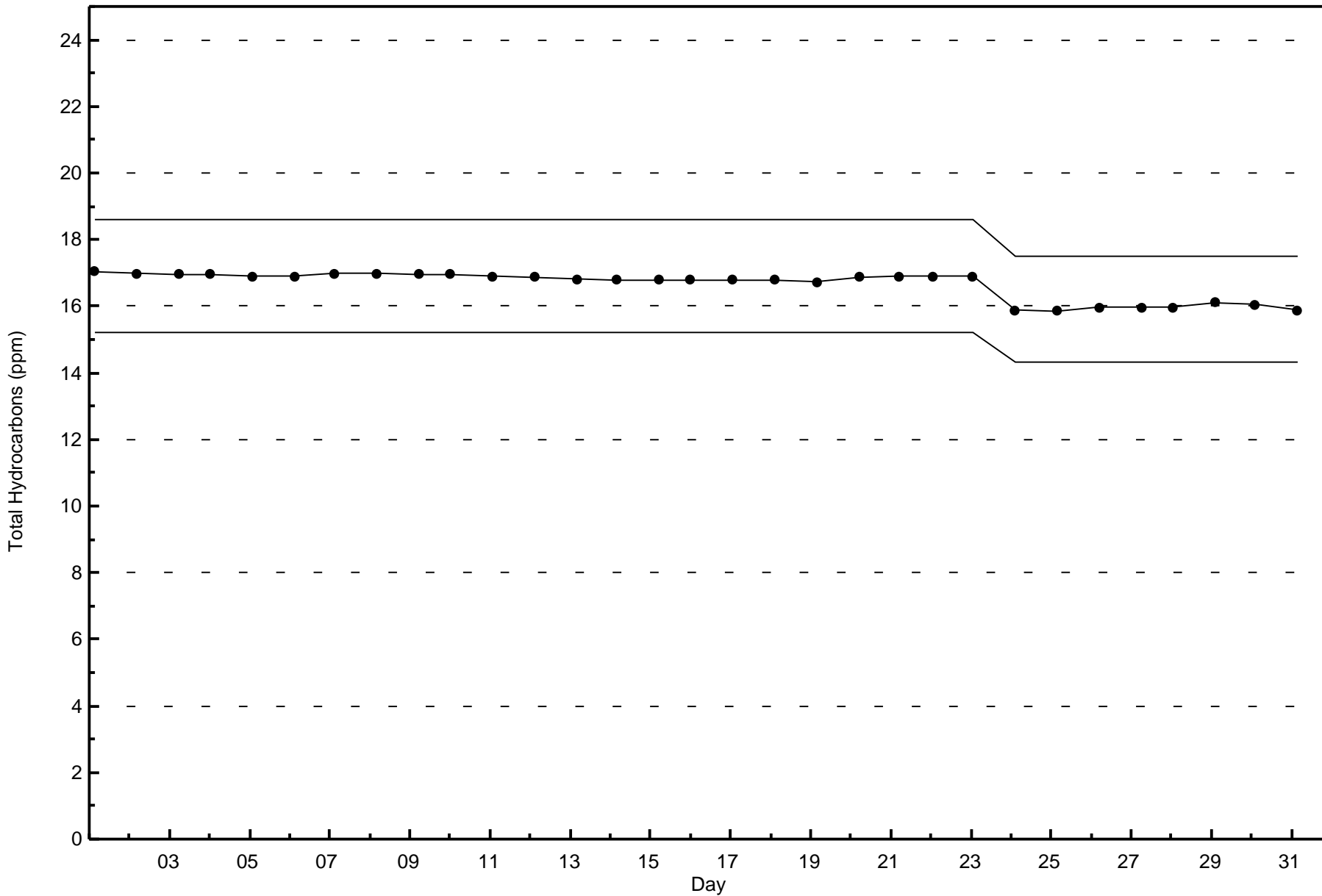
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Total Hydrocarbons (THC) - ppm
Horizon (AMS 15)



Total Number of Valid Hours: 703







Wood Buffalo Environmental Association
Summary of Hour Averages

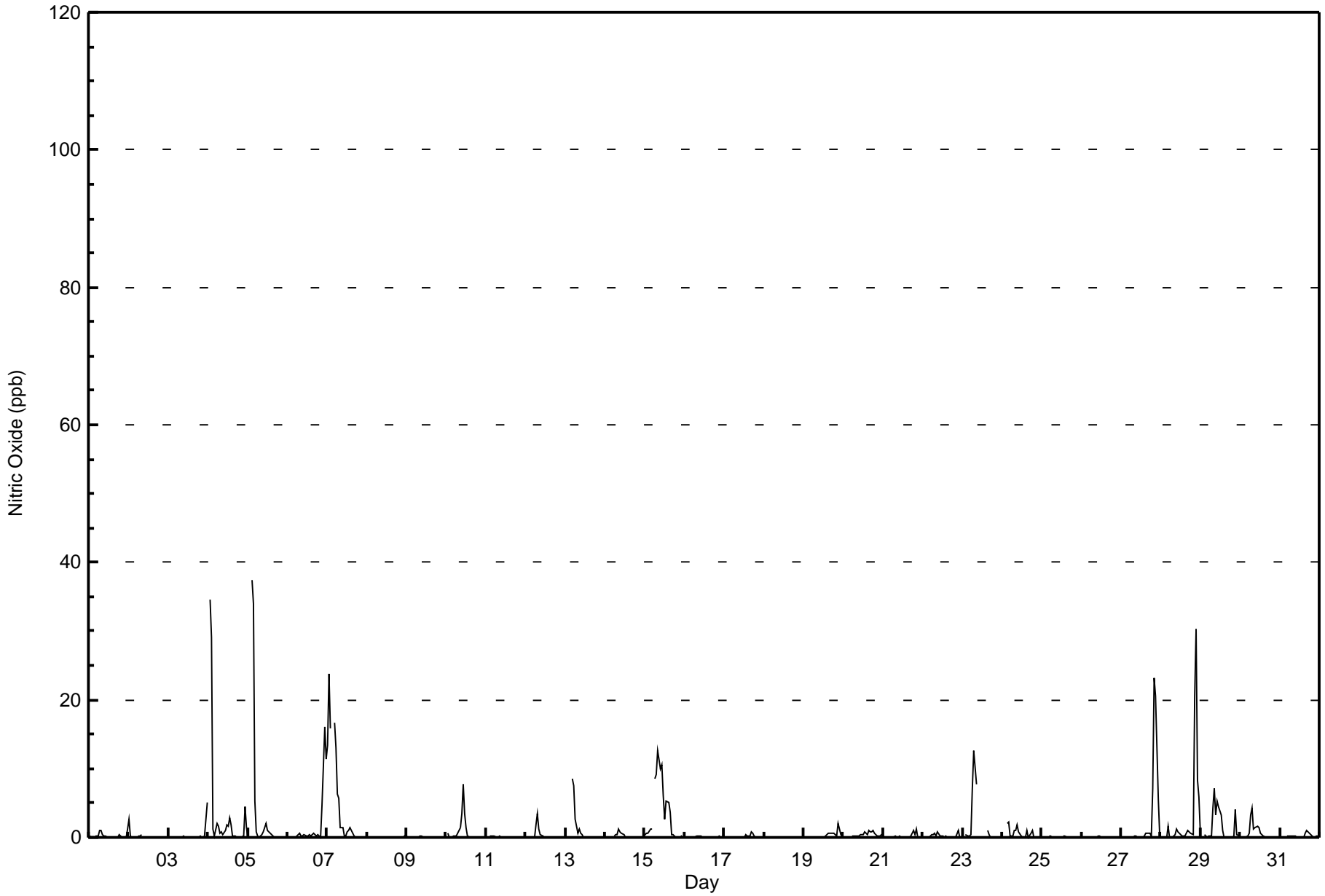
Nitric Oxide (NO) - ppb
Horizon - August 2017

| Maximum Value: 37 ppb on Aug 5 03:00 | | | | | | | | | | | | | | | | | Maximum Daily Average: 4.4 ppb on Aug 7 | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|----|----|----|----|----|---|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|---------------------------|---------------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|-----------------|
| Minimum Value: 0 ppb on Aug 1 16:00 | | | | | | | | | | | | | | | | | Minimum Daily Average: 0.0 ppb on Aug 18 | | | | | | | Hours of Data: 703 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 3.2 ppb at hour 3 | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 0.2 ppb at hour 18 | | | | | | | Hours of Missing Data: 41 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 1.0 ppb | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 23 | | | | | | | Hours of Calibration: 37 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | Percent Operational Time: 99.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 0 | 0 | 0 | Z | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 3 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | M | M | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 3 | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0.3 | 5 | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | Z | 35 | 29 | 1 | 0 | 2 | 2 | 1 | 1 | 0 | 1 | 2 | 2 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 3.7 | 35 | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 0 | Z | 37 | 34 | 5 | 1 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.7 | 37 | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 5 | 16 | 11 | 1.6 | 16 | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 13 | 24 | 16 | Z | 17 | 13 | 6 | 6 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4.4 | 24 | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | Z | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 4 | 8 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.9 | 8 | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 0 | 0 | Z | 0 | 0 | 0 | 2 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 3 | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 0 | 0 | 0 | Z | 8 | 7 | 3 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.9 | 8 | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 0 | 1 | 1 | 1 | 1 | Z | 9 | 9 | 13 | 10 | 11 | 6 | 3 | 5 | 5 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.4 | 13 | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0.3 | 2 | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 0 | Z | 0 | 0 | 0 | 0 | 7 | 13 | 8 | C | C | C | C | C | C | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -- | 13 | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 0 | 0 | Z | 2 | 2 | 0 | 0 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0.5 | 2 | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 7 | 23 | 21 | 6 | 0 | 2.6 | 23 | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | Z | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 21 | 30 | 8 | 6 | 3.2 | 30 | | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 1 | Z | 0 | 0 | 0 | 0 | 0 | 4 | 7 | 3 | 5 | 5 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 1.5 | 7 | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 0 | 0 | Z | 0 | 0 | 1 | 3 | 4 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 4 | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.7 | 2.3 | 3.2 | 1.6 | 1.4 | 1.0 | 1.1 | 1.5 | 1.3 | 1.0 | 1.1 | 0.8 | 0.4 | 0.4 | 0.4 | 0.4 | 0.2 | 0.2 | 0.2 | 0.3 | 1.5 | 2.0 | 1.2 | 0.9 | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | | | | | | | 13 | 35 | 37 | 34 | 17 | 13 | 9 | 13 | 13 | 10 | 11 | 6 | 3 | 5 | 5 | 4 | 1 | 1 | 1 | 1 | 7 | 23 | 30 | 16 | 11 | Diurnal Maximum |
| Z - zerospan C - Calibration M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Horizon - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Horizon - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 694 | 98.72 | 98.72 |
| 21 - 40 | 9 | 1.28 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 703

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Horizon - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|---|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 12 | 42 | 32 | 23 | 8 | 16 | 11 | 40 | 64 | 132 | 155 | 58 | 30 | 51 | 7 | 11 | 692 |
| 21 - 40 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 4 | 1 | 0 | 9 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 12 | 43 | 32 | 23 | 8 | 16 | 11 | 40 | 64 | 134 | 155 | 58 | 31 | 55 | 8 | 11 | 701 |

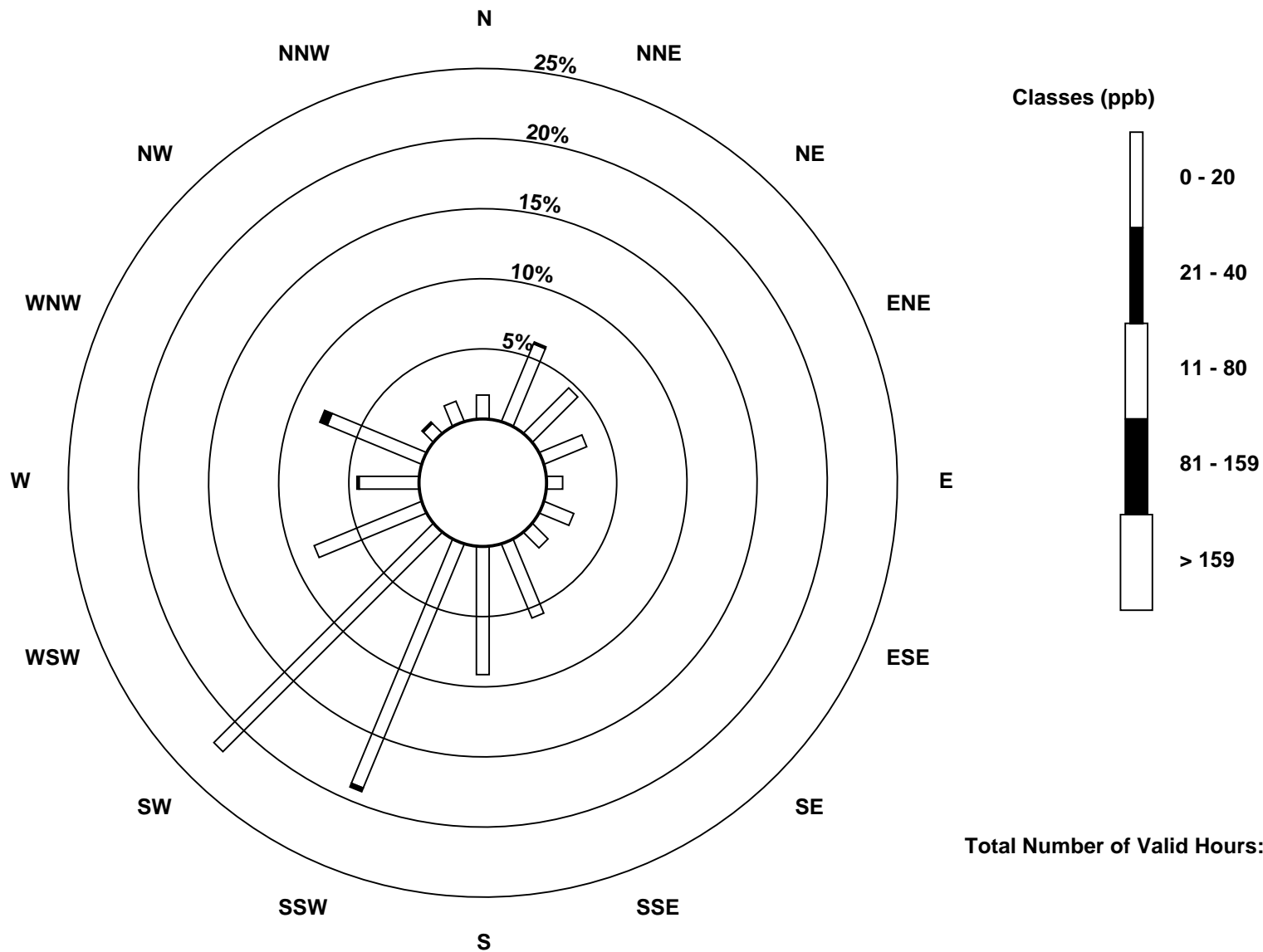
Total Number of Valid Hours: 701

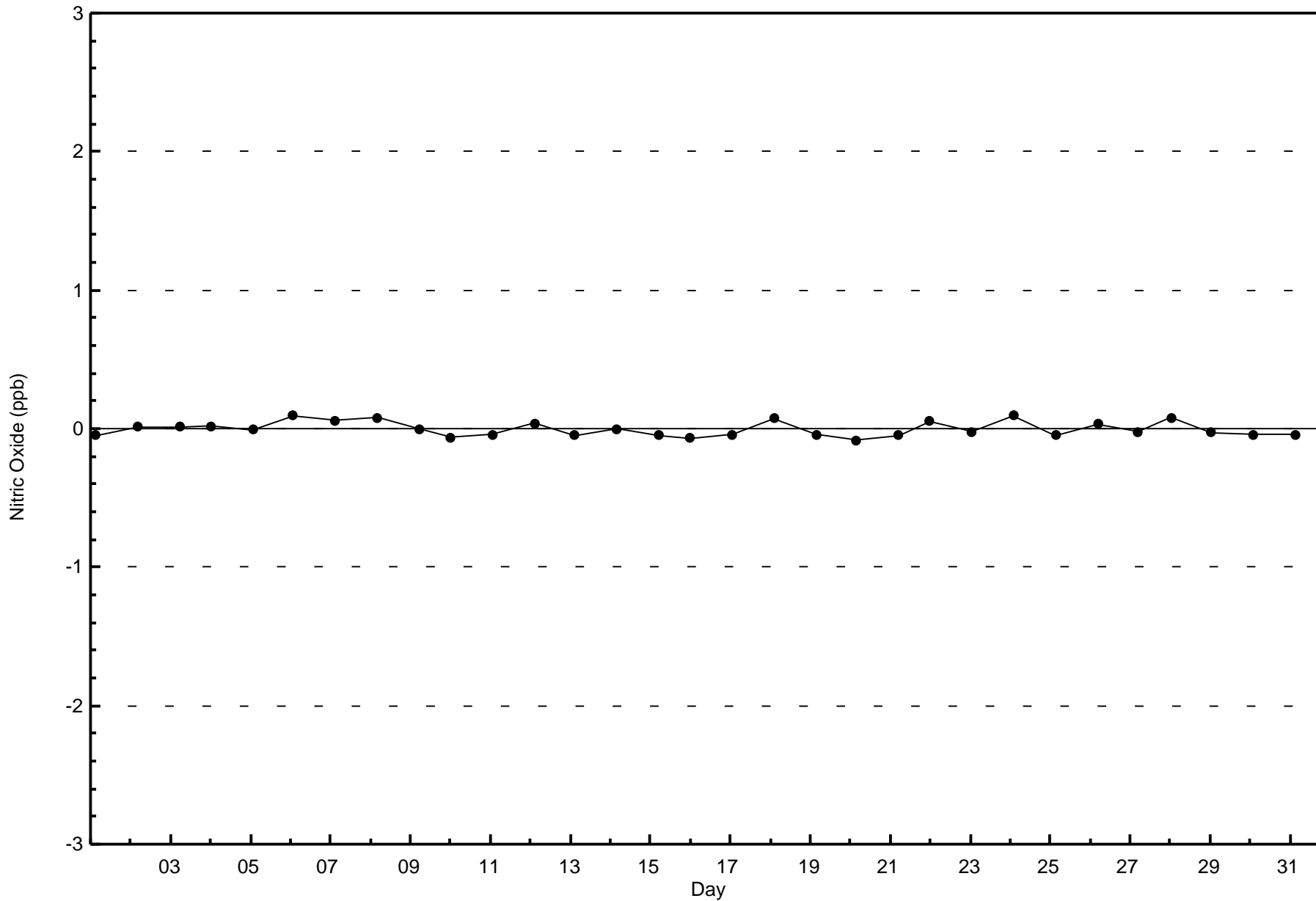
Total Number of Hours: 744

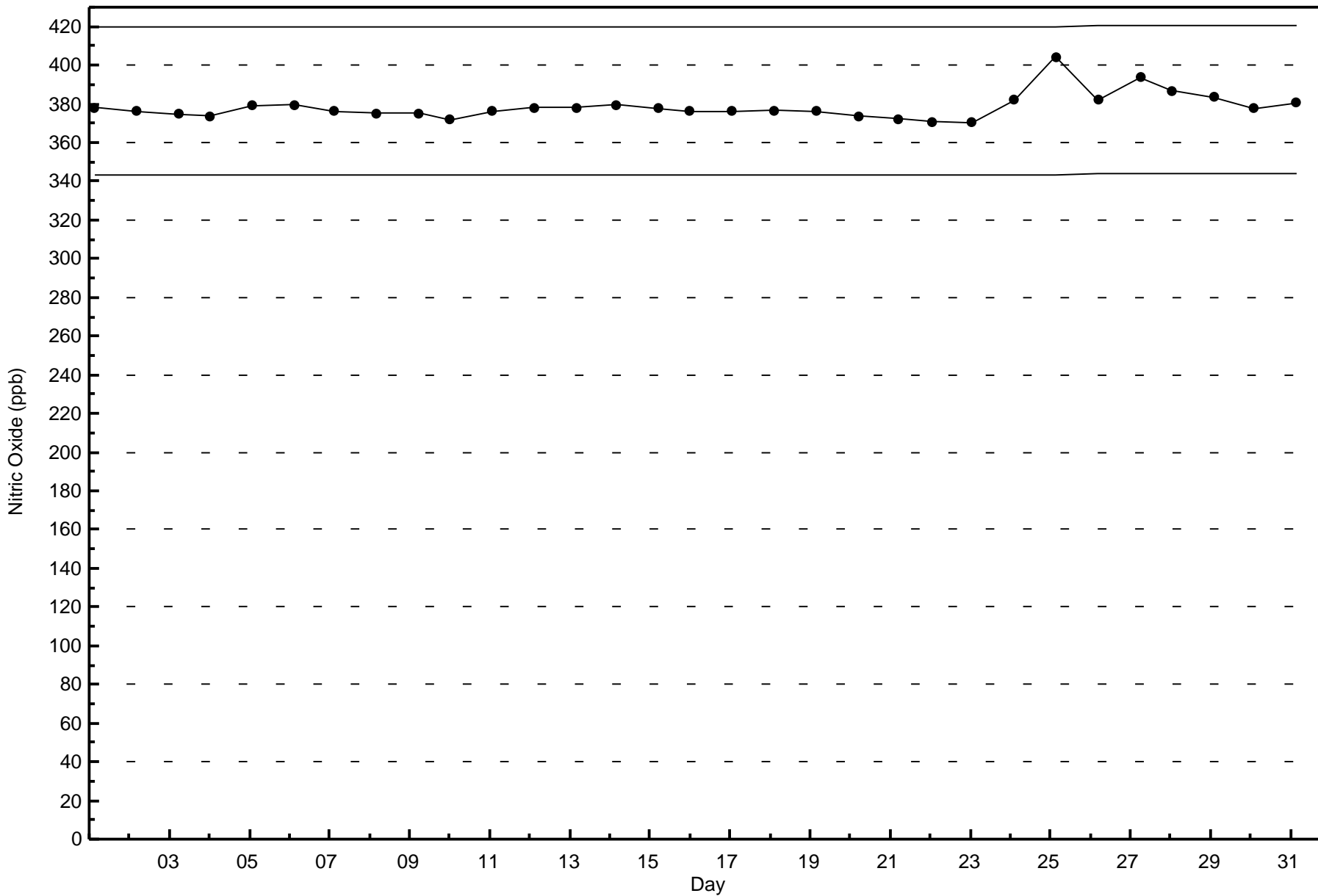


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitric Oxide (NO) - ppb
Horizon (AMS 15)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Horizon - August 2017

| | | | | |
|---|---|----------|---------------------------|------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 30 ppb on Aug 28 21:00 | Maximum Daily Average: 7.7 ppb on Aug 28 | | Hours of Data: | 703 |
| Minimum Value: 0 ppb on Aug 19 09:00 | Minimum Daily Average: 0.1 ppb on Aug 26 | | Hours of Missing Data: | 41 |
| Maximum Diurnal Average: 5.3 ppb at hour 23 | Minimum Diurnal Average: 1.8 ppb at hour 17 | | Hours of Calibration: | 37 |
| Monthly Average: 3.0 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 4 P ₉₀ = 9 P ₉₉ = 22 | | Percent Operational Time: | 99.5 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 1 | 1 | 0 | Z | 0 | 1 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 1 | 1 | 1 | 9 | 1.4 | 9 |
| 2-Aug | 11 | 5 | 3 | 3 | Z | 0 | 1 | 1 | 1 | M | M | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.3 | 11 |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 8 | 3 | 4 | 8 | 13 | 2.0 | 13 |
| 4-Aug | Z | 12 | 12 | 6 | 2 | 4 | 4 | 2 | 3 | 2 | 3 | 5 | 6 | 9 | 9 | 2 | 2 | 2 | 3 | 2 | 5 | 6 | 20 | 12 | 5.8 | 20 |
| 5-Aug | 4 | Z | 15 | 12 | 5 | 2 | 1 | 1 | 2 | 3 | 6 | 11 | 9 | 6 | 4 | 4 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 4.0 | 15 |
| 6-Aug | 1 | 5 | Z | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 12 | 16 | 14 | 3.0 | 16 |
| 7-Aug | 14 | 15 | 13 | Z | 11 | 8 | 6 | 7 | 3 | 2 | 1 | 1 | 2 | 3 | 4 | 3 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 4.2 | 15 |
| 8-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 10 | 0.7 | 10 |
| 9-Aug | 4 | 1 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 0.5 | 4 |
| 10-Aug | Z | 5 | 1 | 0 | 0 | 0 | 0 | 1 | 3 | 7 | 19 | 15 | 11 | 5 | 3 | 1 | 2 | 1 | 3 | 5 | 3 | 3 | 4 | 2 | 4.1 | 19 |
| 11-Aug | 1 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 8 | 13 | 1.6 | 13 |
| 12-Aug | 2 | 1 | Z | 1 | 0 | 1 | 6 | 11 | 6 | 4 | 3 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 2 | 3 | 5 | 9 | 15 | 3.0 | 15 | |
| 13-Aug | 4 | 7 | 8 | Z | 22 | 17 | 10 | 4 | 6 | 5 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 4 | 4.5 | 22 | |
| 14-Aug | 8 | 2 | 2 | 1 | Z | 2 | 4 | 3 | 6 | 5 | 6 | 5 | 2 | 2 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 2 | 2 | 2.4 | 8 | |
| 15-Aug | 1 | 2 | 3 | 5 | 6 | Z | 5 | 7 | 9 | 9 | 10 | 9 | 7 | 12 | 15 | 16 | 7 | 5 | 5 | 3 | 4 | 6 | 9 | 3 | 6.8 | 16 |
| 16-Aug | Z | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 17-Aug | 0 | Z | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 5 | 3 | 5 | 7 | 2 | 1 | 1 | 1 | 1.4 | 7 |
| 18-Aug | 0 | 0 | Z | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 19-Aug | 0 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 3 | 3 | 4 | 5 | 4 | 1 | 16 | 6 | 0 | 1.9 | 16 |
| 20-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 1 | 3 | 3 | 3 | 7 | 9 | 4 | 0 | 2 | 12 | 2.1 | 12 |
| 21-Aug | 9 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 8 | 11 | 10 | 2 | 2 | 3 | 2.1 | 11 |
| 22-Aug | Z | 5 | 4 | 2 | 2 | 3 | 2 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 9 | 5 | 5 | 2.6 | 9 |
| 23-Aug | 4 | Z | 4 | 4 | 4 | 3 | 7 | 13 | 11 | C | C | C | C | C | C | 4 | 4 | 2 | 3 | 4 | 6 | 7 | 5 | 3 | -- | 13 |
| 24-Aug | 3 | 4 | Z | 8 | 7 | 3 | 2 | 5 | 3 | 4 | 3 | 2 | 2 | 1 | 2 | 4 | 1 | 4 | 9 | 3 | 3 | 3 | 2 | 1 | 3.4 | 9 |
| 25-Aug | 1 | 1 | 1 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 26-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 27-Aug | 1 | 1 | 0 | 1 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 3 | 3 | 5 | 6 | 29 | 30 | 26 | 19 | 10 | 5.9 | 30 |
| 28-Aug | Z | 1 | 1 | 1 | 7 | 0 | 0 | 0 | 1 | 4 | 3 | 2 | 2 | 1 | 2 | 4 | 6 | 7 | 9 | 17 | 30 | 30 | 27 | 23 | 7.7 | 30 |
| 29-Aug | 15 | Z | 9 | 1 | 1 | 1 | 1 | 5 | 8 | 5 | 9 | 9 | 9 | 4 | 2 | 1 | 2 | 3 | 5 | 6 | 20 | 24 | 13 | 6 | 6.8 | 24 |
| 30-Aug | 6 | 8 | Z | 5 | 9 | 11 | 9 | 8 | 4 | 4 | 6 | 6 | 4 | 4 | 3 | 2 | 2 | 4 | 4 | 4 | 1 | 1 | 1 | 1 | 4.6 | 11 |
| 31-Aug | 1 | 1 | 2 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 3 | 5 | 7 | 10 | 12 | 1 | 0 | 0 | 0 | 2.1 | 12 |

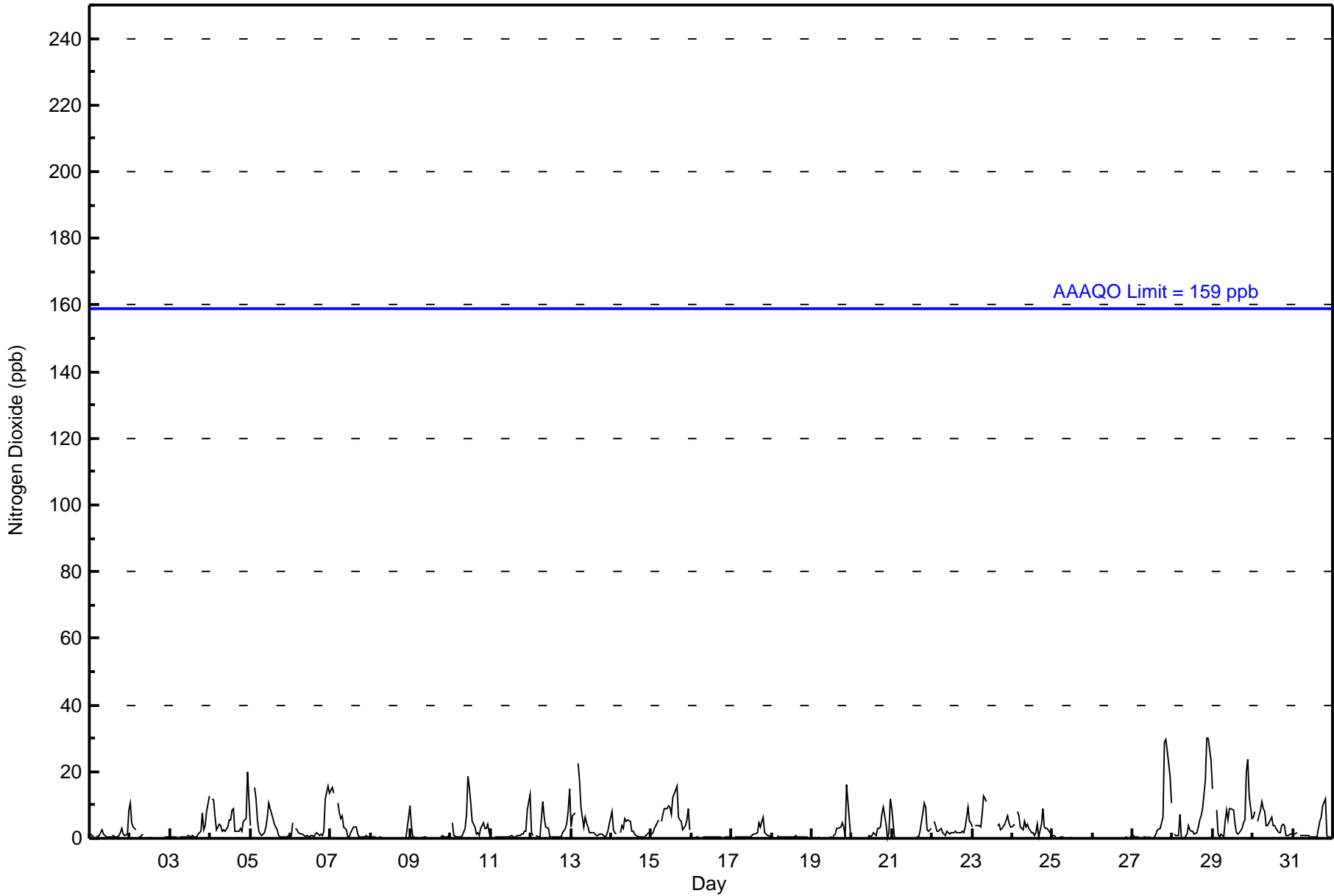
| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|--|
| 3.5 | 3.0 | 3.0 | 2.2 | 3.3 | 2.4 | 2.1 | 2.5 | 2.4 | 2.1 | 2.7 | 2.6 | 2.1 | 2.0 | 1.9 | 2.0 | 1.8 | 2.0 | 3.0 | 4.3 | 4.4 | 5.2 | 5.3 | 5.3 | Diurnal Average | |
| 15 | 15 | 15 | 12 | 22 | 17 | 10 | 13 | 11 | 9 | 19 | 15 | 11 | 12 | 15 | 16 | 7 | 7 | 10 | 29 | 30 | 30 | 27 | 23 | Diurnal Maximum | |

Z - zerospan C - Calibration M - Maintenance
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Horizon - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Horizon - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 694 | 98.72 | 98.72 |
| 21 - 40 | 9 | 1.28 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 703

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Horizon - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 12 | 43 | 32 | 23 | 8 | 16 | 10 | 40 | 64 | 134 | 155 | 58 | 29 | 50 | 8 | 10 | 692 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 5 | 0 | 1 | 9 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 12 | 43 | 32 | 23 | 8 | 16 | 11 | 40 | 64 | 134 | 155 | 58 | 31 | 55 | 8 | 11 | 701 |

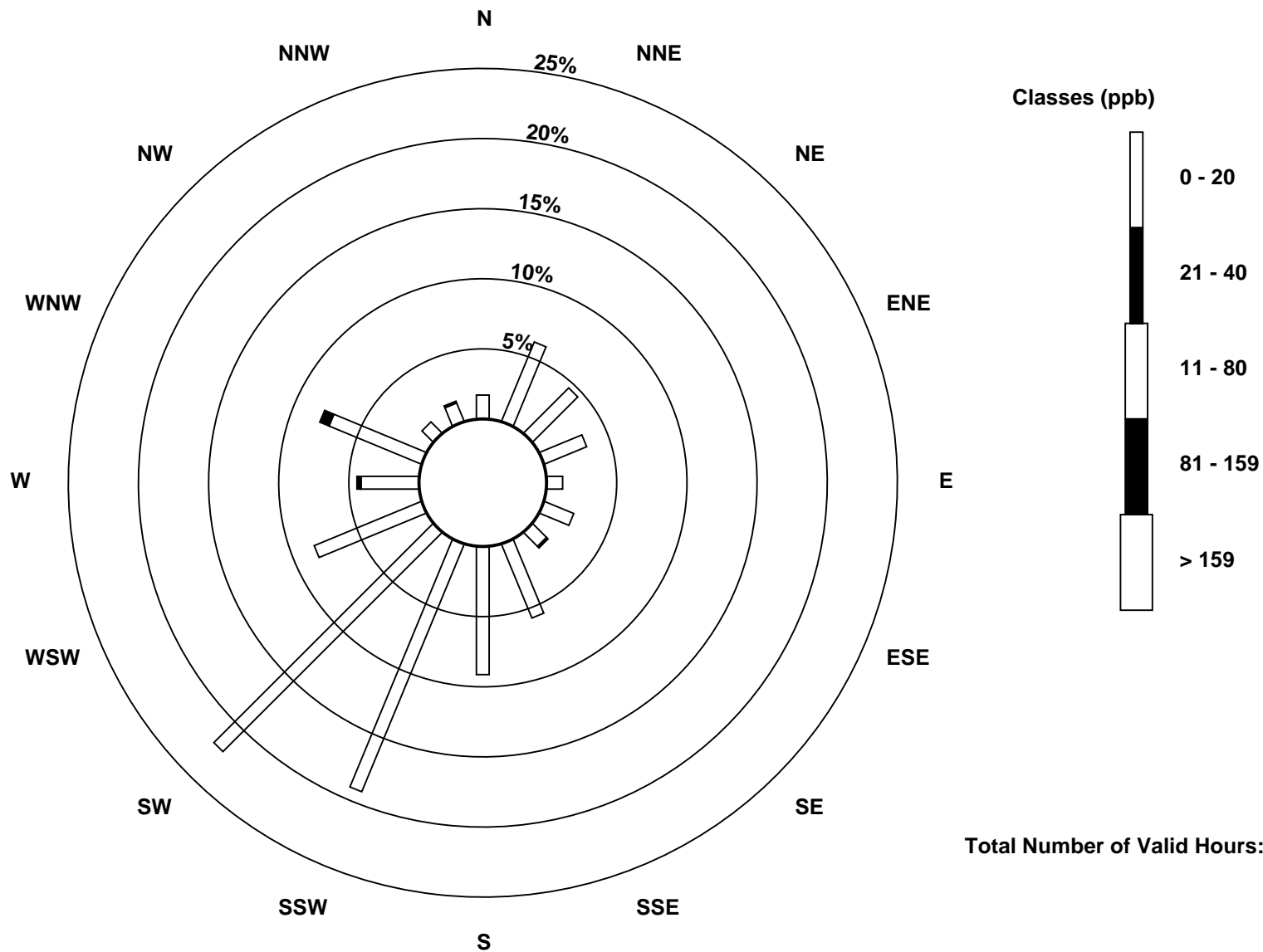
Total Number of Valid Hours: 701

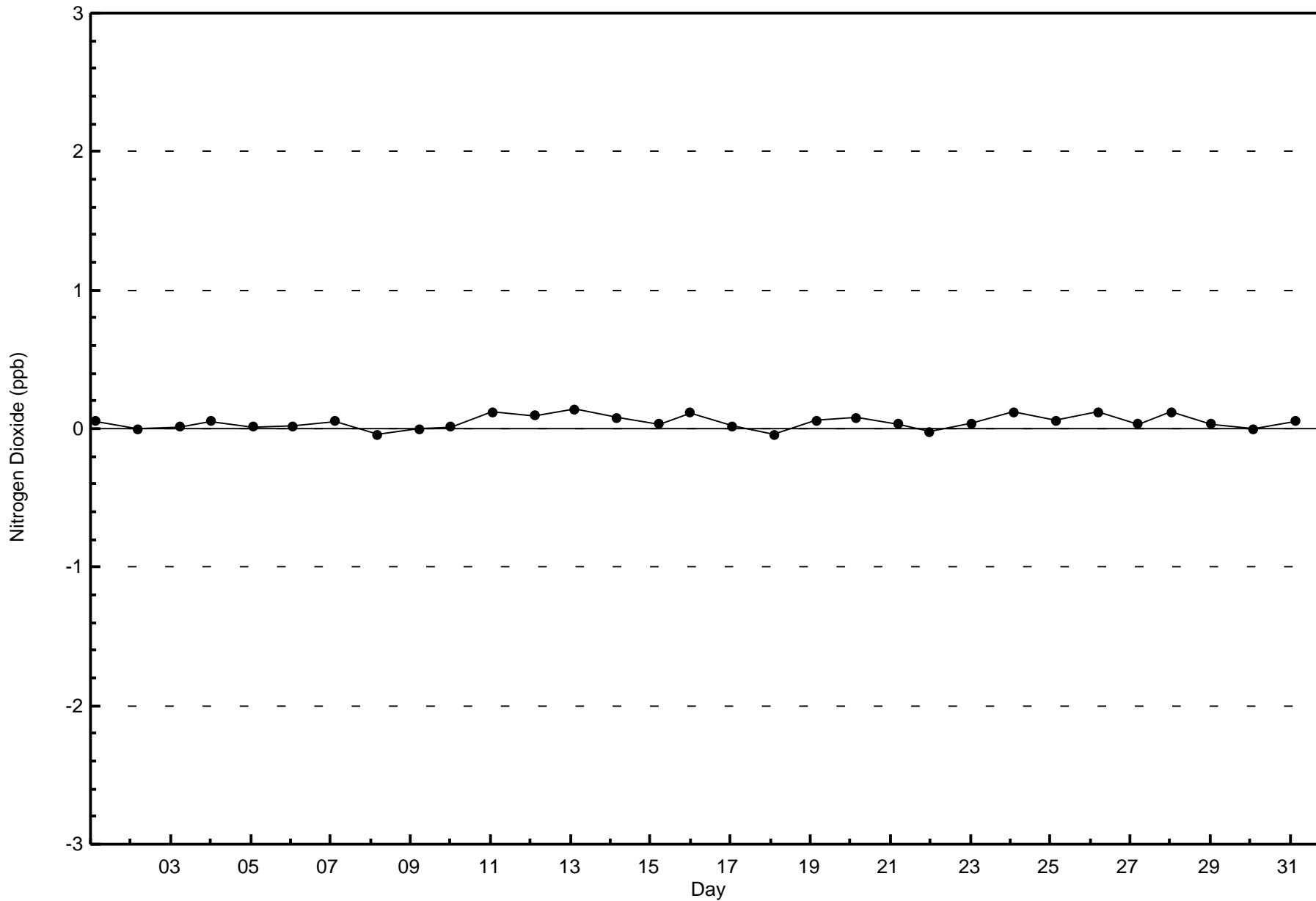
Total Number of Hours: 744

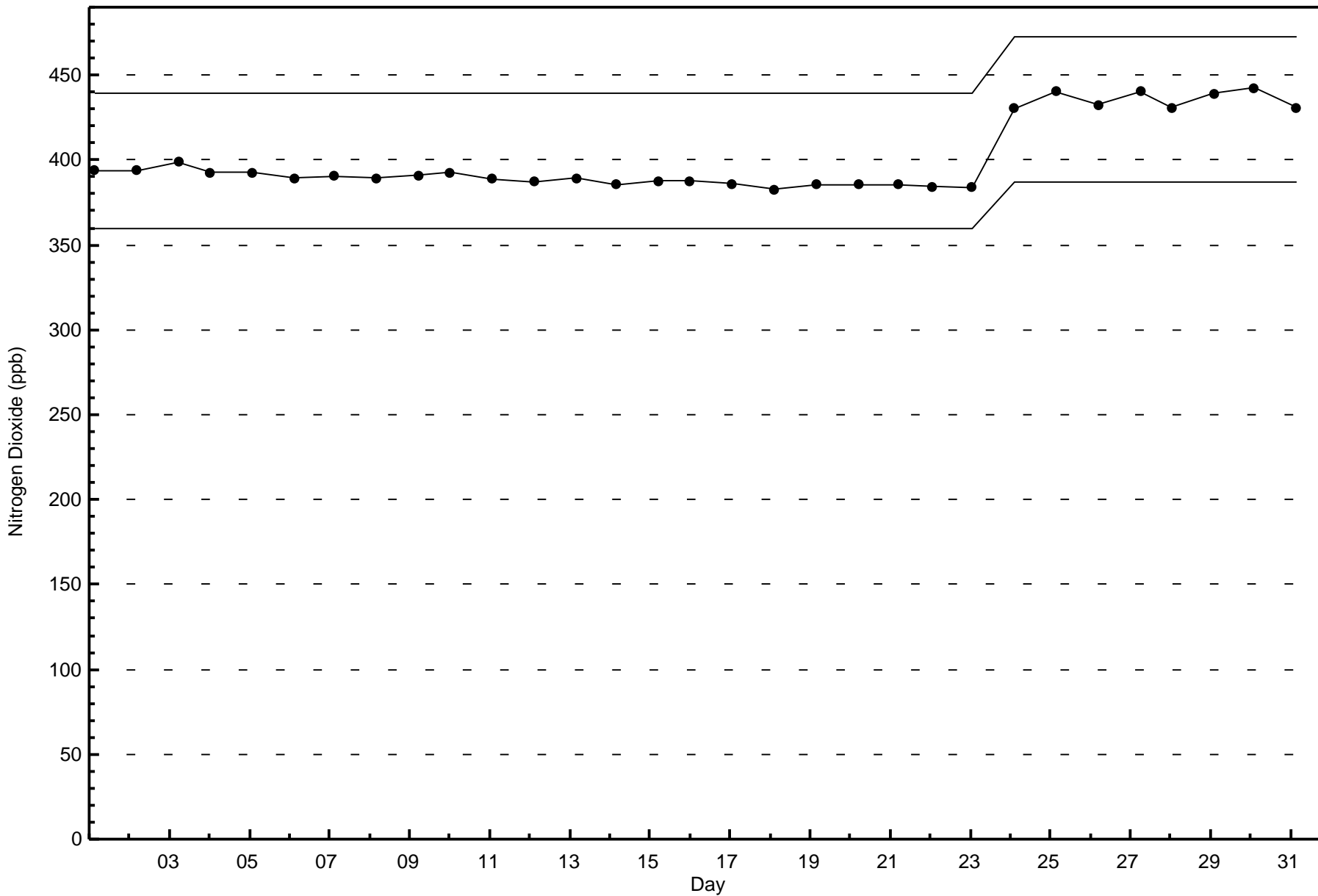


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Dioxide (NO₂) - ppb
Horizon (AMS 15)









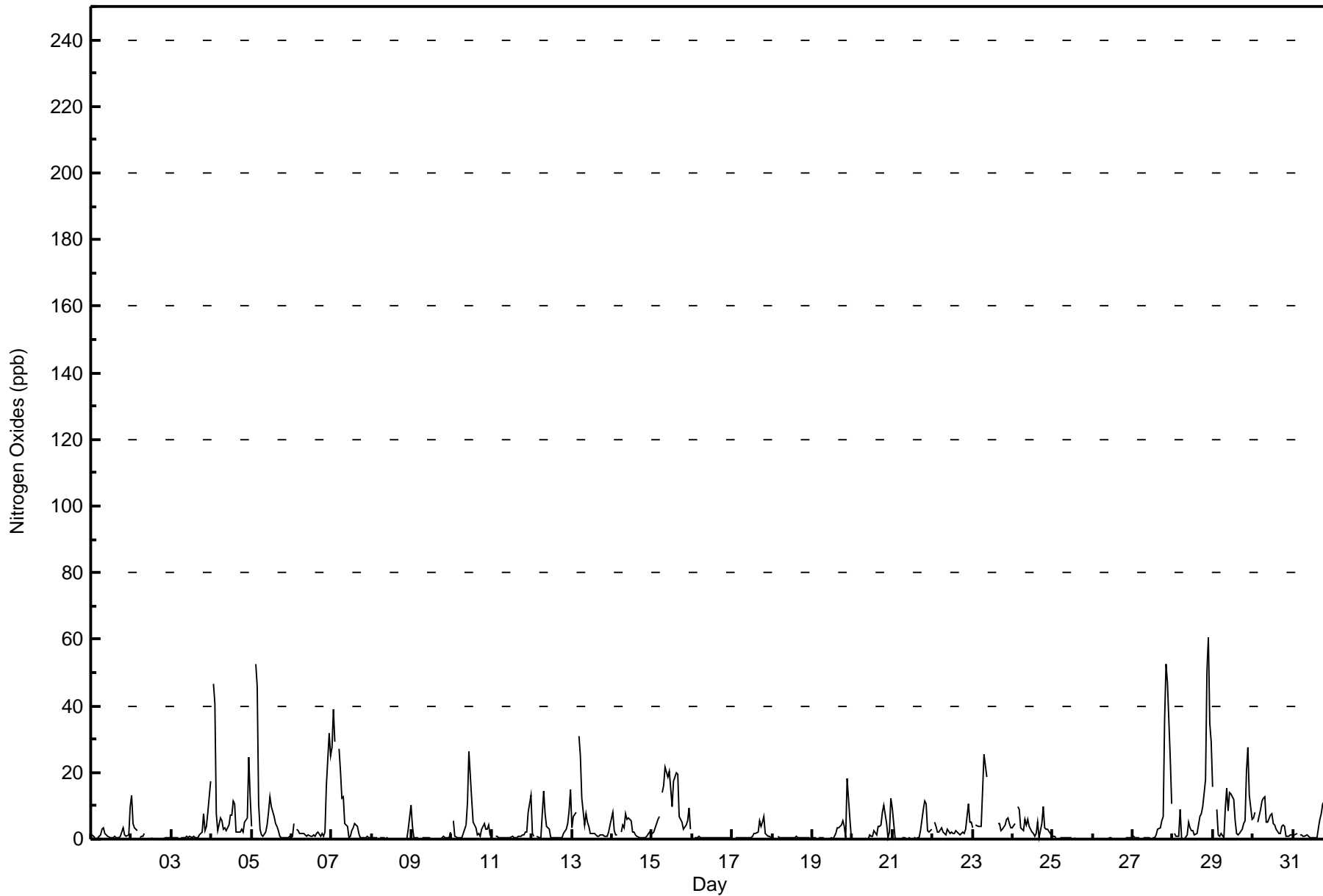
Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb

Horizon - August 2017

| Maximum Value: 60 ppb on Aug 28 22:00 | | Maximum Daily Average: 10.9 ppb on Aug 28 | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|--|----|--------------------------------|----|-----------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|---------------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|--|
| Minimum Value: 0 ppb on Aug 26 04:00 | | Minimum Daily Average: 0.1 ppb on Aug 26 | | Hours of Data: 703 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 7.3 ppb at hour 22 | | Minimum Diurnal Average: 2.0 ppb at hour 17 | | Hours of Missing Data: 41 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 4.0 ppb | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 4 P ₉₀ = 10 P ₉₉ = 46 | | Hours of Calibration: 37 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Percent Operational Time: 99.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 1 | 1 | 1 | Z | 0 | 1 | 3 | 4 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 1 | 1 | 1 | 10 | 1.7 | 10 | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 13 | 5 | 3 | 3 | Z | 0 | 1 | 1 | 2 | M | M | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.5 | 13 | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 2 | 8 | 3 | 4 | 8 | 18 | 2.2 | 18 | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | Z | 47 | 41 | 8 | 3 | 6 | 5 | 3 | 3 | 3 | 4 | 7 | 7 | 12 | 11 | 2 | 2 | 2 | 3 | 2 | 5 | 6 | 24 | 13 | 9.5 | 47 | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 4 | Z | 52 | 46 | 11 | 3 | 1 | 1 | 2 | 4 | 8 | 13 | 10 | 7 | 5 | 4 | 2 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 7.7 | 52 | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 1 | 5 | Z | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 2 | 1 | 2 | 16 | 32 | 25 | 4.6 | 32 | | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 28 | 39 | 29 | Z | 27 | 20 | 12 | 13 | 5 | 4 | 1 | 1 | 3 | 4 | 5 | 4 | 2 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 8.6 | 39 | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 10 | 0.7 | 10 | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 4 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0.5 | 4 | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | Z | 5 | 1 | 1 | 1 | 0 | 0 | 2 | 4 | 11 | 26 | 19 | 12 | 5 | 3 | 1 | 2 | 1 | 3 | 5 | 3 | 3 | 4 | 1 | 5.0 | 26 | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 1 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 8 | 13 | 1.6 | 13 | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 2 | 1 | Z | 1 | 1 | 1 | 8 | 14 | 7 | 4 | 3 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 5 | 9 | 15 | 3.4 | 15 | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 4 | 7 | 8 | Z | 31 | 25 | 12 | 4 | 8 | 5 | 4 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 4 | 5.4 | 31 | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 8 | 2 | 1 | 1 | Z | 2 | 4 | 3 | 7 | 6 | 6 | 5 | 2 | 2 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 2 | 2 | 2.6 | 8 | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 2 | 2 | 3 | 6 | 7 | Z | 14 | 16 | 22 | 19 | 20 | 15 | 10 | 18 | 20 | 19 | 7 | 6 | 5 | 3 | 4 | 6 | 9 | 3 | 10.2 | 22 | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | Z | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 0 | Z | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 2 | 2 | 2 | 6 | 4 | 5 | 7 | 2 | 1 | 1 | 0 | 1.6 | 7 | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 0 | 0 | Z | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 0 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 3 | 4 | 4 | 5 | 4 | 1 | 18 | 6 | 0 | 2.2 | 18 | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 1 | 4 | 4 | 4 | 8 | 10 | 4 | 0 | 2 | 12 | 2.5 | 12 | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 9 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 9 | 11 | 11 | 2 | 2 | 3 | 2.3 | 11 | | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | Z | 5 | 4 | 2 | 2 | 3 | 2 | 2 | 1 | 3 | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 3 | 10 | 5 | 5 | 2.8 | 10 | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 4 | Z | 4 | 4 | 4 | 4 | 15 | 25 | 19 | C | C | C | C | C | C | 5 | 5 | 2 | 3 | 4 | 6 | 7 | 5 | 3 | -- | 25 | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 3 | 4 | Z | 10 | 9 | 3 | 3 | 6 | 4 | 6 | 4 | 2 | 2 | 1 | 2 | 5 | 1 | 5 | 10 | 3 | 3 | 3 | 2 | 1 | 4.0 | 10 | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 1 | 1 | 1 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 1 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 3 | 4 | 5 | 7 | 36 | 53 | 47 | 24 | 11 | 8.5 | 53 | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | Z | 2 | 1 | 1 | 9 | 0 | 0 | 0 | 1 | 5 | 3 | 3 | 2 | 1 | 2 | 4 | 7 | 7 | 10 | 18 | 51 | 60 | 35 | 29 | 10.9 | 60 | | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 16 | Z | 9 | 1 | 1 | 1 | 1 | 9 | 15 | 9 | 14 | 13 | 12 | 5 | 2 | 1 | 2 | 3 | 5 | 6 | 20 | 28 | 13 | 6 | 8.3 | 28 | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 6 | 8 | Z | 5 | 9 | 12 | 12 | 13 | 5 | 5 | 7 | 8 | 4 | 4 | 3 | 2 | 2 | 4 | 4 | 4 | 1 | 1 | 1 | 1 | 5.3 | 13 | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 1 | 1 | 2 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 4 | 6 | 7 | 10 | 12 | 1 | 0 | 0 | 0 | 2.3 | 12 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 4.2 | 5.3 | 6.3 | 3.8 | 4.7 | 3.4 | 3.2 | 3.9 | 3.7 | 3.1 | 3.8 | 3.4 | 2.6 | 2.4 | 2.2 | 2.3 | 2.0 | 2.2 | 3.3 | 4.7 | 5.9 | 7.3 | 6.5 | 6.1 | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | | | | | | | 28 | 47 | 52 | 46 | 31 | 25 | 15 | 25 | 22 | 19 | 26 | 19 | 12 | 18 | 20 | 19 | 7 | 7 | 10 | 36 | 53 | 60 | 35 | 29 | Diurnal Maximum | |
| Z - zerspan | | C - Calibration | | | | M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Horizon - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 678 | 96.44 | 96.44 |
| 21 - 40 | 17 | 2.42 | 98.86 |
| 41 - 80 | 8 | 1.14 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 703

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Horizon - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|---|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 12 | 42 | 29 | 22 | 8 | 16 | 10 | 40 | 64 | 132 | 154 | 58 | 27 | 46 | 6 | 10 | 676 |
| 21 - 40 | 0 | 0 | 3 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 3 | 5 | 2 | 1 | 17 |
| 11 - 80 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 4 | 0 | 0 | 8 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 12 | 43 | 32 | 23 | 8 | 16 | 11 | 40 | 64 | 134 | 155 | 58 | 31 | 55 | 8 | 11 | 701 |

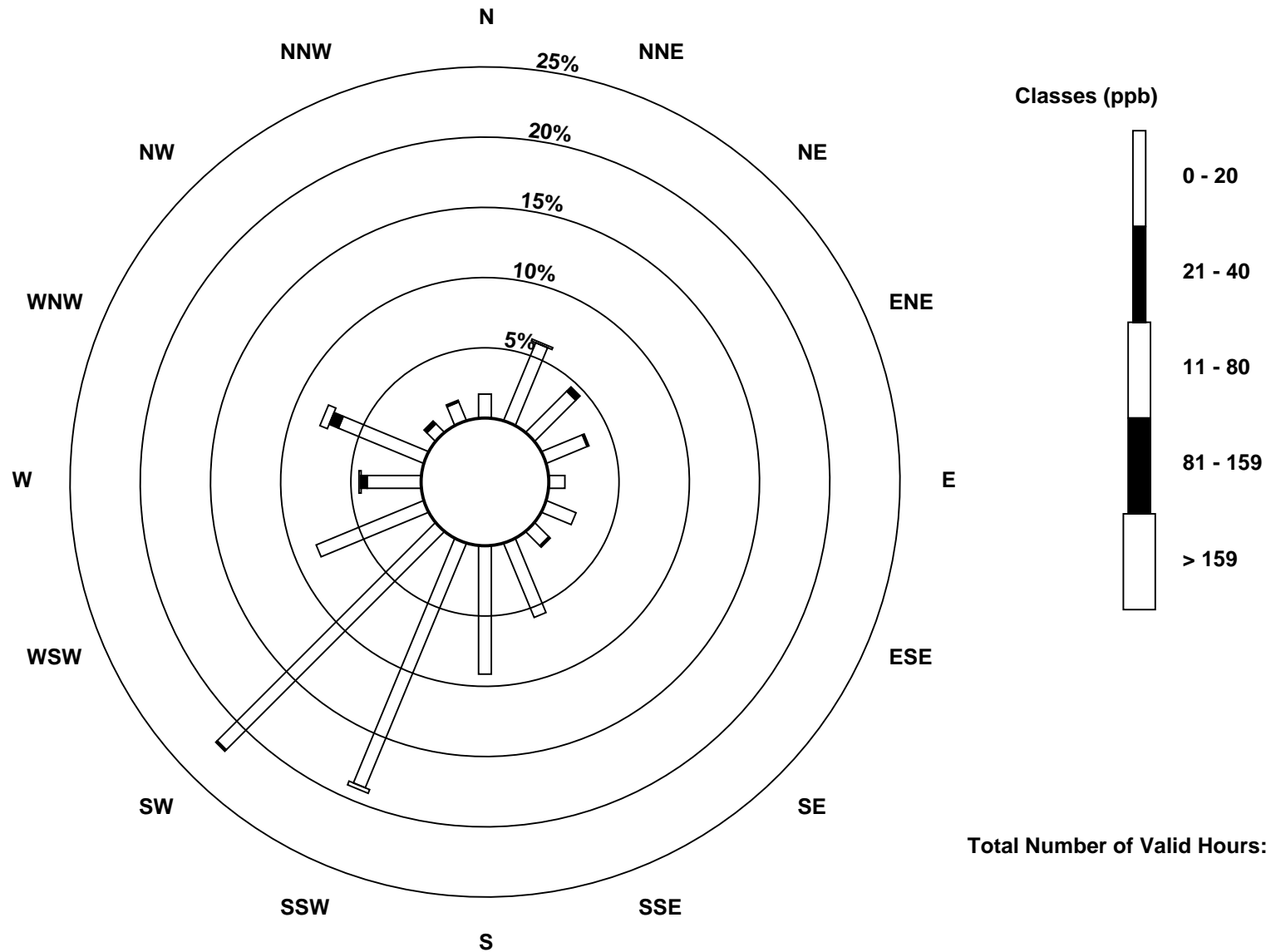
Total Number of Valid Hours: 701

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

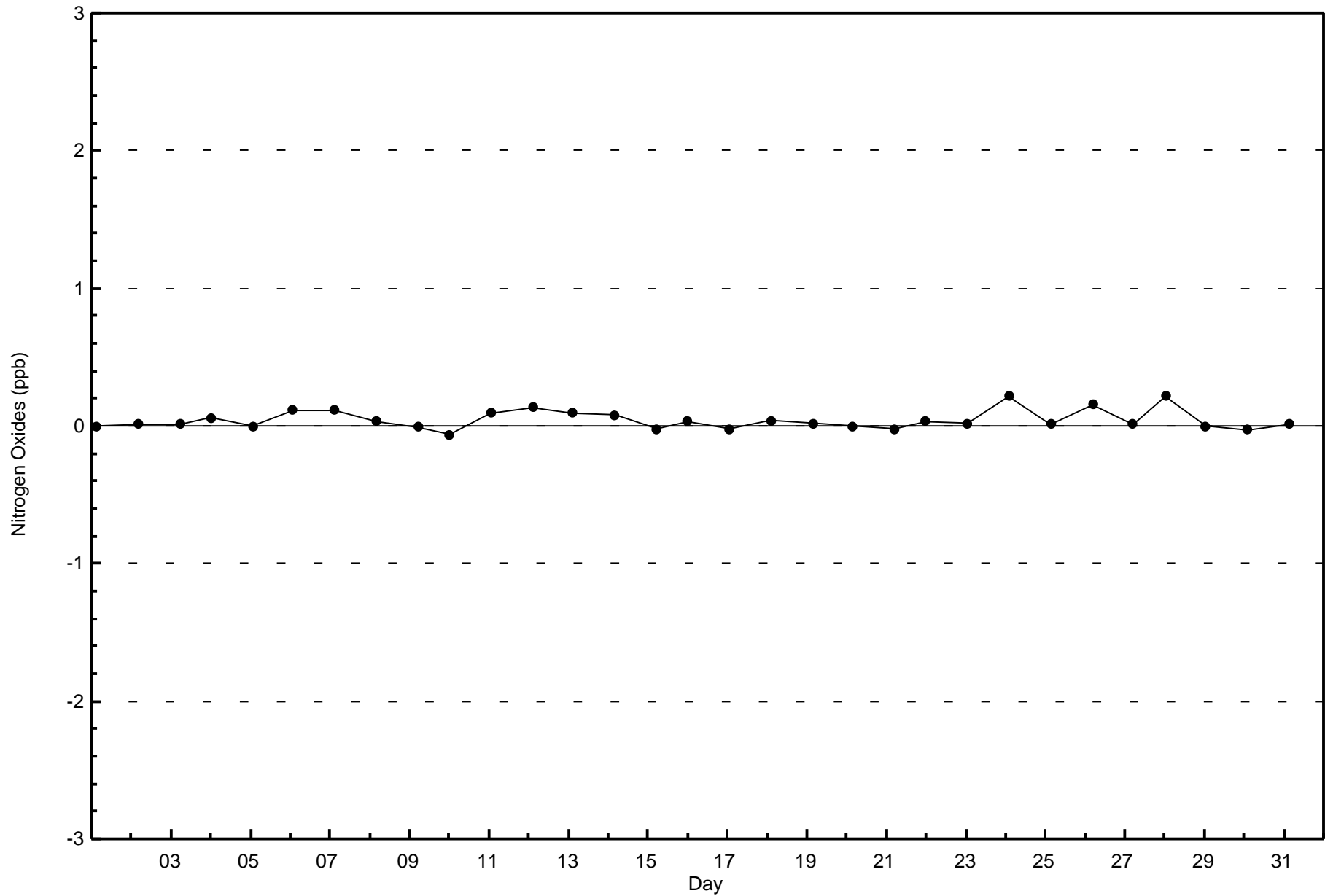
Nitrogen Oxides (NO_x) - ppb
Horizon (AMS 15)





Wood Buffalo Environmental Association
Zero Responses

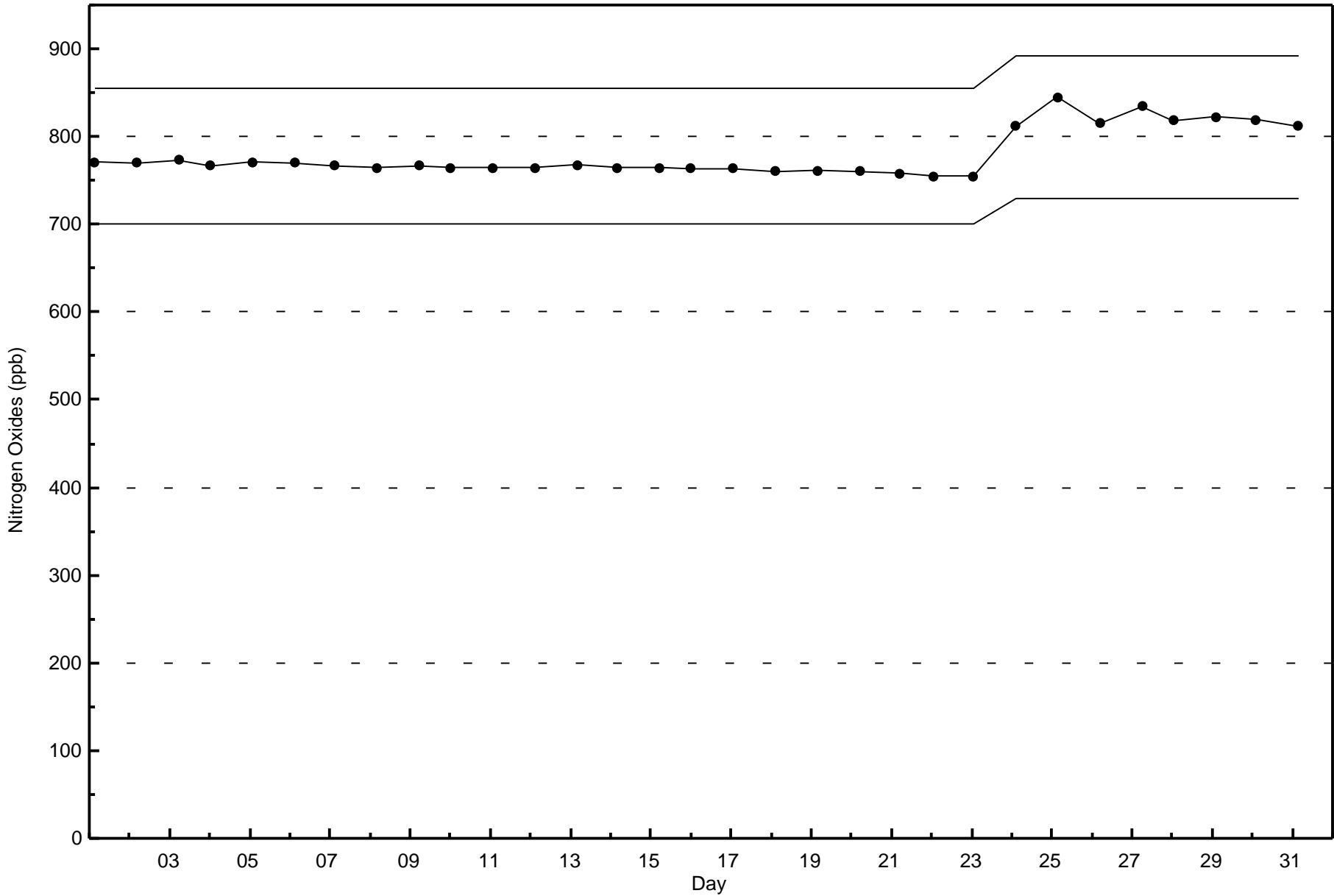
Nitrogen Oxides (NO_x) - ppb
Horizon - August 2017





Wood Buffalo Environmental Association
Span Responses

Nitrogen Oxides (NO_x) - ppb
Horizon - August 2017



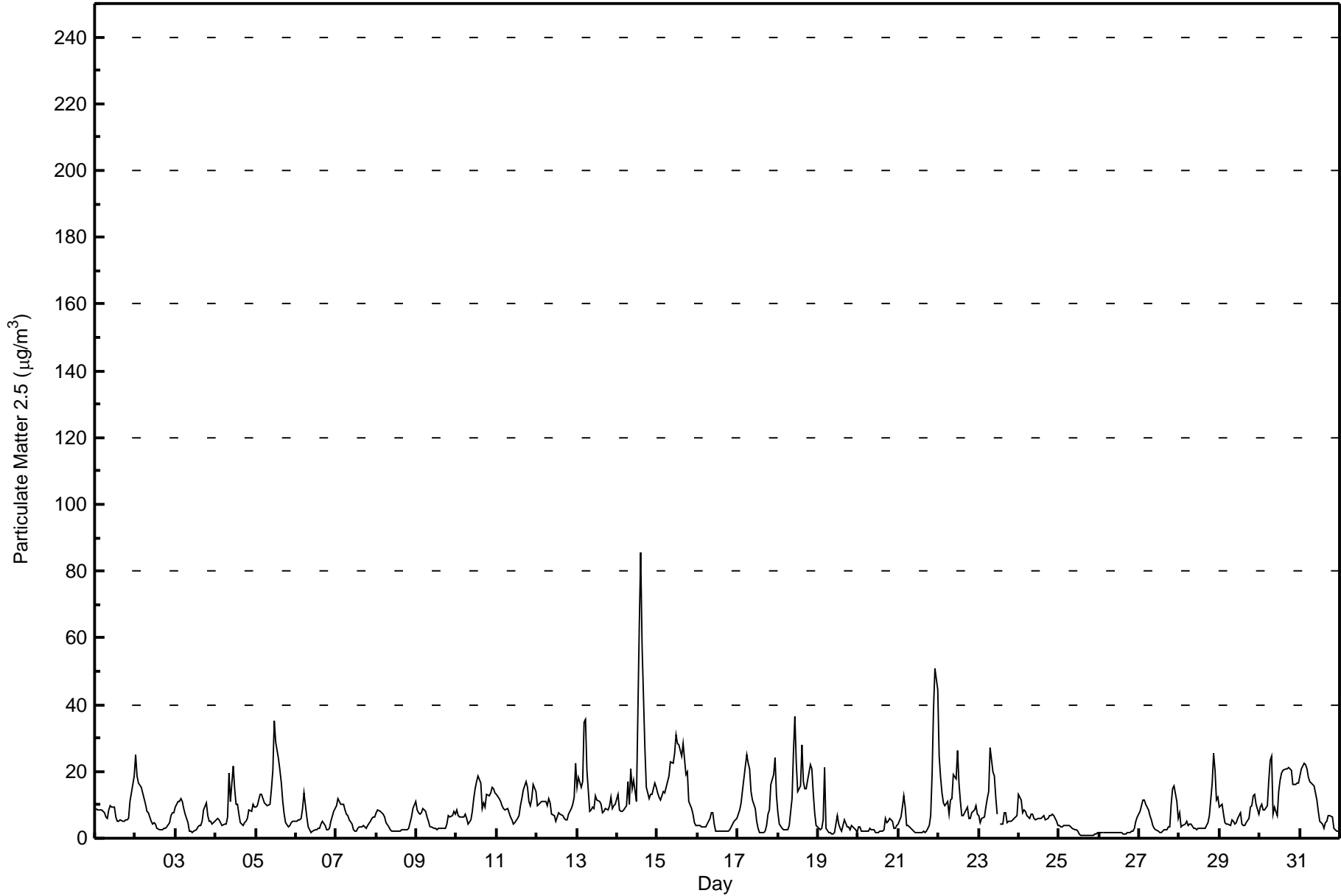


| Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 85.5 µg/m ³ on Aug 14 15:00 Minimum Value: 0.8 µg/m ³ on Aug 25 16:00 Maximum Diurnal Average: 10.3 µg/m ³ at hour 23 Monthly Average: 8.68 µg/m ³ | | Maximum Daily Average: 21.5 µg/m ³ on Aug 14 Minimum Daily Average: 2.0 µg/m ³ on Aug 26 Minimum Diurnal Average: 6.8 µg/m ³ at hour 18 Percentiles: P ₁ = 1.1 P ₁₀ = 2.2 Q ₁ = 3.6 Median = 6.6 Q ₃ = 11.1 P ₉₀ = 18.4 P ₉₉ = 35.4 | | Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 1 Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|---|------|---|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|---------------|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 8.8 | 8.5 | 8.4 | 8.6 | 8.4 | 7.8 | 6.3 | 6.0 | 8.4 | 9.9 | 9.4 | 9.3 | 6.5 | 5.1 | 5.1 | 5.3 | 5.2 | 5.0 | 5.7 | 5.6 | 6.1 | 11.2 | 16.1 | 18.4 | 8.1 | 18.4 |
| 2-Aug | 25.1 | 18.7 | 16.4 | 15.2 | 13.5 | 11.9 | 10.1 | 8.1 | 7.7 | 5.0 | 4.3 | 4.5 | 4.1 | 2.8 | 2.4 | 2.6 | 2.7 | 2.8 | 3.0 | 3.4 | 4.7 | 6.6 | 7.5 | 7.5 | 7.9 | 25.1 |
| 3-Aug | 9.4 | 10.9 | 11.2 | 11.9 | 11.0 | 8.8 | 7.3 | 4.5 | 2.3 | 1.9 | 1.9 | 2.1 | 2.8 | 3.4 | 3.7 | 3.9 | 4.9 | 8.3 | 10.6 | 6.6 | 5.1 | 5.1 | 4.4 | 5.1 | 6.1 | 11.9 |
| 4-Aug | 5.3 | 5.7 | 5.7 | 4.7 | 4.0 | 4.2 | 4.4 | 6.4 | 19.6 | 11.1 | 21.5 | 14.9 | 10.1 | 10.3 | 7.3 | 4.5 | 4.0 | 4.5 | 5.3 | 5.9 | 8.4 | 8.2 | 10.1 | 9.5 | 8.1 | 21.5 |
| 5-Aug | 9.2 | 9.8 | 13.2 | 13.1 | 11.9 | 10.8 | 10.4 | 9.6 | 10.1 | 15.0 | 20.5 | 35.2 | 28.7 | 23.5 | 20.1 | 16.6 | 11.1 | 7.3 | 4.6 | 3.4 | 3.9 | 4.5 | 4.9 | 5.1 | 12.6 | 35.2 |
| 6-Aug | 5.0 | 5.3 | 5.7 | 5.9 | 8.8 | 13.7 | 6.2 | 3.3 | 2.5 | 1.7 | 2.2 | 2.7 | 2.7 | 3.0 | 2.9 | 4.0 | 5.1 | 4.0 | 2.5 | 2.5 | 3.0 | 5.0 | 7.9 | 9.0 | 4.8 | 13.7 |
| 7-Aug | 9.7 | 11.7 | 11.1 | 10.3 | 10.3 | 8.5 | 7.3 | 6.6 | 5.7 | 4.3 | 2.6 | 2.3 | 2.2 | 2.9 | 3.5 | 3.4 | 3.7 | 3.3 | 3.1 | 3.8 | 5.0 | 6.1 | 6.4 | 6.4 | 5.8 | 11.7 |
| 8-Aug | 7.6 | 8.5 | 8.1 | 7.7 | 7.4 | 6.5 | 4.8 | 3.4 | 2.6 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.4 | 2.4 | 2.4 | 2.4 | 3.0 | 4.5 | 6.5 | 9.0 | 11.2 | 4.7 | 11.2 |
| 9-Aug | 8.3 | 7.5 | 7.1 | 7.8 | 8.8 | 7.9 | 6.2 | 4.9 | 3.4 | 3.2 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.9 | 2.9 | 4.3 | 6.7 | 6.5 | 6.9 | 7.9 | 7.3 | 5.3 | 8.8 |
| 10-Aug | 8.7 | 6.7 | 6.5 | 6.4 | 6.2 | 7.1 | 6.1 | 4.4 | 5.6 | 8.1 | 11.8 | 15.0 | 17.2 | 18.6 | 16.4 | 9.1 | 10.5 | 9.2 | 13.2 | 12.6 | 13.5 | 15.4 | 14.7 | 13.7 | 10.7 | 18.6 |
| 11-Aug | 13.1 | 11.8 | 11.0 | 9.5 | 8.8 | 8.6 | 8.7 | 7.5 | 6.5 | 5.5 | 4.4 | 4.8 | 5.9 | 6.7 | 9.8 | 12.0 | 14.2 | 16.9 | 15.1 | 10.9 | 9.8 | 12.0 | 16.3 | 14.2 | 10.2 | 16.9 |
| 12-Aug | 9.7 | 10.3 | 10.7 | 10.9 | 11.0 | 10.9 | 9.9 | 11.8 | 10.8 | 7.3 | 6.9 | 5.0 | 6.4 | 7.7 | 7.3 | 6.7 | 6.0 | 5.4 | 5.5 | 7.4 | 9.0 | 10.1 | 12.2 | 22.3 | 9.2 | 22.3 |
| 13-Aug | 15.2 | 18.1 | 15.2 | 17.1 | 34.9 | 35.4 | 20.4 | 8.0 | 8.3 | 9.4 | 8.9 | 12.6 | 11.3 | 11.2 | 10.2 | 7.8 | 7.9 | 8.7 | 8.4 | 9.5 | 12.4 | 9.0 | 9.6 | 10.0 | 13.3 | 35.4 |
| 14-Aug | 13.1 | 8.6 | 8.0 | 7.9 | 8.4 | 9.8 | 16.8 | 10.0 | 20.8 | 14.9 | 17.4 | 10.9 | 36.9 | 63.1 | 85.5 | 57.8 | 26.6 | 15.1 | 13.6 | 11.8 | 13.0 | 13.3 | 16.6 | 15.2 | 21.5 | 85.5 |
| 15-Aug | 13.7 | 12.4 | 11.3 | 13.9 | 13.6 | 15.4 | 17.1 | 18.5 | 22.8 | 22.6 | 25.4 | 30.8 | 28.5 | 27.9 | 24.6 | 28.6 | 23.5 | 19.0 | 20.0 | 11.1 | 9.0 | 7.3 | 4.7 | 4.0 | 17.7 | 30.8 |
| 16-Aug | 3.7 | 3.8 | 3.6 | 3.5 | 3.4 | 3.2 | 4.4 | 6.1 | 7.7 | 7.5 | 4.3 | 2.1 | 2.0 | 1.9 | 2.0 | 2.0 | 2.0 | 2.2 | 2.3 | 2.7 | 3.5 | 4.0 | 5.1 | 5.8 | 3.7 | 7.7 |
| 17-Aug | 7.1 | 8.3 | 10.7 | 14.3 | 21.8 | 24.9 | 22.6 | 20.7 | 14.1 | 11.5 | 8.8 | 5.1 | 3.0 | 1.7 | 1.5 | 1.5 | 2.1 | 3.6 | 7.2 | 8.4 | 15.9 | 19.0 | 24.3 | 12.5 | 11.3 | 24.9 |
| 18-Aug | 7.6 | 4.1 | 2.8 | 2.3 | 2.4 | 2.5 | 2.7 | 3.7 | 11.8 | 26.1 | 36.6 | 22.5 | 13.8 | 15.8 | 27.9 | 17.1 | 14.8 | 14.6 | 17.2 | 21.9 | 20.9 | 13.4 | 7.5 | 3.7 | 13.1 | 36.6 |
| 19-Aug | 2.8 | 2.4 | 2.9 | 5.6 | 21.2 | 2.8 | 1.7 | 1.6 | 1.4 | 1.3 | 1.8 | 6.6 | 4.1 | 2.8 | 2.0 | 3.8 | 5.3 | 3.5 | 3.2 | 2.6 | 3.6 | 3.5 | 2.6 | 1.8 | 3.8 | 21.2 |
| 20-Aug | 3.6 | 3.2 | 2.2 | 2.0 | 2.1 | 2.1 | 2.2 | 2.9 | 2.6 | 2.5 | 1.5 | 1.5 | 1.5 | 2.1 | 1.9 | 2.7 | 5.9 | 4.8 | 5.0 | 5.8 | 5.3 | 3.1 | 2.9 | 4.0 | 3.1 | 5.9 |
| 21-Aug | 4.1 | 6.4 | 9.1 | 12.8 | 9.4 | 3.7 | 3.7 | 3.0 | 2.6 | 2.0 | 1.7 | 1.6 | 1.7 | 1.6 | 1.6 | 2.0 | 1.8 | 2.2 | 3.7 | 6.8 | 19.2 | 38.6 | 50.9 | 44.4 | 9.8 | 50.9 |
| 22-Aug | 24.8 | 18.4 | 13.4 | 10.5 | 9.9 | 11.0 | 7.1 | 11.6 | 12.0 | 19.2 | 17.8 | 26.3 | 16.7 | 11.0 | 6.6 | 6.9 | 8.5 | 9.2 | 5.8 | 5.8 | 7.5 | 8.4 | 9.6 | 7.1 | 11.9 | 26.3 |
| 23-Aug | 6.7 | 4.9 | 5.8 | 6.2 | 9.3 | 11.7 | 14.2 | 27.0 | 20.0 | 18.4 | 12.2 | 7.3 | C | 4.2 | 4.4 | 7.8 | 7.7 | 4.9 | 5.1 | 5.2 | 5.4 | 5.9 | 6.6 | 6.8 | 9.0 | 27.0 |
| 24-Aug | 13.1 | 11.5 | 7.6 | 8.3 | 7.9 | 6.7 | 6.1 | 7.3 | 7.4 | 6.0 | 5.6 | 5.7 | 5.9 | 6.0 | 6.4 | 6.7 | 5.7 | 6.0 | 6.7 | 6.7 | 7.2 | 6.7 | 5.1 | 3.9 | 6.9 | 13.1 |
| 25-Aug | 3.8 | 3.3 | 3.3 | 3.9 | 3.9 | 3.8 | 3.7 | 3.6 | 2.9 | 2.6 | 2.3 | 2.1 | 1.1 | 0.8 | 0.9 | 0.8 | 1.0 | 0.9 | 1.0 | 1.1 | 1.0 | 1.2 | 1.3 | 1.5 | 2.2 | 3.9 |
| 26-Aug | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.5 | 1.6 | 1.6 | 1.5 | 1.2 | 1.2 | 1.3 | 1.5 | 1.8 | 2.0 | 2.2 | 2.9 | 5.1 | 6.3 | 2.0 | 6.3 |
| 27-Aug | 7.9 | 9.6 | 11.4 | 11.6 | 10.1 | 8.7 | 6.8 | 5.3 | 4.0 | 2.9 | 2.6 | 2.1 | 1.6 | 1.7 | 2.0 | 2.5 | 2.4 | 3.3 | 3.6 | 10.1 | 14.7 | 15.6 | 10.8 | 5.8 | 6.6 | 15.6 |
| 28-Aug | 7.6 | 3.6 | 3.9 | 4.1 | 5.2 | 3.7 | 4.1 | 4.1 | 3.1 | 2.8 | 2.5 | 2.8 | 3.2 | 2.8 | 2.9 | 3.2 | 3.9 | 4.9 | 6.6 | 16.5 | 25.5 | 20.2 | 11.6 | 12.2 | 6.7 | 25.5 |
| 29-Aug | 9.3 | 10.1 | 7.3 | 4.7 | 4.4 | 4.1 | 3.8 | 5.4 | 5.2 | 4.3 | 4.8 | 5.8 | 7.5 | 4.4 | 3.6 | 3.8 | 4.7 | 5.9 | 9.1 | 9.7 | 12.9 | 12.9 | 10.2 | 7.1 | 6.7 | 12.9 |
| 30-Aug | 9.5 | 10.2 | 8.4 | 8.3 | 9.7 | 17.2 | 23.4 | 24.7 | 7.4 | 9.4 | 6.8 | 13.9 | 17.4 | 19.4 | 20.4 | 20.9 | 20.6 | 21.3 | 20.7 | 20.3 | 16.0 | 16.2 | 16.3 | 16.7 | 15.6 | 24.7 |
| 31-Aug | 18.4 | 20.7 | 22.5 | 22.1 | 20.9 | 18.4 | 16.9 | 16.4 | 15.7 | 13.7 | 11.4 | 7.9 | 5.2 | 4.4 | 3.0 | 4.7 | 5.1 | 6.6 | 6.8 | 6.4 | 3.1 | 2.5 | 2.3 | 2.3 | 10.7 | 22.5 |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| 9.5 8.9 8.6 8.8 10.0 9.5 8.6 8.3 8.3 8.2 8.5 8.7 8.5 8.8 9.4 8.2 7.2 6.8 7.2 7.6 9.0 9.7 10.3 9.7 25.1 20.7 22.5 22.1 34.9 35.4 23.4 27.0 22.8 26.1 36.6 35.2 36.9 63.1 85.5 57.8 26.6 21.3 20.7 21.9 25.5 38.6 50.9 44.4 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³ | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Horizon - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Horizon - August 2017

| Concentration Ranges ($\mu\text{g}/\text{m}^3$) | Number of Hours | % | Cumulative % |
|---|------------------------|----------|---------------------|
| 1 - 5 | 304 | 40.92 | 40.92 |
| 6 - 15 | 330 | 44.41 | 85.33 |
| 16 - 25 | 83 | 11.17 | 96.50 |
| 26 - 80 | 20 | 2.69 | 99.19 |
| > 81.0 | 1 | 0.13 | 99.33 |

Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Horizon - August 2017

| Concentration Ranges (μg/m ³) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|--|----------------|-----|----|-----|---|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 1 - 5 | 2 | 11 | 13 | 1 | 3 | 4 | 2 | 5 | 15 | 57 | 89 | 40 | 21 | 35 | 3 | 2 | 303 |
| 6 - 15 | 6 | 24 | 13 | 14 | 4 | 11 | 8 | 29 | 39 | 66 | 59 | 15 | 12 | 17 | 5 | 7 | 329 |
| 16 - 25 | 5 | 6 | 5 | 6 | 1 | 1 | 1 | 6 | 11 | 25 | 7 | 2 | 0 | 4 | 1 | 2 | 83 |
| 26 - 80 | 0 | 3 | 2 | 2 | 0 | 0 | 0 | 0 | 1 | 3 | 5 | 2 | 0 | 0 | 0 | 2 | 20 |
| > 81.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Totals | 13 | 44 | 33 | 23 | 8 | 16 | 11 | 40 | 66 | 152 | 160 | 59 | 33 | 56 | 9 | 13 | 736 |

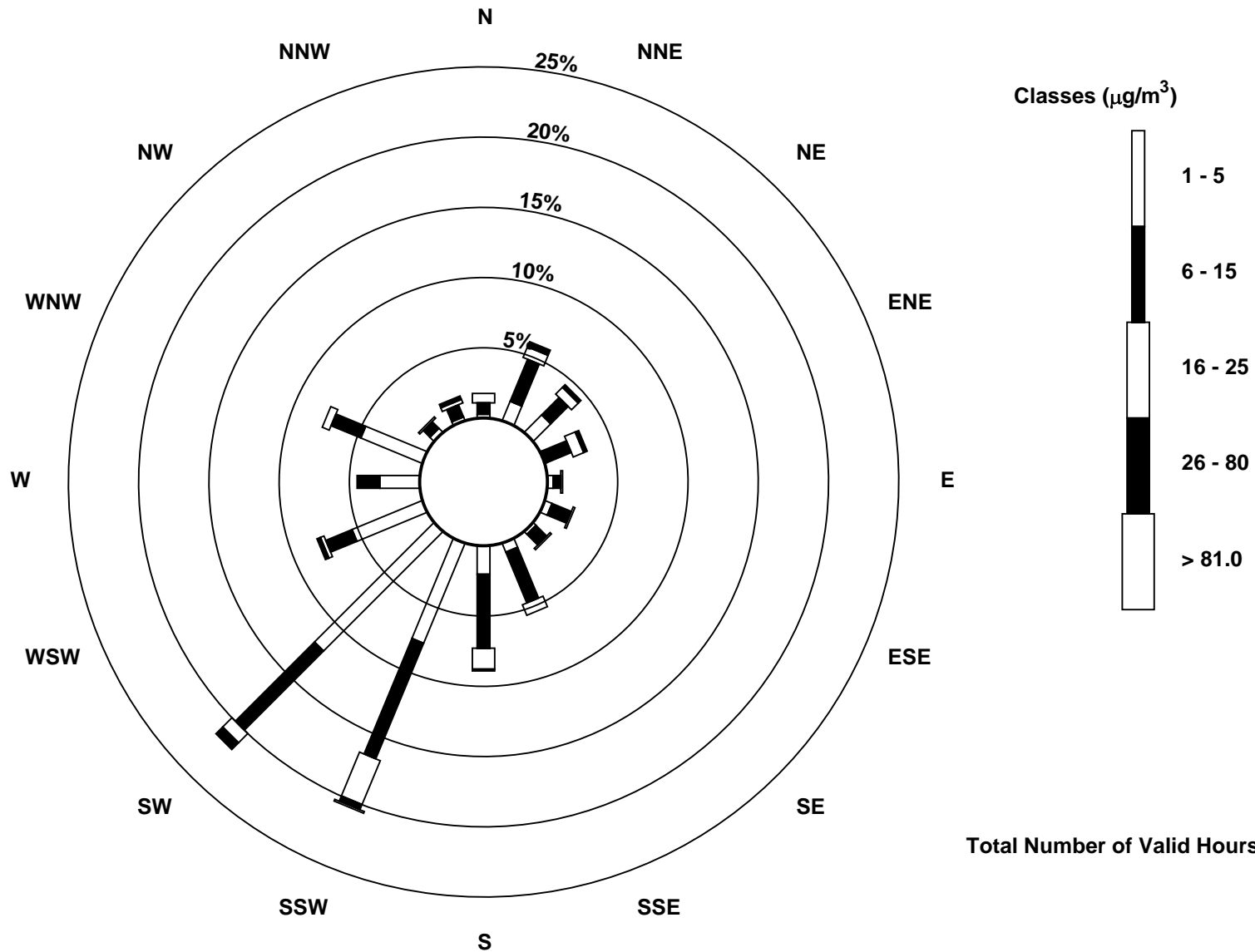
Total Number of Valid Hours: 741

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Horizon (AMS 15)



Total Number of Valid Hours: 741



Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

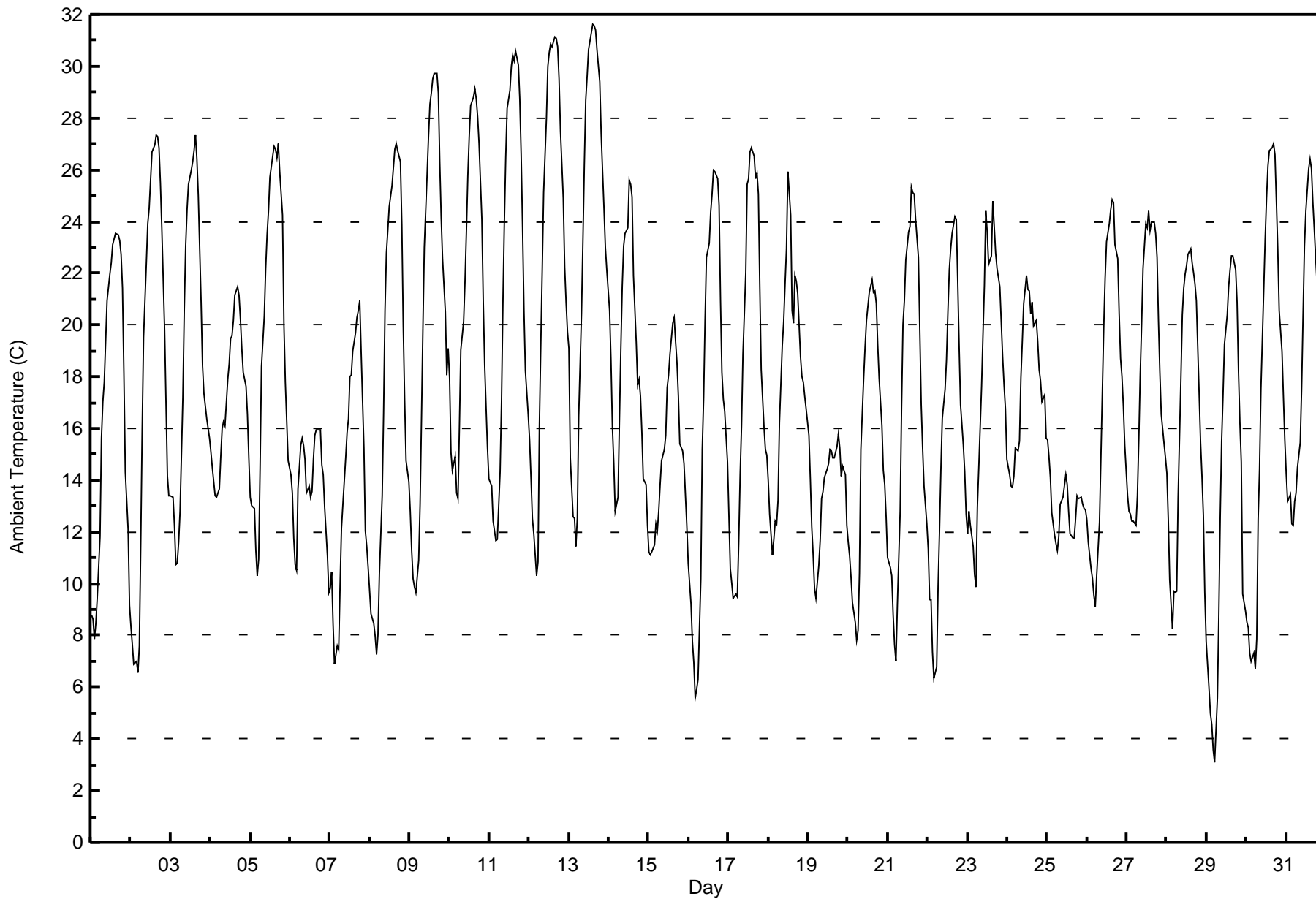
Horizon - August 2017

| Maximum Value: 31.6 C on Aug 13 15:00 Maximum Daily Average: 23.6 C on Aug 13 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---|------|------|---------------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|--|
| Minimum Value: 3.1 C on Aug 29 06:00 Minimum Daily Average: 13.0 C on Aug 25 Maximum Diurnal Average: 24.0 C at hour 16 Minimum Diurnal Average: 10.0 C at hour 5 Monthly Average: 17.61 C Percentiles: P₁ = 6.0 P₁₀ = 9.9 Q₁ = 12.8 Median = 17.0 Q₃ = 22.4 P₉₀ = 26.0 P₉₉ = 30.6 | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 8.8 | 8.6 | 7.8 | 8.5 | 9.4 | 11.8 | 15.6 | 17.0 | 17.8 | 19.4 | 20.9 | 22.0 | 22.4 | 23.1 | 23.3 | 23.5 | 23.5 | 23.3 | 22.7 | 21.4 | 18.1 | 14.3 | 12.1 | 9.2 | 16.9 | 23.5 | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 8.3 | 7.6 | 6.9 | 7.0 | 6.6 | 7.6 | 11.5 | 15.9 | 19.5 | 22.4 | 23.9 | 24.5 | 25.6 | 26.7 | 26.9 | 27.3 | 27.3 | 26.8 | 25.5 | 23.8 | 19.8 | 17.0 | 14.2 | 13.4 | 18.2 | 27.3 | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 13.4 | 13.4 | 12.3 | 10.8 | 10.8 | 11.6 | 12.8 | 17.2 | 20.6 | 23.0 | 24.5 | 25.4 | 26.0 | 26.3 | 26.7 | 27.3 | 26.4 | 25.0 | 20.9 | 18.5 | 17.3 | 16.9 | 16.4 | 15.6 | 19.1 | 27.3 | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 15.1 | 14.5 | 13.9 | 13.4 | 13.3 | 13.7 | 14.9 | 16.0 | 16.3 | 16.1 | 17.9 | 18.5 | 19.5 | 19.6 | 20.2 | 21.2 | 21.5 | 21.2 | 20.2 | 19.1 | 18.2 | 17.6 | 16.5 | 14.9 | 17.2 | 21.5 | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 13.3 | 13.0 | 12.9 | 11.3 | 10.3 | 11.0 | 14.4 | 18.4 | 20.4 | 22.2 | 23.5 | 24.4 | 25.7 | 26.5 | 26.9 | 26.8 | 26.5 | 27.0 | 26.0 | 24.2 | 20.0 | 17.8 | 16.3 | 14.8 | 19.7 | 27.0 | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 14.2 | 13.5 | 11.8 | 10.7 | 10.5 | 13.7 | 15.3 | 15.6 | 15.4 | 14.8 | 13.5 | 13.8 | 13.3 | 13.5 | 14.8 | 15.8 | 16.0 | 15.9 | 15.9 | 14.6 | 14.2 | 13.0 | 11.0 | 9.7 | 13.8 | 16.0 | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 9.8 | 10.5 | 8.5 | 6.9 | 7.6 | 7.5 | 9.9 | 12.1 | 13.1 | 14.8 | 15.8 | 16.4 | 18.0 | 18.1 | 19.0 | 19.7 | 20.3 | 20.6 | 21.0 | 19.0 | 15.3 | 12.0 | 11.4 | 10.6 | 14.1 | 21.0 | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 9.8 | 8.8 | 8.4 | 8.0 | 7.3 | 8.0 | 10.3 | 13.4 | 16.6 | 20.6 | 22.8 | 23.7 | 24.6 | 25.4 | 26.1 | 26.8 | 27.0 | 26.7 | 26.3 | 23.9 | 19.9 | 17.1 | 14.7 | 13.9 | 17.9 | 27.0 | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 12.8 | 11.3 | 10.2 | 9.9 | 9.7 | 10.9 | 13.1 | 16.4 | 19.8 | 23.0 | 25.8 | 27.3 | 28.5 | 29.0 | 29.5 | 29.7 | 29.7 | 29.0 | 26.3 | 24.2 | 22.5 | 20.5 | 18.0 | 19.1 | 20.7 | 29.7 | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 17.9 | 15.1 | 14.4 | 14.9 | 13.5 | 13.3 | 16.1 | 19.0 | 20.1 | 21.7 | 23.7 | 25.7 | 27.3 | 28.5 | 28.8 | 29.2 | 28.7 | 28.1 | 27.0 | 24.1 | 20.9 | 18.4 | 16.8 | 15.2 | 21.2 | 29.2 | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 14.1 | 13.8 | 12.4 | 12.0 | 11.7 | 11.7 | 14.3 | 17.0 | 20.8 | 23.9 | 26.5 | 28.3 | 29.1 | 30.0 | 30.4 | 30.2 | 30.6 | 30.0 | 28.7 | 26.6 | 23.7 | 20.5 | 18.2 | 16.6 | 21.7 | 30.6 | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 15.5 | 14.1 | 12.5 | 12.0 | 10.3 | 10.8 | 16.2 | 19.2 | 22.1 | 25.1 | 28.0 | 30.0 | 30.5 | 30.8 | 30.7 | 31.2 | 31.1 | 30.8 | 29.5 | 27.5 | 24.9 | 22.3 | 20.9 | 19.7 | 22.7 | 31.2 | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 19.1 | 14.9 | 12.6 | 12.5 | 11.5 | 12.5 | 16.5 | 20.4 | 23.3 | 26.2 | 28.7 | 29.6 | 30.7 | 31.3 | 31.6 | 31.6 | 31.4 | 30.7 | 29.4 | 27.4 | 25.9 | 24.5 | 23.0 | 22.1 | 23.6 | 31.6 | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 20.6 | 18.6 | 16.1 | 14.7 | 12.8 | 13.3 | 16.3 | 19.0 | 21.5 | 23.1 | 23.5 | 23.8 | 25.6 | 25.4 | 25.0 | 21.9 | 19.3 | 17.7 | 17.9 | 17.3 | 15.9 | 14.1 | 13.8 | 12.2 | 18.7 | 25.6 | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 11.2 | 11.1 | 11.2 | 11.5 | 12.3 | 12.0 | 12.8 | 13.9 | 14.7 | 15.2 | 15.7 | 17.6 | 18.0 | 18.9 | 20.1 | 20.3 | 19.4 | 18.5 | 17.2 | 15.4 | 15.1 | 14.6 | 13.4 | 12.2 | 15.1 | 20.3 | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 10.8 | 9.2 | 7.7 | 7.0 | 5.6 | 5.9 | 6.3 | 10.2 | 15.2 | 17.2 | 20.2 | 22.6 | 23.2 | 24.4 | 25.1 | 26.0 | 25.9 | 25.6 | 24.6 | 21.0 | 18.1 | 17.2 | 16.6 | 14.7 | 16.7 | 26.0 | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 12.7 | 10.6 | 10.0 | 9.4 | 9.6 | 9.5 | 11.6 | 14.2 | 16.1 | 18.9 | 22.0 | 25.4 | 25.6 | 26.7 | 26.9 | 26.5 | 25.6 | 25.8 | 25.0 | 21.5 | 18.3 | 16.1 | 15.2 | 15.0 | 18.3 | 26.9 | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 14.0 | 12.7 | 11.1 | 11.7 | 12.4 | 12.3 | 13.2 | 16.2 | 19.2 | 20.1 | 21.6 | 22.9 | 25.9 | 24.2 | 20.5 | 20.1 | 21.9 | 21.7 | 21.2 | 18.7 | 18.0 | 17.8 | 17.3 | 16.8 | 18.0 | 25.9 | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 15.7 | 14.1 | 12.2 | 11.1 | 9.8 | 9.4 | 10.7 | 11.6 | 13.3 | 13.6 | 14.1 | 14.4 | 14.6 | 15.2 | 15.1 | 14.9 | 14.9 | 15.3 | 15.8 | 15.2 | 14.1 | 14.6 | 14.2 | 12.3 | 13.6 | 15.8 | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 11.6 | 11.1 | 10.3 | 9.3 | 8.5 | 7.8 | 8.2 | 10.4 | 15.2 | 18.0 | 19.2 | 20.2 | 20.7 | 21.2 | 21.7 | 21.3 | 21.3 | 20.8 | 19.3 | 17.9 | 16.1 | 14.4 | 13.8 | 12.6 | 15.4 | 21.7 | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 11.0 | 10.6 | 10.3 | 8.8 | 7.7 | 7.0 | 9.1 | 12.8 | 16.8 | 20.0 | 21.0 | 22.5 | 23.6 | 23.8 | 25.3 | 25.1 | 25.0 | 24.1 | 22.6 | 19.7 | 16.9 | 15.2 | 13.8 | 12.3 | 16.9 | 25.3 | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 11.3 | 9.4 | 9.4 | 7.4 | 6.3 | 6.8 | 9.9 | 12.0 | 14.4 | 16.4 | 17.5 | 18.7 | 20.5 | 22.1 | 23.0 | 23.6 | 24.2 | 24.1 | 21.7 | 19.2 | 16.9 | 15.3 | 14.3 | 12.7 | 15.7 | 24.2 | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 11.9 | 12.8 | 12.2 | 11.4 | 10.4 | 9.9 | 13.0 | 14.5 | 17.7 | 19.6 | 21.6 | 24.4 | 23.6 | 22.3 | 22.7 | 24.8 | 23.8 | 22.8 | 22.2 | 21.5 | 20.1 | 18.8 | 17.7 | 16.8 | 18.2 | 24.8 | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 14.8 | 14.2 | 13.8 | 13.7 | 14.1 | 15.3 | 15.1 | 15.5 | 18.0 | 19.4 | 20.8 | 21.9 | 21.4 | 21.3 | 20.4 | 20.9 | 19.9 | 20.2 | 19.4 | 18.3 | 17.8 | 17.1 | 17.3 | 15.6 | 17.8 | 21.9 | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 15.6 | 14.9 | 14.1 | 12.8 | 11.9 | 11.5 | 11.3 | 11.8 | 13.1 | 13.3 | 13.8 | 14.2 | 13.8 | 12.8 | 11.9 | 11.8 | 11.8 | 12.5 | 13.4 | 13.3 | 13.4 | 13.1 | 12.9 | 12.8 | 13.0 | 15.6 | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 12.5 | 11.6 | 10.6 | 10.2 | 9.5 | 9.1 | 10.3 | 12.3 | 14.9 | 17.3 | 19.8 | 21.8 | 23.2 | 23.9 | 24.5 | 24.9 | 24.7 | 23.1 | 22.6 | 20.4 | 18.7 | 18.0 | 16.9 | 15.3 | 17.3 | 24.9 | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 13.4 | 12.8 | 12.7 | 12.4 | 12.4 | 12.2 | 13.4 | 15.6 | 18.1 | 20.0 | 22.2 | 23.9 | 23.8 | 24.4 | 23.7 | 24.0 | 24.0 | 23.6 | 22.6 | 20.2 | 18.1 | 16.5 | 15.4 | 14.9 | 18.3 | 24.4 | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 14.3 | 12.5 | 10.2 | 8.3 | 9.7 | 9.6 | 9.7 | 13.4 | 18.0 | 20.4 | 21.4 | 22.0 | 22.3 | 22.7 | 22.9 | 22.4 | 22.0 | 21.6 | 21.0 | 17.3 | 15.5 | 14.2 | 12.6 | 9.6 | 16.4 | 22.9 | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 7.8 | 6.0 | 5.0 | 4.6 | 3.6 | 3.1 | 5.6 | 8.8 | 12.6 | 15.5 | 17.3 | 19.2 | 20.4 | 21.5 | 22.1 | 22.7 | 22.7 | 22.2 | 20.9 | 18.2 | 16.3 | 14.7 | 9.6 | 8.9 | 13.7 | 22.7 | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 8.5 | 8.3 | 7.3 | 7.0 | 7.3 | 6.7 | 7.9 | 12.5 | 14.5 | 17.5 | 21.3 | 23.3 | 24.9 | 26.2 | 26.7 | 26.8 | 27.0 | 26.6 | 24.8 | 22.9 | 20.6 | 19.0 | 17.2 | 15.6 | 17.5 | 27.0 | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 14.3 | 13.2 | 13.4 | 12.3 | 12.3 | 13.2 | 13.5 | 14.5 | 15.5 | 17.6 | 20.3 | 23.1 | 24.4 | 26.0 | 26.4 | 26.0 | 24.7 | 23.7 | 22.6 | 20.6 | 17.9 | 16.1 | 14.4 | 13.5 | 18.3 | 26.4 | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | 13.0 | 12.0 | 11.0 | 10.4 | 10.0 | 10.3 | 12.2 | 14.7 | 17.2 | 19.2 | 20.9 | 22.3 | 23.1 | 23.6 | 23.8 | 24.0 | 23.8 | 23.4 | 22.4 | 20.4 | 18.3 | 16.7 | 15.4 | 14.1 | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | | | | | 20.6 | 18.6 | 16.1 | 14.9 | 14.1 | 15.3 | 16.5 | 20.4 | 23.3 | 26.2 | 28.7 | 30.0 | 30.7 | 31.3 | 31.6 | 31.6 | 31.4 | 30.8 | 29.5 | 27.5 | 25.9 | 24.5 | 23.0 | 22.1 | Diurnal Maximum | |



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Horizon - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Horizon - August 2017**

| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 77 | 10.35 | 10.35 |
| 10 - 20 | 391 | 52.55 | 62.90 |
| > 20 | 276 | 37.10 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Precipitation (PC) - mm

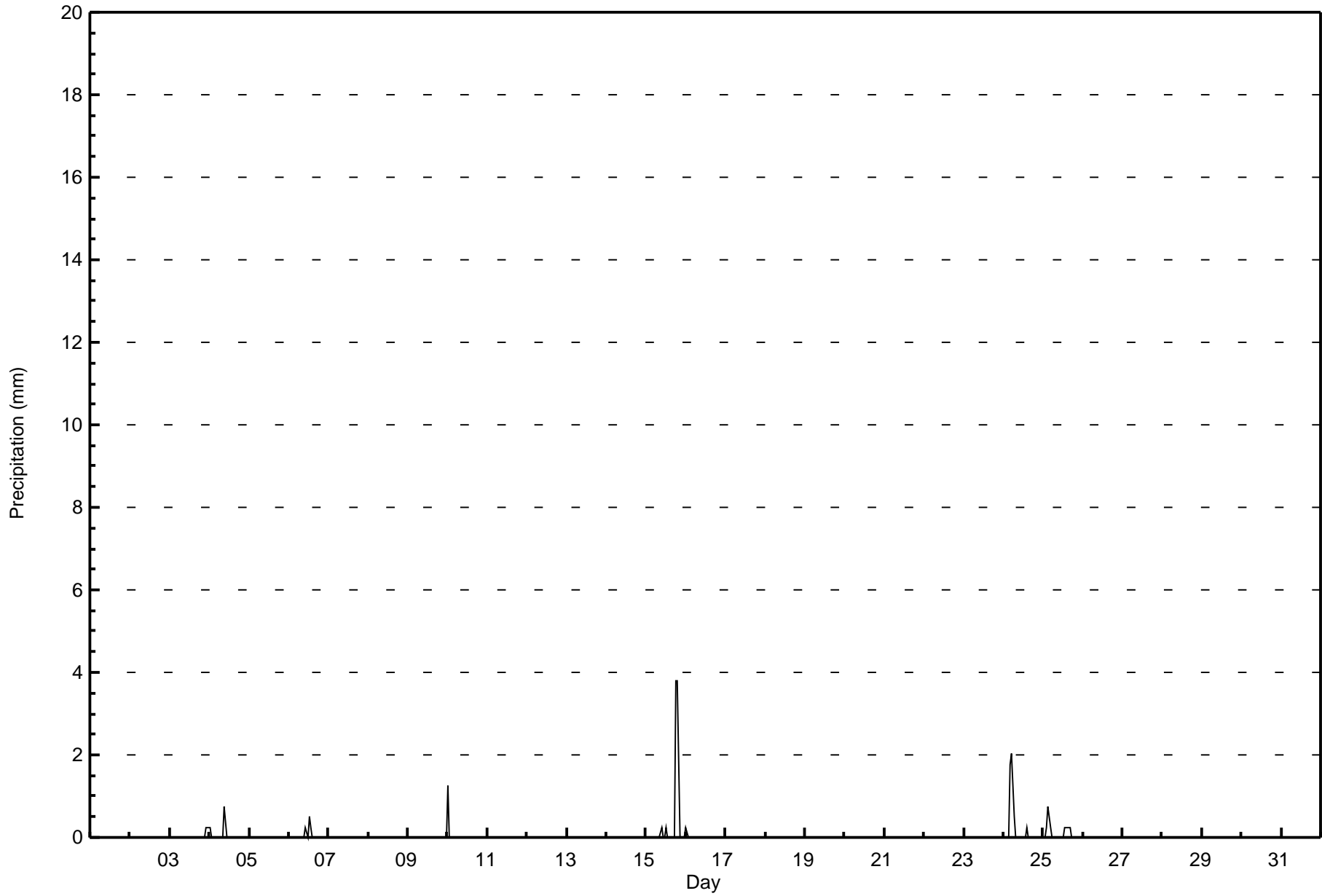
Horizon - August 2017

| Maximum Value: 3.8 mm on Aug 15 19:00 | | Maximum Daily Total: 8.1 mm on Aug 15 | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|--|-----|---------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------|-----------------|-----|
| Minimum Value: 0.0 mm on Aug 1 01:00 | | Minimum Daily Total: 0.0 mm on Aug 1 | | Hours of Data: 744 | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Total: 3.8 mm at hour 19 | | Minimum Diurnal Total: 0.0 mm at hour 2 | | Hours of Missing Data: 0 | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Total: 19.05 mm | | Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.8 | | Hours of Calibration: 0 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 3-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.3 | 0.5 | 0.3 | 0.5 |
| 4-Aug | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.8 |
| 5-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 6-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.5 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.5 |
| 7-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 8-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 9-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 10-Aug | 1.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.3 | 1.3 | 1.3 |
| 11-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 12-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 13-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 14-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 15-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.8 | 3.8 | 0.0 | 0.0 | 0.0 | 0.0 | 8.1 | 3.8 |
| 16-Aug | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.3 | 0.3 |
| 17-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 18-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 19-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 20-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 21-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 22-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 23-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 24-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 1.8 | 2.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.6 | 2.0 |
| 25-Aug | 0.0 | 0.0 | 0.3 | 0.8 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.3 | 0.3 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.3 | 0.8 | 2.3 |
| 26-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 27-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 28-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 29-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 30-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 31-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | | 1.8 | 0.0 | 0.3 | 0.8 | 2.0 | 2.0 | 0.5 | 0.0 | 0.0 | 1.0 | 0.3 | 0.0 | 0.8 | 0.5 | 0.5 | 0.3 | 0.3 | 0.0 | 3.8 | 3.8 | 0.0 | 0.0 | 0.3 | 0.3 | Diurnal Average | |
| | | 1.3 | 0.0 | 0.3 | 0.8 | 1.8 | 2.0 | 0.5 | 0.0 | 0.0 | 0.8 | 0.3 | 0.0 | 0.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.0 | 3.8 | 3.8 | 0.0 | 0.0 | 0.3 | 0.3 | Diurnal Maximum | |



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Horizon - August 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

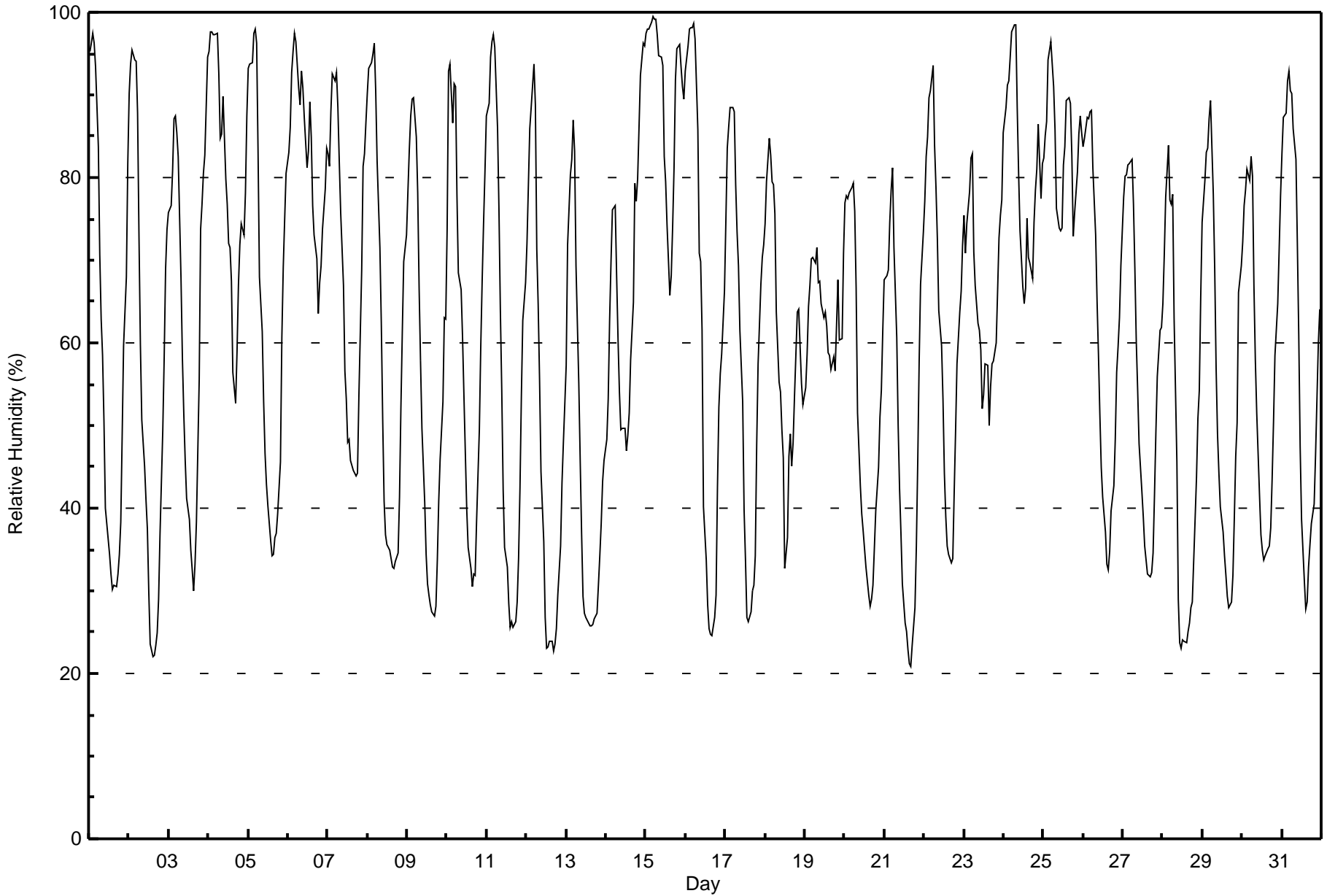
Horizon - August 2017

| Maximum Value: 99 % on Aug 15 05:00 Maximum Daily Average: 89.7 % on Aug 15 | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|---|---------------|---------------|--|--|--|
| Minimum Value: 21 % on Aug 21 17:00 Minimum Daily Average: 45.9 % on Aug 13 Maximum Diurnal Average: 88.8 % at hour 5 Minimum Diurnal Average: 39.5 % at hour 16 Monthly Average: 62.3 % Percentiles: P ₁ = 23 P ₁₀ = 31 Q ₁ = 41 Median = 65 O ₃ = 82 P ₉₀ = 92 P ₉₉ = 98 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | |
| 1-Aug | 95 | 96 | 97 | 96 | 93 | 84 | 71 | 63 | 59 | 50 | 40 | 36 | 34 | 32 | 30 | 31 | 31 | 32 | 34 | 38 | 49 | 60 | 68 | 82 | 58.4 | 97 | | | |
| 2-Aug | 90 | 94 | 95 | 94 | 94 | 88 | 73 | 60 | 51 | 45 | 41 | 37 | 30 | 24 | 22 | 22 | 23 | 25 | 29 | 37 | 50 | 58 | 69 | 74 | 55.2 | 95 | | | |
| 3-Aug | 76 | 77 | 81 | 87 | 87 | 85 | 83 | 68 | 58 | 51 | 46 | 41 | 39 | 35 | 32 | 30 | 33 | 38 | 56 | 74 | 77 | 80 | 83 | 95 | 63.0 | 95 | | | |
| 4-Aug | 95 | 98 | 98 | 97 | 97 | 97 | 93 | 85 | 85 | 90 | 80 | 77 | 72 | 72 | 67 | 57 | 53 | 59 | 67 | 72 | 74 | 73 | 78 | 88 | 80.1 | 98 | | | |
| 5-Aug | 93 | 94 | 94 | 97 | 98 | 96 | 83 | 68 | 61 | 53 | 47 | 43 | 40 | 36 | 34 | 34 | 37 | 37 | 39 | 46 | 61 | 69 | 75 | 81 | 63.2 | 98 | | | |
| 6-Aug | 83 | 86 | 93 | 95 | 98 | 96 | 91 | 89 | 93 | 91 | 87 | 81 | 83 | 89 | 85 | 77 | 73 | 70 | 64 | 67 | 69 | 74 | 79 | 84 | 83.2 | 98 | | | |
| 7-Aug | 83 | 81 | 88 | 93 | 92 | 93 | 88 | 82 | 76 | 67 | 57 | 53 | 48 | 48 | 46 | 45 | 44 | 44 | 44 | 54 | 69 | 81 | 83 | 87 | 68.5 | 93 | | | |
| 8-Aug | 90 | 93 | 94 | 95 | 96 | 90 | 82 | 72 | 62 | 51 | 41 | 37 | 36 | 35 | 34 | 33 | 33 | 34 | 35 | 41 | 52 | 61 | 70 | 73 | 59.9 | 96 | | | |
| 9-Aug | 78 | 83 | 87 | 89 | 90 | 85 | 78 | 67 | 58 | 50 | 41 | 34 | 31 | 30 | 28 | 27 | 27 | 28 | 34 | 41 | 46 | 53 | 63 | 63 | 54.6 | 90 | | | |
| 10-Aug | 74 | 93 | 94 | 87 | 91 | 91 | 78 | 68 | 66 | 61 | 54 | 47 | 40 | 35 | 33 | 30 | 32 | 32 | 38 | 50 | 59 | 67 | 74 | 81 | 61.5 | 94 | | | |
| 11-Aug | 87 | 89 | 95 | 96 | 97 | 96 | 86 | 76 | 64 | 54 | 42 | 35 | 33 | 28 | 26 | 26 | 26 | 26 | 29 | 34 | 42 | 54 | 63 | 67 | 57.1 | 97 | | | |
| 12-Aug | 72 | 79 | 86 | 88 | 94 | 89 | 71 | 65 | 55 | 44 | 36 | 27 | 23 | 23 | 24 | 24 | 23 | 24 | 25 | 29 | 35 | 43 | 48 | 53 | 49.2 | 94 | | | |
| 13-Aug | 57 | 72 | 80 | 82 | 87 | 83 | 69 | 55 | 46 | 37 | 29 | 27 | 27 | 26 | 26 | 26 | 26 | 27 | 27 | 31 | 34 | 38 | 43 | 46 | 45.9 | 87 | | | |
| 14-Aug | 48 | 53 | 63 | 70 | 76 | 77 | 68 | 60 | 54 | 49 | 50 | 50 | 47 | 49 | 51 | 58 | 65 | 79 | 77 | 80 | 86 | 92 | 96 | 96 | 66.5 | 96 | | | |
| 15-Aug | 97 | 98 | 98 | 99 | 99 | 99 | 99 | 97 | 95 | 94 | 94 | 83 | 80 | 74 | 66 | 68 | 74 | 81 | 92 | 96 | 96 | 93 | 91 | 89 | 89.7 | 99 | | | |
| 16-Aug | 93 | 96 | 98 | 98 | 98 | 99 | 97 | 86 | 71 | 70 | 61 | 40 | 34 | 28 | 25 | 25 | 25 | 27 | 30 | 43 | 52 | 56 | 59 | 66 | 61.5 | 99 | | | |
| 17-Aug | 75 | 84 | 86 | 88 | 88 | 88 | 79 | 73 | 69 | 61 | 53 | 40 | 34 | 27 | 26 | 27 | 30 | 31 | 34 | 48 | 58 | 67 | 70 | 72 | 58.7 | 88 | | | |
| 18-Aug | 74 | 80 | 85 | 83 | 79 | 79 | 76 | 64 | 55 | 54 | 49 | 46 | 33 | 36 | 46 | 49 | 45 | 48 | 53 | 64 | 64 | 59 | 55 | 53 | 59.6 | 85 | | | |
| 19-Aug | 55 | 59 | 64 | 67 | 70 | 70 | 70 | 72 | 67 | 67 | 65 | 63 | 64 | 62 | 59 | 58 | 57 | 58 | 57 | 62 | 68 | 60 | 60 | 71 | 63.5 | 72 | | | |
| 20-Aug | 77 | 78 | 77 | 78 | 79 | 79 | 76 | 67 | 51 | 43 | 39 | 37 | 35 | 33 | 29 | 28 | 29 | 31 | 35 | 40 | 45 | 51 | 54 | 61 | 52.2 | 79 | | | |
| 21-Aug | 68 | 68 | 69 | 75 | 78 | 81 | 71 | 61 | 50 | 42 | 37 | 31 | 26 | 25 | 23 | 21 | 21 | 23 | 28 | 35 | 46 | 58 | 67 | 73 | 49.1 | 81 | | | |
| 22-Aug | 77 | 83 | 85 | 90 | 90 | 94 | 84 | 79 | 73 | 64 | 60 | 53 | 44 | 39 | 35 | 34 | 33 | 34 | 42 | 49 | 58 | 64 | 66 | 72 | 62.5 | 94 | | | |
| 23-Aug | 75 | 71 | 74 | 78 | 82 | 83 | 71 | 67 | 62 | 62 | 59 | 52 | 54 | 57 | 57 | 50 | 55 | 58 | 58 | 60 | 66 | 73 | 75 | 77 | 65.7 | 83 | | | |
| 24-Aug | 85 | 89 | 91 | 92 | 95 | 98 | 98 | 99 | 89 | 80 | 73 | 67 | 65 | 67 | 75 | 70 | 70 | 68 | 74 | 78 | 81 | 86 | 77 | 82 | 81.2 | 99 | | | |
| 25-Aug | 82 | 85 | 87 | 94 | 96 | 94 | 91 | 86 | 76 | 74 | 73 | 74 | 81 | 84 | 89 | 90 | 89 | 83 | 73 | 76 | 81 | 85 | 88 | 85 | 84.0 | 96 | | | |
| 26-Aug | 84 | 85 | 87 | 87 | 88 | 88 | 81 | 73 | 65 | 59 | 51 | 45 | 41 | 37 | 33 | 33 | 35 | 40 | 43 | 48 | 56 | 60 | 63 | 69 | 60.5 | 88 | | | |
| 27-Aug | 78 | 80 | 80 | 82 | 82 | 82 | 77 | 69 | 60 | 54 | 48 | 42 | 39 | 35 | 34 | 32 | 32 | 32 | 35 | 41 | 49 | 56 | 62 | 62 | 55.9 | 82 | | | |
| 28-Aug | 65 | 71 | 78 | 84 | 77 | 77 | 78 | 63 | 46 | 29 | 24 | 23 | 24 | 24 | 24 | 25 | 26 | 28 | 29 | 39 | 44 | 51 | 54 | 65 | 47.7 | 84 | | | |
| 29-Aug | 75 | 80 | 83 | 84 | 87 | 89 | 78 | 69 | 57 | 49 | 44 | 40 | 37 | 34 | 32 | 29 | 28 | 29 | 32 | 39 | 46 | 50 | 66 | 69 | 55.3 | 89 | | | |
| 30-Aug | 72 | 77 | 79 | 81 | 80 | 83 | 80 | 67 | 58 | 52 | 42 | 37 | 35 | 34 | 34 | 35 | 35 | 38 | 44 | 51 | 58 | 65 | 71 | 78 | 57.6 | 83 | | | |
| 31-Aug | 83 | 87 | 88 | 92 | 93 | 91 | 90 | 86 | 82 | 72 | 61 | 47 | 39 | 31 | 28 | 29 | 33 | 36 | 38 | 40 | 47 | 53 | 60 | 64 | 61.2 | 93 | | | |
| | | | | | | | | | | | | | | | | | | Diurnal Average | | | | | | 78.6 82.4 85.6 87.7 88.8 87.9 81.0 72.7 65.0 58.7 52.4 46.6 43.4 41.6 40.5 39.5 40.0 41.8 44.9 51.6 58.7 64.3 68.8 73.4 | | | | | |
| | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | | 97 98 98 99 99 99 99 99 99 95 94 94 83 83 89 89 90 89 83 92 96 96 93 96 96 | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Horizon - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Horizon - August 2017

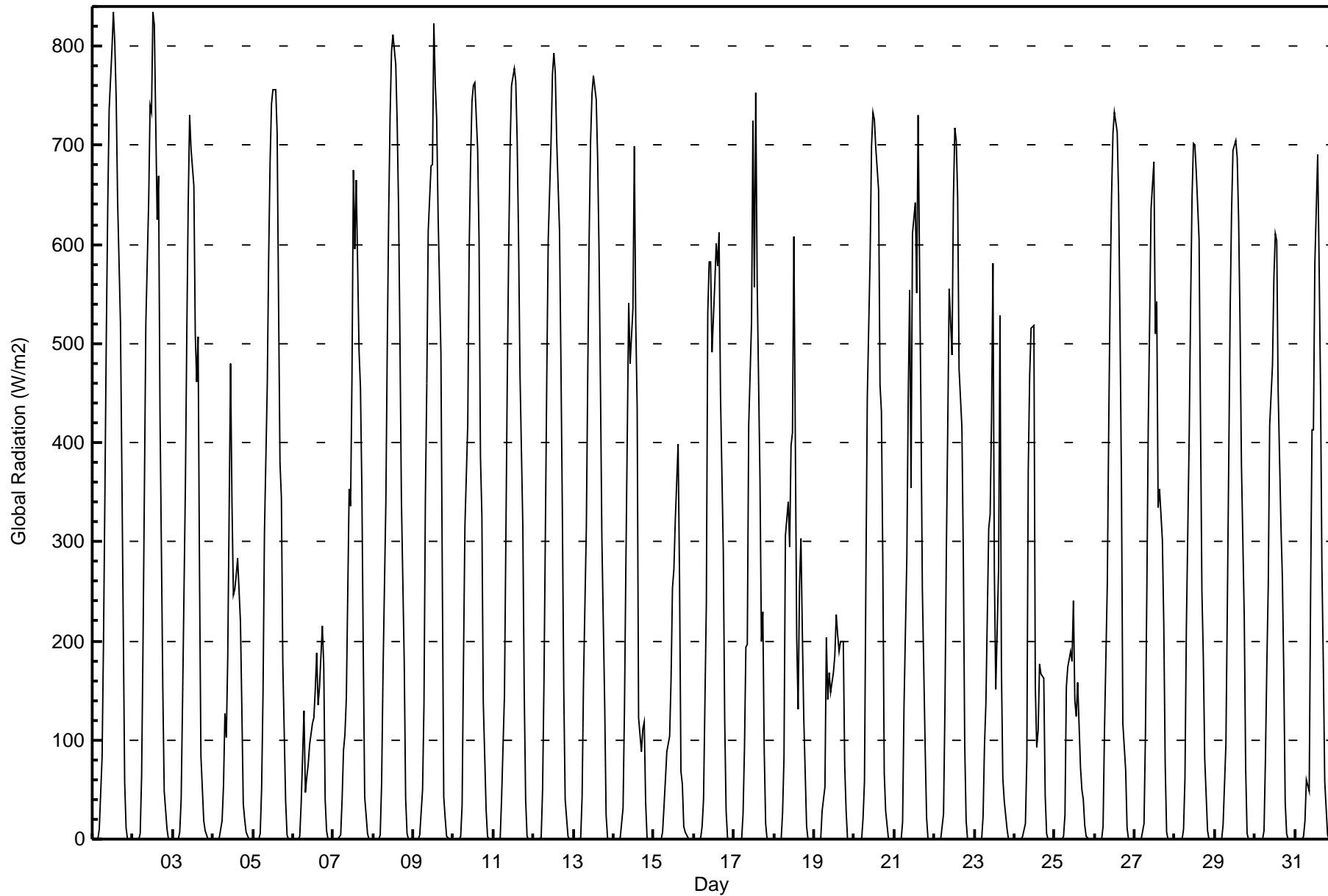
| Concentration Ranges (%) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 0 | 0.00 | 0.00 |
| 20 - 40 | 174 | 23.39 | 23.39 |
| 40 - 60 | 157 | 21.10 | 44.49 |
| 60 - 80 | 206 | 27.69 | 72.18 |
| 80 - 100 | 207 | 27.82 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



| Maximum Value: 835 W/m2 on Aug 1 13:00 | | | | | | | | | | | | | | | | | | | Maximum Daily Average: 313.4 W/m2 on Aug 1 | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|---|---|---|---|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|-----|-----|-----|-----|------|---------------------------------|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|-----|-----|-----|-----|-----------------|--|
| Minimum Value: 0 W/m2 on Aug 1 01:00 | | | | | | | | | | | | | | | | | | | Minimum Daily Average: 65.3 W/m2 on Aug 25 | | | | | | Hours of Data: 744 | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 588.2 W/m2 at hour 13 | | | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 0.0 W/m2 at hour 3 | | | | | | Hours of Missing Data: 0 | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 211.4 W/m2 | | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 74 Q ₃ = 416 P ₉₀ = 647 P ₉₉ = 791 | | | | | | Hours of Calibration: 0 | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 0 | 0 | 0 | 0 | 9 | 83 | 200 | 348 | 510 | 638 | 736 | 797 | 835 | 803 | 746 | 644 | 522 | 371 | 215 | 57 | 11 | 0 | 0 | 0 | 313.4 | 835 | | | | | | | | | | | | | | | | | | |
| 2-Aug | 0 | 0 | 0 | 0 | 6 | 64 | 197 | 358 | 521 | 644 | 740 | 734 | 834 | 821 | 626 | 670 | 433 | 293 | 152 | 49 | 10 | 0 | 0 | 0 | 298.0 | 834 | | | | | | | | | | | | | | | | | | |
| 3-Aug | 0 | 0 | 0 | 0 | 6 | 40 | 139 | 356 | 509 | 641 | 730 | 696 | 659 | 510 | 462 | 506 | 269 | 84 | 18 | 9 | 4 | 0 | 0 | 0 | 234.9 | 730 | | | | | | | | | | | | | | | | | | |
| 4-Aug | 0 | 0 | 0 | 0 | 2 | 19 | 55 | 126 | 103 | 184 | 480 | 339 | 247 | 252 | 266 | 283 | 219 | 130 | 35 | 20 | 7 | 0 | 0 | 0 | 115.3 | 480 | | | | | | | | | | | | | | | | | | |
| 5-Aug | 0 | 0 | 0 | 0 | 5 | 52 | 148 | 309 | 459 | 587 | 683 | 742 | 756 | 757 | 712 | 541 | 380 | 344 | 177 | 39 | 5 | 0 | 0 | 0 | 279.0 | 757 | | | | | | | | | | | | | | | | | | |
| 6-Aug | 0 | 0 | 0 | 0 | 3 | 35 | 130 | 48 | 63 | 75 | 96 | 117 | 122 | 152 | 188 | 136 | 154 | 215 | 175 | 40 | 9 | 0 | 0 | 0 | 73.2 | 215 | | | | | | | | | | | | | | | | | | |
| 7-Aug | 0 | 0 | 0 | 0 | 5 | 40 | 90 | 106 | 143 | 353 | 336 | 468 | 675 | 595 | 665 | 493 | 455 | 353 | 188 | 43 | 6 | 0 | 0 | 0 | 208.9 | 675 | | | | | | | | | | | | | | | | | | |
| 8-Aug | 0 | 0 | 0 | 0 | 4 | 58 | 169 | 341 | 498 | 630 | 731 | 795 | 812 | 781 | 723 | 636 | 499 | 343 | 180 | 41 | 5 | 0 | 0 | 0 | 302.0 | 812 | | | | | | | | | | | | | | | | | | |
| 9-Aug | 0 | 0 | 0 | 0 | 4 | 50 | 136 | 345 | 459 | 614 | 679 | 680 | 823 | 761 | 725 | 629 | 490 | 260 | 42 | 22 | 2 | 0 | 0 | 0 | 280.1 | 823 | | | | | | | | | | | | | | | | | | |
| 10-Aug | 0 | 0 | 0 | 0 | 2 | 34 | 182 | 317 | 419 | 593 | 684 | 745 | 761 | 764 | 696 | 605 | 386 | 328 | 138 | 29 | 3 | 0 | 0 | 0 | 278.6 | 764 | | | | | | | | | | | | | | | | | | |
| 11-Aug | 0 | 0 | 0 | 0 | 2 | 43 | 145 | 303 | 464 | 597 | 697 | 760 | 778 | 764 | 704 | 604 | 470 | 316 | 150 | 40 | 3 | 0 | 0 | 0 | 285.0 | 778 | | | | | | | | | | | | | | | | | | |
| 12-Aug | 0 | 0 | 0 | 0 | 2 | 50 | 159 | 313 | 469 | 605 | 703 | 772 | 793 | 773 | 705 | 613 | 481 | 330 | 153 | 40 | 3 | 0 | 0 | 0 | 290.2 | 793 | | | | | | | | | | | | | | | | | | |
| 13-Aug | 0 | 0 | 0 | 0 | 2 | 43 | 159 | 314 | 470 | 608 | 705 | 752 | 771 | 747 | 686 | 592 | 457 | 303 | 136 | 25 | 1 | 0 | 0 | 0 | 282.1 | 771 | | | | | | | | | | | | | | | | | | |
| 14-Aug | 0 | 0 | 0 | 0 | 1 | 32 | 131 | 277 | 409 | 541 | 480 | 535 | 700 | 521 | 436 | 122 | 88 | 110 | 119 | 37 | 2 | 0 | 0 | 0 | 189.2 | 700 | | | | | | | | | | | | | | | | | | |
| 15-Aug | 0 | 0 | 0 | 0 | 0 | 8 | 33 | 60 | 88 | 104 | 160 | 253 | 272 | 322 | 399 | 263 | 69 | 55 | 13 | 7 | 1 | 0 | 0 | 0 | 87.8 | 399 | | | | | | | | | | | | | | | | | | |
| 16-Aug | 0 | 0 | 0 | 0 | 1 | 14 | 40 | 238 | 531 | 582 | 582 | 491 | 561 | 601 | 578 | 612 | 450 | 290 | 120 | 29 | 2 | 0 | 0 | 0 | 238.4 | 612 | | | | | | | | | | | | | | | | | | |
| 17-Aug | 0 | 0 | 0 | 0 | 0 | 26 | 92 | 194 | 196 | 417 | 522 | 725 | 557 | 754 | 561 | 362 | 200 | 230 | 88 | 15 | 1 | 0 | 0 | 0 | 205.7 | 754 | | | | | | | | | | | | | | | | | | |
| 18-Aug | 0 | 0 | 0 | 0 | 0 | 28 | 83 | 305 | 340 | 294 | 397 | 410 | 609 | 203 | 130 | 256 | 303 | 209 | 122 | 13 | 0 | 0 | 0 | 0 | 154.3 | 609 | | | | | | | | | | | | | | | | | | |
| 19-Aug | 0 | 0 | 0 | 0 | 0 | 29 | 52 | 203 | 141 | 168 | 148 | 168 | 185 | 226 | 207 | 190 | 199 | 199 | 74 | 28 | 0 | 0 | 0 | 0 | 92.4 | 226 | | | | | | | | | | | | | | | | | | |
| 20-Aug | 0 | 0 | 0 | 0 | 0 | 22 | 58 | 261 | 446 | 587 | 699 | 734 | 727 | 697 | 655 | 458 | 431 | 277 | 67 | 29 | 0 | 0 | 0 | 0 | 256.2 | 734 | | | | | | | | | | | | | | | | | | |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | 17 | 134 | 285 | 446 | 553 | 354 | 610 | 643 | 551 | 731 | 581 | 431 | 252 | 91 | 21 | 0 | 0 | 0 | 0 | 237.6 | 731 | | | | | | | | | | | | | | | | | | |
| 22-Aug | 0 | 0 | 0 | 0 | 0 | 26 | 133 | 290 | 419 | 555 | 489 | 647 | 717 | 705 | 648 | 474 | 416 | 288 | 96 | 18 | 0 | 0 | 0 | 0 | 246.8 | 717 | | | | | | | | | | | | | | | | | | |
| 23-Aug | 0 | 0 | 0 | 0 | 0 | 22 | 93 | 137 | 314 | 328 | 424 | 581 | 270 | 151 | 273 | 528 | 172 | 61 | 39 | 10 | 0 | 0 | 0 | 0 | 141.9 | 581 | | | | | | | | | | | | | | | | | | |
| 24-Aug | 0 | 0 | 0 | 0 | 0 | 2 | 16 | 80 | 372 | 468 | 516 | 519 | 154 | 93 | 110 | 176 | 167 | 162 | 44 | 6 | 0 | 0 | 0 | 0 | 120.1 | 519 | | | | | | | | | | | | | | | | | | |
| 25-Aug | 0 | 0 | 0 | 0 | 0 | 3 | 24 | 153 | 174 | 189 | 180 | 240 | 140 | 124 | 158 | 72 | 50 | 40 | 15 | 3 | 0 | 0 | 0 | 0 | 65.3 | 240 | | | | | | | | | | | | | | | | | | |
| 26-Aug | 0 | 0 | 0 | 0 | 0 | 13 | 109 | 257 | 416 | 551 | 648 | 712 | 733 | 713 | 650 | 518 | 363 | 116 | 70 | 11 | 0 | 0 | 0 | 0 | 245.0 | 733 | | | | | | | | | | | | | | | | | | |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | 15 | 105 | 250 | 417 | 524 | 637 | 683 | 509 | 542 | 335 | 353 | 303 | 216 | 75 | 8 | 0 | 0 | 0 | 0 | 207.1 | 683 | | | | | | | | | | | | | | | | | | |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | 10 | 61 | 214 | 407 | 538 | 647 | 703 | 700 | 673 | 605 | 424 | 251 | 183 | 82 | 9 | 0 | 0 | 0 | 0 | 229.5 | 703 | | | | | | | | | | | | | | | | | | |
| 29-Aug | 0 | 0 | 0 | 0 | 0 | 14 | 95 | 233 | 381 | 533 | 633 | 694 | 704 | 687 | 626 | 521 | 378 | 223 | 71 | 6 | 0 | 0 | 0 | 0 | 241.6 | 704 | | | | | | | | | | | | | | | | | | |
| 30-Aug | 0 | 0 | 0 | 0 | 0 | 9 | 81 | 177 | 256 | 417 | 479 | 567 | 611 | 603 | 452 | 315 | 264 | 167 | 37 | 5 | 0 | 0 | 0 | 0 | 185.1 | 611 | | | | | | | | | | | | | | | | | | |
| 31-Aug | 0 | 0 | 0 | 0 | 0 | 2 | 18 | 60 | 49 | 249 | 413 | 413 | 582 | 691 | 582 | 457 | 274 | 176 | 59 | 4 | 0 | 0 | 0 | 0 | 167.9 | 691 | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 1.9 | 29.1 | 105.5 | 234.1 | 351.3 | 463.4 | 529.2 | 583.2 | 588.2 | 559.2 | 517.4 | 439.8 | 323.3 | 223.4 | 98.0 | 23.1 | 2.5 | 0.0 | 0.0 | 0.0 | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | | 0 | 0 | 0 | 0 | 9 | 83 | 200 | 358 | 531 | 644 | 740 | 797 | 835 | 821 | 746 | 670 | 522 | 371 | 215 | 57 | 11 | 0 | 0 | 0 | Diurnal Maximum | |





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Horizon - August 2017

| | | |
|--|---|--------------------------------|
| Maximum Speed: 37 km/h on Aug 19 17:00 | Maximum Daily Speed Average: 16.6 km/h on Aug 20 | Hours in Service: 744 |
| Minimum Speed Value: 0 km/h on Aug 23 08:00 | Minimum Daily Speed Average: 0.4 km/h on Aug 4 | Hours of Data: 742 |
| Maximum Diurnal Speed Average: 7.7 km/h at hour 14 | Minimum Diurnal Speed Average: 4.4 km/h at hour 20 | Hours of Missing Data: 2 |
| Monthly Average Velocity: 5.6 km/h 224.7 deg | Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 6 Median = 8 Q ₃ = 12 P ₉₀ = 17 P ₉₉ = 27 | Percent Operational Time: 99.9 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | |
|--------|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|---------------|-------|-------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | |
| 1-Aug | SW3 | SW4 | SSW6 | SSW6 | SSW6 | SSW5 | WSW1 | NE4 | NNE8 | NNE6 | NE10 | NE10 | NE11 | NNE11 | NE13 | NE12 | NE11 | NE10 | NE10 | NE6 | NE5 | NNE4 | NW3 | WSW1 | NE4.1 | NE13 | | |
| 2-Aug | SW3 | SW5 | SSW5 | SSW6 | SSW7 | SSW8 | SSW5 | SSW6 | S6 | SW8 | SSW8 | S7 | SSW7 | SW9 | SW9 | SW12 | SW13 | SW11 | SW9 | SSW6 | SW8 | SW7 | SW7 | SW7 | SW7.3 | SW13 | | |
| 3-Aug | SW8 | SW11 | SW8 | S8 | SSW11 | SSW10 | SSW11 | SSW11 | SSW10 | SSW10 | SSW9 | S8 | SSW8 | S6 | SSW7 | SW7 | ESE4 | ENE4 | NNW16 | NNE7 | SSE3 | WSW7 | WNW2 | NNW3 | SSW5.2 | NNW16 | | |
| 4-Aug | W3 | W3 | SSW3 | SSW3 | W0 | NNW3 | NNE5 | NNE5 | NE6 | N3 | NNE5 | N4 | ENE3 | ESE9 | E7 | E8 | ESE9 | SSW7 | SW5 | SW7 | SW4 | WNW7 | W3 | SSW2 | ESE0.4 | ESE9 | | |
| 5-Aug | S6 | W5 | NNE4 | SSW7 | SW7 | SW6 | SW4 | SSW5 | SSW6 | SSW6 | SSW6 | SSW6 | SSW8 | SSW11 | S12 | SSW11 | SSW12 | SW11 | SSW10 | SSW8 | SSW7 | SW7 | SW9 | SW7 | SSW6.8 | SSW12 | | |
| 6-Aug | WSW5 | SSW3 | SSW4 | SW2 | E3 | ENE9 | NE7 | NNE11 | NNE9 | NNE14 | NNE16 | NNE12 | NE9 | NE6 | NE7 | NE10 | NE11 | NE12 | NE13 | NNE10 | N9 | NW12 | NW8 | WNW7 | NNE6.5 | NNE16 | | |
| 7-Aug | WNW8 | NW8 | WNW7 | NW5 | WNW6 | S4 | S4 | SSW3 | NE3 | NNE6 | NNE8 | NNE6 | WNW4 | N2 | WNW3 | SSE4 | S7 | S7 | SW7 | SSW8 | SSW7 | SSW7 | SW9 | SW8 | WSW2.2 | SW9 | | |
| 8-Aug | SW10 | SW10 | SW12 | SW11 | SW10 | SSW6 | SSW8 | SSW8 | SSW8 | C | SSW8 | SW6 | S9 | SSW11 | SSW11 | SSW10 | SSW12 | SSW13 | SSW12 | S10 | S7 | S4 | SSE4 | SSW7 | SSW8.7 | SSW13 | | |
| 9-Aug | SSW9 | SW8 | SW8 | SW9 | SSW8 | SSW10 | SSW9 | SSW8 | S7 | SSW8 | SSW9 | SSW11 | SW12 | SW13 | SW10 | SSW9 | SSW9 | SSW9 | S7 | S7 | SW8 | SW7 | SW8 | SW3 | SSW8.3 | SW13 | | |
| 10-Aug | SSW4 | S6 | SSW8 | SW11 | SSW7 | SW8 | SW5 | SE2 | ENE4 | ENE6 | ENE8 | ENE4 | ESE5 | E3 | NE7 | ENE8 | ENE8 | ENE13 | SE7 | S8 | SW6 | SSW3 | SSW6 | SSW6 | SSE2.5 | ENE13 | | |
| 11-Aug | SSW8 | SW9 | SSW6 | S8 | SSW7 | S7 | SSW8 | S9 | SSW8 | SSW9 | SSW11 | SSW11 | SSW12 | SSW12 | SSW12 | S12 | SSW13 | S11 | SSE9 | SSE8 | SSE8 | S7 | S8 | SW8 | S9.1 | SSW13 | | |
| 12-Aug | SSW8 | SSW7 | SSW7 | SW6 | SW5 | SW5 | SW5 | SSW5 | SSW6 | S11 | S13 | SSW19 | S22 | S21 | S21 | S20 | S21 | SSW19 | S16 | S12 | S11 | S11 | S9 | S10 | S11.7 | S22 | | |
| 13-Aug | S8 | SSW4 | WNW3 | NNW4 | NNW3 | NE3 | NNE2 | SSE4 | SSE9 | SSE13 | SSE17 | SSE21 | SSE20 | SSE20 | SSE18 | SSE18 | SE18 | SSE18 | SSE18 | SSE16 | SSE15 | SSE12 | S10 | SSE8 | SSE10.5 | SSE21 | | |
| 14-Aug | SE7 | S5 | S4 | SSE3 | SSW3 | NNW3 | ENE6 | ESE4 | SSE8 | S6 | SE10 | SSW11 | S12 | SSW13 | SSW15 | SW17 | SW15 | SW13 | SW9 | SSW9 | S7 | S5 | S6 | SSW4 | S6.4 | SW17 | | |
| 15-Aug | WNW1 | WNW1 | NNW3 | N1 | SE3 | WNW3 | ENE2 | NNE2 | NE5 | ENE5 | NNE1 | SW4 | WSW3 | NNW2 | N4 | ENE5 | ENE7 | ENE7 | ENE4 | SW2 | WNW2 | W4 | W6 | WSW10 | N0.8 | WSW10 | | |
| 16-Aug | WSW8 | SW6 | SW6 | SSW5 | SW4 | SW7 | SW7 | SSW7 | SSW7 | S9 | S8 | SW4 | SSW5 | WSW8 | WSW9 | SW13 | SW13 | SW12 | SW11 | SW8 | SW10 | WSW9 | WSW13 | WSW10 | SW7.8 | SW13 | | |
| 17-Aug | SW8 | SSW7 | SSW8 | SSW8 | SSW9 | SSW8 | SSW7 | S6 | S9 | SSW10 | SSW9 | SSW10 | WSW8 | WNW13 | WNW14 | W15 | WNW13 | WNW10 | WNW6 | WSW4 | SW6 | SW7 | SW9 | WSW10 | WSW6.9 | W15 | | |
| 18-Aug | WSW9 | SW8 | SW7 | SW10 | SW12 | SW9 | SW8 | SW13 | SW11 | SW13 | SW15 | SW14 | WSW22 | SW24 | SW23 | SSW18 | SW18 | SW18 | SSW16 | SSW13 | SSW13 | SW14 | SW12 | SW14 | SW13.7 | SW24 | | |
| 19-Aug | WSW12 | WSW11 | WSW7 | WSW10 | WSW10 | SW11 | SW11 | SW16 | SW17 | WSW18 | WSW18 | W19 | W22 | W25 | W29 | WNW37 | WNW37 | WNW28 | WNW23 | W11 | WSW11 | WNW14 | NW7 | SW10 | W15.7 | WNW37 | | |
| 20-Aug | SW13 | WSW18 | WSW17 | WSW16 | SW18 | SW17 | SW13 | SW15 | SW12 | W17 | WNW22 | W22 | W26 | WNW26 | WNW28 | WNW30 | NW28 | WNW27 | WNW26 | WNW19 | W12 | W12 | W11 | WSW3 | W16.6 | WNW30 | | |
| 21-Aug | SW6 | SW8 | WSW12 | WSW13 | SW14 | SW14 | SW12 | SSW8 | SW11 | SSW12 | SW15 | WSW17 | W16 | W14 | WSW17 | W17 | W16 | WNW17 | NW12 | NW8 | N5 | NNE8 | NNE8 | NNE6 | WSW9.0 | W17 | | |
| 22-Aug | N6 | N4 | NNE6 | NNE5 | NNE3 | NNE5 | NNE6 | NNE8 | NNE7 | NE9 | NNE7 | ENE3 | NE6 | NE6 | E7 | SSE4 | WSW4 | S4 | ENE9 | ENE7 | NNE6 | NE6 | N6 | N5 | NE4.5 | NE9 | | |
| 23-Aug | NNE4 | NE6 | NE6 | NNE4 | NNE4 | N2 | NNW2 | NE0 | SSW5 | SSW7 | SSW7 | SSW15 | SSW16 | SSW15 | S13 | S17 | SSE13 | SSE12 | SSE10 | SSE10 | S8 | S4 | S6 | SSW6 | S5.5 | S17 | | |
| 24-Aug | SW4 | SW2 | NNW3 | AF | S5 | SW4 | W1 | SE4 | SSE8 | SSE9 | ESE5 | ESE9 | SE6 | SSE2 | ENE6 | SSE4 | SE6 | ENE5 | NE7 | NNE6 | NNE3 | SSW4 | SW13 | SW11 | SSE2.5 | SW13 | | |
| 25-Aug | SW12 | SSW11 | SW13 | SSW11 | SSW11 | SSW13 | SSW13 | SSW13 | SSW16 | SSW17 | SW18 | SSW18 | SSW17 | WSW22 | SW22 | SW23 | WSW23 | WSW22 | WSW20 | SW13 | SW12 | SW9 | SW11 | SW10 | SW15.1 | WSW23 | | |
| 26-Aug | SW7 | WSW8 | SW14 | WSW17 | WSW16 | WSW16 | SW15 | SW16 | SW16 | SW17 | SW14 | SW16 | SW16 | SW18 | SW19 | WSW19 | WSW15 | WSW12 | WSW12 | WSW11 | SSW8 | SW10 | SW11 | WSW7 | SW13.6 | SW19 | | |
| 27-Aug | W6 | WSW8 | WSW10 | SW15 | SW15 | SW17 | WSW18 | WSW17 | WSW15 | WSW17 | SW17 | WSW18 | W17 | W16 | WNW13 | WNW16 | WNW17 | WNW17 | WNW10 | WNW7 | WNW6 | WNW6 | SW5 | W6 | WSW11.8 | WSW18 | | |
| 28-Aug | WSW6 | SSW7 | SW7 | SW7 | SW7 | SW9 | SW11 | SW10 | WSW9 | WNW17 | WNW21 | WNW23 | WNW23 | WNW22 | WNW22 | WNW23 | WNW22 | WNW23 | WNW22 | WNW18 | WNW16 | WNW9 | WNW9 | WNW12 | W8 | W3 | W12.0 | WNW23 |
| 29-Aug | NNE2 | SW5 | SSW6 | SW7 | SW6 | SSW6 | SSW6 | E3 | S5 | E2 | NE5 | ESE5 | E7 | ENE6 | ESE8 | SE9 | SE10 | ESE10 | ESE7 | ESE6 | ESE6 | SE6 | W3 | ESE2 | SE3.5 | ESE10 | | |
| 30-Aug | NNE4 | NE4 | NNE3 | NNW4 | NNW4 | N3 | NNW4 | NNE2 | NNE4 | ESE4 | SSE9 | SSE15 | SSE16 | SSE19 | SSE18 | S19 | S17 | SSE13 | SSE11 | S12 | SSW12 | SSW10 | SSW10 | SSW8 | S6.4 | SSE19 | | |
| 31-Aug | SSW9 | S8 | S10 | SSW11 | SSW12 | SSW7 | SSW8 | SSW9 | SSW10 | SSW12 | SSW11 | SW15 | SW18 | SW21 | W18 | WNW25 | WNW22 | WNW21 | WNW15 | W10 | WSW9 | SW10 | WSW8 | WSW10 | WSW10.3 | WNW25 | | |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----------------|
| SW5.0 | SW5.2 | SW5.2 | SW6.2 | SW6.2 | SW5.8 | SW5.0 | SSW4.7 | SSW4.8 | SSW5.3 | SW5.1 | SW6.4 | SW7.2 | SW7.7 | SW7.0 | SW7.2 | SW6.5 | SW5.7 | SW4.4 | SW4.4 | SW4.6 | SW4.7 | SW5.4 | SW5.2 | Diurnal Average |
| SW13 | WSW18 | WSW17 | WSW17 | SW18 | SW17 | WSW18 | WSW17 | SW17 | WSW18 | WNW22 | WNW23 | W26 | WNW26 | W29 | WNW37 | WNW37 | WNW28 | WNW26 | WNW19 | SSE15 | SW14 | SW13 | SW14 | Diurnal Maximum |

C - Calibration AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Horizon - August 2017

| | |
|--|--|
| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Aug 19 17:00 | Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 1 Percent Operational Time: 99.9 |
| Minimum Value: 0 km/h on Aug 30 04:00 | |
| Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 8 | |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
|--------|-------------------------------|---|---|----|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 5 | 4 | 4 | 4 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 2 | 5 |
| 2-Aug | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 3 | 3 | 3 | 4 | 5 | 5 | 5 | 4 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 5 |
| 3-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 4 | 4 | 3 | 3 | 2 | 4 | 8 | 2 | 2 | 2 | 2 | 2 | 8 |
| 4-Aug | 3 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 1 | 3 | 2 | 3 | 2 | 3 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 3 |
| 5-Aug | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 2 | 4 | 4 | 4 | 5 | 4 | 4 | 3 | 3 | 1 | 1 | 1 | 1 | 5 |
| 6-Aug | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 5 | 4 | 3 | 2 | 2 | 3 | 3 | 3 | 4 | 4 | 3 | 2 | 3 | 1 | 5 |
| 7-Aug | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 2 | 3 | 2 | 3 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 3 |
| 8-Aug | 1 | 1 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | C | 3 | 3 | 4 | 5 | 4 | 4 | 4 | 4 | 3 | 2 | 1 | 2 | 2 | 1 | 5 |
| 9-Aug | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 4 | 5 | 5 | 4 | 4 | 4 | 3 | 2 | 1 | 1 | 1 | 1 | 3 | 5 |
| 10-Aug | 4 | 2 | 2 | 3 | 2 | 2 | 3 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 3 | 3 | 5 | 3 | 2 | 2 | 2 | 1 | 2 | 5 |
| 11-Aug | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 4 |
| 12-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 4 | 6 | 5 | 6 | 6 | 6 | 5 | 6 | 5 | 5 | 3 | 2 | 2 | 2 | 2 | 6 |
| 13-Aug | 2 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 4 | 7 | 6 | 6 | 6 | 6 | 6 | 5 | 6 | 5 | 4 | 4 | 3 | 3 | 2 | 7 |
| 14-Aug | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 2 | 3 | 3 | 3 | 3 | 4 | 4 | 5 | 5 | 4 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 5 |
| 15-Aug | 1 | 1 | 1 | 2 | 1 | 3 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 3 | 1 | 2 | 3 |
| 16-Aug | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 3 | 3 | 5 | 3 | 4 | 4 | 4 | 4 | 3 | 1 | 2 | 2 | 2 | 2 | 5 |
| 17-Aug | 3 | 1 | 2 | 1 | 2 | 2 | 2 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 4 | 3 | 3 | 2 | 3 | 1 | 1 | 1 | 1 | 2 | 5 |
| 18-Aug | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 5 | 3 | 5 | 5 | 4 | 8 | 7 | 7 | 6 | 6 | 5 | 4 | 3 | 3 | 3 | 3 | 3 | 8 |
| 19-Aug | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 7 | 6 | 8 | 8 | 8 | 9 | 8 | 7 | 4 | 3 | 4 | 3 | 3 | 9 |
| 20-Aug | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 5 | 5 | 7 | 6 | 7 | 8 | 6 | 6 | 7 | 5 | 4 | 2 | 3 | 3 | 1 | 8 |
| 21-Aug | 2 | 3 | 3 | 2 | 3 | 2 | 3 | 2 | 3 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 4 | 3 | 3 | 2 | 1 | 2 | 2 | 2 | 5 |
| 22-Aug | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 3 |
| 23-Aug | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 5 | 4 | 4 | 4 | 5 | 4 | 3 | 3 | 3 | 2 | 2 | 2 | 1 | 5 |
| 24-Aug | 1 | 2 | 2 | AF | 3 | 2 | 1 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 4 | 4 | 3 | 2 | 2 | 1 | 2 | 3 | 5 | 3 | 5 |
| 25-Aug | 3 | 3 | 4 | 2 | 3 | 3 | 3 | 3 | 5 | 5 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 3 | 4 | 3 | 3 | 6 |
| 26-Aug | 3 | 2 | 4 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 5 | 6 | 6 | 5 | 4 | 5 | 5 | 3 | 2 | 2 | 2 | 2 | 6 |
| 27-Aug | 1 | 2 | 2 | 3 | 3 | 3 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 5 | 4 | 2 | 2 | 1 | 1 | 2 | 3 | 5 |
| 28-Aug | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 6 | 5 | 5 | 6 | 6 | 5 | 5 | 4 | 4 | 4 | 2 | 2 | 1 | 2 | 2 | 6 |
| 29-Aug | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 2 | 2 | 1 | 3 |
| 30-Aug | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 2 | 1 | 1 | 4 | 4 | 5 | 6 | 5 | 6 | 5 | 4 | 3 | 3 | 2 | 2 | 2 | 1 | 6 |
| 31-Aug | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 5 | 6 | 6 | 6 | 4 | 4 | 5 | 3 | 1 | 2 | 1 | 3 | 6 |
| | 4 | 3 | 4 | 3 | 3 | 3 | 4 | 5 | 5 | 6 | 7 | 7 | 8 | 8 | 8 | 8 | 9 | 8 | 8 | 4 | 4 | 4 | 5 | 3 | |

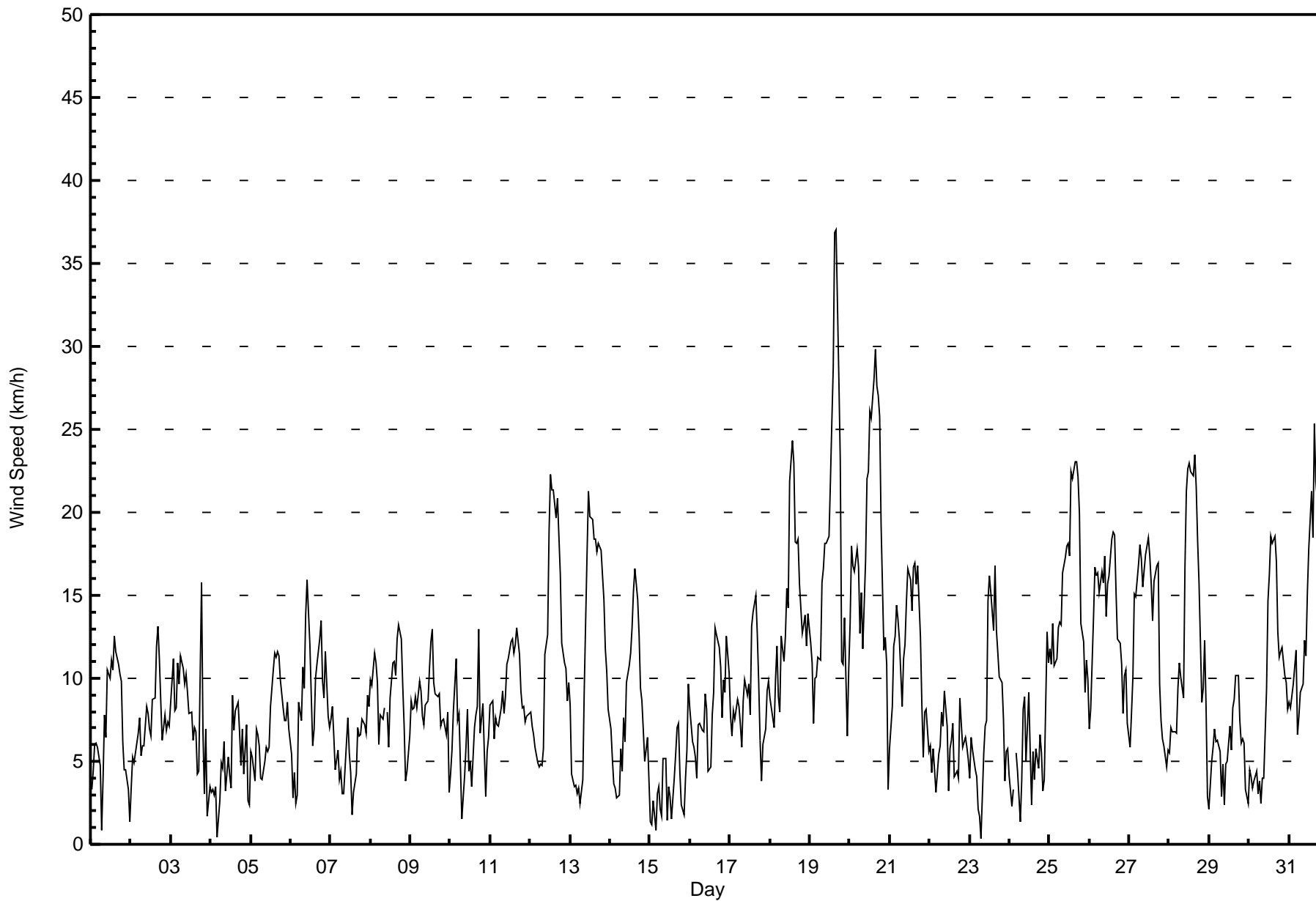
Diurnal Maximum

C - Calibration AF - Analyzer Failure



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Horizon - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Horizon - August 2017**

| Wind Speed Ranges (km/h) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 5 | 161 | 21.70 | 21.70 |
| 6 - 11 | 363 | 48.92 | 70.62 |
| 12 - 19 | 174 | 23.45 | 94.07 |
| 20 - 28 | 40 | 5.39 | 99.46 |
| 29 - 38 | 4 | 0.54 | 100.00 |
| > 38 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 742

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Horizon - August 2017**

| Wind Speed Ranges (km/h) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------------|-----------------------|-----|----|-----|---|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 5 | 10 | 20 | 8 | 10 | 4 | 8 | 2 | 8 | 10 | 20 | 22 | 8 | 9 | 8 | 2 | 12 | 161 |
| 6 - 11 | 3 | 21 | 21 | 12 | 4 | 8 | 8 | 13 | 40 | 105 | 79 | 25 | 7 | 13 | 4 | 0 | 363 |
| 12 - 19 | 0 | 3 | 4 | 1 | 0 | 0 | 1 | 16 | 11 | 28 | 56 | 24 | 12 | 15 | 2 | 1 | 174 |
| 20 - 28 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 5 | 0 | 5 | 5 | 4 | 17 | 1 | 0 | 40 |
| 29 - 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 0 | 4 |
| > 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 13 | 44 | 33 | 23 | 8 | 16 | 11 | 40 | 66 | 153 | 162 | 62 | 33 | 56 | 9 | 13 | 742 |

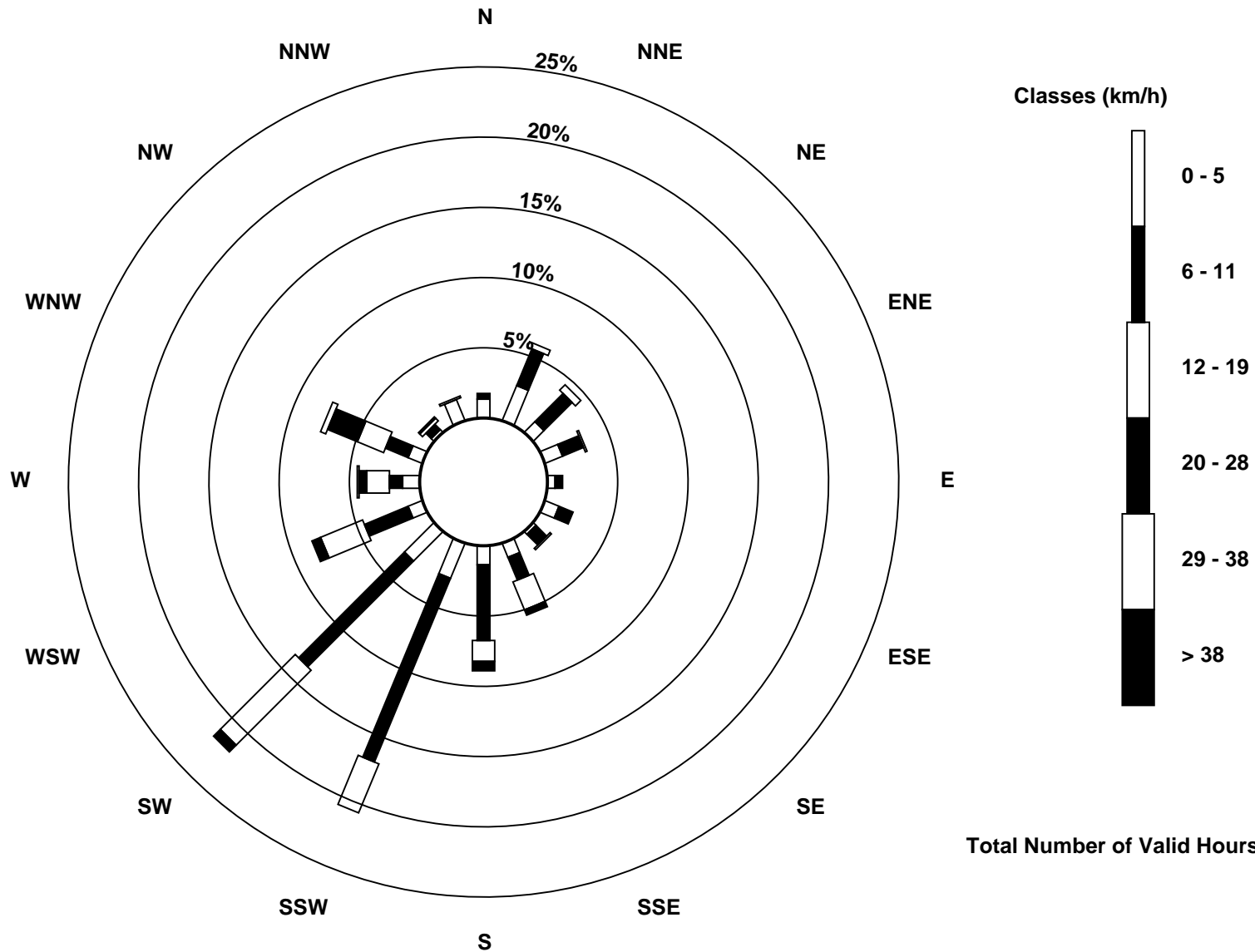
Total Number of Valid Hours: 742

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Wind Speed (WS) - km/h
Horizon (AMS 15)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Horizon - August 2017

| Direction of Maximum Speed: 288 deg on Aug 19 17:00 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 | | | |
|---|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--------------------------------|-----|-----|---------------|
| Direction of Maximum Daily Speed Average: 270.0 deg on Aug 20 | | | | | | | | | | | | | | | | | | | | | | Hours of Data: 742 | | | |
| Direction of Minimum Speed: 45 deg on Aug 23 08:00 | | | | | | | | | | | Direction of Minimum Daily Speed Average: 0.4 deg on Aug 4 | | | | | | | | | | | Hours of Missing Data: 2 | | | |
| Monthly Average Direction: 227.8 deg | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 99.9 | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 224 | 234 | 193 | 196 | 212 | 211 | 237 | 35 | 33 | 23 | 39 | 43 | 47 | 33 | 47 | 45 | 49 | 49 | 35 | 34 | 52 | 26 | 306 | 254 | 41.3 |
| 2-Aug | 216 | 216 | 210 | 207 | 209 | 207 | 211 | 203 | 190 | 214 | 192 | 188 | 196 | 232 | 228 | 235 | 218 | 221 | 224 | 209 | 216 | 226 | 227 | 224 | 214.9 |
| 3-Aug | 225 | 215 | 226 | 190 | 195 | 200 | 198 | 202 | 207 | 202 | 197 | 185 | 204 | 179 | 200 | 230 | 119 | 57 | 340 | 13 | 156 | 238 | 285 | 346 | 208.4 |
| 4-Aug | 273 | 272 | 209 | 213 | 274 | 337 | 19 | 24 | 38 | 10 | 17 | 8 | 71 | 114 | 94 | 94 | 116 | 198 | 222 | 216 | 217 | 286 | 275 | 207 | 106.8 |
| 5-Aug | 189 | 271 | 21 | 208 | 233 | 220 | 218 | 225 | 196 | 197 | 201 | 208 | 201 | 199 | 190 | 192 | 195 | 228 | 207 | 210 | 206 | 217 | 214 | 228 | 209.0 |
| 6-Aug | 237 | 210 | 212 | 214 | 90 | 58 | 41 | 32 | 26 | 25 | 31 | 23 | 36 | 48 | 46 | 35 | 38 | 38 | 37 | 29 | 356 | 320 | 311 | 301 | 23.5 |
| 7-Aug | 300 | 310 | 299 | 318 | 303 | 189 | 189 | 193 | 34 | 13 | 25 | 24 | 294 | 2 | 288 | 152 | 187 | 186 | 215 | 193 | 202 | 209 | 217 | 220 | 244.1 |
| 8-Aug | 215 | 217 | 226 | 219 | 214 | 209 | 206 | 208 | 198 | C | 211 | 219 | 180 | 196 | 197 | 204 | 197 | 199 | 204 | 191 | 177 | 175 | 163 | 196 | 202.6 |
| 9-Aug | 198 | 216 | 216 | 214 | 195 | 192 | 198 | 197 | 189 | 194 | 201 | 207 | 215 | 216 | 217 | 210 | 196 | 195 | 173 | 190 | 231 | 231 | 221 | 220 | 205.4 |
| 10-Aug | 211 | 177 | 197 | 222 | 212 | 217 | 219 | 124 | 65 | 78 | 63 | 60 | 103 | 92 | 43 | 62 | 64 | 77 | 129 | 188 | 217 | 205 | 210 | 206 | 146.9 |
| 11-Aug | 192 | 215 | 192 | 185 | 201 | 191 | 192 | 187 | 193 | 195 | 194 | 201 | 193 | 198 | 194 | 180 | 204 | 190 | 162 | 165 | 164 | 178 | 191 | 214 | 190.9 |
| 12-Aug | 204 | 195 | 203 | 218 | 225 | 225 | 218 | 200 | 205 | 190 | 185 | 193 | 181 | 186 | 177 | 188 | 190 | 196 | 185 | 180 | 180 | 186 | 182 | 175 | 189.6 |
| 13-Aug | 185 | 199 | 303 | 328 | 344 | 36 | 32 | 148 | 153 | 155 | 161 | 159 | 154 | 155 | 159 | 150 | 146 | 154 | 158 | 168 | 168 | 168 | 169 | 155 | 158.4 |
| 14-Aug | 144 | 189 | 180 | 153 | 192 | 347 | 61 | 111 | 168 | 170 | 138 | 156 | 186 | 195 | 202 | 224 | 228 | 233 | 224 | 208 | 191 | 176 | 179 | 203 | 191.1 |
| 15-Aug | 284 | 290 | 329 | 350 | 138 | 288 | 77 | 24 | 46 | 73 | 31 | 236 | 252 | 331 | 5 | 64 | 70 | 76 | 64 | 234 | 290 | 274 | 278 | 254 | 2.4 |
| 16-Aug | 242 | 232 | 227 | 211 | 230 | 222 | 216 | 210 | 193 | 184 | 177 | 232 | 209 | 244 | 241 | 235 | 235 | 233 | 231 | 228 | 224 | 248 | 244 | 245 | 227.0 |
| 17-Aug | 225 | 212 | 212 | 193 | 210 | 212 | 204 | 186 | 182 | 200 | 196 | 205 | 250 | 292 | 287 | 281 | 294 | 291 | 291 | 238 | 220 | 215 | 226 | 244 | 236.9 |
| 18-Aug | 249 | 229 | 217 | 215 | 215 | 229 | 227 | 220 | 220 | 232 | 222 | 217 | 240 | 234 | 218 | 213 | 216 | 217 | 205 | 202 | 211 | 218 | 218 | 218 | 220.8 |
| 19-Aug | 240 | 241 | 244 | 238 | 240 | 224 | 218 | 226 | 234 | 239 | 251 | 271 | 270 | 275 | 277 | 287 | 288 | 284 | 288 | 262 | 258 | 294 | 311 | 219 | 264.3 |
| 20-Aug | 231 | 243 | 241 | 238 | 234 | 228 | 222 | 228 | 226 | 261 | 282 | 278 | 275 | 288 | 287 | 299 | 309 | 298 | 299 | 289 | 264 | 259 | 272 | 248 | 270.0 |
| 21-Aug | 232 | 219 | 238 | 240 | 235 | 229 | 223 | 210 | 216 | 212 | 228 | 237 | 261 | 259 | 249 | 271 | 268 | 295 | 307 | 305 | 355 | 17 | 13 | 15 | 254.0 |
| 22-Aug | 1 | 359 | 19 | 20 | 32 | 12 | 16 | 30 | 29 | 42 | 25 | 68 | 41 | 56 | 101 | 160 | 256 | 176 | 60 | 60 | 31 | 34 | 9 | 11 | 35.8 |
| 23-Aug | 20 | 35 | 34 | 19 | 20 | 10 | 328 | 45 | 199 | 200 | 202 | 205 | 202 | 192 | 186 | 171 | 168 | 167 | 167 | 165 | 169 | 181 | 174 | 195 | 180.0 |
| 24-Aug | 215 | 227 | 333 | AF | 188 | 216 | 269 | 143 | 159 | 152 | 120 | 122 | 141 | 166 | 65 | 162 | 138 | 59 | 41 | 29 | 18 | 202 | 226 | 218 | 159.9 |
| 25-Aug | 220 | 196 | 215 | 206 | 197 | 211 | 209 | 209 | 220 | 215 | 214 | 211 | 210 | 237 | 234 | 236 | 238 | 245 | 250 | 230 | 230 | 233 | 223 | 227 | 223.9 |
| 26-Aug | 221 | 241 | 235 | 241 | 237 | 237 | 236 | 230 | 230 | 229 | 230 | 229 | 220 | 234 | 236 | 238 | 243 | 249 | 239 | 240 | 213 | 217 | 221 | 239 | 233.3 |
| 27-Aug | 270 | 258 | 247 | 235 | 233 | 233 | 237 | 237 | 247 | 245 | 236 | 241 | 267 | 263 | 283 | 291 | 294 | 296 | 283 | 289 | 297 | 294 | 235 | 270 | 258.5 |
| 28-Aug | 249 | 210 | 230 | 227 | 234 | 224 | 228 | 236 | 253 | 287 | 286 | 300 | 294 | 286 | 286 | 303 | 300 | 299 | 296 | 299 | 289 | 295 | 279 | 279 | 280.9 |
| 29-Aug | 16 | 228 | 208 | 218 | 224 | 211 | 203 | 97 | 180 | 80 | 42 | 105 | 101 | 66 | 103 | 136 | 136 | 122 | 120 | 118 | 110 | 132 | 269 | 122 | 138.4 |
| 30-Aug | 13 | 45 | 23 | 346 | 332 | 354 | 339 | 26 | 19 | 103 | 160 | 163 | 163 | 165 | 160 | 171 | 171 | 161 | 164 | 187 | 199 | 197 | 201 | 203 | 169.5 |
| 31-Aug | 201 | 188 | 190 | 200 | 208 | 207 | 200 | 203 | 196 | 207 | 201 | 220 | 232 | 236 | 264 | 288 | 295 | 298 | 289 | 276 | 241 | 236 | 253 | 246 | 241.4 |
| 226.1 225.9 227.4 222.4 221.5 221.5 217.8 210.6 206.5 213.2 214.0 216.2 221.2 228.5 229.2 237.4 236.1 239.7 241.8 219.2 215.7 233.4 230.6 226.3 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Diurnal Average | | | | | | | | | | | | | | | | | | | | | | | | | |
| C - Calibration AF - Analyzer Failure | | | | | | | | | | | | | | | | | | | | | | | | | |
| All monthly, daily, and diurnal averages have been calculated using vector methods | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

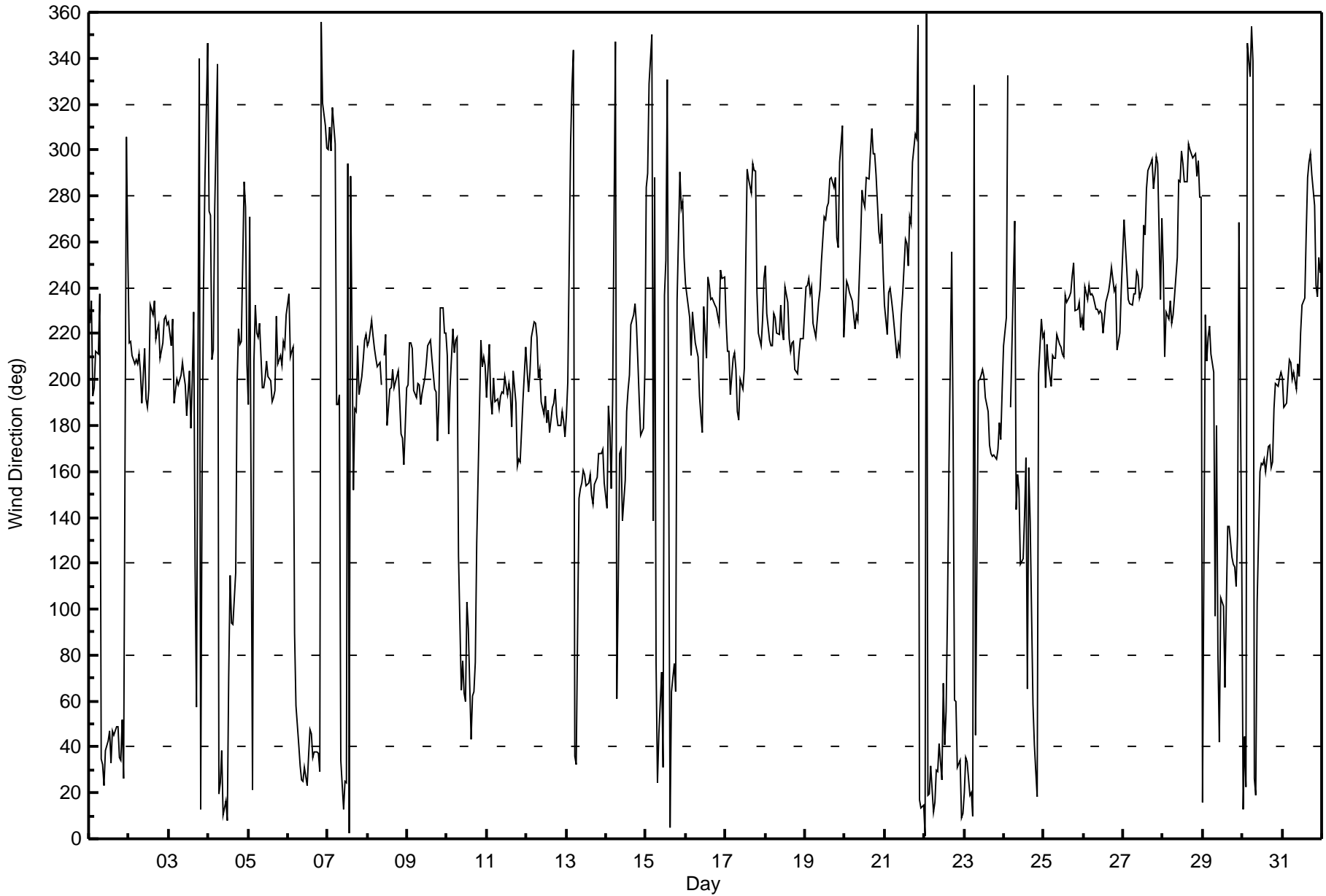
Wind Direction (WD) - deg
Horizon - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 101 deg on Aug 7 14:00 Minimum Value: 6 deg on Aug 7 02:00 Percentiles: P ₁ = 9 P ₁₀ = 12 Q ₁ = 15 Median = 20 Q ₃ = 31 P ₉₀ = 50 P ₉₉ = 82 | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 1 Percent Operational Time: 99.9 | | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|-----|----|----|----|----|--|----|----|----|----|-----------------------|---------------|--|--|--|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | |
| 1-Aug | 39 | 22 | 13 | 18 | 9 | 10 | 70 | 42 | 30 | 44 | 29 | 32 | 51 | 35 | 29 | 28 | 24 | 24 | 20 | 16 | 16 | 14 | 44 | 50 | 70 | | | |
| 2-Aug | 46 | 9 | 9 | 9 | 8 | 11 | 19 | 21 | 30 | 25 | 35 | 53 | 61 | 56 | 43 | 32 | 22 | 18 | 15 | 14 | 13 | 19 | 10 | 11 | 61 | | | |
| 3-Aug | 10 | 10 | 13 | 11 | 14 | 16 | 16 | 20 | 22 | 23 | 37 | 43 | 39 | 73 | 40 | 41 | 50 | 53 | 26 | 32 | 65 | 30 | 69 | 42 | 73 | | | |
| 4-Aug | 43 | 31 | 43 | 63 | 83 | 25 | 15 | 19 | 20 | 30 | 32 | 39 | 54 | 24 | 38 | 28 | 22 | 23 | 14 | 14 | 39 | 13 | 77 | 57 | 83 | | | |
| 5-Aug | 23 | 37 | 42 | 15 | 12 | 22 | 19 | 25 | 34 | 38 | 48 | 54 | 47 | 37 | 35 | 31 | 27 | 26 | 19 | 17 | 13 | 13 | 11 | 25 | 54 | | | |
| 6-Aug | 50 | 76 | 24 | 37 | 41 | 14 | 22 | 21 | 21 | 21 | 19 | 22 | 22 | 21 | 23 | 22 | 20 | 21 | 19 | 17 | 22 | 10 | 23 | 11 | 76 | | | |
| 7-Aug | 9 | 6 | 9 | 25 | 31 | 46 | 19 | 28 | 53 | 33 | 37 | 51 | 67 | 101 | 83 | 75 | 40 | 40 | 26 | 18 | 9 | 9 | 9 | 10 | 101 | | | |
| 8-Aug | 9 | 10 | 13 | 12 | 13 | 15 | 18 | 21 | 22 | C | 44 | 62 | 41 | 29 | 35 | 40 | 24 | 22 | 19 | 16 | 12 | 69 | 17 | 8 | 69 | | | |
| 9-Aug | 11 | 13 | 12 | 14 | 14 | 13 | 18 | 21 | 26 | 25 | 30 | 33 | 34 | 27 | 38 | 45 | 36 | 24 | 16 | 14 | 21 | 24 | 11 | 83 | 83 | | | |
| 10-Aug | 60 | 33 | 18 | 14 | 16 | 15 | 34 | 70 | 42 | 32 | 28 | 66 | 70 | 80 | 52 | 53 | 29 | 24 | 36 | 23 | 68 | 69 | 41 | 30 | 80 | | | |
| 11-Aug | 13 | 18 | 21 | 13 | 14 | 15 | 17 | 20 | 24 | 22 | 24 | 28 | 28 | 30 | 32 | 27 | 23 | 25 | 23 | 18 | 17 | 8 | 12 | 11 | 32 | | | |
| 12-Aug | 12 | 10 | 10 | 15 | 11 | 13 | 15 | 30 | 29 | 25 | 33 | 23 | 22 | 22 | 22 | 22 | 21 | 19 | 18 | 16 | 14 | 13 | 12 | 12 | 33 | | | |
| 13-Aug | 15 | 13 | 38 | 16 | 26 | 33 | 39 | 35 | 28 | 25 | 26 | 25 | 25 | 27 | 28 | 25 | 24 | 23 | 22 | 19 | 20 | 18 | 17 | 23 | 39 | | | |
| 14-Aug | 19 | 18 | 18 | 24 | 61 | 36 | 11 | 48 | 36 | 45 | 32 | 27 | 33 | 25 | 21 | 19 | 15 | 16 | 21 | 18 | 15 | 15 | 14 | 27 | 61 | | | |
| 15-Aug | 35 | 78 | 35 | 77 | 40 | 61 | 65 | 52 | 28 | 17 | 83 | 50 | 64 | 81 | 56 | 39 | 20 | 16 | 44 | 79 | 74 | 55 | 20 | 9 | 83 | | | |
| 16-Aug | 11 | 19 | 14 | 18 | 27 | 14 | 14 | 21 | 22 | 22 | 27 | 62 | 75 | 47 | 35 | 25 | 26 | 18 | 17 | 13 | 11 | 15 | 12 | 15 | 75 | | | |
| 17-Aug | 38 | 15 | 16 | 15 | 16 | 16 | 16 | 21 | 18 | 21 | 26 | 32 | 49 | 24 | 21 | 21 | 14 | 17 | 18 | 25 | 12 | 16 | 14 | 15 | 49 | | | |
| 18-Aug | 12 | 10 | 9 | 12 | 14 | 18 | 17 | 18 | 20 | 20 | 19 | 20 | 19 | 18 | 17 | 18 | 19 | 18 | 18 | 18 | 16 | 15 | 14 | 14 | 20 | | | |
| 19-Aug | 16 | 18 | 14 | 11 | 14 | 15 | 16 | 16 | 17 | 16 | 21 | 21 | 18 | 20 | 18 | 14 | 14 | 16 | 17 | 32 | 19 | 15 | 46 | 12 | 46 | | | |
| 20-Aug | 13 | 12 | 12 | 12 | 12 | 13 | 16 | 14 | 21 | 23 | 19 | 20 | 18 | 21 | 20 | 14 | 14 | 12 | 12 | 12 | 17 | 14 | 42 | 63 | 63 | | | |
| 21-Aug | 28 | 42 | 15 | 13 | 12 | 13 | 15 | 18 | 18 | 21 | 19 | 20 | 30 | 26 | 25 | 24 | 25 | 17 | 10 | 14 | 41 | 17 | 17 | 15 | 42 | | | |
| 22-Aug | 12 | 12 | 12 | 18 | 41 | 12 | 22 | 23 | 31 | 24 | 36 | 72 | 60 | 49 | 51 | 70 | 62 | 61 | 21 | 12 | 15 | 15 | 9 | 10 | 72 | | | |
| 23-Aug | 17 | 11 | 16 | 18 | 28 | 34 | 50 | 95 | 52 | 27 | 28 | 25 | 20 | 19 | 22 | 23 | 22 | 20 | 20 | 20 | 20 | 35 | 14 | 18 | 95 | | | |
| 24-Aug | 11 | 53 | 16 | AF | 21 | 49 | 83 | 46 | 24 | 27 | 58 | 31 | 28 | 67 | 52 | 75 | 33 | 29 | 17 | 21 | 46 | 45 | 27 | 16 | 83 | | | |
| 25-Aug | 20 | 21 | 18 | 17 | 17 | 16 | 17 | 17 | 18 | 18 | 18 | 19 | 20 | 17 | 17 | 16 | 16 | 16 | 18 | 19 | 18 | 17 | 16 | 19 | 21 | | | |
| 26-Aug | 29 | 19 | 14 | 12 | 13 | 13 | 14 | 14 | 16 | 16 | 20 | 22 | 22 | 22 | 20 | 19 | 19 | 17 | 18 | 17 | 13 | 12 | 13 | 25 | 29 | | | |
| 27-Aug | 17 | 15 | 12 | 11 | 13 | 14 | 14 | 14 | 19 | 19 | 18 | 20 | 22 | 25 | 18 | 18 | 16 | 16 | 16 | 11 | 11 | 13 | 32 | 33 | 33 | | | |
| 28-Aug | 25 | 14 | 21 | 10 | 33 | 13 | 11 | 14 | 21 | 18 | 17 | 17 | 15 | 18 | 17 | 12 | 11 | 12 | 10 | 11 | 10 | 8 | 19 | 78 | 78 | | | |
| 29-Aug | 70 | 40 | 15 | 12 | 14 | 17 | 31 | 44 | 39 | 86 | 59 | 56 | 48 | 73 | 41 | 33 | 26 | 21 | 17 | 9 | 10 | 23 | 35 | 47 | 86 | | | |
| 30-Aug | 19 | 26 | 34 | 17 | 11 | 24 | 14 | 24 | 32 | 56 | 32 | 22 | 24 | 24 | 24 | 22 | 20 | 24 | 20 | 19 | 16 | 14 | 15 | 14 | 56 | | | |
| 31-Aug | 13 | 12 | 12 | 14 | 16 | 36 | 23 | 30 | 25 | 21 | 19 | 24 | 17 | 19 | 26 | 17 | 15 | 12 | 15 | 16 | 14 | 13 | 11 | 17 | 36 | | | |
| 70 78 43 77 83 61 83 95 53 86 83 72 75 101 83 75 62 61 44 79 74 69 77 83 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | |
| C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | AF - Analyzer Failure | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Horizon - August 2017





Wood Buffalo Environmental Association

SO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|---------------|
| Station Name: | Horizon | Station number: | AMS 15 |
| Calibration Date: | August 23, 2017 | Last Cal Date: | July 13, 2017 |
| Start time (MST): | 9:17 | End time (MST): | 10:07 |
| Reason: | As Found | | |

Calibration Standards

| | | | | |
|-----------------------|-------------------|-----|------------------|--------------------|
| Cal Gas Concentration | <u>50</u> | ppm | Cal Gas Exp Date | September 26, 2017 |
| Cal Gas Cylinder # | <u>S0002488</u> | | | |
| Calibrator Make/Model | Teledyne API T700 | | Serial Number | 1223 |
| ZAG Make/Model | Teledyne API 701 | | Serial Number | 1004 |

Analyzer Information

Analyzer make: Thermo 43i

Analyzer serial #: 710321322

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|----------------------|--------------|---------------|--------------|--------------|---------------|
| Analyzer Range | 0 - 1000 ppb | | PMT voltage | -623 | -623 |
| Calculated slope | 1.002156 | 1.018099 | Lamp voltage | 866 | 864 |
| Calculated intercept | -0.841360 | -0.203620 | Pressure | 707.8 | 710.0 |
| Analyzer Background | 20.1 | 20.1 | Flow | 0.556 | 0.555 |
| Analyzer Coefficient | 1.011 | 1.011 | Intensity | 91 | 91 |

SO₂ Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|-----------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5070 | 0.0 | 0.0 | 0.2 | ---- |
| as found span | 4995 | 81.6 | 803.7 | 789.6 | 1.018 |
| calibrator zero | 5070 | 0.0 | 0.0 | 0.2 | ---- |
| high point | 4995 | 81.6 | 803.7 | 789.6 | 1.018 |
| second point | | | | | |
| third point | | | | | |
| as left zero | | | | | |
| as left span | | | | | |

| | | | | | |
|---------------------------|--------|-------------------|--------|-----------|------|
| Average Correction Factor | | | | 1.018 | |
| Corrected As found | 789.40 | Previous response | 802.80 | *% change | 1.7% |

* = > +/-5% change initiates investigation

Notes:

As founds for cylinder removal

Calibration Performed By: Jayme Marcoux



Wood Buffalo Environmental Association

SO₂ Calibration Summary

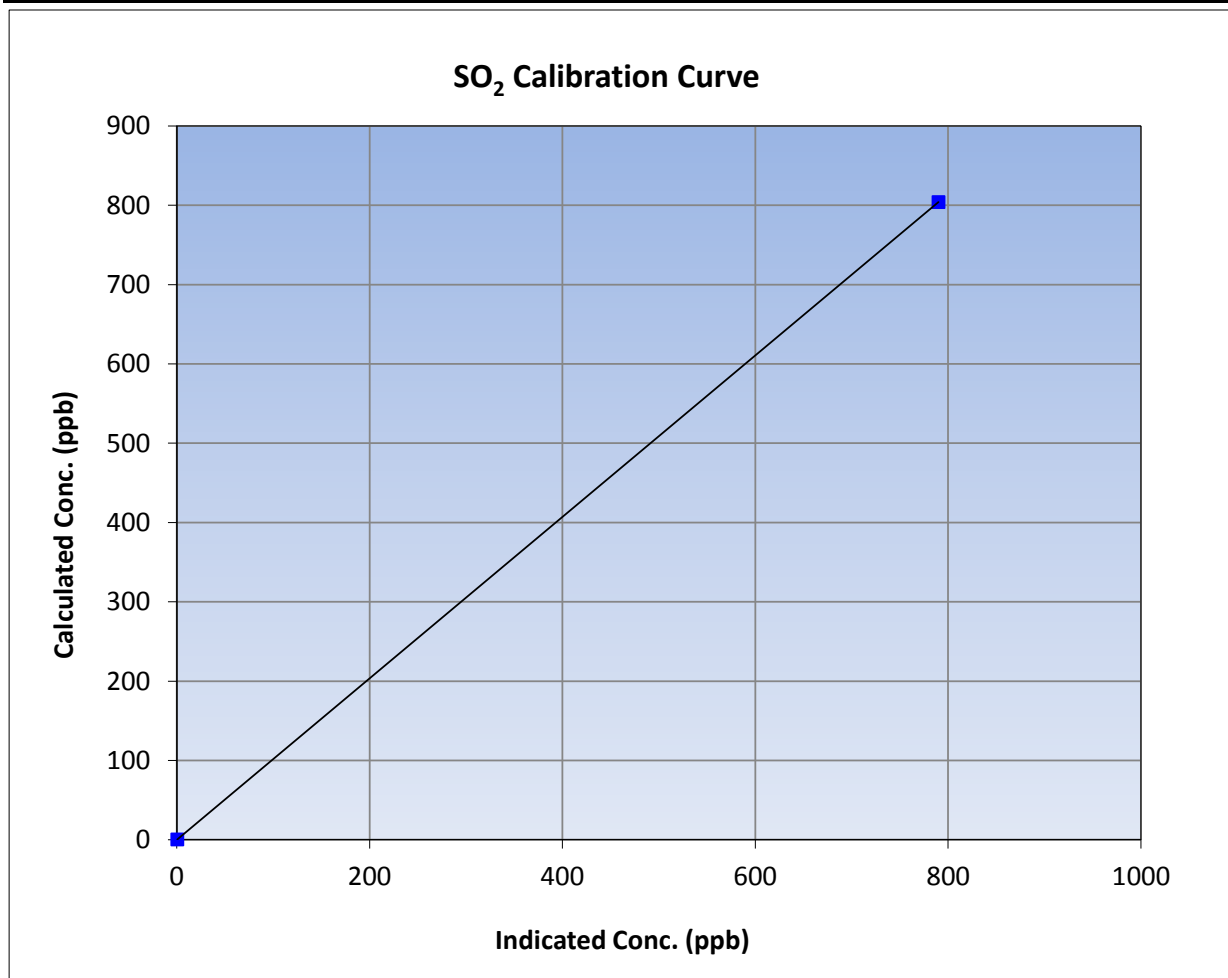
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 23, 2017 | Previous Calibration | July 13, 2017 |
| Station Name | Horizon | Station Number | AMS 15 |
| Start Time (MST) | 9:17 | End Time (MST) | 10:07 |
| Analyzer make | Thermo 43i | Analyzer serial # | 710321322 |

Calibration Data

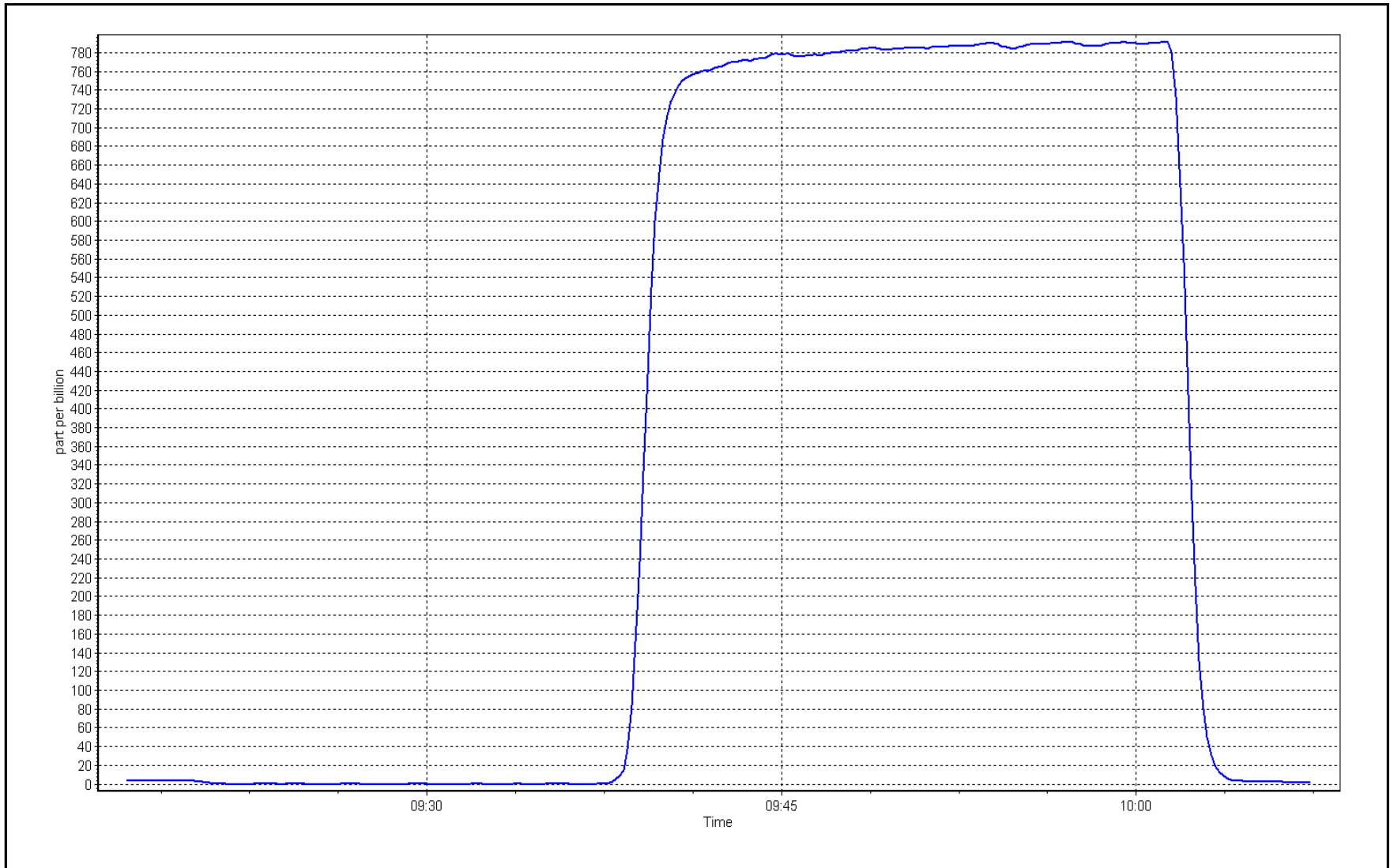
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|--------------|
| 0.0 | 0.2 | ---- | Correlation Coefficient | 1.000000 | ≥ 0.995 |
| 803.7 | 789.6 | 1.0178 | Slope | 1.018099 | 0.90 - 1.10 |
| | | | Intercept | -0.203620 | +/-30 |



SO2 Calibration Plot

Date: August 23, 2017

Location: Horizon





Wood Buffalo Environmental Association

SO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|---------------|
| Station Name: | Horizon | Station number: | AMS 15 |
| Calibration Date: | August 23, 2017 | Last Cal Date: | July 13, 2017 |
| Start time (MST): | 10:17 | End time (MST): | 14:51 |
| Reason: | Routine | | |

Calibration Standards

| | | | | |
|-----------------------|-------------------|-----|------------------|--------------|
| Cal Gas Concentration | <u>50.9</u> | ppm | Cal Gas Exp Date | May 22, 2020 |
| Cal Gas Cylinder # | <u>EY0000368</u> | | | |
| Calibrator Make/Model | Teledyne API T700 | | Serial Number | 1223 |
| ZAG Make/Model | Teledyne API 701 | | Serial Number | 1004 |

Analyzer Information

Analyzer make: Thermo 43i

Analyzer serial #: 710321322

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|----------------------|--------------|---------------|--------------|--------------|---------------|
| Analyzer Range | 0 - 1000 ppb | | PMT voltage | -623 | -623 |
| Calculated slope | 1.018099 | 1.002847 | Lamp voltage | 866 | 868 |
| Calculated intercept | -0.203620 | -0.138721 | Pressure | 707.8 | 710.0 |
| Analyzer Background | 20.1 | 19.1 | Flow | 0.556 | 0.555 |
| Analyzer Coefficient | 1.011 | 0.960 | Intensity | 91 | 91 |

SO₂ Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5080 | 0.0 | 0.0 | 0.1 | ---- |
| as found span | 5012 | 75.8 | 758.3 | 794.6 | 0.954 |
| calibrator zero | 5080 | 0.0 | 0.0 | 0.1 | ---- |
| high point | 5012 | 75.8 | 758.3 | 756.5 | 1.002 |
| second point | 5045 | 37.8 | 378.5 | 377.0 | 1.004 |
| third point | 5070 | 18.8 | 188.0 | 188.1 | 1.000 |
| as left zero | 5080 | 0.0 | 0.0 | 0.8 | ---- |
| as left span | 5012 | 75.8 | 758.3 | 757.7 | 1.001 |
| Average Correction Factor | | | | | 1.002 |
| Corrected As found | 794.50 | Previous response | 745.05 | *% change | -6.2% |

* = > +/-5% change initiates investigation

Notes:

New mixed gas cylinder. Changed inlet filter after asfinds. Adjusted the span.

Calibration Performed By: Jayme Marcoux



Wood Buffalo Environmental Association

SO₂ Calibration Summary

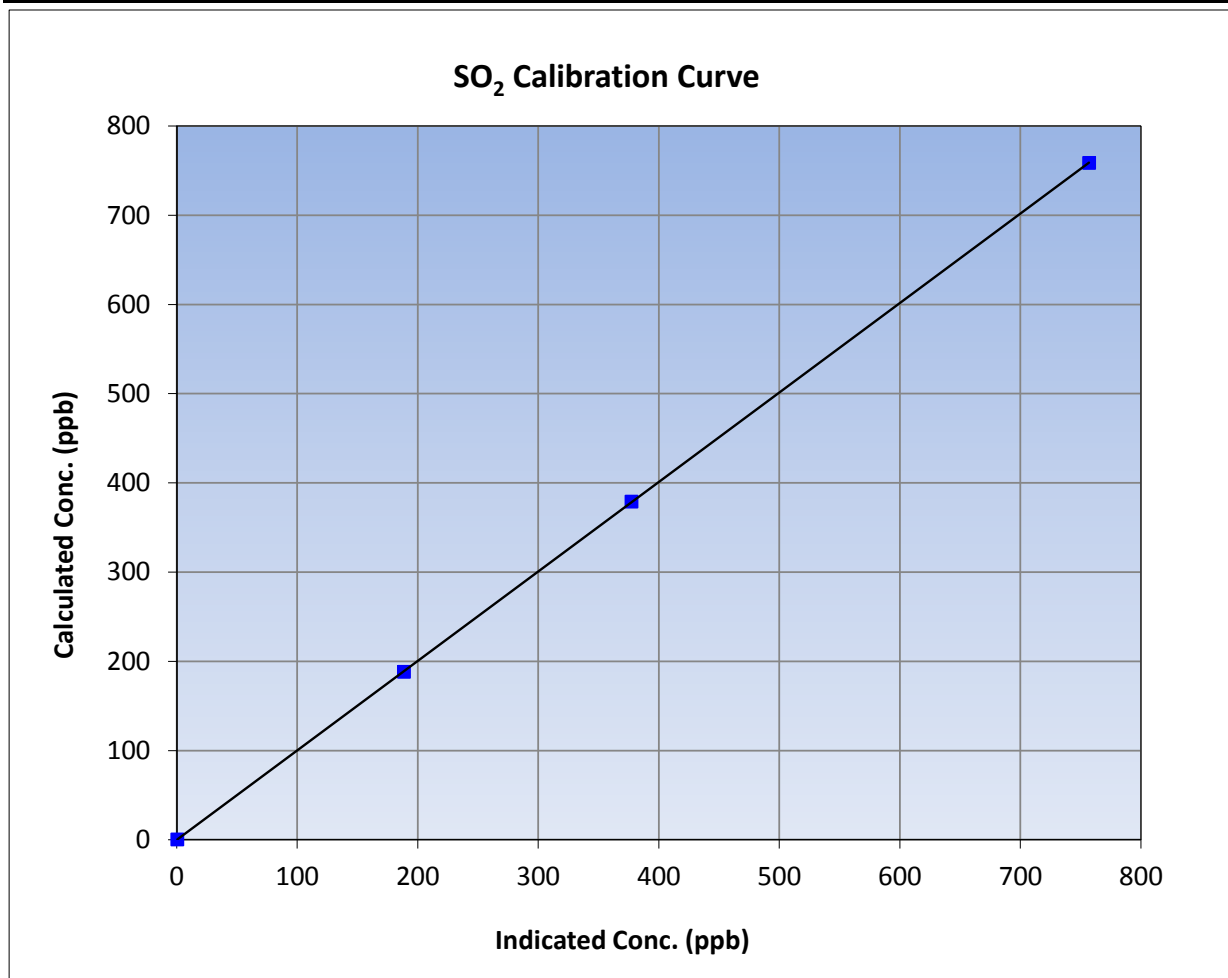
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 23, 2017 | Previous Calibration | July 13, 2017 |
| Station Name | Horizon | Station Number | AMS 15 |
| Start Time (MST) | 10:17 | End Time (MST) | 14:51 |
| Analyzer make | Thermo 43i | Analyzer serial # | 710321322 |

Calibration Data

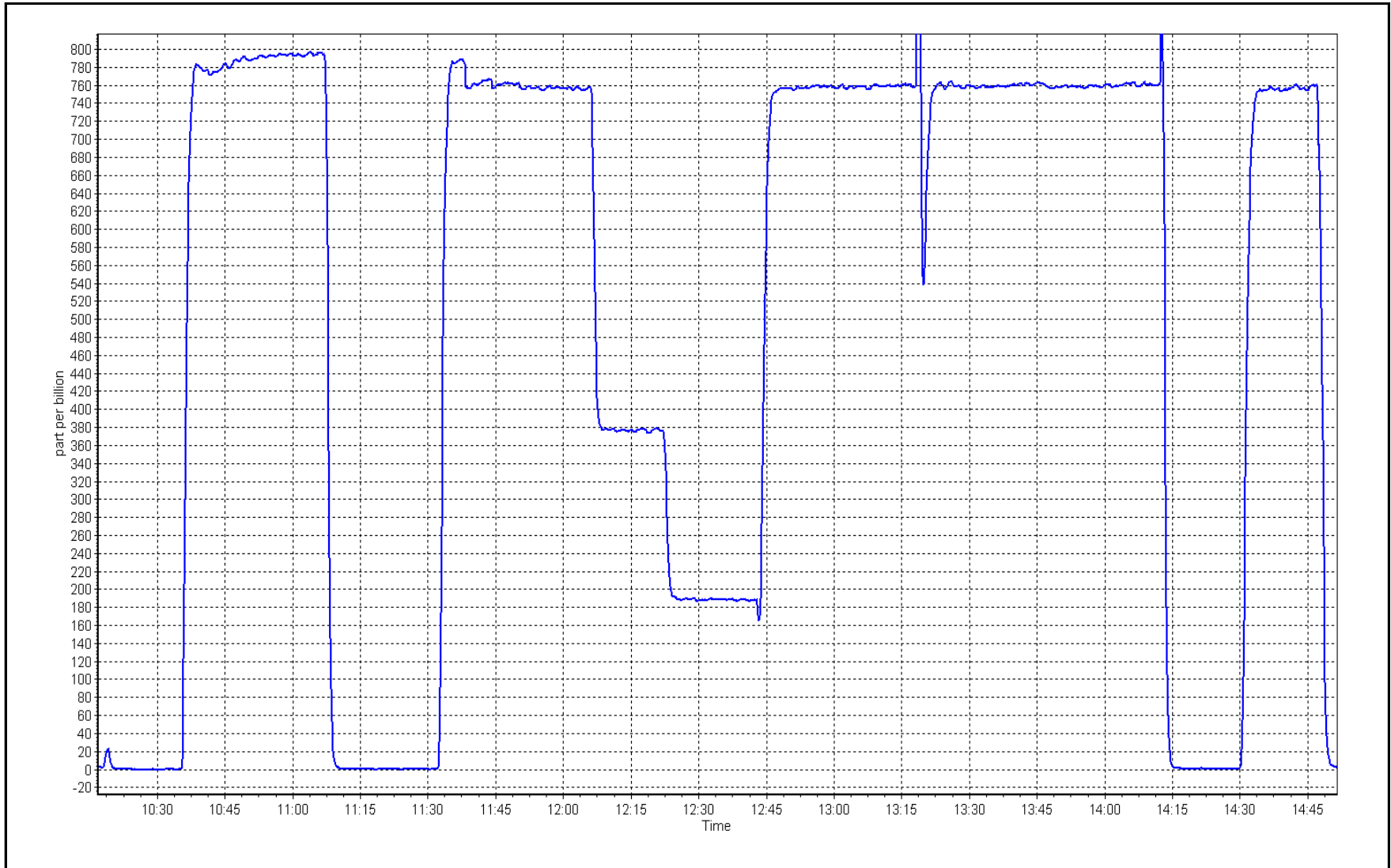
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|-------------|
| 0.0 | 0.1 | ---- | Correlation Coefficient | ≥0.995 | |
| 758.3 | 756.5 | 1.0024 | | | |
| 378.5 | 377.0 | 1.0041 | | | |
| 188.0 | 188.1 | 0.9997 | | | |
| | | | Slope | 1.002847 | 0.90 - 1.10 |
| | | | Intercept | -0.138721 | +/-30 |



SO2 Calibration Plot

Date: August 23, 2017

Location: Horizon





Wood Buffalo Environmental Association

TRS Calibration Summary

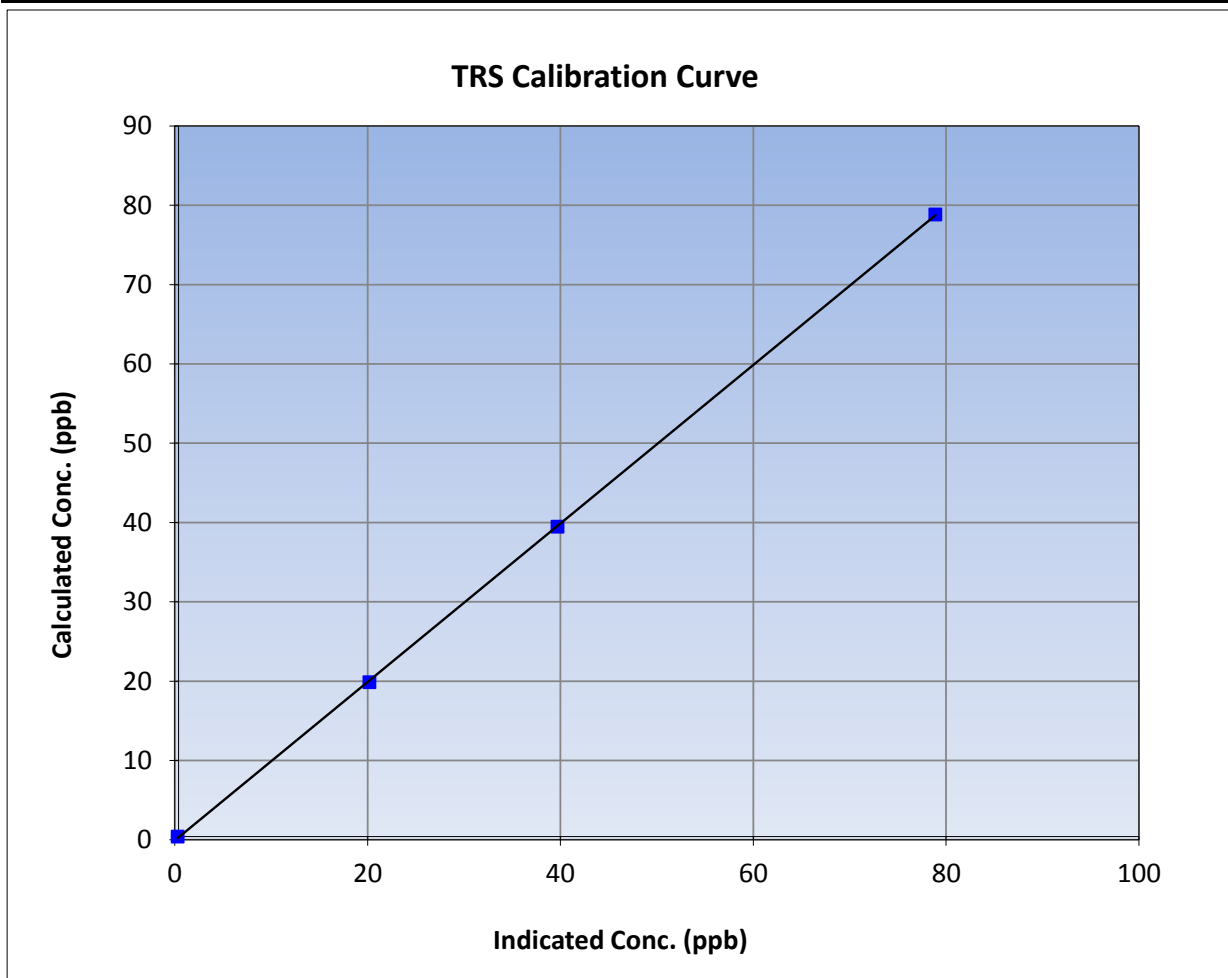
Version-03-2017

Station Information

| | | | |
|------------------|----------------|----------------------|---------------|
| Calibration Date | August 8, 2017 | Previous Calibration | July 21, 2017 |
| Station Name | Horizon | Station Number | AMS 15 |
| Start Time (MST) | 9:08 | End Time (MST) | 12:08 |
| Analyzer make | Thermo 43i-TLE | Analyzer serial # | 1151680032 |

Calibration Data

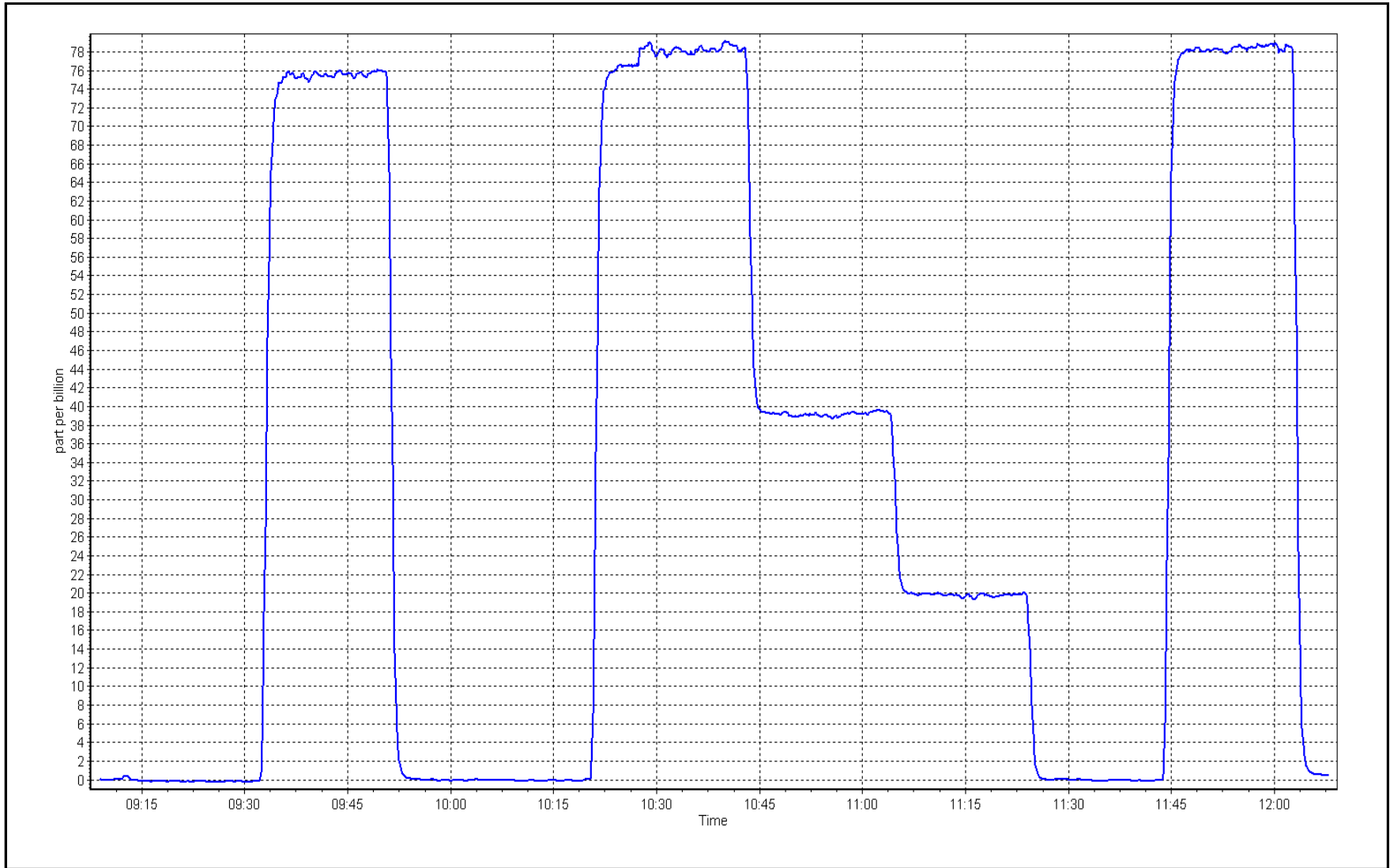
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|-------------|
| 0.0 | -0.1 | ---- | Correlation Coefficient | 0.999971 | ≥0.995 |
| 78.4 | 78.5 | 0.9993 | | | |
| 39.1 | 39.3 | 0.9944 | Slope | 0.999304 | 0.90 - 1.10 |
| 19.5 | 19.8 | 0.9844 | | | |
| | | | Intercept | -0.095961 | +/-3 |



TRS Calibration Plot

Date: August 8, 2017

Location: Horizon





Wood Buffalo Environmental Association

THC Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|---------------|
| Station Name: | Horizon | Station number: | AMS 15 |
| Calibration Date: | August 23, 2017 | Last Cal Date: | July 13, 2017 |
| Start time (MST): | 9:17 | End time (MST): | 15:26 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|-----------------------|-------------------|---------------------|--------------------|
| Gas Cert Reference | S0002488 | Cal Gas Expiry Date | September 26, 2017 |
| CH4 Cal Gas Conc. | <u>505.0</u> ppm | CH4 Equiv Conc. | 1046.8 ppm |
| C3H8 Cal Gas Conc. | <u>197.0</u> ppm | Station temp. | Deg C |
| Calibrator Make/Model | Teledyne API T700 | Serial Number | 1223 |
| ZAG Make/Model | Teledyne API 701 | Serial Number | 1004 |

Analyzer Information

| | | | |
|----------------------|--------------|---------------------|---------------|
| Analyzer make: | Thermo 51-LT | Analyzer serial #: | 1327059295 |
| | <u>Start</u> | <u>Finish</u> | <u>Start</u> |
| Analyzer Range | 0 - 25 ppm | Bias voltage supply | -301 |
| Calculated slope | 0.994810 | Sample pressure | 8.7 |
| Calculated intercept | 0.036378 | Fuel pressure | 26.3 |
| Analyzer Background | 2.230 | Air pressure | 38.0 |
| Analyzer Coefficient | 3.188 | Flame temperature | 155.4 |
| | | | <u>Finish</u> |
| | | | -300 |
| | | | 8.8 |
| | | | 26.3 |
| | | | 38.0 |
| | | | 155.0 |

THC Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|-----------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5070 | 0.0 | 0.00 | -0.17 | ---- |
| as found span | 5004 | 81.6 | 16.80 | 16.76 | 1.002 |
| calibrator zero | 5070 | 0.0 | 0.00 | -0.17 | ---- |
| high point | 5004 | 81.6 | 16.80 | 16.76 | 1.002 |
| second point | | | | | |
| third point | | | | | |
| as left zero | | | | | |
| as left span | | | | | |

| | | | | | |
|---------------------------|-------|-------------------|-------|-----------|-------|
| Average Correction Factor | | | | 1.002 | |
| Corrected As found | 16.93 | Previous response | 16.85 | *% change | -0.5% |

* = > +/-5% change initiates investigation

Notes:

As founds for cylinder removal.

Calibration Performed By: Jayme Marcoux



Wood Buffalo Environmental Association

THC Calibration Summary

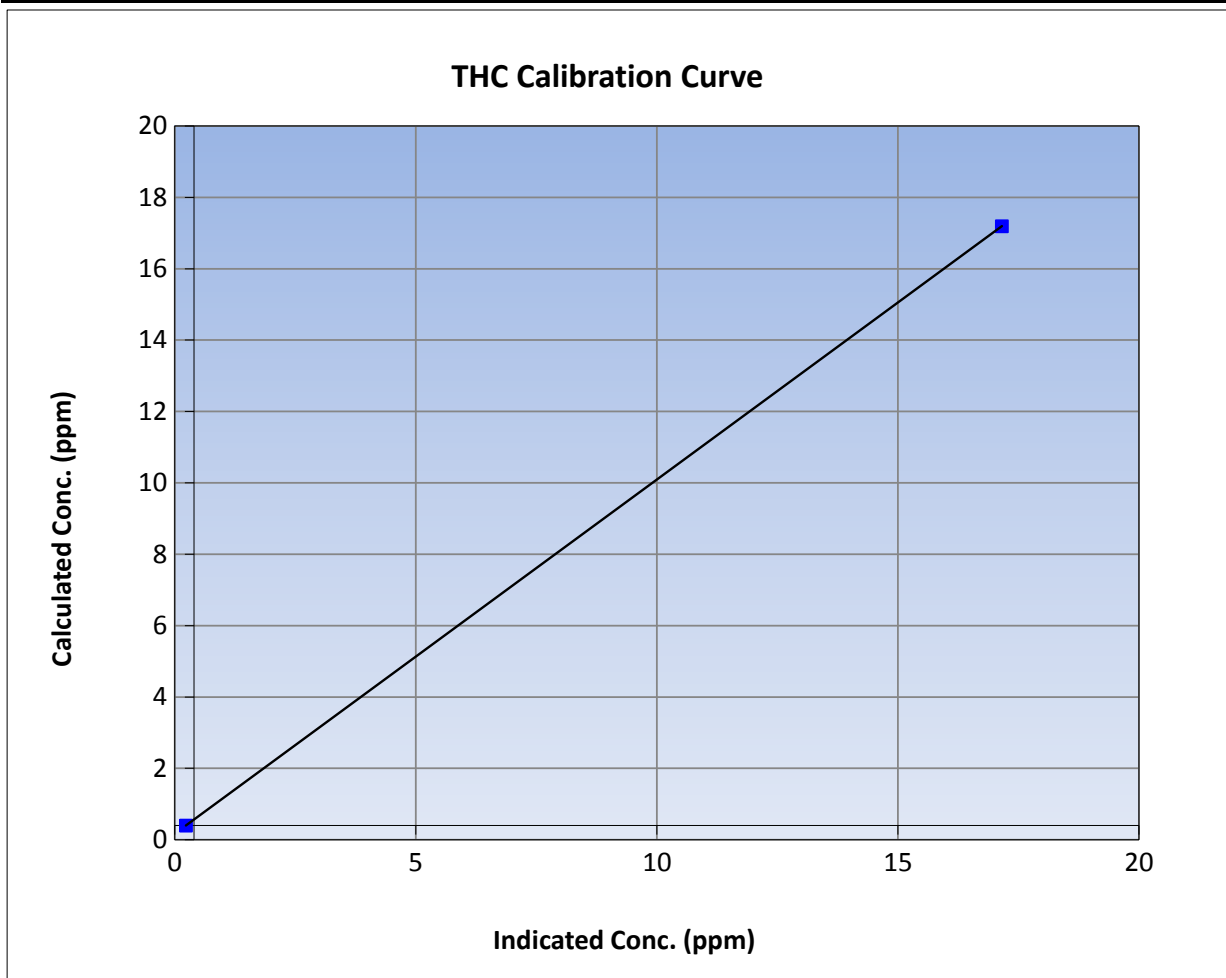
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 23, 2017 | Previous Calibration | July 13, 2017 |
| Station Name | Horizon | Station Number | AMS 15 |
| Start Time (MST) | 8:47 | End Time (MST) | 15:26 |
| Analyzer make | Thermo 51-LT | Analyzer serial # | 1327059295 |

Calibration Data

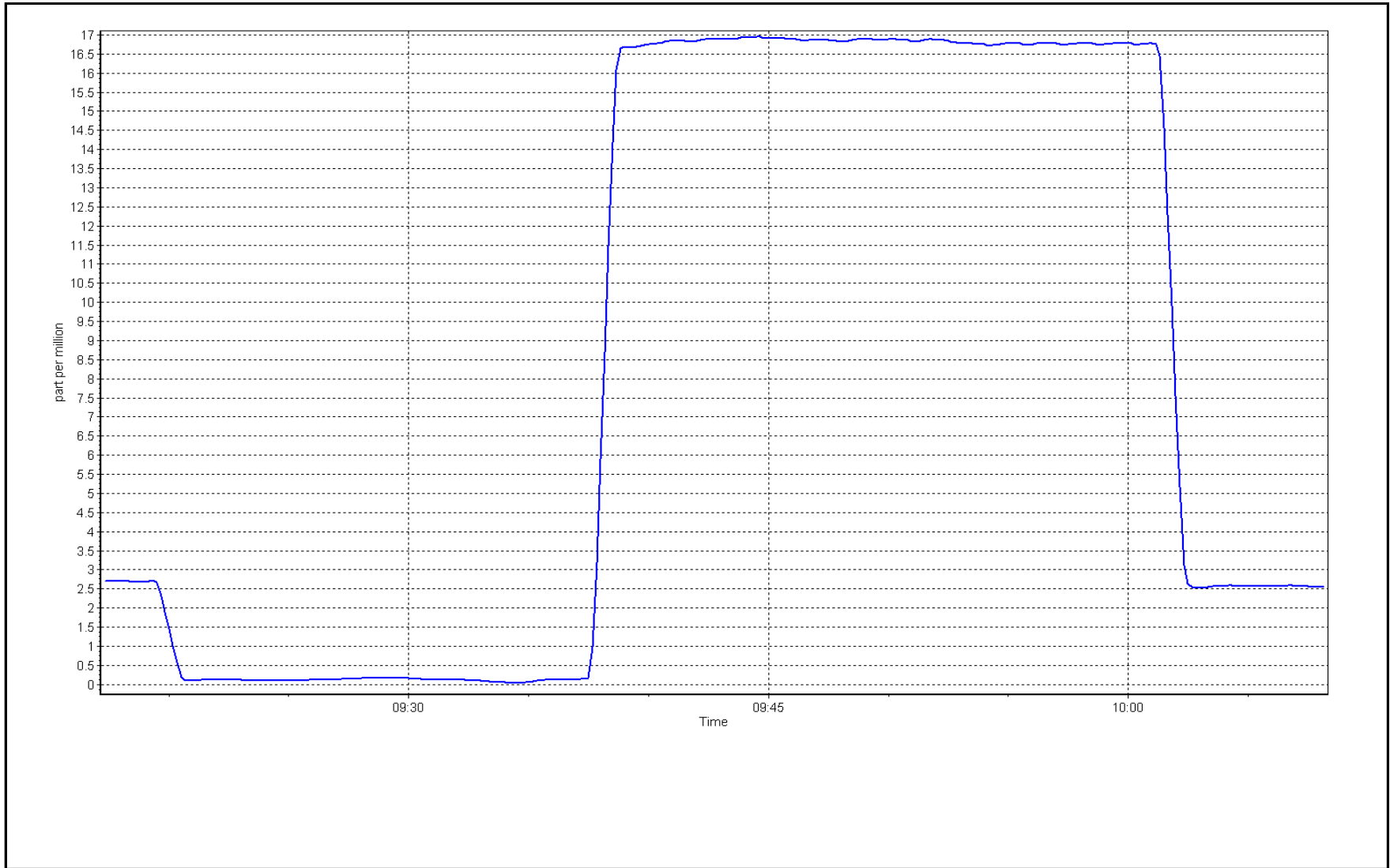
| Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (lc) | Correction factor (Cc/lc) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|-------------|
| 0.0 | -0.2 | ---- | Correlation Coefficient | 1.000000 | |
| 16.8 | 16.8 | 1.0022 | | | ≥0.995 |
| | | | | | |
| | | | Slope | 0.992285 | 0.90 - 1.10 |
| | | | Intercept | 0.166704 | +/-1.5 |



THC Calibration Plot

Date: August 23, 2017

Location: Horizon





Wood Buffalo Environmental Association

THC Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|---------------|
| Station Name: | Horizon | Station number: | AMS 15 |
| Calibration Date: | August 23, 2017 | Last Cal Date: | July 13, 2017 |
| Start time (MST): | 10:17 | End time (MST): | 14:49 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|-----------------------|-------------------|---------------------|--------------|
| Gas Cert Reference | EY0000368 | Cal Gas Expiry Date | May 22, 2020 |
| CH4 Cal Gas Conc. | <u>506.0</u> ppm | CH4 Equiv Conc. | 1067.0 ppm |
| C3H8 Cal Gas Conc. | <u>204.0</u> ppm | Station temp. | Deg C |
| Calibrator Make/Model | Teledyne API T700 | Serial Number | 1223 |
| ZAG Make/Model | Teledyne API 701 | Serial Number | 1004 |

Analyzer Information

| | | | |
|----------------------|--------------|---------------------|---------------|
| Analyzer make: | Thermo 51-LT | Analyzer serial #: | 1327059295 |
| | <u>Start</u> | <u>Finish</u> | <u>Start</u> |
| Analyzer Range | 0 - 25 ppm | Bias voltage supply | -301 |
| Calculated slope | 0.992285 | Sample pressure | 8.7 |
| Calculated intercept | 0.166704 | Fuel pressure | 26.3 |
| Analyzer Background | 2.23 | Air pressure | 38.0 |
| Analyzer Coefficient | 3.188 | Flame temperature | 155.4 |
| | | | <u>Finish</u> |
| | | | -300 |
| | | | 8.8 |
| | | | 26.3 |
| | | | 38.0 |
| | | | 155.0 |

THC Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5080 | 0.0 | 0.00 | -0.08 | ---- |
| as found span | 5012 | 75.8 | 15.90 | 15.63 | 1.017 |
| calibrator zero | 5080 | 0.0 | 0.00 | 0.05 | ---- |
| high point | 5012 | 75.8 | 15.90 | 15.86 | 1.002 |
| second point | 5040 | 37.8 | 7.94 | 7.96 | 0.998 |
| third point | 5070 | 18.8 | 3.94 | 4.03 | 0.978 |
| as left zero | 5080 | 0.0 | 0.00 | 0.04 | ---- |
| as left span | 5012 | 75.8 | 15.90 | 15.78 | 1.007 |
| Average Correction Factor | | | | | 0.993 |
| Corrected As found | 15.71 | Previous response | 15.85 | *% change | 0.9% |

* = > +/-5% change initiates investigation

Notes:

New Mixed gas cylinder. Changed inlet filter after asfinds.

Calibration Performed By:

Jayme Marcoux



Wood Buffalo Environmental Association

THC Calibration Summary

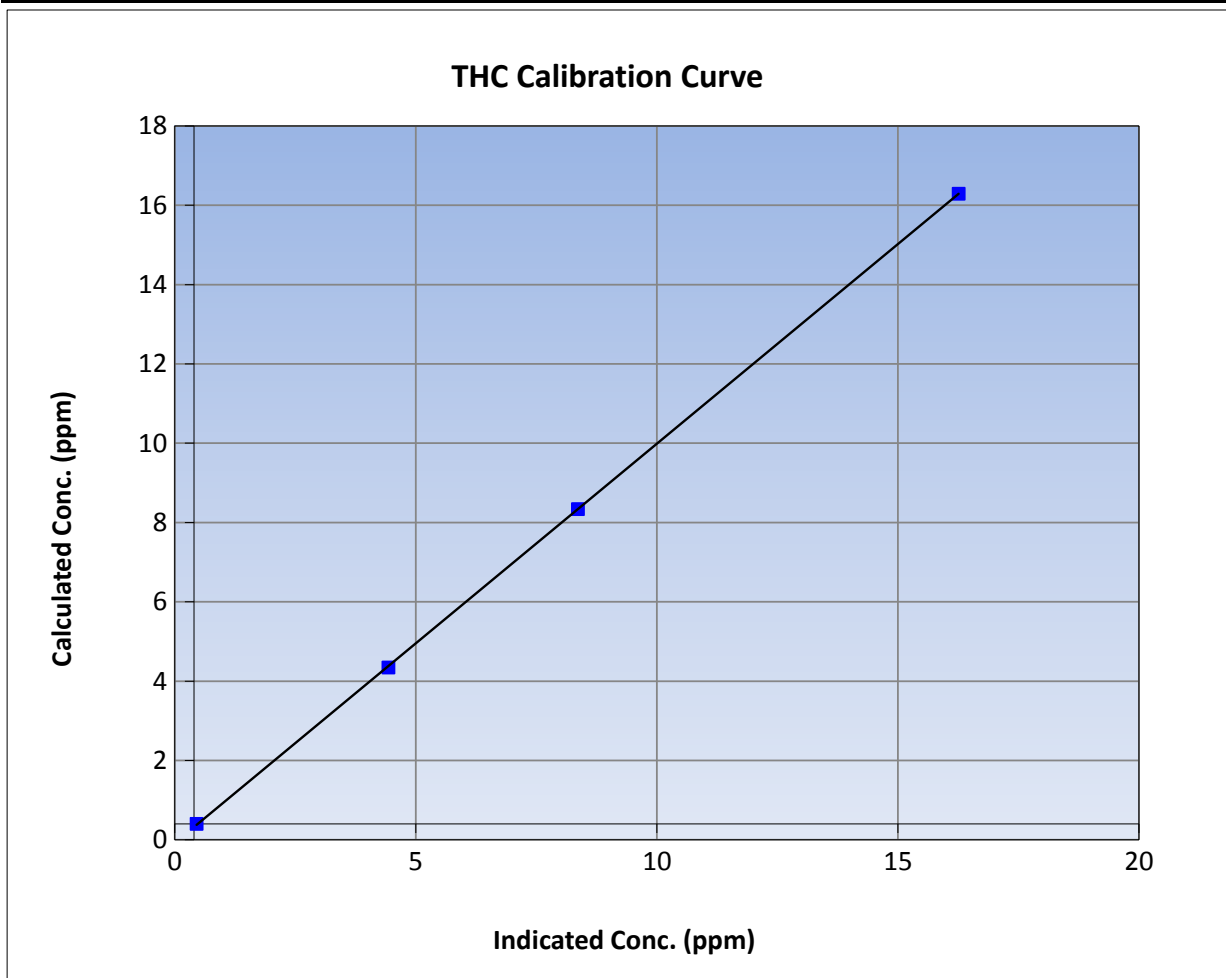
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 23, 2017 | Previous Calibration | July 13, 2017 |
| Station Name | Horizon | Station Number | AMS 15 |
| Start Time (MST) | 8:47 | End Time (MST) | 14:49 |
| Analyzer make | Thermo 51-LT | Analyzer serial # | 1327059295 |

Calibration Data

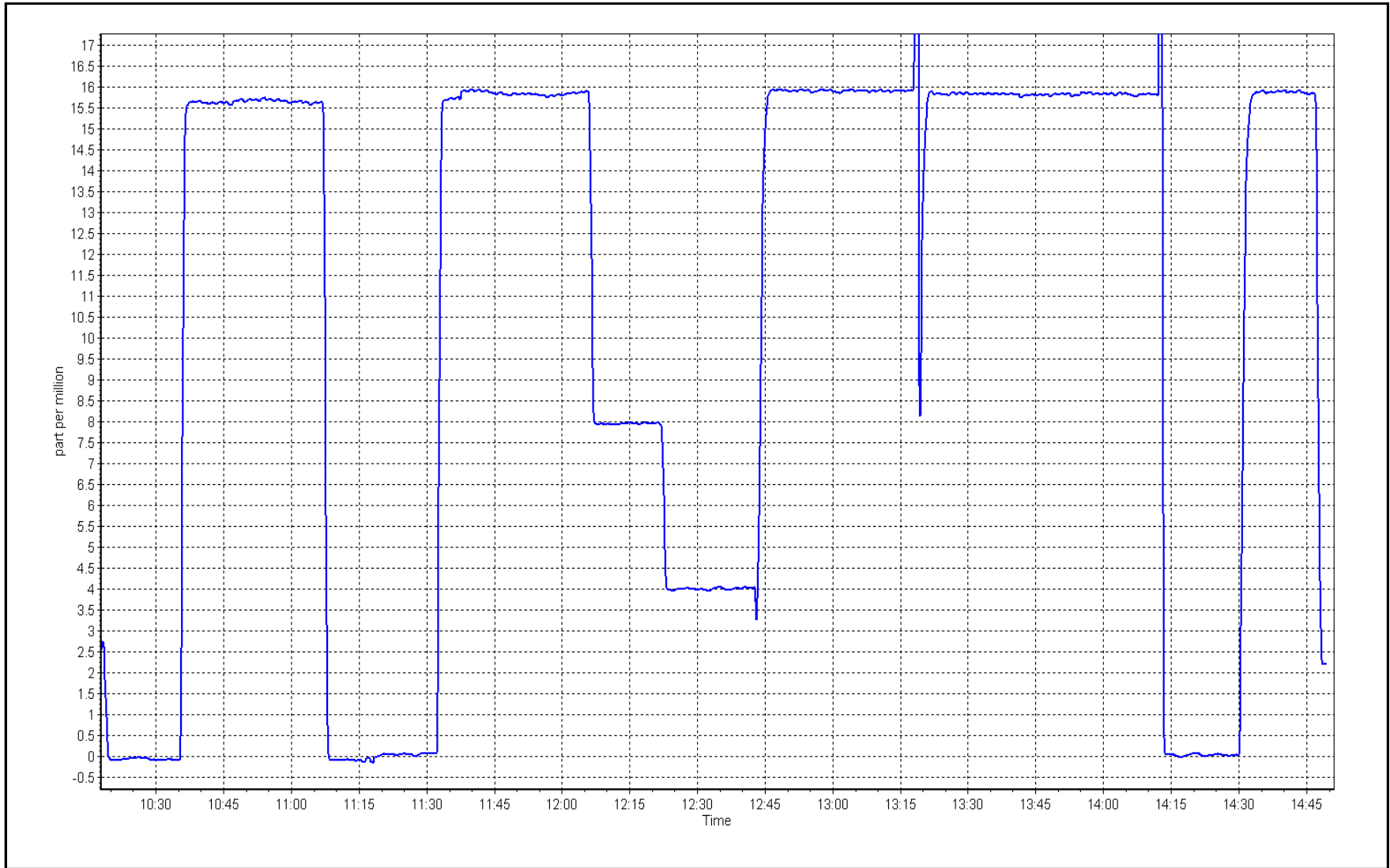
| Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (lc) | Correction factor (Cc/lc) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|-------------|
| 0.0 | 0.1 | ---- | Correlation Coefficient | 0.999985 | ≥0.995 |
| 15.9 | 15.9 | 1.0023 | | | |
| 7.9 | 8.0 | 0.9976 | Slope | 1.006883 | 0.90 - 1.10 |
| 3.9 | 4.0 | 0.9781 | | | |
| | | | Intercept | -0.079167 | +/-1.5 |



THC Calibration Plot

Date: August 23, 2017

Location: Horizon





Wood Buffalo Environmental Association

NO_x - NO - NO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|---------------|
| Station Name: | Horizon | Station number: | AMS 15 |
| Calibration Date: | August 23, 2017 | Last Cal Date: | July 13, 2017 |
| Start time (MST): | 11:14 | End time (MST): | 10:08 |
| Reason: | As Found | | |

Calibration Standards

| | | | |
|-------------------|-------------------|---------------------|--------------------|
| NO Gas Cylinder # | S0002488 | Cal Gas Expiry Date | September 26, 2017 |
| NOX Cal Gas Conc. | <u>48.9</u> ppb | NO Cal Gas Conc. | <u>48.9</u> ppb |
| Calibrator Model | Teledyne API T700 | Serial Number | 1223 |
| ZAG make/model | Teledyne API 701 | Serial Number | 1004 |

Analyzer Information

| | | | | |
|-----------------------------|--------------|--------------------|---------------------|---------------|
| Analyzer make: | Thermo 42i | Analyzer serial #: | 710321429 | |
| | <u>Start</u> | <u>Finish</u> | <u>Start</u> | <u>Finish</u> |
| NO coefficient | 0.900 | 0.900 | NOX Range (ppb) | 0 - 1000 ppb |
| NOX coefficient | 0.999 | 0.999 | PMT Temperature | -3.0 -3.0 |
| NO ₂ coefficient | 1.000 | 1.000 | Reaction cell Press | 165.0 159.6 |
| NO bkgrnd | 11.1 | 11.0 | Sample Flow | 0.706 0.711 |
| NOX bkgrnd | 11.1 | 11.1 | PMT Voltage | -779.2 -779.6 |

Calibration Statistics

| | | |
|----------------------------|--------------|---------------|
| | <u>Start</u> | <u>Finish</u> |
| NO _x Cal Slope | 1.001539 | 1.045450 |
| NO _x Cal Offset | -1.584318 | -0.209090 |
| NO Cal Slope | 1.000909 | 1.045310 |
| NO Cal Offset | -1.643585 | -0.104531 |
| NO ₂ Cal Slope | 0.999558 | |
| NO ₂ Cal Offset | -0.169841 | |



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Version-03-2017

Dilution Calibration Data

| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|----------------------------------|---------------------------|-----------------------------|---|--|---|--|---------------------------------------|--|---|--|
| as found zero | 5070 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.1 | 0.2 | ---- | ---- |
| as found span | 5004 | 81.5 | 783.7 | 783.7 | 0.0 | 749.8 | 749.8 | 0.0 | 1.0452 | 1.0452 |
| calibrator zero | 5070 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.1 | 0.2 | ---- | ---- |
| high point | 5004 | 81.5 | 783.7 | 783.7 | 0.0 | 749.8 | 749.8 | 0.0 | 1.0452 | 1.0452 |
| second point | | | | | | | | | | |
| third point | | | | | | | | | | |
| as left zero | | | | | | | | | | |
| as left span | | | | | | | | | | |
| Average Correction Factor | | | | | | | | | 1.0452 | 1.0452 |

| | | | | | |
|--|-----------------------------|----------------|--|-----------------|------------------------|
| Corrected As found | NO _x = 749.6 ppb | NO = 749.7 ppb | | *Percent Change | NO _x = 4.6% |
| Previous Response | NO _x = 784.0 ppb | NO = 784.6 ppb | | *Percent Change | NO = 4.7% |
| <i>* = > +/-5% change initiates investigation</i> | | | | | |

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO drop conc (ppb) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | Converter Efficiency <i>Limit = 96-104%</i> |
|----------------------------------|------------------------------|---|--|---------------------------------------|--|---|--|---|--|
| 1st NO ref point | | | | | | | | | |
| 1st NO2 (400 ppb O3) | | | | | | | | | |
| 2nd NO2 (200 ppb O3) | | | | | | | | | |
| 3rd NO2 (100 ppb O3) | | | | | | | | | |
| 2nd NO ref point | | | | | | | | | |
| Average Correction Factor | | | | | | | | | |

Notes:

As founds for cylinder removal

Calibration Performed By: Jayme Marcoux



Wood Buffalo Environmental Association

NO_x Calibration Summary

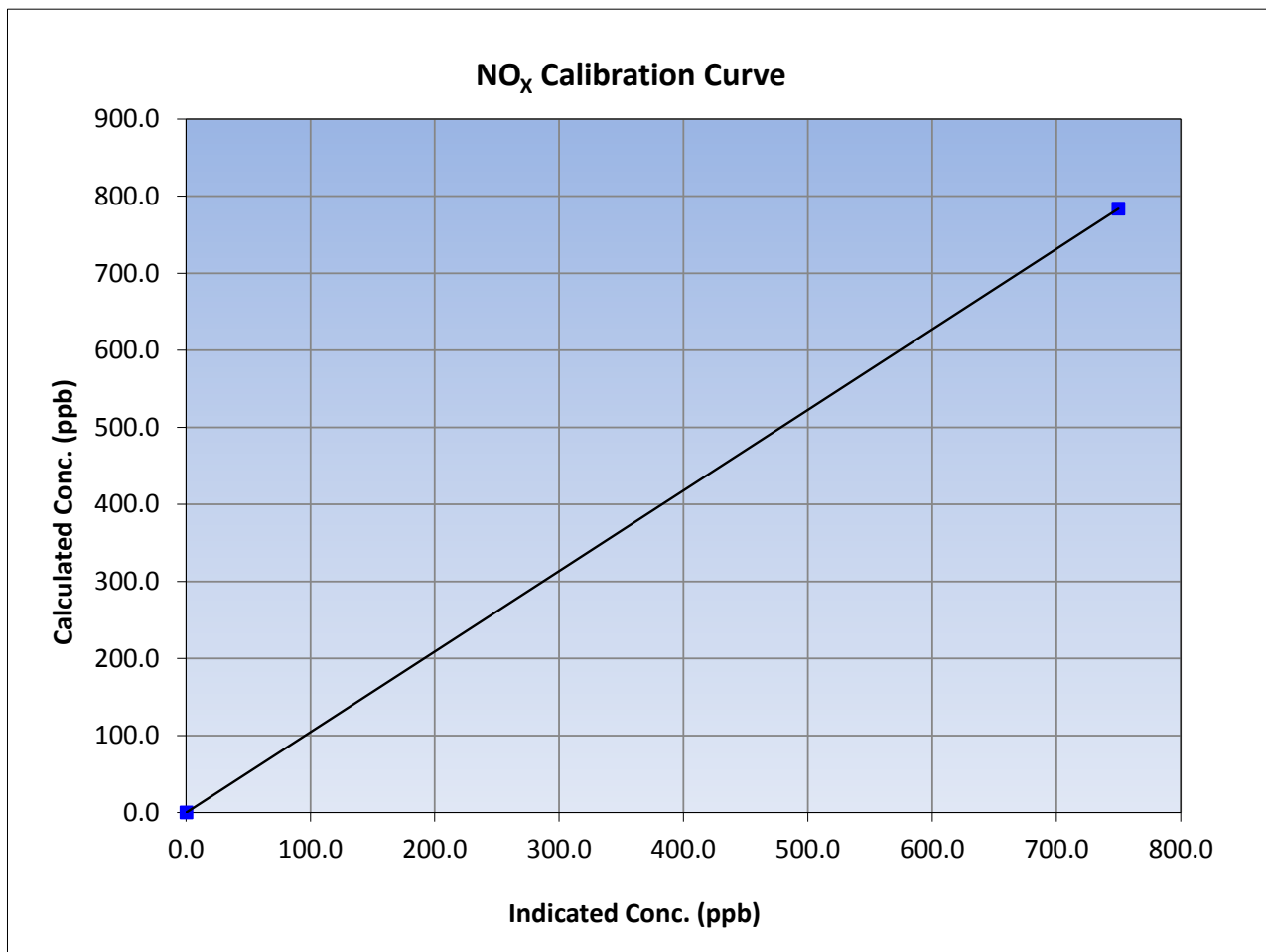
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 23, 2017 | Previous Calibration | July 13, 2017 |
| Station Name | Horizon | Station Number | AMS 15 |
| Start Time (MST) | 11:14 | End Time (MST) | 10:08 |
| Analyzer make | Thermo 42i | Analyzer serial # | 710321429 |

Calibration Data

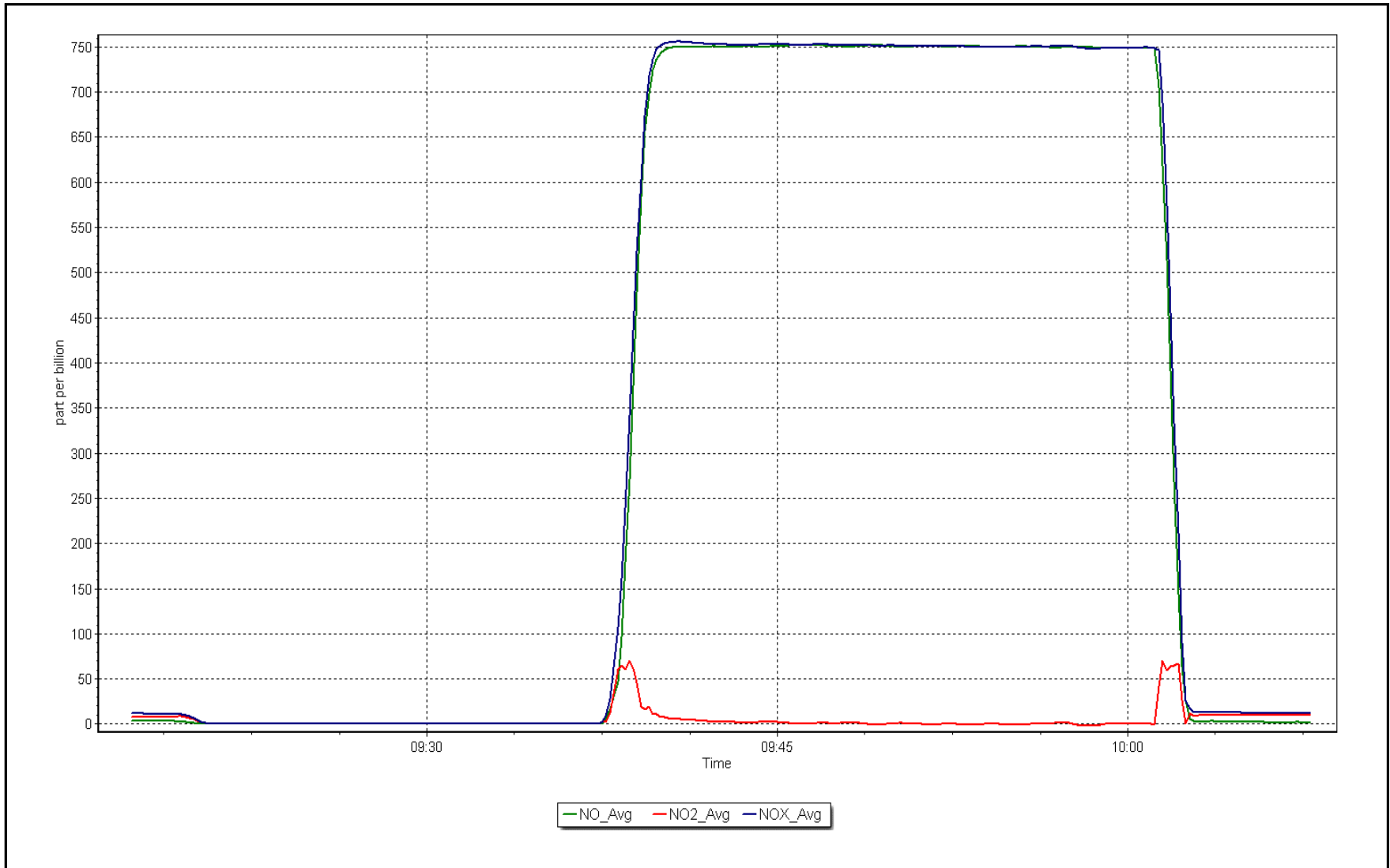
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|
| 0.0 | 0.2 | ---- | Correlation Coefficient | ≥0.995 |
| 783.7 | 749.8 | 1.0452 | | |
| | | | Slope | 0.90 - 1.10 |
| | | | Intercept | +/-20 |



NO_x Calibration Plot

Date: August 23, 2017

Location: Horizon





Wood Buffalo Environmental Association

NO_x - NO - NO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|---------------|
| Station Name: | Horizon | Station number: | AMS 15 |
| Calibration Date: | August 23, 2017 | Last Cal Date: | July 13, 2017 |
| Start time (MST): | 10:17 | End time (MST): | 14:50 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|-------------------|-------------------|---------------------|-----------------|
| NO Gas Cylinder # | EY0000368 | Cal Gas Expiry Date | May 22, 2020 |
| NOX Cal Gas Conc. | <u>52.6</u> ppb | NO Cal Gas Conc. | <u>52.6</u> ppb |
| Calibrator Model | Teledyne API T700 | Serial Number | 1223 |
| ZAG make/model | Teledyne API 701 | Serial Number | 1004 |

Analyzer Information

| | | | | |
|-----------------|--------------|--------------------|---------------------|---------------|
| Analyzer make: | Thermo 42i | Analyzer serial #: | 710321429 | |
| | <u>Start</u> | <u>Finish</u> | <u>Start</u> | <u>Finish</u> |
| NO coefficient | 0.900 | 1.208 | NOX Range (ppb) | 0 - 1000 ppb |
| NOX coefficient | 0.999 | 0.999 | PMT Temperature | -3.0 -3.1 |
| NO2 coefficient | 1.000 | 1.000 | Reaction cell Press | 165.0 180.3 |
| NO bkgrnd | 11.0 | 14.1 | Sample Flow | 0.706 0.622 |
| NOX bkgrnd | 11.1 | 14.0 | PMT Voltage | -779.2 -779.2 |

Calibration Statistics

| | | |
|----------------------------|--------------|---------------|
| | <u>Start</u> | <u>Finish</u> |
| NO _x Cal Slope | 1.045450 | 1.001537 |
| NO _x Cal Offset | -0.209090 | -1.441742 |
| NO Cal Slope | 1.045310 | 1.002459 |
| NO Cal Offset | -0.104531 | -1.482737 |
| NO ₂ Cal Slope | 0.997743 | 1.002469 |
| NO ₂ Cal Offset | -0.723663 | -0.522386 |



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Version-03-2017

Dilution Calibration Data

| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|----------------------------------|---------------------------|-----------------------------|---|--|---|--|---------------------------------------|--|---|--|
| as found zero | 5080 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.1 | 0.1 | ---- | ---- |
| as found span | 5012 | 75.8 | 783.7 | 783.7 | 0.0 | 714.6 | 713.4 | 1.2 | 1.0966 | 1.0985 |
| calibrator zero | 5080 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.1 | 0.1 | ---- | ---- |
| high point | 5012 | 75.8 | 783.7 | 783.7 | 0.0 | 784.0 | 783.2 | 0.9 | 0.9996 | 1.0006 |
| second point | 5040 | 37.8 | 391.6 | 391.6 | 0.0 | 390.8 | 390.7 | 0.1 | 1.0020 | 1.0022 |
| third point | 5070 | 18.8 | 194.3 | 194.3 | 0.0 | 198.2 | 198.1 | 0.2 | 0.9804 | 0.9809 |
| as left zero | 5080 | 0.0 | 0.0 | 0.0 | 0.0 | 4.3 | 4.1 | 0.2 | ---- | ---- |
| as left span | 5012 | 75.8 | 783.7 | 357.3 | 426.4 | 782.7 | 359.0 | 423.7 | 1.0012 | 0.9953 |
| Average Correction Factor | | | | | | | | | 0.9940 | 0.9946 |

| | | | | |
|--------------------|-----------------------------|----------------|-----------------|------------------------|
| Corrected As found | NO _x = 714.4 ppb | NO = 713.3 ppb | *Percent Change | NO _x = 5.0% |
| Previous Response | NO _x = 749.8 ppb | NO = 749.8 ppb | *Percent Change | NO = 5.1% |

* = > +/-5% change initiates investigation

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO drop conc (ppb) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | Converter Efficiency <i>Limit = 96-104%</i> |
|----------------------------------|------------------------------|---|--|---------------------------------------|--|---|--|---|--|
| 1st NO ref point | | 0.0 | 784.9 | 782.9 | 2.0 | 0.9984 | 1.0010 | ---- | ---- |
| 1st NO2 (400 ppb O3) | 357.3 | 425.6 | 782.1 | 357.3 | 424.8 | 1.0020 | ---- | 1.0019 | 99.8% |
| 2nd NO2 (200 ppb O3) | 560.6 | 222.3 | 783.2 | 560.6 | 222.6 | 1.0006 | ---- | 0.9987 | 100.1% |
| 3rd NO2 (100 ppb O3) | 665.7 | 117.2 | 783.5 | 665.7 | 117.8 | 1.0002 | ---- | 0.9949 | 100.5% |
| 2nd NO ref point | ---- | 0.0 | 783.6 | 782.2 | 1.4 | 1.0001 | 1.0019 | ---- | ---- |
| Average Correction Factor | | | | | | 1.0007 | 1.0014 | 0.9985 | 100.2% |

Notes: New Mix gas cylinder. Changed inlet filter after asfinds. Installed new pump and scrubber cartidge. Adjusted the span.

Calibration Performed By: Jayme Marcoux



Wood Buffalo Environmental Association

NO_x Calibration Summary

Version-03-2017

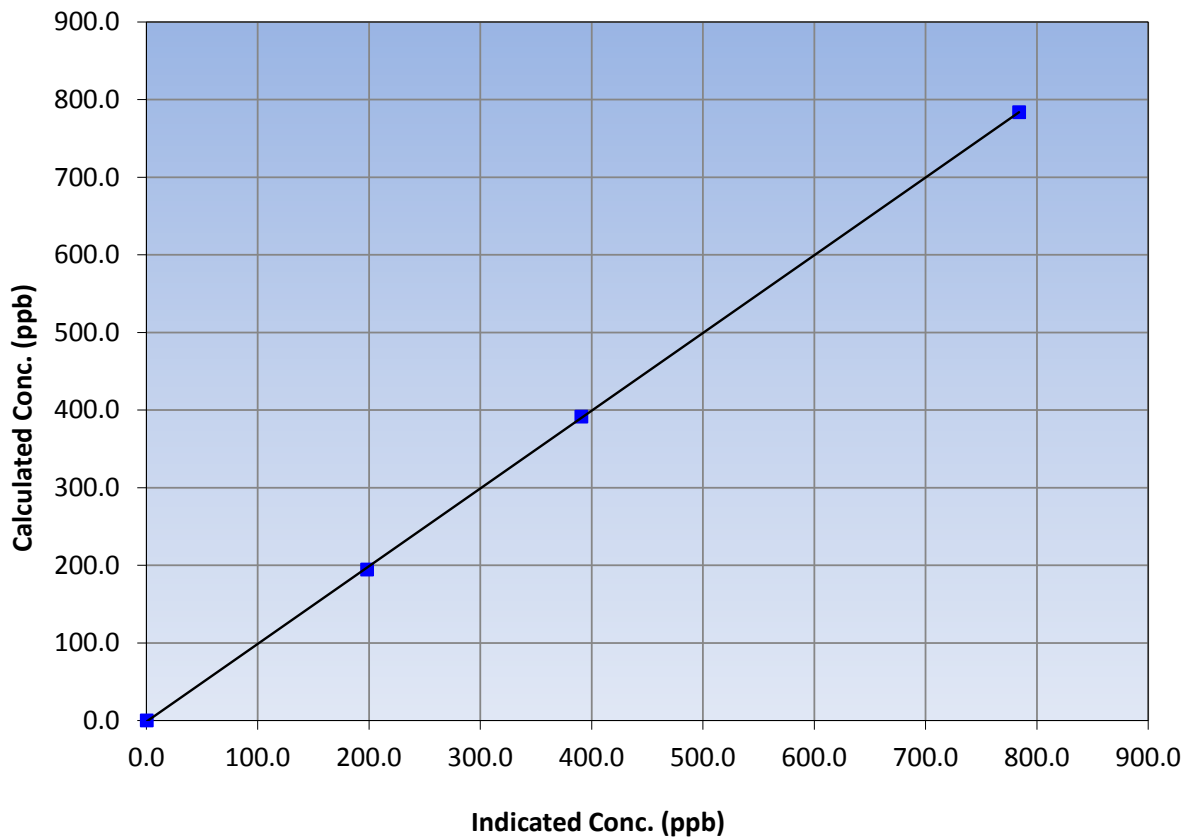
Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 23, 2017 | Previous Calibration | July 13, 2017 |
| Station Name | Horizon | Station Number | AMS 15 |
| Start Time (MST) | 10:17 | End Time (MST) | 14:50 |
| Analyzer make | Thermo 42i | Analyzer serial # | 710321429 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> |
|-------------------------------------|------------------------------------|---------------------------|---|--------------------------------|
| 0.0 | 0.2 | ---- | Correlation Coefficient Slope Intercept | ≥0.995 0.90 - 1.10 +/-20 |
| 783.7 | 784.0 | 0.9996 | | |
| 391.6 | 390.8 | 1.0020 | | |
| 194.3 | 198.2 | 0.9804 | | |
| | | | 0.999965 | |
| | | | 1.001537 | |
| | | | -1.441742 | |

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

Version-03-2017

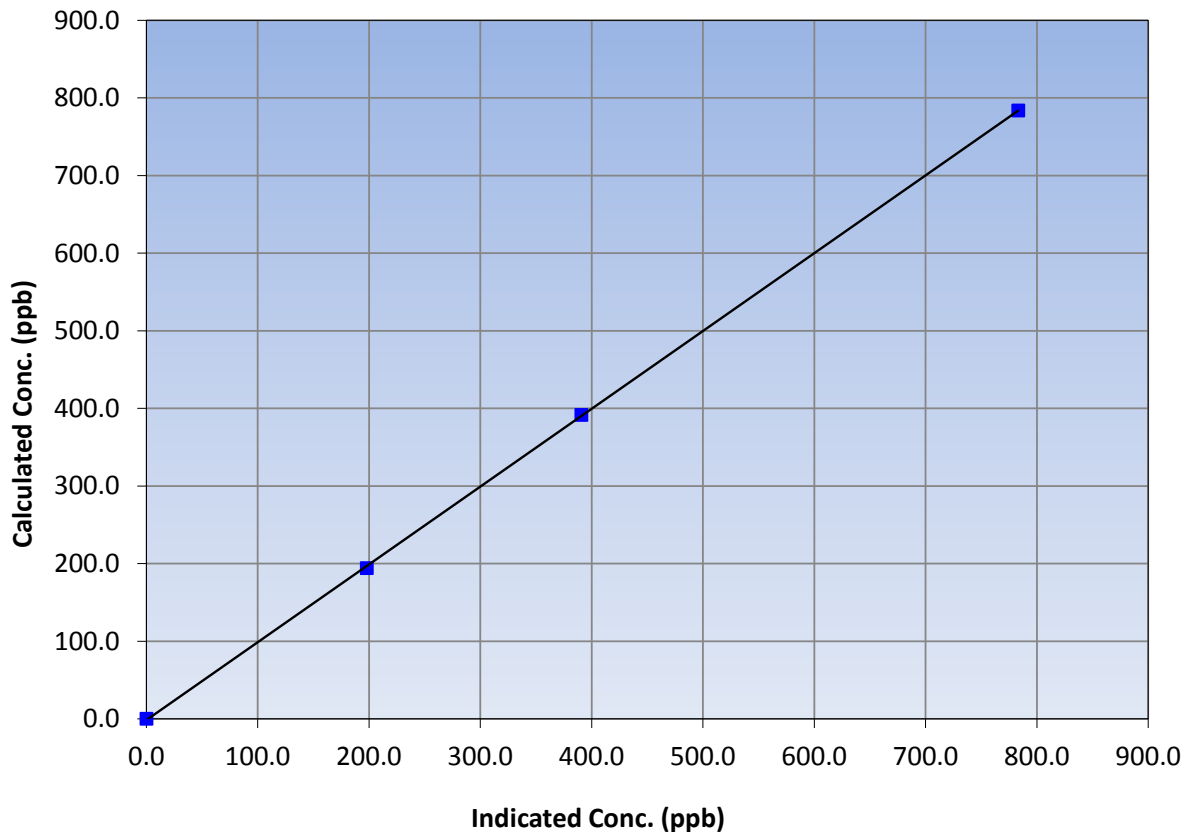
Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 23, 2017 | Previous Calibration | July 13, 2017 |
| Station Name | Horizon | Station Number | AMS 15 |
| Start Time (MST) | 10:17 | End Time (MST) | 14:50 |
| Analyzer make | Thermo 42i | Analyzer serial # | 710321429 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.1 | ---- | Correlation Coefficient | ≥0.995 | |
| 783.7 | 783.2 | 1.0006 | | | |
| 391.6 | 390.7 | 1.0022 | | | |
| 194.3 | 198.1 | 0.9809 | | | |
| | | | Slope | 1.002459 | 0.90 - 1.10 |
| | | | Intercept | -1.482737 | +/-20 |

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

Version-03-2017

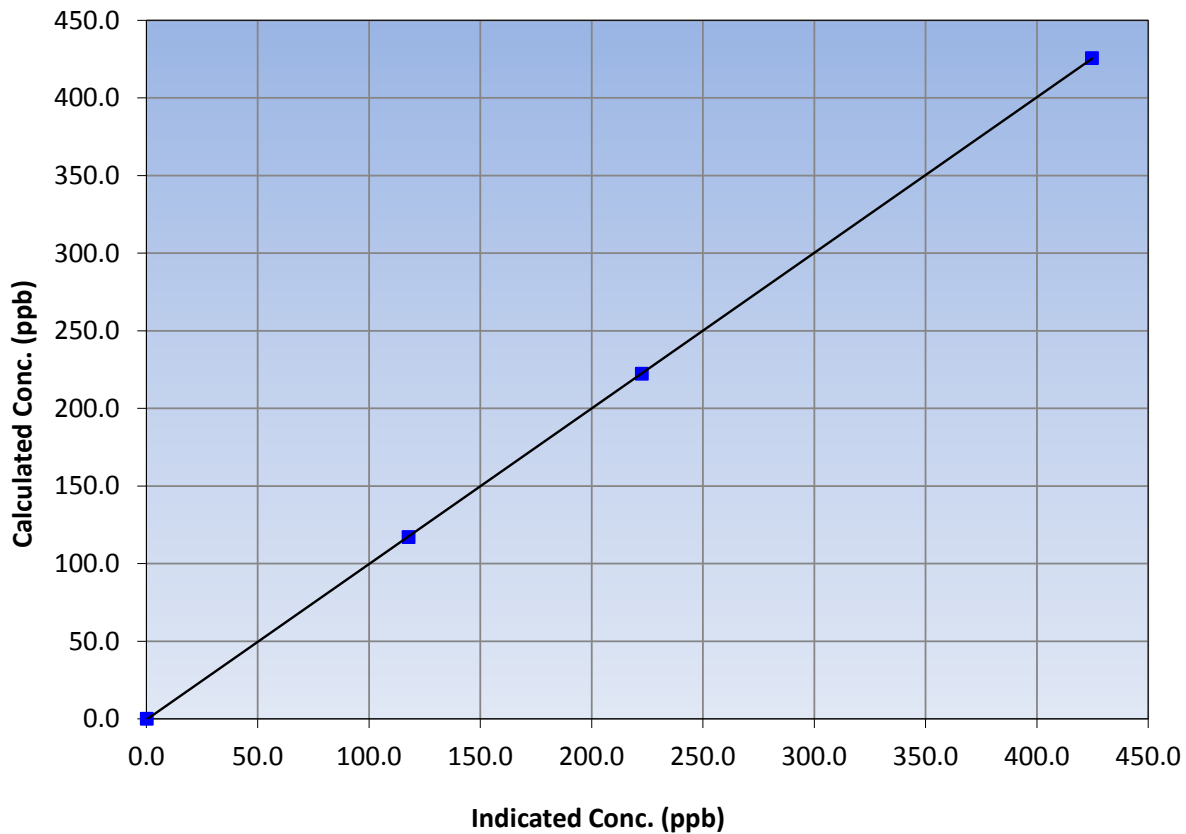
Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 23, 2017 | Previous Calibration | July 13, 2017 |
| Station Name | Horizon | Station Number | AMS 15 |
| Start Time (MST) | 10:17 | End Time (MST) | 14:50 |
| Analyzer make | Thermo 42i | Analyzer serial # | 710321429 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.1 | ---- | Correlation Coefficient | ≥0.995 | |
| 425.6 | 424.8 | 1.0019 | | | |
| 222.3 | 222.6 | 0.9987 | | | |
| 117.2 | 117.8 | 0.9949 | | | |
| | | | Slope | 1.002469 | 0.90 - 1.10 |
| | | | Intercept | -0.522386 | +/-20 |

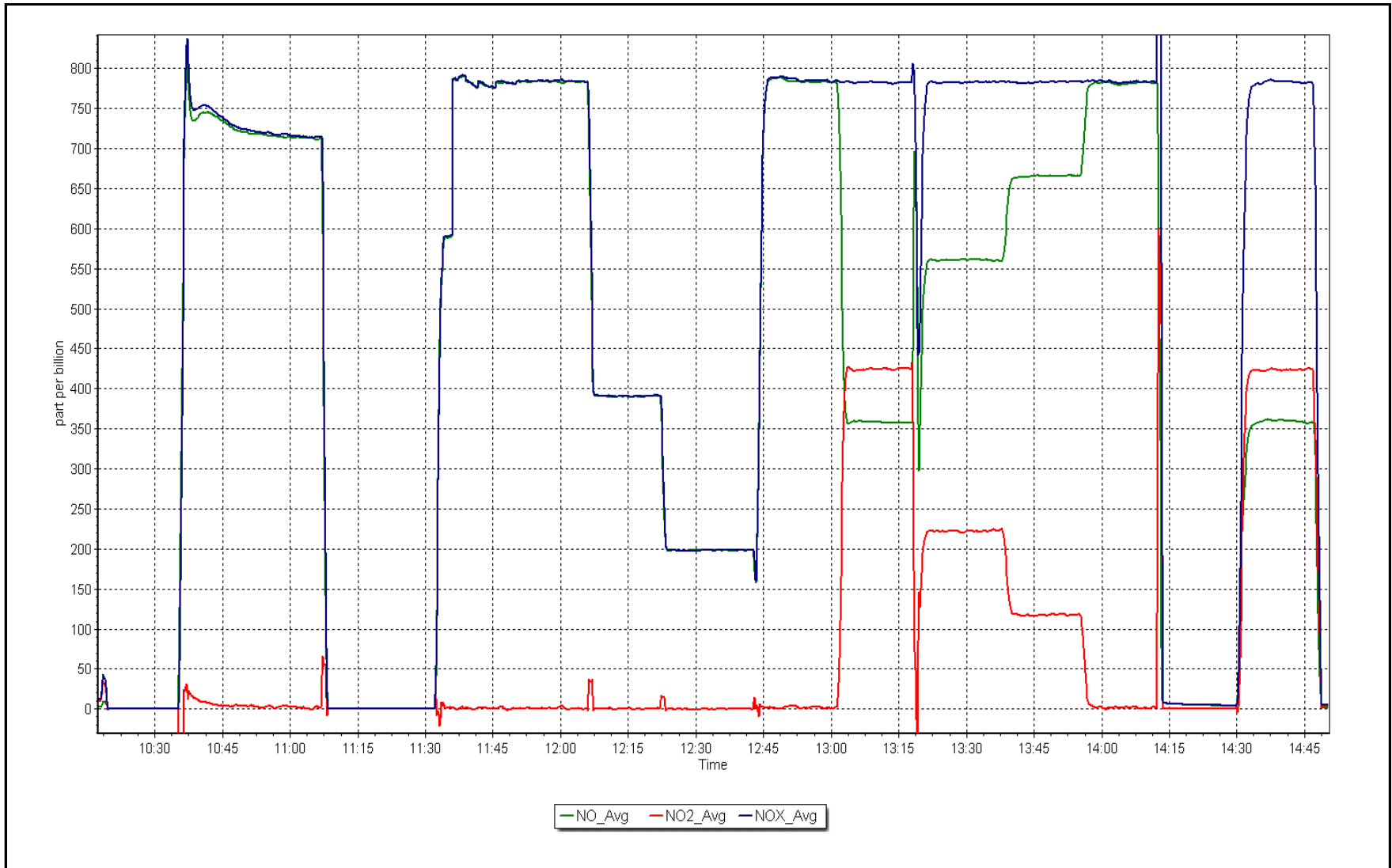
NO₂ Calibration Curve



NO_x Calibration Plot

Date: August 23, 2017

Location: Horizon





Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-02-2017

Station Information

| | | | |
|------------------------|-----------------|-----------------|---------------|
| Station Name: | Horizon | Station number: | AMS 15 |
| Calibration Date: | August 23, 2017 | Last Cal Date: | July 21, 2017 |
| Start time (MST): | 11:45 | End time (MST): | 12:28 |
| Sharp Model: | 5030 | S/N: | E-2020 |
| Particulate Fraction: | PM2.5 | C14 Source S/N: | 7409 |
| Flow Meter Make/Model: | Delta cal | S/N: | 628 |
| Temp/RH standard: | NA | S/N: | NA |

Monthly Calibration Test

| <u>Parameter</u> | <u>As found</u> | <u>Measured</u> | <u>As left</u> | <u>Adjusted</u> | (Limits) |
|-----------------------------|-----------------|-------------------------------------|----------------|-------------------------------------|-----------------|
| T1 (°C) | 24.0 | 23.9 | 24.0 | <input type="checkbox"/> | +/- 2 °C |
| P3 (hPa) | 973 | 974 | 973 | <input type="checkbox"/> | +/- 13 hPa |
| flow (LPH) | 1000.0 | 1000.0 | 1000.0 | <input type="checkbox"/> | +/- 50 LPH |
| Nephelometer zero | -0.4 | ----- | -0.1 | <input checked="" type="checkbox"/> | +/- 0.5 ug/m3 |
| Instrument Clock: | Verified | <input type="checkbox"/> | | | |
| Cyclone cleaning : | PM10 Cyclone | <input checked="" type="checkbox"/> | PM2.5 Cyclone | <input checked="" type="checkbox"/> | |
| Date Filter Tape Installed: | | | | | |

Quarterly Calibration Test

Leak Test: Date of check: _____ Last Cal Date: May 12, 2017
 Flow w/o adaptor: 14.97 Flow w/ adaptor: 14.89

(Limit) 0.4 LPM

| <u>Adjusted</u> | <u>Current Test</u> | <u>Previous Test</u> | <u>% Change</u> |
|-----------------------------------|--|---|-----------------|
| <input type="checkbox"/> | Foil S/N: <u>2022</u> | Foil S/N: <u>2022</u> | |
| Foil Calibration | Foil Mass: <u>1507</u> | Foil Mass: <u>2395</u> | |
| | Calibration Date: <u>July 21, 2017</u> | Calibration Date: <u>February 6, 2017</u> | |
| (Limit) +/- 5% of previous | Correction Factor: <u>7016</u> | Correction Factor: <u>7041</u> | -0.36% |

Annual Calibration Test

| <u>Parameter</u> | <u>As found</u> | <u>Measured</u> | <u>As left</u> | <u>Adjusted</u> | (Limits) |
|-----------------------------|-----------------|-----------------|----------------|--------------------------|-----------------|
| T2 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| T3 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| T4 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| RH (%) | | | | <input type="checkbox"/> | +/- 10% |
| Date Sample Tube Cleaned: | | | | | |
| Date Pump Rebuilt/Replaced: | | | | | |

Notes: Adjusted nephalometer. Cyclone head cleaned at site.

Calibration by: Jayme Marcoux



Wood Buffalo Environmental Association

Wind Speed/Direction Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|----------------|-----------------|------------------|
| Station Name: | Horizon | Station Number: | AMS 15 |
| Calibration Date: | August 8, 2017 | Prev Cal Date: | October 13, 2016 |
| Start Time (MST): | 9:15 | End Time (MST): | 10:15 |
| Barometric Press: | 739.6 | Station Temp: | 26 Deg C |
| Reason: | Routine | | |

Wind Speed Information

| | | | |
|--------------------|----------------|----------------|-------|
| Sensor make/model: | Met One 010C-1 | Serial Number: | J4337 |
| WS Calibrator: | MetOne 053 | Serial Number: | |

| Shaft RPM | Actual Speed (K/hr) (Cv) | Indicated Speed (K/hr) (Iv) | Correction factor (Cv/Iv) <i>Limit = 0.95-1.05</i> |
|----------------------------------|--------------------------|-----------------------------|---|
| 0 | 0.0 | 0.0 | n/a |
| 200 | 20.2 | 20.2 | 0.9981 |
| 400 | 39.4 | 39.4 | 0.9990 |
| 600 | 58.6 | 58.6 | 0.9992 |
| 800 | 77.8 | 77.8 | 0.9989 |
| Average Correction Factor | | | 0.9988 |

| | <u>Start</u> | <u>Finish</u> | <u>Limits</u> |
|--------------------------------|--------------|---------------|--------------------|
| Correl Coeff (r ²) | | 1.000000 | <i>≥0.995</i> |
| Calculated slope | 0.998939 | 0.999056 | <i>0.90 - 1.10</i> |
| Calculated intercept | 0.036731 | -0.005370 | <i>+/- 2</i> |

Wind Direction Information

| | | | |
|--|----------------|---|-------|
| Sensor make/model: | Met One 020C-1 | Serial Number: | J2732 |
| As Found Declination (deg west of North) | <u>16</u> | As Left Declination (deg west of North) | |

| Physical Direction (Degrees) (Cv) | Indicated Direction (Degrees) (Iv) | Correction factor (Cv/Iv) <i>Limit = 0.95-1.05</i> |
|-----------------------------------|------------------------------------|---|
| 0 | 0.3 | n/a |
| 90 | 87.4 | 1.0297 |
| 180 | 178.7 | 1.0073 |
| 270 | 268.8 | 1.0045 |
| 357 | 357.8 | 0.9978 |
| Average Correction Factor | | 1.0098 |

| | <u>Start</u> | <u>Finish</u> | <u>Limits</u> |
|--------------------------------|--------------|---------------|--------------------|
| Correl Coeff (r ²) | | 0.999957 | <i>≥0.995</i> |
| Calculated slope | 0.998737 | 0.997323 | <i>0.90 - 1.10</i> |
| Calculated intercept | -0.711889 | 1.274078 | <i>+/- 7</i> |

Notes: Adjusted the Met arm delination. Sensors were good.

Calibration Performed By: Jayme Marcoux



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 16
MUSKEG RIVER
AUGUST 2017**

Operations, Data Collection,
QA/QC, Data Validation and Reporting by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

September 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MUSKEG RIVER (AMS 16)
AUGUST 2017

MONTHLY SUMMARY for
AMD SECTION III.B.1(c)

| Parameter | Hours of Data | Hours of Calibration | Hours without Data | Operational Time | Maximum 1-Hour Value | 1-Hour Exceedances | Maximum 24-Hour Value | 24-Hour Exceedances |
|------------------------------------|---------------|----------------------|--------------------|------------------|----------------------|--------------------|-----------------------|---------------------|
| SO2 (ppb) Average | 708 | 36 | 36 | 100 | 28 | 0 | 3 | 0 |
| THC (ppm) Average | 708 | 36 | 36 | 100 | 4.2 | - | 3.1 | - |
| NO2 (ppb) Average | 705 | 37 | 39 | 99.73 | 34 | 0 | 10 | - |
| NO (ppb) Average | 705 | 37 | 39 | 99.73 | 80 | - | 16 | - |
| NOX (ppb) Average | 705 | 37 | 39 | 99.73 | 107 | - | 26 | - |
| PM2.5 (ug/m3) Average | 743 | 1 | 1 | 100 | 165.7 | - | 28.3 | 0 |
| Temperature 2 m (C) Average | 744 | 0 | 0 | 100 | 31.4 | - | 23.7 | - |
| Relative Humidity (%) Average | 744 | 0 | 0 | 100 | 99 | - | 91 | - |
| Barometric Pressure (inHg) Average | 744 | 0 | 0 | 100 | 29.3 | - | 29.3 | - |
| Wind Speed 10 m (km/h) Average | 744 | 0 | 0 | 100 | 36 | - | 20 | - |
| Wind Direction 10 m (deg) Average | 744 | 0 | 0 | 100 | - | - | - | - |

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MUSKEG RIVER (AMS 16)
AUGUST 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

| Parameter | Number | Mean | StnDev | Total | Percentile | | | | | | |
|------------------------------------|--------|-------|--------|-------|------------|------|------|--------|------|------|-------|
| | | | | | Min | P10 | Q1 | Median | Q3 | P90 | Max |
| SO2 (ppb) Average | 708 | 0.7 | 2 | - | 0 | 0 | 0 | 0 | 0 | 2 | 28 |
| THC (ppm) Average | 708 | 2.49 | 0.4 | - | 1.9 | 2.1 | 2.2 | 2.4 | 2.7 | 3 | 4.2 |
| NO2 (ppb) Average | 705 | 5.2 | 5 | - | 0 | 0 | 1 | 3 | 8 | 12 | 34 |
| NO (ppb) Average | 705 | 3.1 | 8 | - | 0 | 0 | 0 | 0 | 2 | 9 | 80 |
| NOX (ppb) Average | 705 | 8.3 | 12 | - | 0 | 0 | 1 | 4 | 12 | 20 | 107 |
| PM2.5 (ug/m3) Average | 743 | 10.24 | 12.2 | - | 0.6 | 2.3 | 4.1 | 7 | 12.4 | 20.9 | 165.7 |
| Temperature 2 m (C) Average | 744 | 17.27 | 5.7 | - | 2.3 | 10.5 | 13.1 | 16.5 | 21.6 | 25.1 | 31.4 |
| Relative Humidity (%) Average | 744 | 64.6 | 21 | - | 25 | 34 | 46 | 67 | 83 | 93 | 99 |
| Barometric Pressure (inHg) Average | 744 | 28.84 | 0.2 | - | 28.5 | 28.6 | 28.7 | 28.9 | 29 | 29.1 | 29.3 |
| Wind Speed 10 m (km/h) Average | 744 | 10.9 | 6 | - | 0 | 4 | 7 | 9 | 14 | 20 | 36 |
| Wind Direction 10 m (deg) Average | 744 | - | - | - | - | - | - | - | - | - | - |

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -MUSKEG RIVER (AMS 16)
AUGUST 2017

OPERATIONAL NOTES

| Parameter | Period Start | Period End | Duration (Hours) | Notes |
|--------------|-------------------|-------------------|------------------|--|
| NO2, NO, NOX | 31 Aug 2017 09:00 | 31 Aug 2017 10:00 | 2 | Maintenance - reinitiated daily QA check |



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Muskeg River - August 2017

| | | | | |
|---|--|----------|---------------------------|-------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 28 ppb on Aug 11 10:00 | Maximum Daily Average: 3.3 ppb on Aug 11 | | Hours of Data: | 708 |
| Minimum Value: 0 ppb on Aug 1 02:00 | Minimum Daily Average: 0.0 ppb on Aug 19 | | Hours of Missing Data: | 36 |
| Maximum Diurnal Average: 2.6 ppb at hour 10 | Minimum Diurnal Average: 0.1 ppb at hour 6 | | Hours of Calibration: | 36 |
| Monthly Average: 0.7 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 2 P ₉₉ = 9 | | Percent Operational Time: | 100.0 |

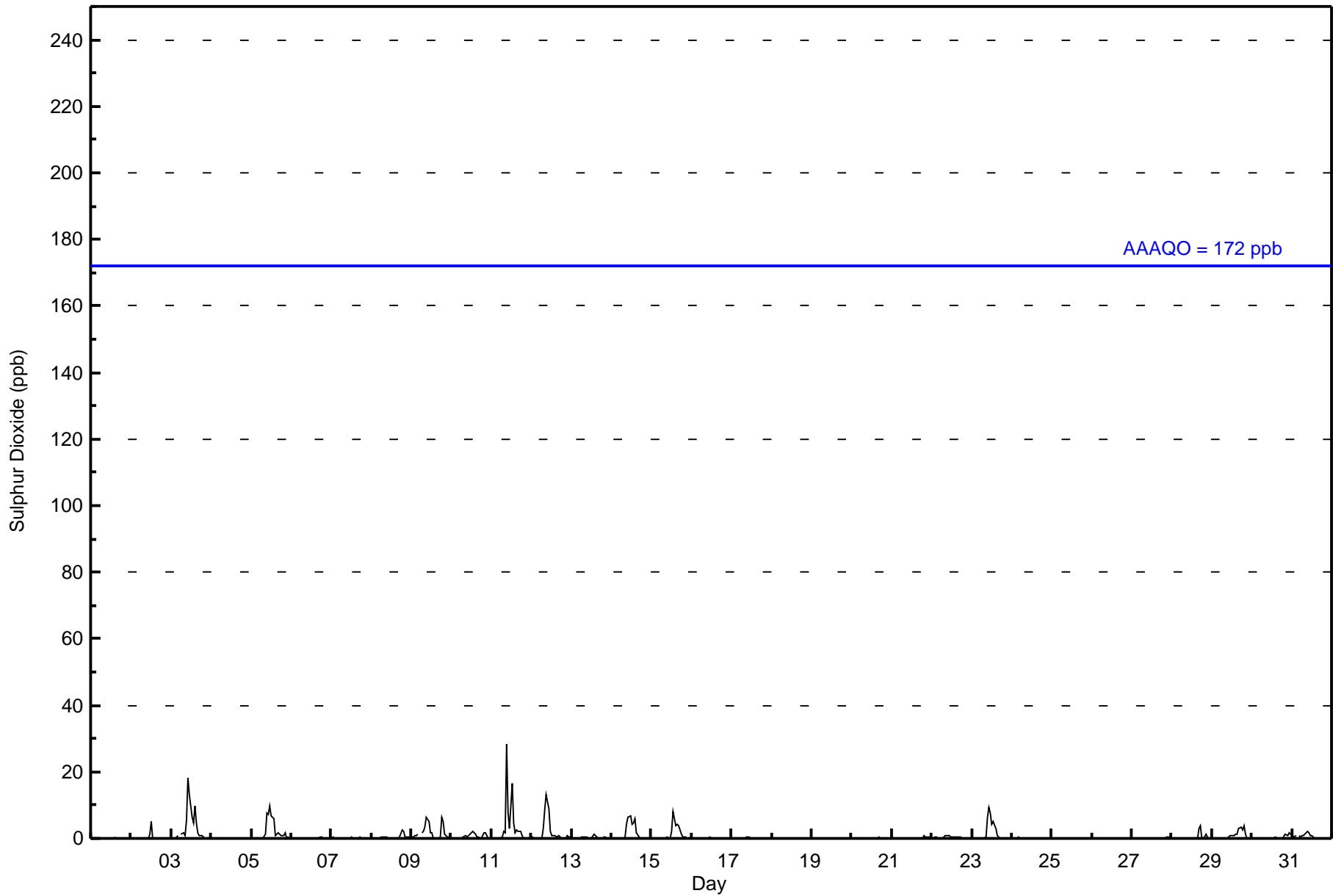
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | C | C | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 2-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 5 |
| 3-Aug | 0 | 0 | 0 | 0 | 1 | Z | 1 | 2 | 1 | 5 | 18 | 13 | 6 | 4 | 10 | 5 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 3.1 | 18 | |
| 4-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | |
| 5-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 8 | 7 | 10 | 7 | 6 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 0 | 0 | 2.1 | 10 | |
| 6-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | |
| 7-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | |
| 8-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0.4 | 2 | |
| 9-Aug | 1 | 1 | 1 | 1 | 1 | Z | 2 | 2 | 3 | 6 | 5 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 6 | 5 | 1 | 0 | 0 | 1.7 | 6 | |
| 10-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 2 | 2 | 1 | 0 | 0.7 | 2 | |
| 11-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 28 | 8 | 3 | 16 | 5 | 2 | 2 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 3.3 | 28 | |
| 12-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 3 | 8 | 13 | 9 | 2 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1.8 | 13 | |
| 13-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | |
| 14-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 4 | 6 | 7 | 4 | 5 | 6 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.6 | 7 | |
| 15-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 2 | 8 | 4 | 4 | 4 | 4 | 3 | 1 | 1 | 0 | 0 | 0 | 1.2 | 8 | |
| 16-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | |
| 17-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 | |
| 18-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | |
| 19-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | |
| 20-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0.1 | 1 | |
| 22-Aug | Z | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | |
| 23-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 9 | 8 | 4 | 5 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1.7 | 9 | |
| 24-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | |
| 25-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | |
| 26-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0.1 | 1 | |
| 28-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 4 | 0 | 1 | 1 | 0 | 0 | 0 | 0.5 | 4 | |
| 29-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 3 | 3 | 2 | 4 | 1 | 0 | 0 | 0 | 0.8 | 4 | |
| 30-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 0.3 | 2 |
| 31-Aug | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 2 | |

Z - zerospan C - Calibration
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Muskeg River - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Muskeg River - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 10 | 703 | 99.29 | 99.29 |
| 11 - 20 | 4 | 0.56 | 99.86 |
| 21 - 60 | 1 | 0.14 | 100.00 |
| 61 - 110 | 0 | 0.00 | 100.00 |
| 111 - 172 | 0 | 0.00 | 100.00 |
| > 172 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Muskeg River - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 10 | 7 | 27 | 30 | 12 | 14 | 10 | 14 | 74 | 142 | 122 | 97 | 65 | 29 | 40 | 10 | 10 | 703 |
| 11 - 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 21 - 60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 61 - 110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 111 - 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 7 | 27 | 30 | 12 | 14 | 10 | 14 | 74 | 145 | 124 | 97 | 65 | 29 | 40 | 10 | 10 | 708 |

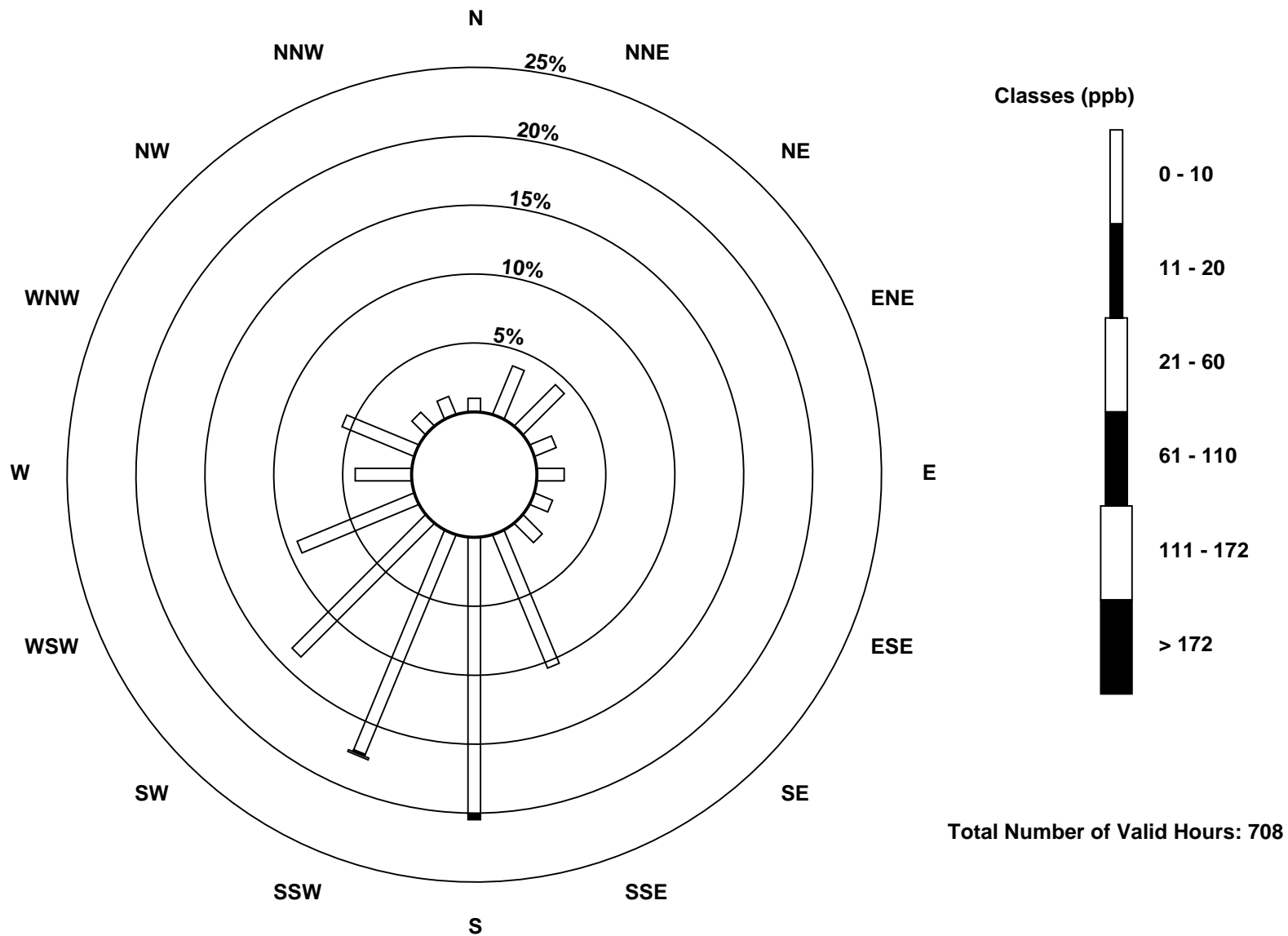
Total Number of Valid Hours: 708

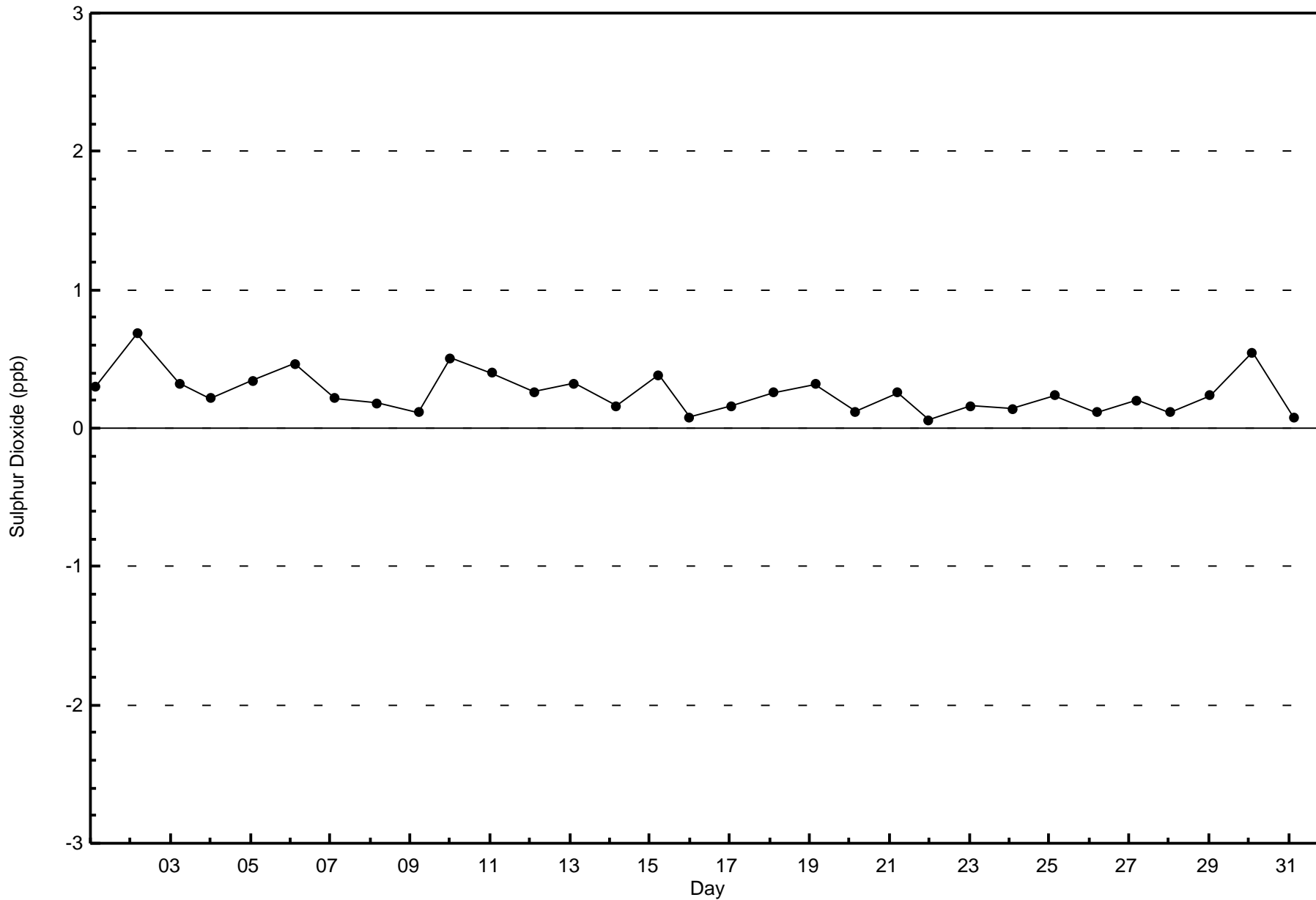
Total Number of Hours: 744

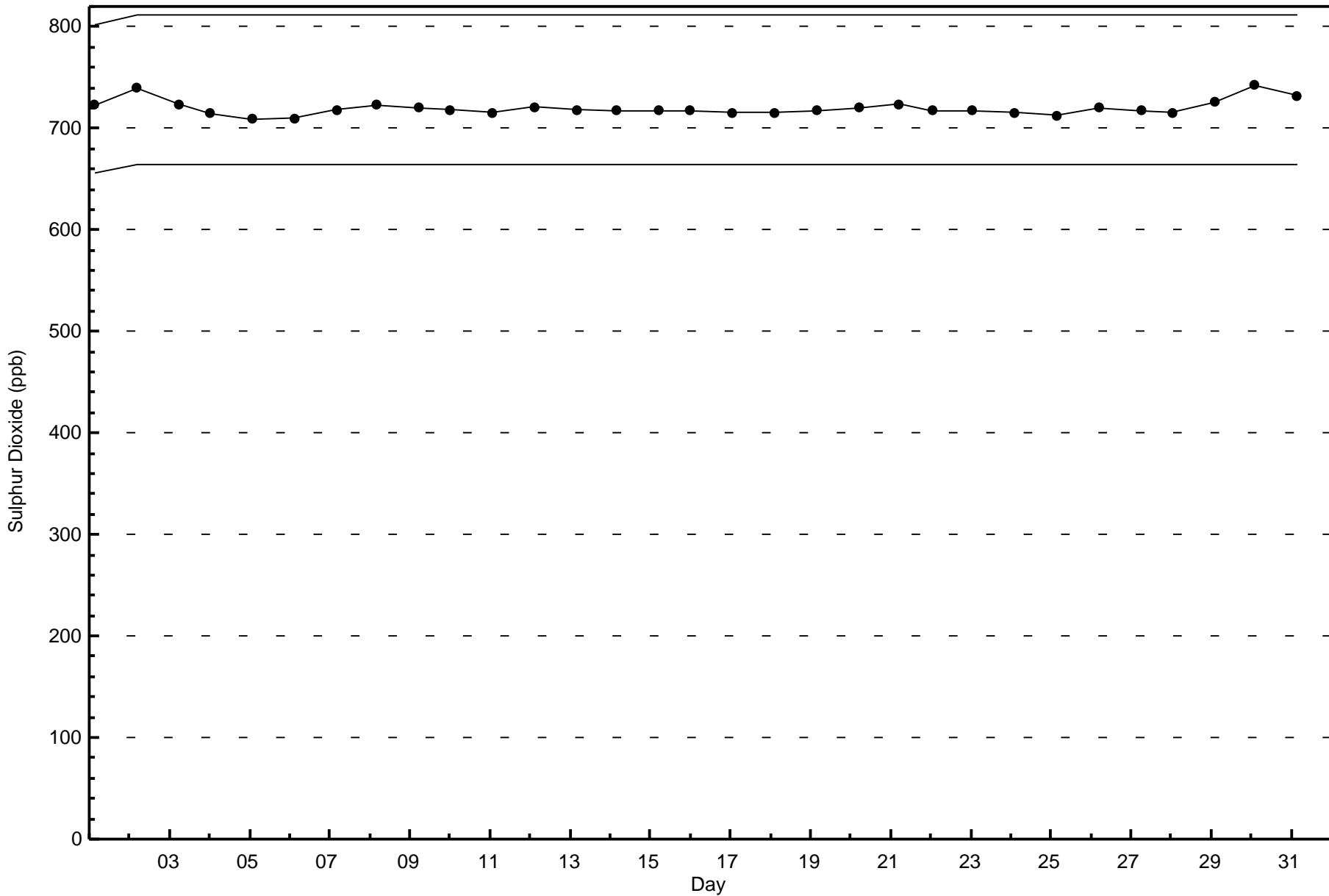


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Sulphur Dioxide (SO₂) - ppb
Muskeg River (AMS 16)





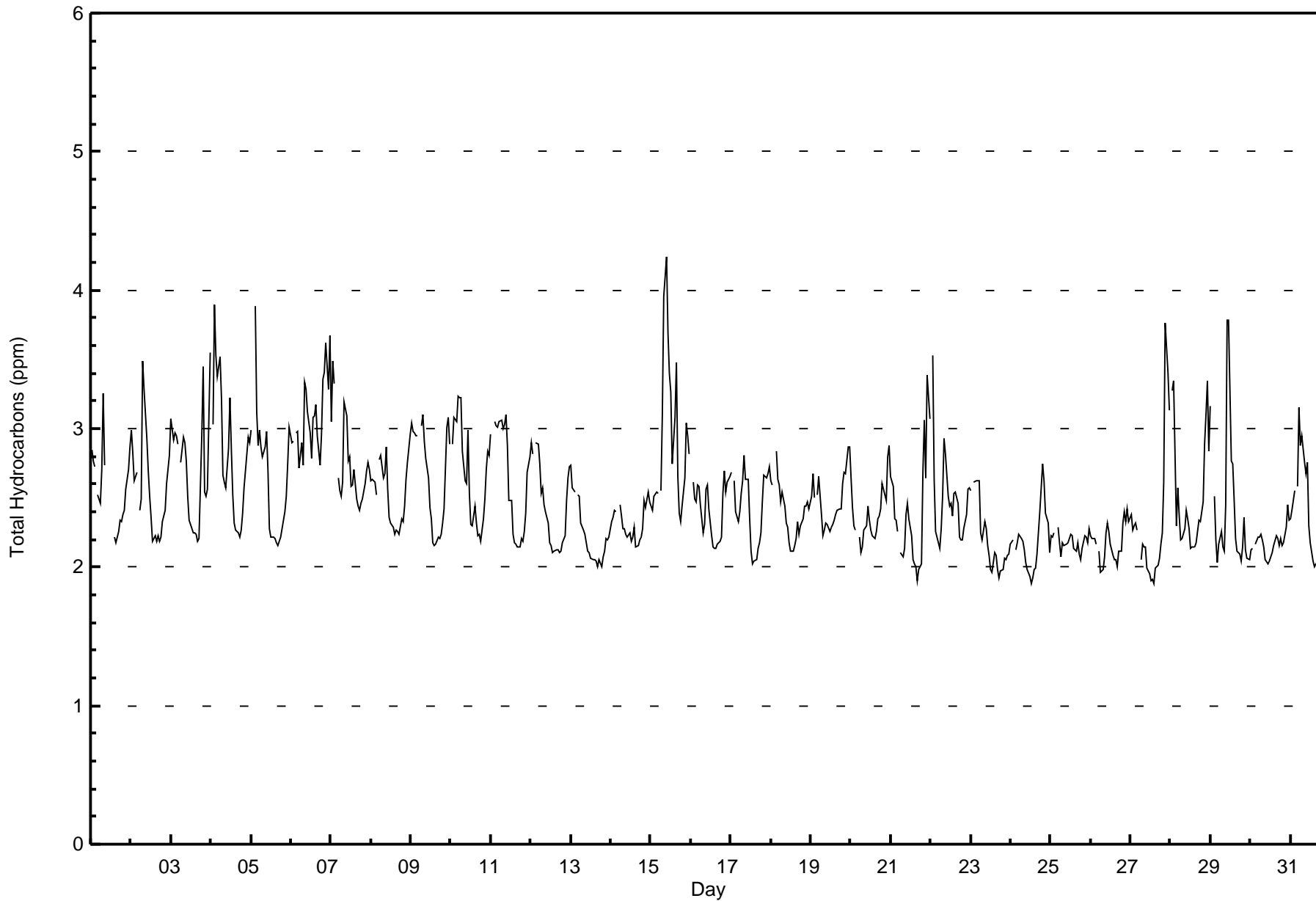




Wood Buffalo Environmental Association
Summary of Hour Averages

Total Hydrocarbons (THC) - ppm
Muskeg River - August 2017

| Maximum Value: 4.2 ppm on Aug 15 10:00 | | Maximum Daily Average: 3.1 ppm on Aug 6 | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|--|-----|---------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------|-----------------|--|
| Minimum Value: 1.9 ppm on Aug 24 13:00 | | Minimum Daily Average: 2.2 ppm on Aug 30 | | Hours of Data: 708 | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 2.7 ppm at hour 3 | | Minimum Diurnal Average: 2.2 ppm at hour 18 | | Hours of Missing Data: 36 | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 2.49 ppm | | Percentiles: P ₁ = 1.9 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.4 Q ₃ = 2.7 P ₉₀ = 3.0 P ₉₉ = 3.8 | | Hours of Calibration: 36 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 2.9 | 2.8 | 2.7 | Z | 2.5 | 2.5 | 2.7 | 3.3 | 2.7 | C | C | C | C | C | 2.2 | 2.2 | 2.3 | 2.3 | 2.3 | 2.4 | 2.4 | 2.6 | 2.7 | 2.9 | 2.6 | 3.3 | |
| 2-Aug | 3.0 | 2.8 | 2.6 | 2.7 | Z | 2.4 | 2.5 | 3.5 | 3.3 | 2.9 | 2.7 | 2.5 | 2.4 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.4 | 2.6 | 2.7 | 2.8 | 2.6 | 3.5 | |
| 3-Aug | 3.1 | 2.9 | 3.0 | 2.9 | 2.9 | Z | 2.8 | 2.9 | 2.9 | 2.8 | 2.5 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 3.0 | 3.4 | 2.5 | 2.5 | 2.6 | 3.5 | 2.7 | 3.5 | |
| 4-Aug | Z | 3.0 | 3.9 | 3.5 | 3.4 | 3.5 | 3.2 | 2.7 | 2.6 | 2.6 | 2.9 | 3.2 | 2.9 | 2.5 | 2.3 | 2.3 | 2.3 | 2.2 | 2.3 | 2.4 | 2.6 | 2.8 | 2.9 | 2.9 | 2.8 | 3.9 | |
| 5-Aug | 3.0 | Z | 3.9 | 3.1 | 2.9 | 3.0 | 2.9 | 2.8 | 2.9 | 3.0 | 2.7 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.4 | 2.5 | 2.7 | 3.0 | 2.6 | 3.9 | |
| 6-Aug | 2.9 | 2.9 | Z | 3.0 | 3.0 | 2.7 | 2.9 | 2.7 | 3.3 | 3.3 | 3.1 | 3.0 | 2.8 | 3.1 | 3.1 | 3.2 | 2.9 | 2.7 | 3.0 | 3.4 | 3.4 | 3.6 | 3.3 | 3.7 | 3.1 | 3.7 | |
| 7-Aug | 3.1 | 3.5 | 3.3 | Z | 2.6 | 2.6 | 2.5 | 2.6 | 3.2 | 3.1 | 2.8 | 2.8 | 2.6 | 2.6 | 2.7 | 2.5 | 2.4 | 2.4 | 2.5 | 2.5 | 2.6 | 2.7 | 2.8 | 2.7 | 2.7 | 3.5 | |
| 8-Aug | 2.6 | 2.6 | 2.6 | 2.5 | Z | 2.8 | 2.8 | 2.6 | 2.7 | 2.9 | 2.6 | 2.4 | 2.3 | 2.3 | 2.2 | 2.3 | 2.3 | 2.2 | 2.3 | 2.3 | 2.4 | 2.6 | 2.8 | 3.0 | 2.5 | 3.0 | |
| 9-Aug | 3.0 | 3.0 | 3.0 | 2.9 | 2.9 | Z | 3.0 | 3.1 | 2.9 | 2.8 | 2.6 | 2.4 | 2.4 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.4 | 3.0 | 3.1 | 2.9 | 2.7 | 3.1 | |
| 10-Aug | Z | 2.9 | 3.1 | 3.0 | 3.2 | 3.2 | 3.2 | 2.8 | 2.6 | 2.6 | 3.0 | 2.5 | 2.3 | 2.3 | 2.4 | 2.3 | 2.2 | 2.2 | 2.2 | 2.3 | 2.5 | 2.7 | 2.8 | 2.8 | 2.7 | 3.2 | |
| 11-Aug | 3.0 | Z | 3.1 | 3.0 | 3.0 | 3.1 | 3.1 | 3.0 | 3.0 | 3.1 | 2.9 | 2.5 | 2.5 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.2 | 2.2 | 2.3 | 2.4 | 2.7 | 2.8 | 2.6 | 3.1 | |
| 12-Aug | 2.9 | 2.8 | Z | 2.9 | 2.9 | 2.7 | 2.5 | 2.6 | 2.5 | 2.4 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.5 | 2.6 | 2.7 | 2.4 | 2.9 | |
| 13-Aug | 2.7 | 2.6 | 2.5 | Z | 2.5 | 2.5 | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.1 | 2.0 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.7 | |
| 14-Aug | 2.3 | 2.4 | 2.4 | 2.4 | Z | 2.5 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.1 | 2.2 | 2.2 | 2.2 | 2.3 | 2.5 | 2.4 | 2.5 | 2.5 | 2.3 | 2.5 | |
| 15-Aug | 2.4 | 2.4 | 2.5 | 2.5 | 2.5 | Z | 2.6 | 3.1 | 4.0 | 4.2 | 3.7 | 3.4 | 3.3 | 2.8 | 3.1 | 3.5 | 2.7 | 2.4 | 2.3 | 2.4 | 2.6 | 3.0 | 2.9 | 2.8 | 2.9 | 4.2 | |
| 16-Aug | Z | 2.6 | 2.5 | 2.5 | 2.6 | 2.6 | 2.4 | 2.2 | 2.3 | 2.6 | 2.6 | 2.4 | 2.2 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.5 | 2.7 | 2.5 | 2.6 | 2.7 | 2.4 | 2.7 | |
| 17-Aug | 2.7 | Z | 2.6 | 2.4 | 2.3 | 2.4 | 2.5 | 2.6 | 2.8 | 2.6 | 2.6 | 2.3 | 2.1 | 2.0 | 2.0 | 2.1 | 2.1 | 2.2 | 2.3 | 2.5 | 2.7 | 2.6 | 2.7 | 2.7 | 2.4 | 2.8 | |
| 18-Aug | 2.6 | 2.6 | Z | 2.8 | 2.6 | 2.6 | 2.5 | 2.5 | 2.4 | 2.3 | 2.3 | 2.2 | 2.1 | 2.1 | 2.2 | 2.2 | 2.3 | 2.2 | 2.3 | 2.3 | 2.4 | 2.4 | 2.5 | 2.4 | 2.4 | 2.8 | |
| 19-Aug | 2.5 | 2.7 | 2.5 | Z | 2.5 | 2.7 | 2.4 | 2.2 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.4 | 2.4 | 2.4 | 2.4 | 2.6 | 2.7 | 2.7 | 2.9 | 2.9 | 2.5 | 2.9 | |
| 20-Aug | 2.6 | 2.4 | 2.3 | 2.3 | Z | 2.2 | 2.1 | 2.1 | 2.3 | 2.3 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.3 | 2.3 | 2.4 | 2.4 | 2.6 | 2.5 | 2.5 | 2.8 | 2.9 | 2.4 | 2.9 | |
| 21-Aug | 2.7 | 2.6 | 2.3 | 2.3 | 2.3 | Z | 2.1 | 2.1 | 2.1 | 2.4 | 2.5 | 2.3 | 2.2 | 2.1 | 2.0 | 2.0 | 1.9 | 2.0 | 2.0 | 2.7 | 3.1 | 2.6 | 3.4 | 3.1 | 2.4 | 3.4 | |
| 22-Aug | Z | 3.5 | 2.6 | 2.3 | 2.2 | 2.1 | 2.3 | 2.5 | 2.9 | 2.8 | 2.5 | 2.4 | 2.5 | 2.4 | 2.5 | 2.5 | 2.5 | 2.2 | 2.2 | 2.2 | 2.3 | 2.4 | 2.6 | 2.6 | 2.5 | 3.5 | |
| 23-Aug | 2.6 | Z | 2.6 | 2.6 | 2.6 | 2.6 | 2.2 | 2.2 | 2.3 | 2.3 | 2.2 | 2.1 | 2.0 | 2.0 | 2.1 | 2.1 | 2.0 | 1.9 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.6 | |
| 24-Aug | 2.2 | 2.2 | Z | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.1 | 2.4 | 2.6 | 2.8 | 2.6 | 2.4 | 2.3 | 2.1 | 2.2 | 2.8 | |
| 25-Aug | 2.2 | 2.2 | 2.2 | Z | 2.3 | 2.2 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.2 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.3 | 2.2 | 2.3 | |
| 26-Aug | 2.2 | 2.2 | 2.2 | 2.2 | Z | 2.1 | 2.0 | 2.0 | 2.1 | 2.2 | 2.3 | 2.3 | 2.2 | 2.1 | 2.1 | 2.1 | 2.0 | 2.1 | 2.1 | 2.3 | 2.4 | 2.3 | 2.4 | 2.3 | 2.2 | 2.4 | |
| 27-Aug | 2.4 | 2.3 | 2.3 | 2.3 | 2.3 | Z | 2.1 | 2.2 | 2.1 | 2.1 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.1 | 2.2 | 2.2 | 2.6 | 3.8 | 3.4 | 3.1 | 2.3 | 3.8 | |
| 28-Aug | Z | 3.3 | 3.3 | 2.3 | 2.6 | 2.4 | 2.2 | 2.2 | 2.3 | 2.4 | 2.3 | 2.3 | 2.1 | 2.1 | 2.1 | 2.2 | 2.3 | 2.3 | 2.3 | 2.5 | 2.9 | 3.1 | 3.3 | 2.8 | 2.5 | 3.3 | |
| 29-Aug | 3.2 | Z | 2.5 | 2.2 | 2.0 | 2.2 | 2.3 | 2.1 | 2.1 | 2.4 | 3.8 | 3.8 | 2.8 | 2.7 | 2.5 | 2.2 | 2.1 | 2.1 | 2.0 | 2.1 | 2.4 | 2.1 | 2.1 | 2.1 | 2.4 | 3.8 | |
| 30-Aug | 2.1 | 2.1 | Z | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.0 | 2.0 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.5 | 2.3 | 2.2 | 2.5 | |
| 31-Aug | 2.3 | 2.4 | 2.6 | Z | 2.6 | 3.1 | 2.9 | 3.0 | 2.8 | 2.7 | 2.8 | 2.3 | 2.2 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.3 | 3.1 | 2.7 | 2.8 | 2.5 | 3.1 | |
| | 2.7 | 2.7 | 2.7 | 2.6 | 2.6 | 2.6 | 2.5 | 2.5 | 2.6 | 2.6 | 2.6 | 2.4 | 2.3 | 2.2 | 2.3 | 2.3 | 2.2 | 2.2 | 2.3 | 2.4 | 2.5 | 2.6 | 2.7 | 2.7 | | Diurnal Average | |
| | 3.2 | 3.5 | 3.9 | 3.5 | 3.4 | 3.5 | 3.2 | 3.5 | 4.0 | 4.2 | 3.8 | 3.8 | 3.3 | 3.1 | 3.1 | 3.5 | 2.9 | 2.7 | 3.0 | 3.4 | 3.4 | 3.8 | 3.4 | 3.7 | | Diurnal Maximum | |
| Z - zerospan | | C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | | |





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Muskeg River - August 2017

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2.0 | 42 | 5.93 | 5.93 |
| 2.1 - 3.0 | 602 | 85.03 | 90.96 |
| 3.1 - 10.0 | 64 | 9.04 | 100.00 |
| > 10.0 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Muskeg River - August 2017

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2.0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 10 | 3 | 4 | 3 | 7 | 6 | 4 | 0 | 0 | 42 |
| 2.1 - 3.0 | 1 | 15 | 28 | 12 | 12 | 8 | 9 | 60 | 136 | 112 | 93 | 55 | 22 | 31 | 7 | 1 | 602 |
| 3.1 - 10.0 | 6 | 12 | 2 | 0 | 2 | 0 | 2 | 4 | 6 | 8 | 1 | 3 | 1 | 5 | 3 | 9 | 64 |
| > 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 7 | 27 | 30 | 12 | 14 | 10 | 14 | 74 | 145 | 124 | 97 | 65 | 29 | 40 | 10 | 10 | 708 |

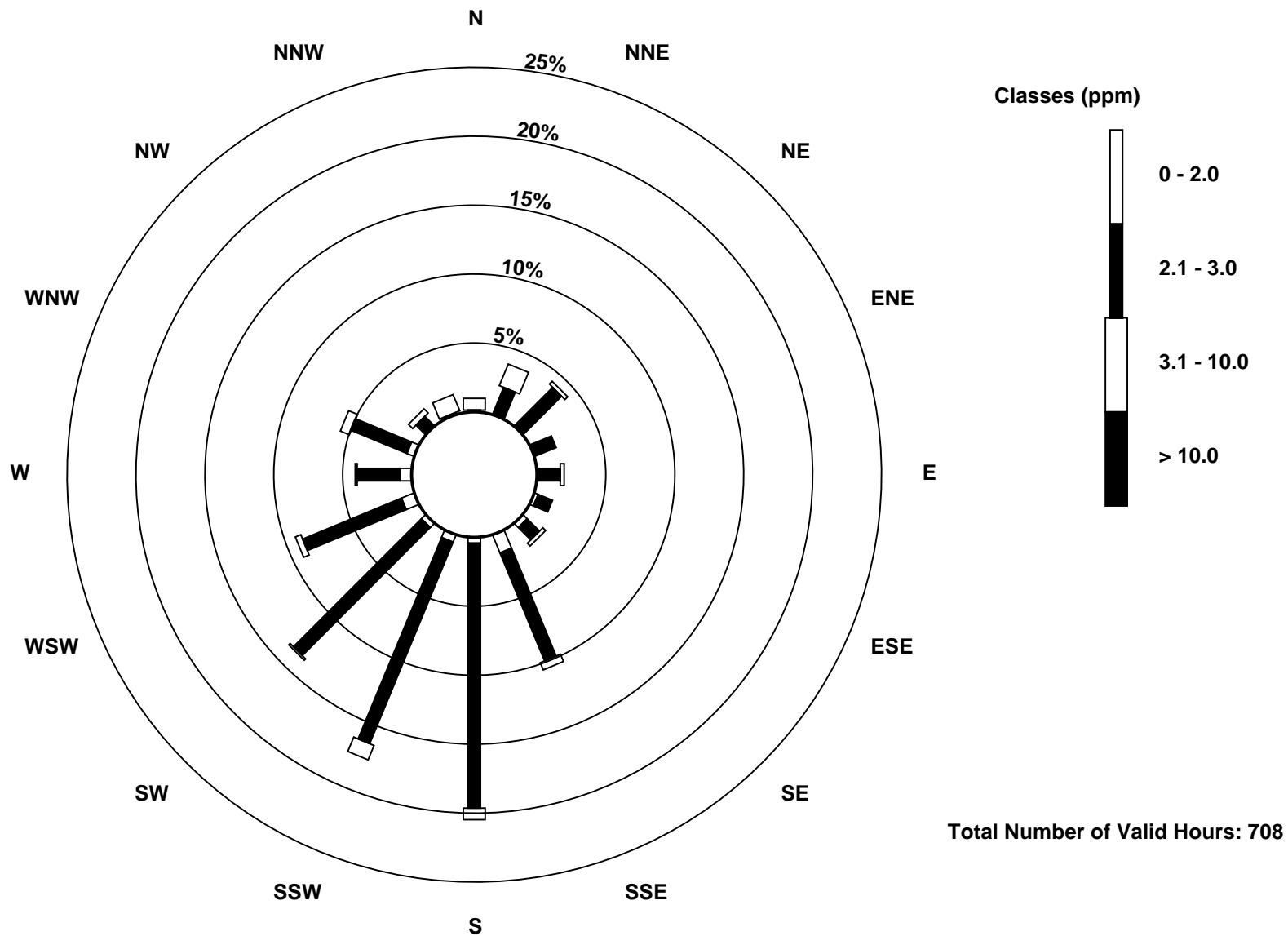
Total Number of Valid Hours: 708

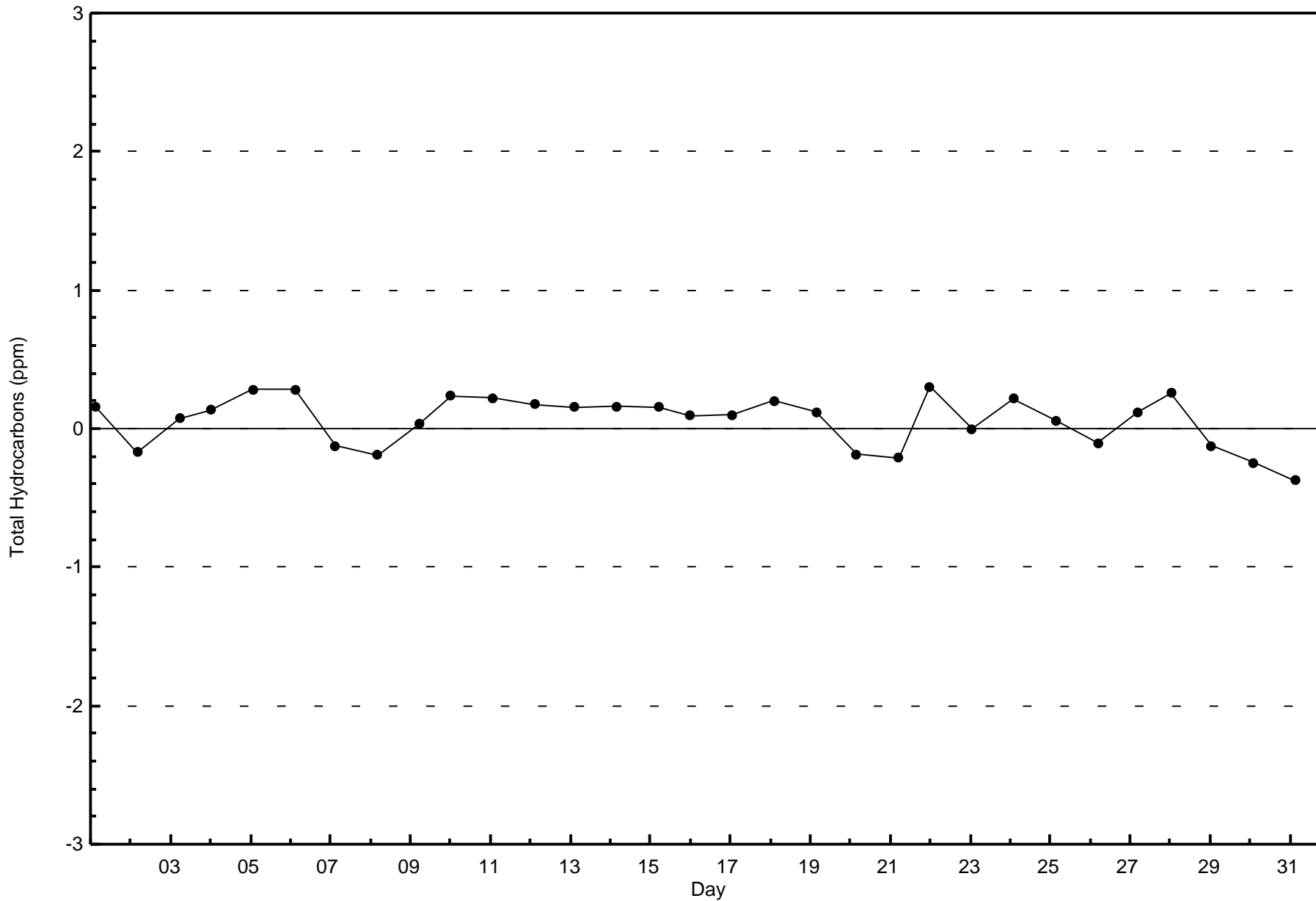
Total Number of Hours: 744

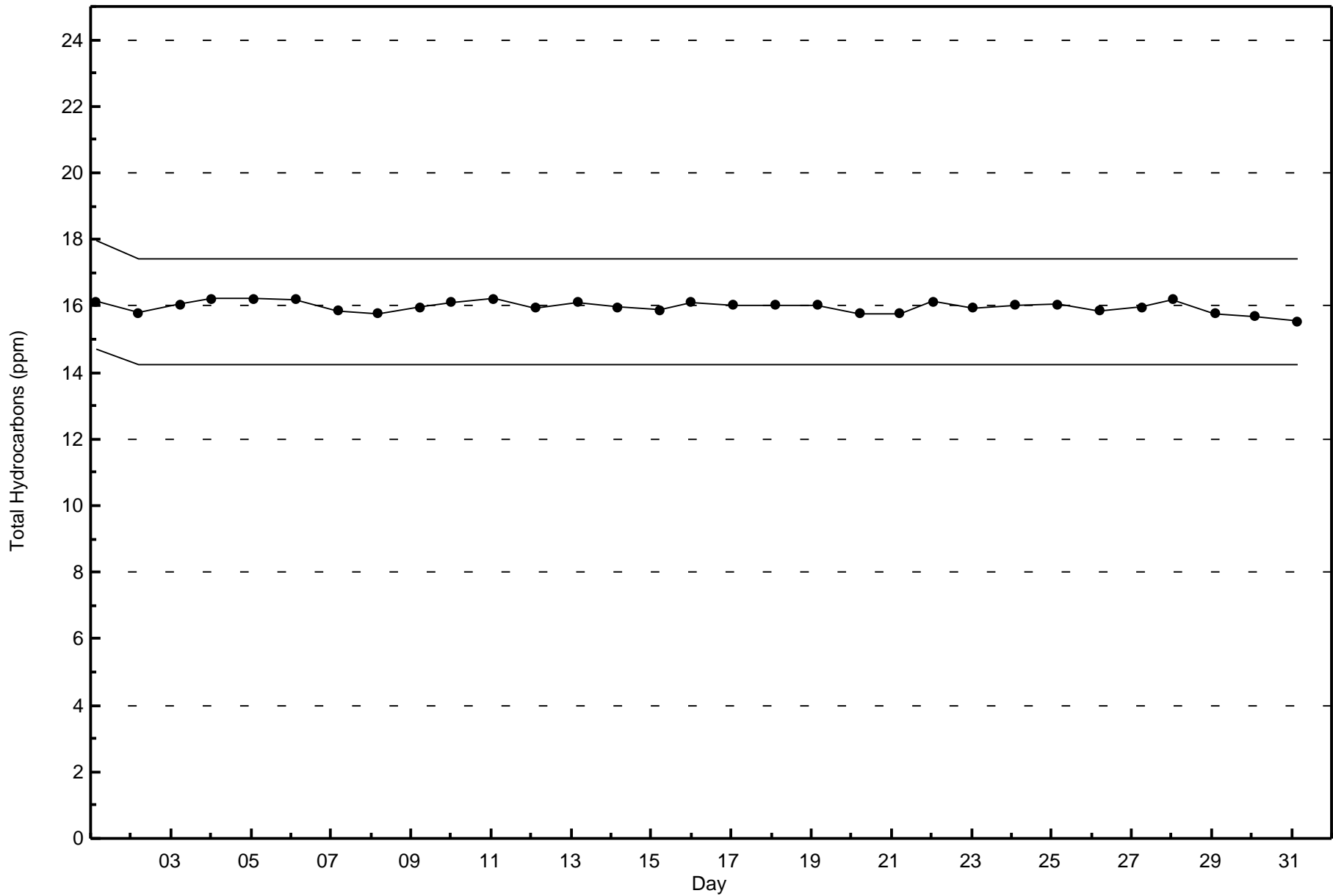


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Total Hydrocarbons (THC) - ppm
Muskeg River (AMS 16)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

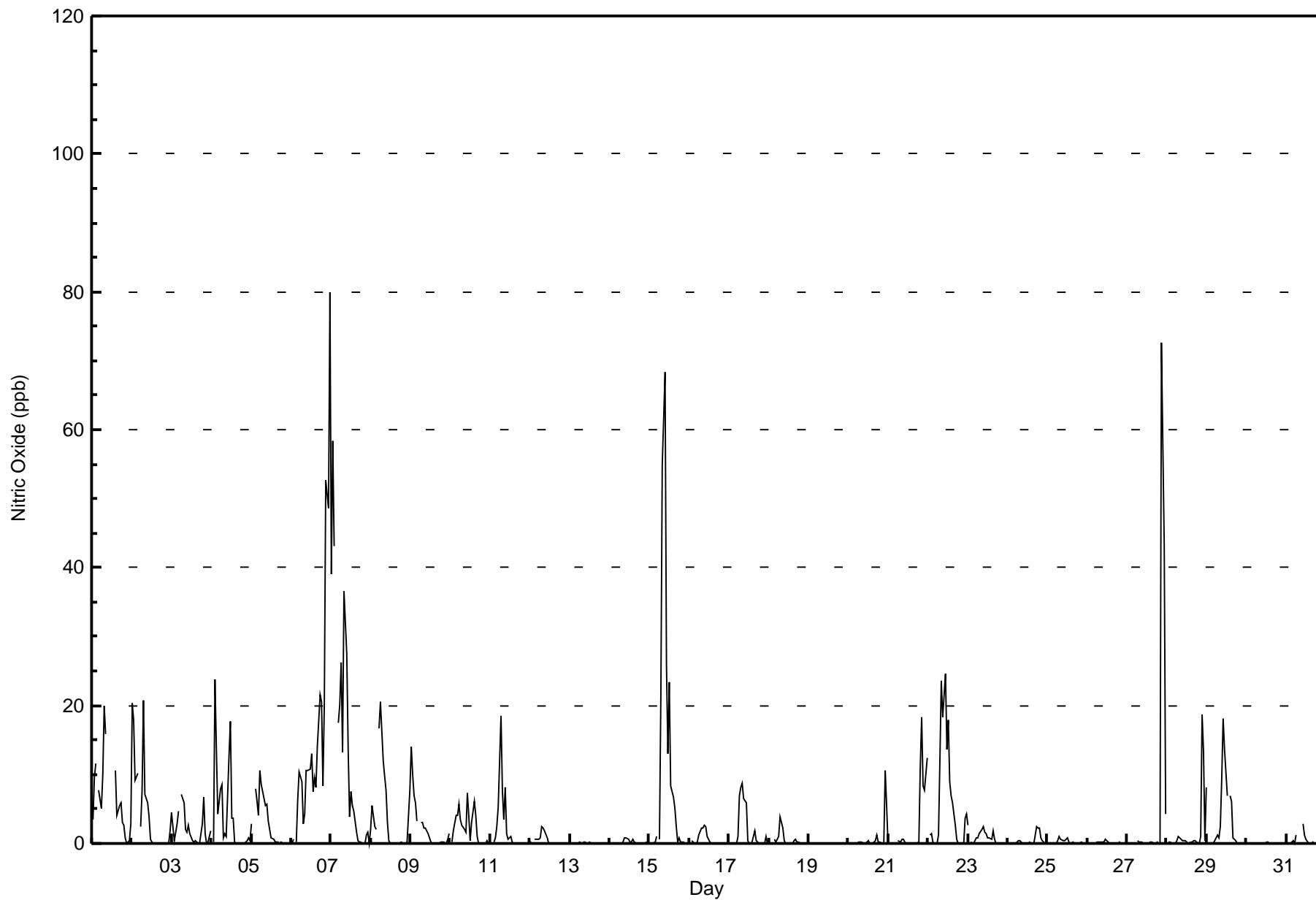
Muskeg River - August 2017

| Maximum Value: 80 ppb on Aug 7 00:00 | | | | | | | | | | | | | | | | | | Maximum Daily Average: 16.1 ppb on Aug 6 | | | | | | Hours in Service: 744 | | | |
|--|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|--------------------------------|---------------|---------------|----|
| Minimum Value: 0 ppb on Aug 1 22:00 | | | | | | | | | | | | | | | | | | Minimum Daily Average: 0.0 ppb on Aug 19 | | | | | | Hours of Data: 705 | | | |
| Maximum Diurnal Average: 6.4 ppb at hour 9 | | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 1.0 ppb at hour 17 | | | | | | Hours of Missing Data: 39 | | | |
| Monthly Average: 3.1 ppb | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 O ₃ = 2 P ₉₀ = 9 P ₉₉ = 46 | | | | | | Hours of Calibration: 37 | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 99.7 | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 3 | 10 | 12 | Z | 8 | 5 | 10 | 20 | 16 | C | C | C | C | C | 11 | 4 | 5 | 6 | 3 | 3 | 1 | 0 | 0 | 3 | 6.6 | 20 | |
| 2-Aug | 20 | 18 | 9 | 10 | Z | 3 | 8 | 21 | 7 | 6 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 4.7 | 21 | |
| 3-Aug | 5 | 0 | 2 | 3 | 5 | Z | 7 | 6 | 2 | 2 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 7 | 1 | 0 | 0 | 2 | 2.1 | 7 | |
| 4-Aug | Z | 0 | 24 | 14 | 4 | 8 | 8 | 1 | 2 | 1 | 13 | 18 | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 4.4 | 24 | |
| 5-Aug | 3 | Z | 8 | 6 | 4 | 11 | 9 | 7 | 5 | 6 | 3 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.9 | 11 | |
| 6-Aug | 0 | 1 | Z | 0 | 6 | 10 | 9 | 3 | 4 | 11 | 11 | 11 | 13 | 8 | 10 | 8 | 14 | 22 | 21 | 8 | 20 | 53 | 49 | 80 | 16.1 | 80 | |
| 7-Aug | 39 | 58 | 43 | Z | 18 | 20 | 26 | 13 | 37 | 27 | 14 | 4 | 8 | 5 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 14.0 | 58 | |
| 8-Aug | 2 | 5 | 2 | 2 | Z | 17 | 21 | 12 | 10 | 8 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 3.9 | 21 | |
| 9-Aug | 14 | 10 | 7 | 6 | 3 | Z | 3 | 3 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2.4 | 14 | |
| 10-Aug | Z | 0 | 2 | 4 | 4 | 6 | 3 | 3 | 2 | 2 | 7 | 4 | 0 | 3 | 6 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.3 | 7 | |
| 11-Aug | 0 | Z | 0 | 1 | 2 | 5 | 18 | 7 | 3 | 8 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.1 | 18 | |
| 12-Aug | 0 | 0 | Z | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 2 | |
| 13-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | |
| 14-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | |
| 15-Aug | 0 | 0 | 0 | 0 | 1 | Z | 1 | 21 | 55 | 68 | 26 | 13 | 23 | 8 | 7 | 5 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 10.1 | 68 | |
| 16-Aug | Z | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 2 | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 3 | |
| 17-Aug | 0 | Z | 0 | 0 | 0 | 1 | 7 | 8 | 9 | 6 | 6 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1.8 | 9 | |
| 18-Aug | 0 | 0 | Z | 1 | 0 | 1 | 1 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 4 | |
| 19-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | |
| 20-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 11 | 6 | 0.9 | 11 | |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 18 | 8 | 8 | 12 | 2.6 | 18 |
| 22-Aug | Z | 1 | 1 | 0 | 0 | 0 | 1 | 12 | 24 | 18 | 25 | 14 | 18 | 9 | 7 | 6 | 3 | 1 | 0 | 0 | 0 | 0 | 4 | 4 | 6.4 | 25 | |
| 23-Aug | 3 | Z | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.8 | 3 | |
| 24-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 2 | 1 | 0 | 0 | 0 | 0.4 | 3 | |
| 25-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | |
| 26-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 | |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 73 | 43 | 4 | 5.3 | 73 | |
| 28-Aug | Z | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 19 | 13 | 0 | 1.7 | 19 | |
| 29-Aug | 8 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 9 | 18 | 14 | 7 | Z | 7 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.4 | 18 | |
| 30-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | |
| 31-Aug | 0 | 0 | 0 | 0 | 0 | 0 | 1 | Z | M | M | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 3 | |
| | | | | | | | | | | | | | | | | | | Diurnal Average | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | | | | | |
| Z - zerospan | | | | | | | | | | | | | | | | | | C - Calibration | | | | | | M - Maintenance | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Muskeg River - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Muskeg River - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 682 | 96.74 | 96.74 |
| 21 - 40 | 14 | 1.99 | 98.72 |
| 41 - 80 | 9 | 1.28 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 705

Total Number of Hours: 744



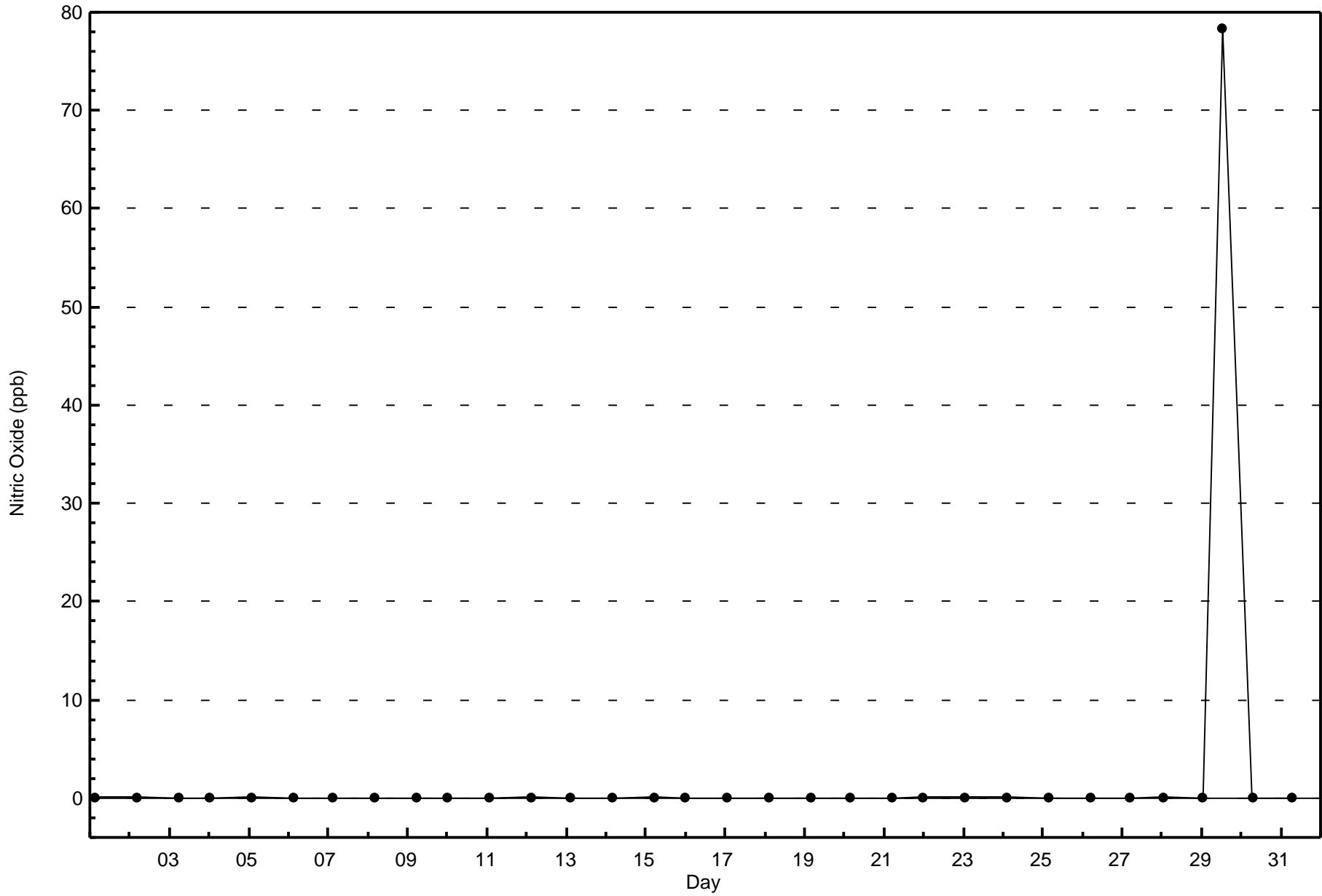
**Wood Buffalo Environmental Association
Frequency Distribution**

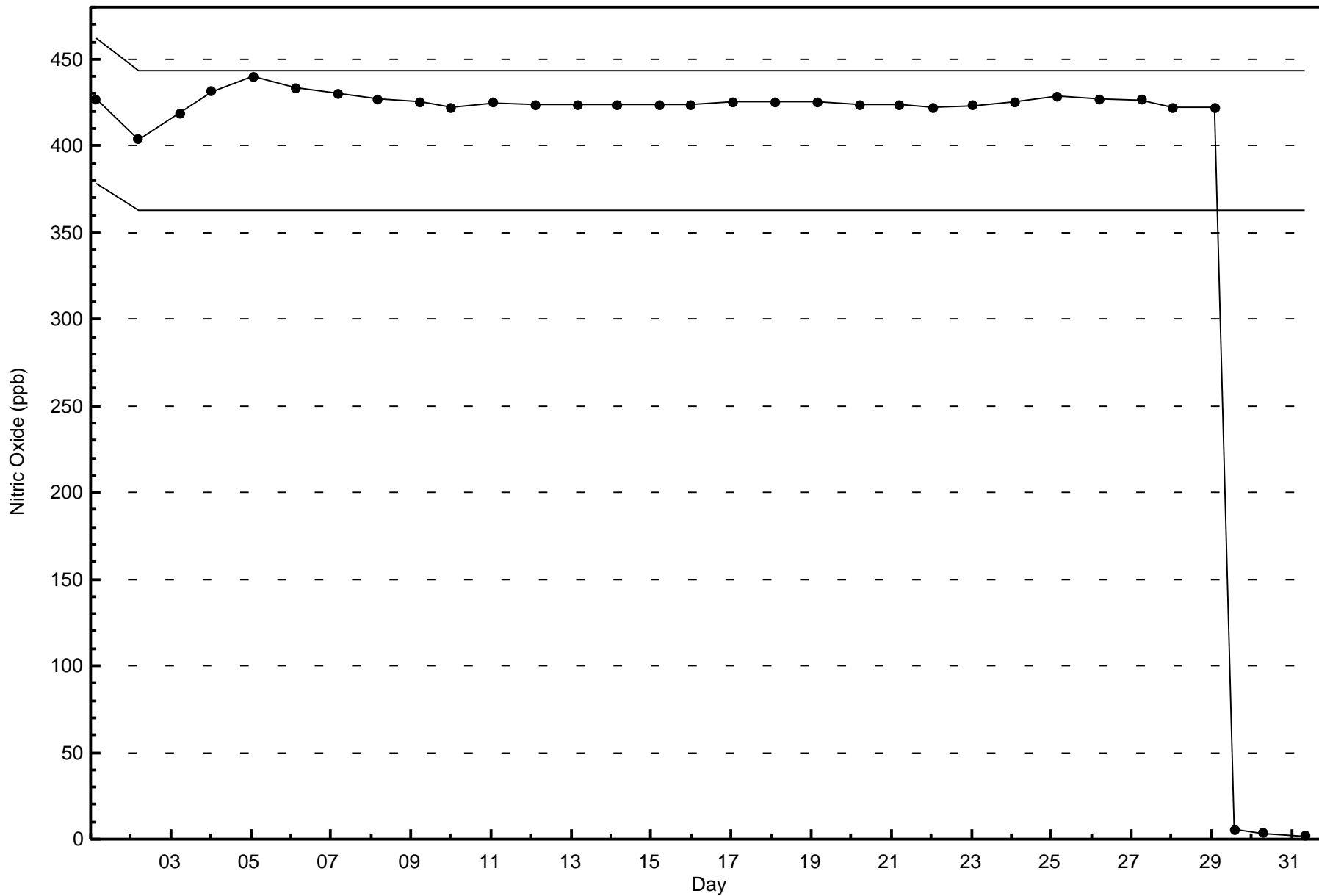
**Nitric Oxide (NO) - ppb
Muskeg River - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 5 | 24 | 27 | 12 | 14 | 10 | 14 | 72 | 143 | 122 | 97 | 64 | 29 | 37 | 8 | 4 | 682 |
| 21 - 40 | 1 | 2 | 3 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 2 | 1 | 1 | 14 |
| 11 - 80 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 5 | 9 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 7 | 26 | 30 | 12 | 14 | 10 | 14 | 73 | 144 | 124 | 97 | 65 | 29 | 40 | 10 | 10 | 705 |

Total Number of Valid Hours: 705

Total Number of Hours: 744







Wood Buffalo Environmental Association
Summary of Hour Averages

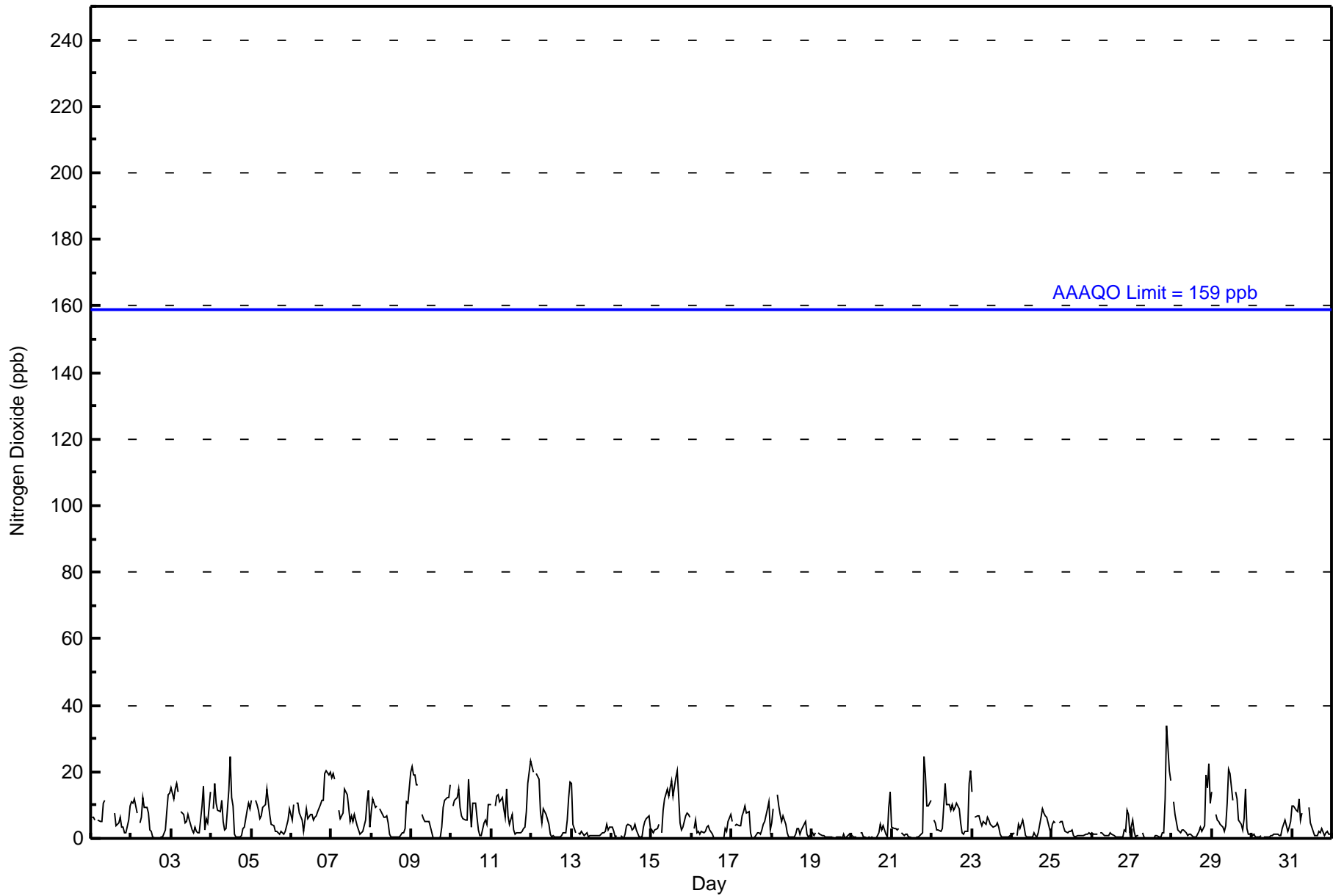
Nitrogen Dioxide (NO₂) - ppb
Muskeg River - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 34 ppb on Aug 27 22:00 Minimum Value: 0 ppb on Aug 2 17:00 Maximum Diurnal Average: 8.9 ppb at hour 24 Monthly Average: 5.2 ppb | | Maximum Daily Average: 9.8 ppb on Aug 6 Minimum Daily Average: 0.7 ppb on Aug 19 Minimum Diurnal Average: 2.1 ppb at hour 18 Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 3 Q ₃ = 8 P ₉₀ = 12 P ₉₉ = 21 | | Hours in Service: 744 Hours of Data: 705 Hours of Missing Data: 39 Hours of Calibration: 37 Percent Operational Time: 99.7 | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|--|----|--|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----------------|---------------|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 7 | 6 | 6 | Z | 5 | 5 | 5 | 11 | 11 | C | C | C | C | C | 8 | 4 | 5 | 6 | 3 | 3 | 2 | 2 | 6 | 10 | 5.8 | 11 |
| 2-Aug | 11 | 11 | 12 | 8 | Z | 5 | 6 | 12 | 10 | 9 | 8 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 8 | 13 | 14 | 5.9 | 14 |
| 3-Aug | 15 | 12 | 15 | 16 | 14 | Z | 8 | 7 | 5 | 5 | 7 | 5 | 2 | 2 | 3 | 2 | 2 | 2 | 10 | 16 | 3 | 6 | 5 | 14 | 7.6 | 16 |
| 4-Aug | Z | 9 | 17 | 11 | 9 | 8 | 12 | 5 | 2 | 3 | 14 | 25 | 12 | 10 | 1 | 1 | 1 | 1 | 1 | 3 | 3 | 9 | 11 | 9 | 7.5 | 25 |
| 5-Aug | 12 | Z | 11 | 10 | 8 | 6 | 7 | 9 | 10 | 15 | 11 | 7 | 4 | 4 | 2 | 2 | 2 | 1 | 2 | 1 | 2 | 4 | 6 | 9 | 6.3 | 15 |
| 6-Aug | 6 | 10 | Z | 10 | 11 | 8 | 6 | 2 | 6 | 9 | 6 | 7 | 7 | 6 | 6 | 7 | 8 | 10 | 11 | 12 | 20 | 20 | 19 | 20 | 9.8 | 20 |
| 7-Aug | 18 | 20 | 18 | Z | 8 | 6 | 7 | 8 | 15 | 13 | 9 | 5 | 7 | 5 | 7 | 4 | 2 | 1 | 2 | 2 | 5 | 11 | 14 | 4 | 8.4 | 20 |
| 8-Aug | 8 | 12 | 9 | 10 | Z | 9 | 8 | 6 | 6 | 7 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 2 | 3 | 11 | 10 | 20 | 5.7 | 20 |
| 9-Aug | 21 | 19 | 19 | 16 | 16 | Z | 7 | 6 | 5 | 5 | 5 | 3 | 2 | 0 | 0 | 0 | 0 | 1 | 3 | 9 | 12 | 12 | 12 | 16 | 8.3 | 21 |
| 10-Aug | Z | 10 | 11 | 12 | 15 | 10 | 7 | 6 | 5 | 6 | 18 | 10 | 4 | 11 | 11 | 7 | 3 | 1 | 1 | 5 | 5 | 4 | 10 | 10 | 7.8 | 18 |
| 11-Aug | 10 | Z | 10 | 13 | 13 | 11 | 12 | 9 | 6 | 15 | 7 | 4 | 7 | 3 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 8 | 16 | 24 | 7.9 | 24 |
| 12-Aug | 22 | 20 | Z | 19 | 18 | 8 | 5 | 9 | 8 | 7 | 4 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 2 | 2 | 6 | 12 | 17 | 7.1 | 22 |
| 13-Aug | 17 | 4 | 2 | Z | 2 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 4 | 3 | 3 | 2.3 | 17 |
| 14-Aug | 4 | 2 | 1 | 1 | Z | 1 | 0 | 0 | 1 | 4 | 4 | 4 | 3 | 3 | 4 | 2 | 1 | 1 | 0 | 3 | 5 | 6 | 7 | 3 | 2.6 | 7 |
| 15-Aug | 3 | 2 | 3 | 3 | 4 | Z | 2 | 8 | 12 | 15 | 13 | 15 | 18 | 13 | 18 | 20 | 13 | 5 | 2 | 3 | 7 | 8 | 7 | 7 | 8.6 | 20 |
| 16-Aug | Z | 3 | 6 | 2 | 2 | 1 | 2 | 2 | 2 | 3 | 4 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 5 | 7 | 2.1 | 7 |
| 17-Aug | 5 | Z | 4 | 4 | 4 | 4 | 7 | 8 | 10 | 8 | 8 | 2 | 0 | 0 | 1 | 2 | 2 | 1 | 2 | 4 | 5 | 9 | 11 | 3 | 4.5 | 11 |
| 18-Aug | 5 | 9 | Z | 13 | 10 | 7 | 5 | 7 | 4 | 2 | 1 | 0 | 0 | 0 | 1 | 3 | 3 | 1 | 2 | 4 | 5 | 1 | 1 | 1 | 3.7 | 13 |
| 19-Aug | 2 | 1 | 2 | Z | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0.7 | 2 |
| 20-Aug | 1 | 1 | 1 | 0 | Z | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 | 4 | 3 | 4 | 1 | 1 | 10 | 14 | 2.0 | 14 |
| 21-Aug | 4 | 3 | 3 | 3 | 3 | Z | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 25 | 19 | 10 | 10 | 11 | 4.3 | 25 |
| 22-Aug | Z | 6 | 5 | 3 | 3 | 2 | 3 | 10 | 17 | 10 | 10 | 8 | 10 | 9 | 10 | 11 | 9 | 5 | 2 | 1 | 2 | 2 | 17 | 20 | 7.5 | 20 |
| 23-Aug | 14 | Z | 6 | 7 | 7 | 5 | 4 | 5 | 4 | 6 | 6 | 4 | 4 | 3 | 4 | 5 | 4 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 4.0 | 14 |
| 24-Aug | 1 | 2 | Z | 1 | 4 | 3 | 6 | 4 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 7 | 9 | 8 | 7 | 6 | 3 | 1 | 2.9 | 9 |
| 25-Aug | 4 | 5 | 5 | Z | 5 | 5 | 5 | 3 | 2 | 2 | 2 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2.3 | 5 |
| 26-Aug | 2 | 1 | 1 | 1 | Z | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 3 | 2 | 8 | 7 | 2 | 1.7 | 8 |
| 27-Aug | 5 | 2 | 1 | 1 | 1 | Z | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 2 | 12 | 34 | 20 | 17 | 4.4 | 34 |
| 28-Aug | Z | 11 | 7 | 3 | 2 | 2 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 2 | 3 | 2 | 4 | 19 | 15 | 23 | 11 | 5.1 | 23 |
| 29-Aug | 14 | Z | 7 | 6 | 5 | 4 | 4 | 2 | 4 | 11 | 21 | 19 | 11 | Z | 14 | 12 | 6 | 4 | 3 | 6 | 15 | 3 | 1 | 1 | 7.8 | 21 |
| 30-Aug | 1 | 1 | 0 | 0 | 0 | 1 | Z | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 4 | 5 | 2 | 4 | 5 | 1.6 | 5 |
| 31-Aug | 10 | 10 | 8 | 8 | 12 | 6 | 8 | Z | M | M | 9 | 5 | 4 | 1 | 1 | 1 | 2 | 2 | 3 | 1 | 2 | 2 | 1 | 1 | 4.5 | 12 |
| 8.4 7.3 6.9 6.9 7.0 4.7 4.9 4.9 5.1 5.5 5.9 4.7 3.6 2.6 3.2 2.9 2.3 2.1 2.5 4.3 5.7 7.0 8.6 8.9 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| 22 20 19 19 18 11 12 12 17 15 21 25 18 13 18 20 13 10 11 25 20 34 23 24 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| Z - zerospan C - Calibration M - Maintenance Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Muskeg River - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Muskeg River - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 697 | 98.87 | 98.87 |
| 21 - 40 | 8 | 1.13 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Muskeg River - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|------------|-----------|------------|-----------|------------|-----------|------------|------------|------------|-----------|------------|-----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 6 | 26 | 30 | 12 | 14 | 10 | 14 | 73 | 142 | 123 | 97 | 65 | 29 | 40 | 8 | 8 | 697 |
| 21 - 40 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 2 | 2 | 8 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 7 | 26 | 30 | 12 | 14 | 10 | 14 | 73 | 144 | 124 | 97 | 65 | 29 | 40 | 10 | 10 | 705 |

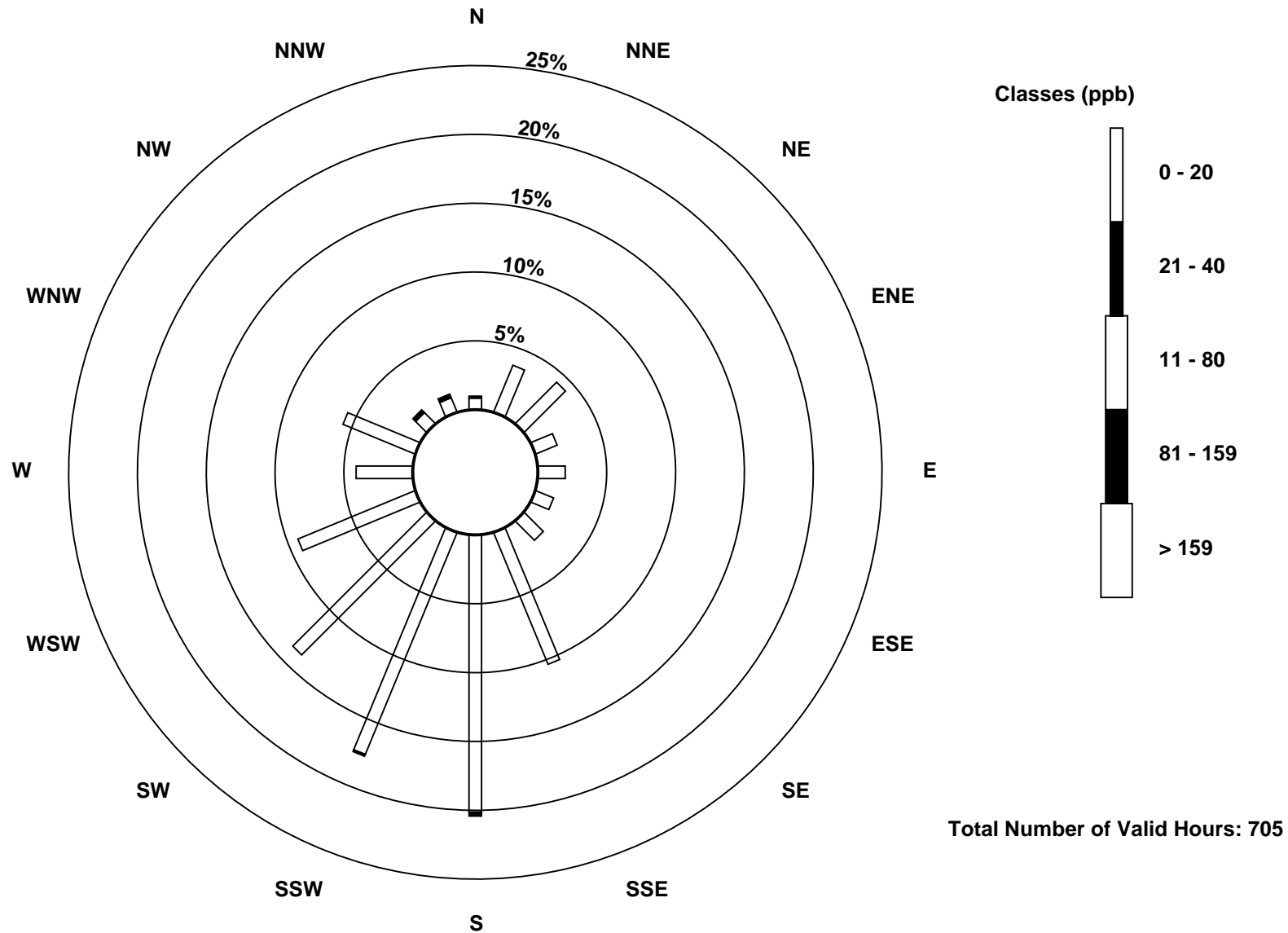
Total Number of Valid Hours: 705

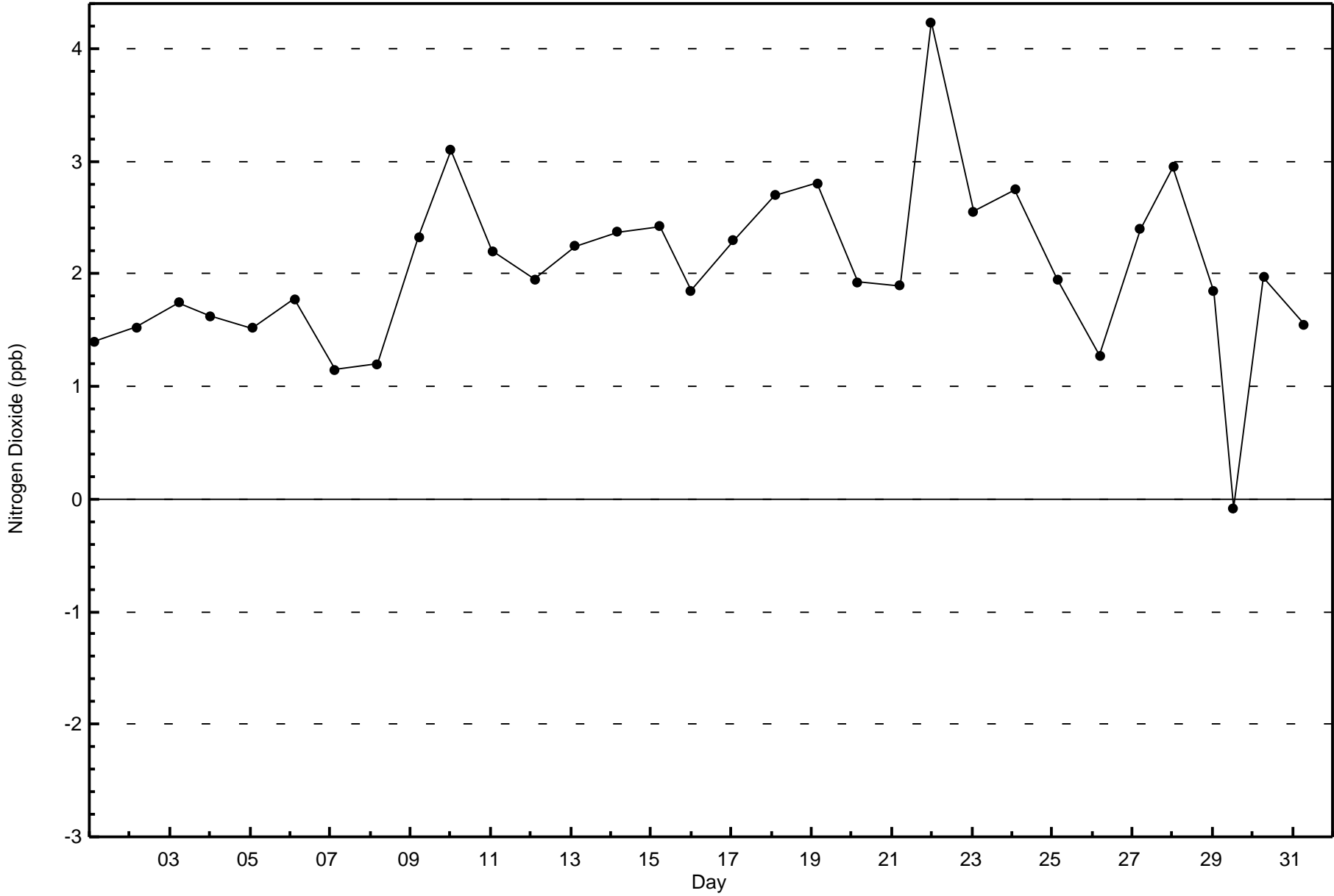
Total Number of Hours: 744

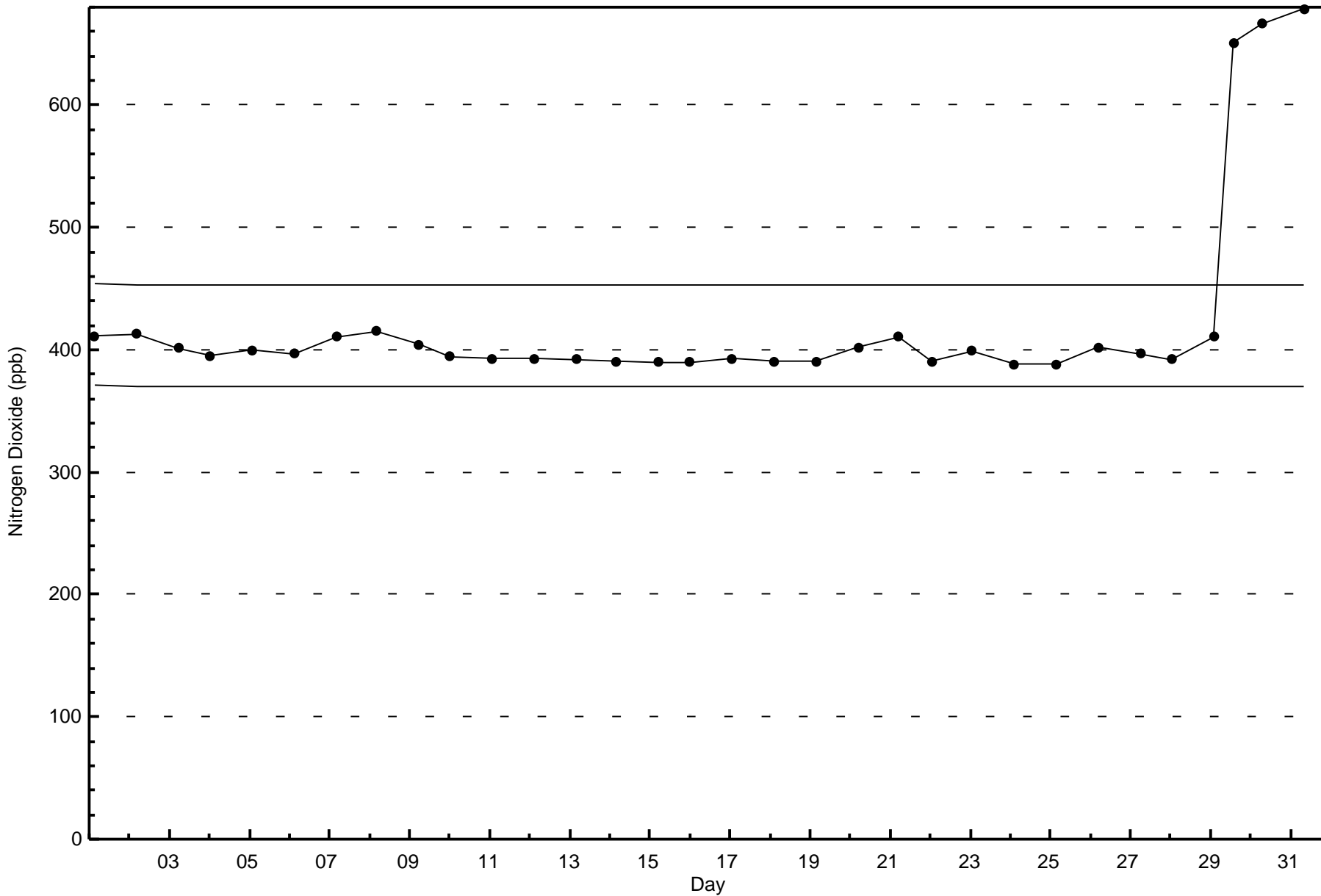


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Dioxide (NO₂) - ppb
Muskeg River (AMS 16)









Wood Buffalo Environmental Association
Summary of Hour Averages

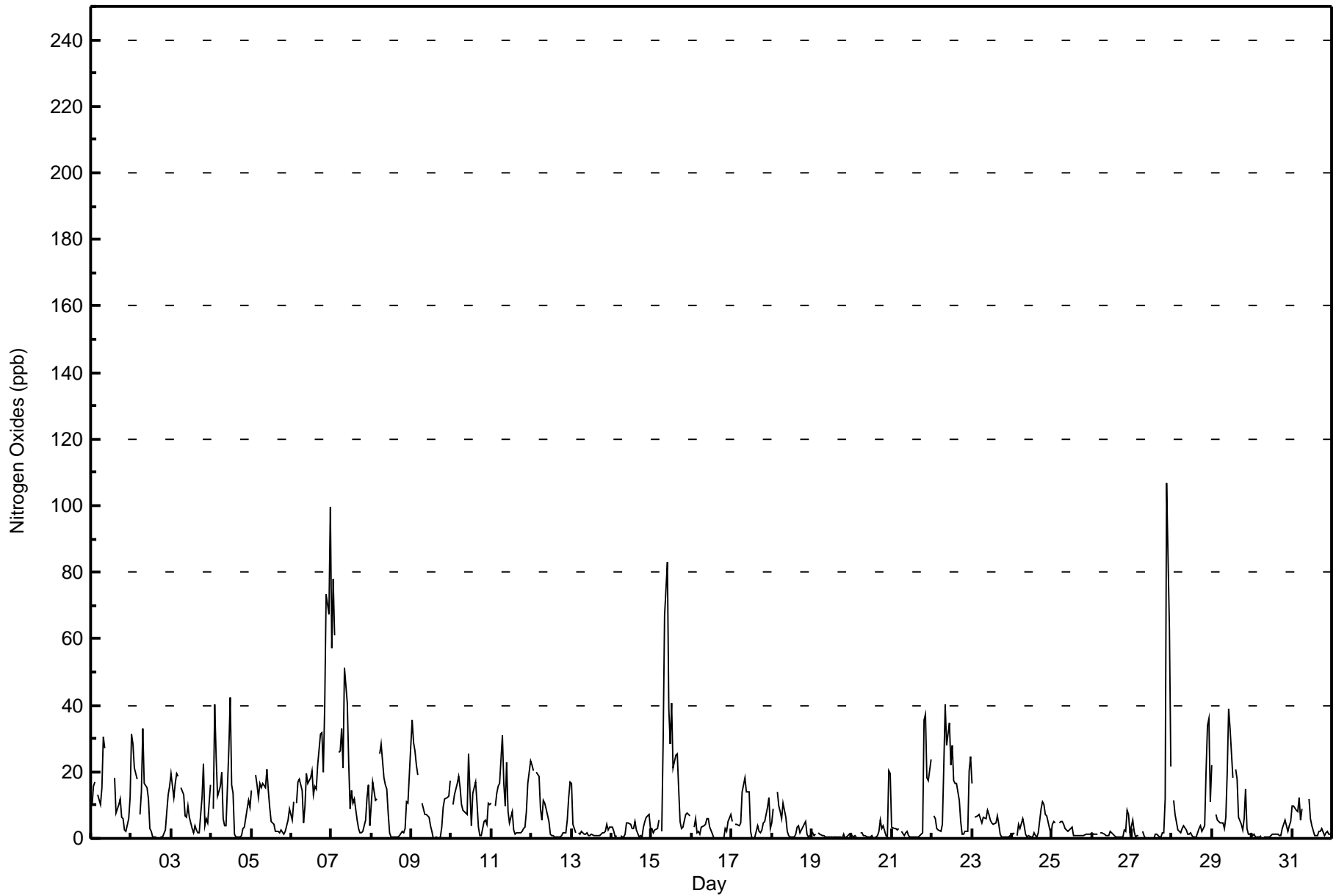
Nitrogen Oxides (NO_x) - ppb
Muskeg River - August 2017

| Maximum Value: 107 ppb on Aug 27 22:00 | | Maximum Daily Average: 25.9 ppb on Aug 6 | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|---|------|--------------------------------|-----------------|-----|-----|-----|-----|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|---------------|-----------------|--|--|--|--|--|
| Minimum Value: 0 ppb on Aug 16 14:00 | | Minimum Daily Average: 0.7 ppb on Aug 19 | | Hours of Data: 705 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 12.9 ppb at hour 24 | | Minimum Diurnal Average: 3.1 ppb at hour 18 | | Hours of Missing Data: 39 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 8.3 ppb | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 4 Q ₃ = 12 P ₉₀ = 20 P ₉₉ = 66 | | Hours of Calibration: 37 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Percent Operational Time: 99.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | |
| 1-Aug | 10 | 16 | 17 | Z | 13 | 10 | 15 | 30 | 27 | C | C | C | C | C | 18 | 8 | 10 | 12 | 6 | 6 | 3 | 2 | 6 | 12 | 12.4 | 30 | | | | | |
| 2-Aug | 31 | 28 | 21 | 18 | Z | 7 | 14 | 33 | 17 | 15 | 12 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 8 | 13 | 16 | 10.6 | 33 | | | | | |
| 3-Aug | 20 | 12 | 16 | 19 | 19 | Z | 15 | 13 | 7 | 7 | 10 | 7 | 3 | 2 | 4 | 2 | 2 | 2 | 12 | 23 | 4 | 6 | 5 | 16 | 9.8 | 23 | | | | | |
| 4-Aug | Z | 9 | 40 | 25 | 13 | 16 | 20 | 6 | 4 | 4 | 27 | 42 | 16 | 13 | 1 | 1 | 0 | 0 | 1 | 3 | 3 | 9 | 11 | 9 | 11.9 | 42 | | | | | |
| 5-Aug | 14 | Z | 19 | 16 | 12 | 17 | 15 | 17 | 15 | 21 | 14 | 9 | 5 | 4 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 4 | 5 | 9 | 9.2 | 21 | | | | | |
| 6-Aug | 6 | 11 | Z | 11 | 17 | 18 | 15 | 5 | 10 | 19 | 17 | 18 | 20 | 13 | 16 | 15 | 22 | 32 | 32 | 20 | 40 | 73 | 68 | 100 | 25.9 | 100 | | | | | |
| 7-Aug | 57 | 78 | 61 | Z | 26 | 26 | 33 | 21 | 51 | 41 | 23 | 9 | 15 | 11 | 12 | 5 | 3 | 2 | 2 | 2 | 6 | 12 | 16 | 4 | 22.4 | 78 | | | | | |
| 8-Aug | 10 | 17 | 12 | 12 | Z | 26 | 28 | 18 | 16 | 15 | 8 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 2 | 3 | 11 | 11 | 28 | 9.6 | 28 | | | | | |
| 9-Aug | 35 | 29 | 26 | 22 | 19 | Z | 10 | 9 | 7 | 7 | 7 | 4 | 2 | 0 | 0 | 0 | 0 | 1 | 3 | 10 | 12 | 12 | 13 | 17 | 10.7 | 35 | | | | | |
| 10-Aug | Z | 10 | 13 | 16 | 19 | 15 | 10 | 8 | 8 | 7 | 25 | 14 | 4 | 14 | 17 | 11 | 4 | 1 | 1 | 5 | 5 | 4 | 11 | 10 | 10.1 | 25 | | | | | |
| 11-Aug | 10 | Z | 10 | 13 | 16 | 17 | 31 | 17 | 10 | 23 | 8 | 5 | 8 | 3 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 8 | 16 | 24 | 10.1 | 31 | | | | | |
| 12-Aug | 22 | 20 | Z | 20 | 19 | 9 | 6 | 11 | 10 | 9 | 5 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 2 | 2 | 6 | 12 | 17 | 7.6 | 22 | | | | | |
| 13-Aug | 17 | 4 | 2 | Z | 2 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 4 | 2 | 3 | 2.4 | 17 | | | | | |
| 14-Aug | 3 | 2 | 1 | 1 | Z | 1 | 0 | 0 | 1 | 5 | 5 | 4 | 3 | 3 | 5 | 3 | 1 | 1 | 0 | 3 | 5 | 6 | 7 | 3 | 2.8 | 7 | | | | | |
| 15-Aug | 3 | 2 | 3 | 3 | 5 | Z | 2 | 30 | 67 | 83 | 39 | 28 | 41 | 21 | 25 | 25 | 15 | 5 | 3 | 3 | 7 | 8 | 7 | 7 | 18.8 | 83 | | | | | |
| 16-Aug | Z | 3 | 6 | 2 | 2 | 1 | 4 | 4 | 4 | 6 | 6 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 5 | 7 | 2.6 | 7 | | | | | |
| 17-Aug | 5 | Z | 4 | 4 | 4 | 5 | 14 | 16 | 18 | 14 | 14 | 2 | 0 | 0 | 1 | 4 | 2 | 2 | 2 | 5 | 5 | 9 | 12 | 3 | 6.3 | 18 | | | | | |
| 18-Aug | 5 | 9 | Z | 14 | 10 | 8 | 6 | 11 | 6 | 2 | 1 | 0 | 0 | 0 | 1 | 3 | 4 | 2 | 3 | 4 | 5 | 1 | 1 | 1 | 4.2 | 14 | | | | | |
| 19-Aug | 2 | 1 | 1 | Z | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0.7 | 2 | | | | | |
| 20-Aug | 1 | 1 | 1 | 0 | Z | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 | 5 | 3 | 4 | 1 | 1 | 20 | 19 | 2.9 | 20 | | | | | |
| 21-Aug | 4 | 3 | 3 | 3 | 3 | Z | 2 | 1 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 36 | 37 | 18 | 17 | 24 | 6.9 | 37 | | | | | |
| 22-Aug | Z | 7 | 6 | 3 | 3 | 2 | 4 | 22 | 40 | 28 | 35 | 22 | 28 | 17 | 16 | 16 | 12 | 5 | 1 | 1 | 2 | 2 | 20 | 25 | 13.8 | 40 | | | | | |
| 23-Aug | 17 | Z | 6 | 7 | 7 | 6 | 5 | 6 | 6 | 9 | 7 | 6 | 5 | 4 | 5 | 7 | 4 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 4.8 | 17 | | | | | |
| 24-Aug | 1 | 2 | Z | 1 | 4 | 3 | 6 | 4 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 9 | 11 | 10 | 7 | 7 | 3 | 1 | 3.3 | 11 | | | | | |
| 25-Aug | 4 | 5 | 5 | Z | 4 | 5 | 5 | 4 | 3 | 2 | 3 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2.5 | 5 | | | | | |
| 26-Aug | 2 | 1 | 1 | 1 | Z | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 0 | 3 | 2 | 8 | 7 | 2 | 1.8 | 8 | | | | | |
| 27-Aug | 5 | 2 | 0 | 1 | 1 | Z | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 2 | 2 | 12 | 107 | 63 | 21 | 9.7 | 107 | | | | | |
| 28-Aug | Z | 11 | 7 | 3 | 2 | 2 | 3 | 4 | 2 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 3 | 4 | 2 | 4 | 20 | 34 | 36 | 11 | 6.8 | 36 | | | | | |
| 29-Aug | 22 | Z | 7 | 6 | 5 | 5 | 5 | 3 | 6 | 20 | 39 | 33 | 18 | Z | 21 | 18 | 6 | 4 | 3 | 6 | 15 | 3 | 1 | 1 | 11.2 | 39 | | | | | |
| 30-Aug | 1 | 1 | 0 | 0 | 0 | 1 | Z | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 4 | 5 | 2 | 4 | 5 | 1.6 | 5 | | | | | |
| 31-Aug | 10 | 10 | 8 | 8 | 12 | 6 | 9 | Z | M | M | 12 | 6 | 4 | 1 | 1 | 1 | 2 | 2 | 3 | 1 | 2 | 2 | 1 | 1 | 4.8 | 12 | | | | | |
| | | 12.2 | 11.3 | 11.0 | 8.8 | 9.2 | 8.1 | 9.5 | 9.9 | 11.5 | 11.9 | 10.7 | 7.6 | 6.2 | 4.0 | 5.0 | 4.3 | 3.3 | 3.1 | 3.5 | 5.4 | 7.1 | 12.0 | 12.8 | 12.9 | Diurnal Average | | | | | |
| | | 57 | 78 | 61 | 25 | 26 | 26 | 33 | 33 | 67 | 83 | 39 | 42 | 41 | 21 | 25 | 25 | 22 | 32 | 32 | 36 | 40 | 107 | 68 | 100 | Diurnal Maximum | | | | | |
| Z - zerospan | | C - Calibration | | | M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Muskeg River - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Muskeg River - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 636 | 90.21 | 90.21 |
| 21 - 40 | 55 | 7.80 | 98.01 |
| 41 - 80 | 11 | 1.56 | 99.57 |
| 81 - 159 | 3 | 0.43 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Muskeg River - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 4 | 18 | 20 | 11 | 12 | 10 | 14 | 71 | 135 | 113 | 96 | 63 | 29 | 33 | 6 | 1 | 636 |
| 21 - 40 | 1 | 8 | 10 | 1 | 2 | 0 | 0 | 2 | 9 | 11 | 1 | 1 | 0 | 5 | 2 | 2 | 55 |
| 11 - 80 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 6 | 11 |
| 81 - 159 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 3 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 7 | 26 | 30 | 12 | 14 | 10 | 14 | 73 | 144 | 124 | 97 | 65 | 29 | 40 | 10 | 10 | 705 |

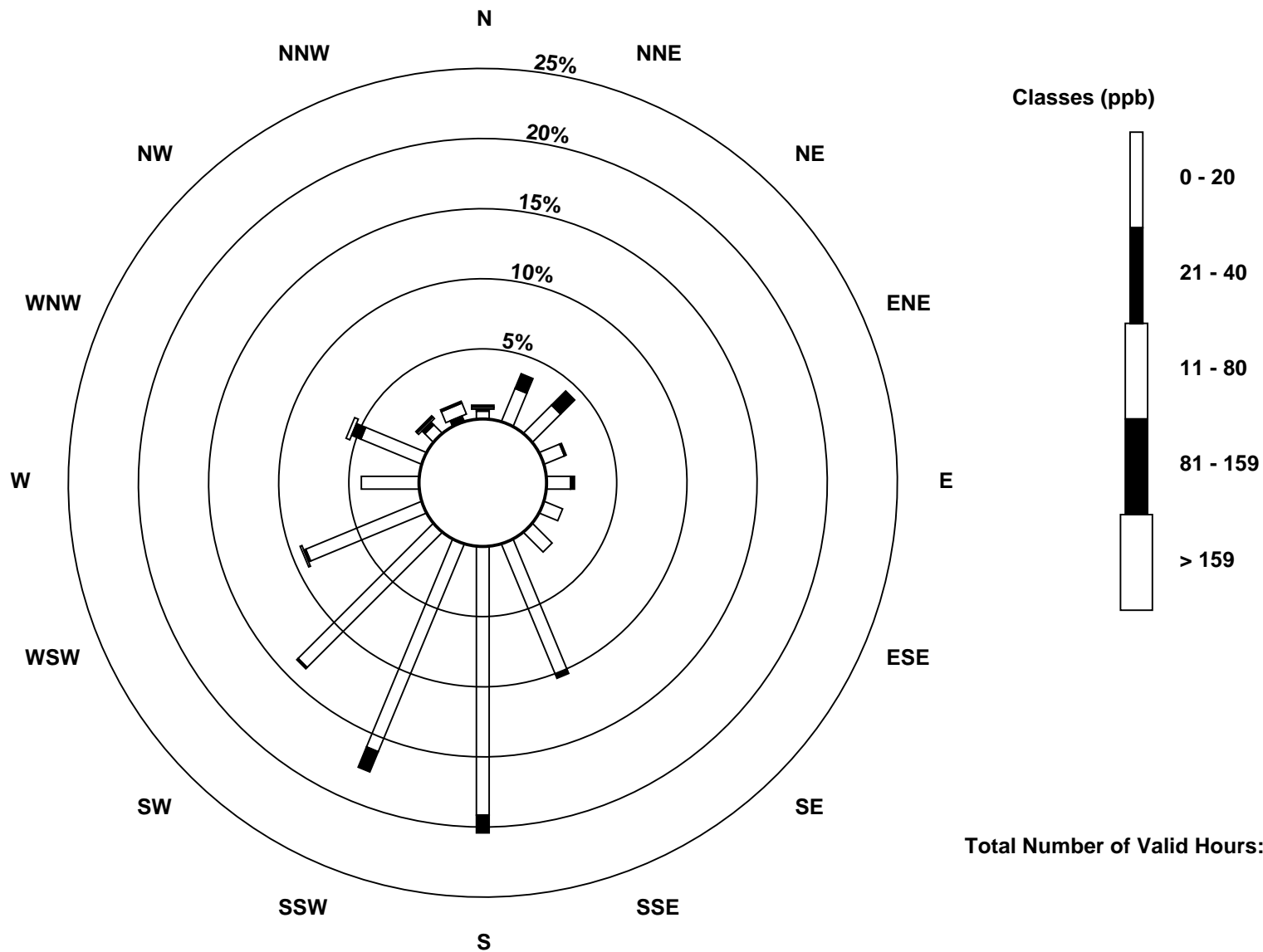
Total Number of Valid Hours: 705

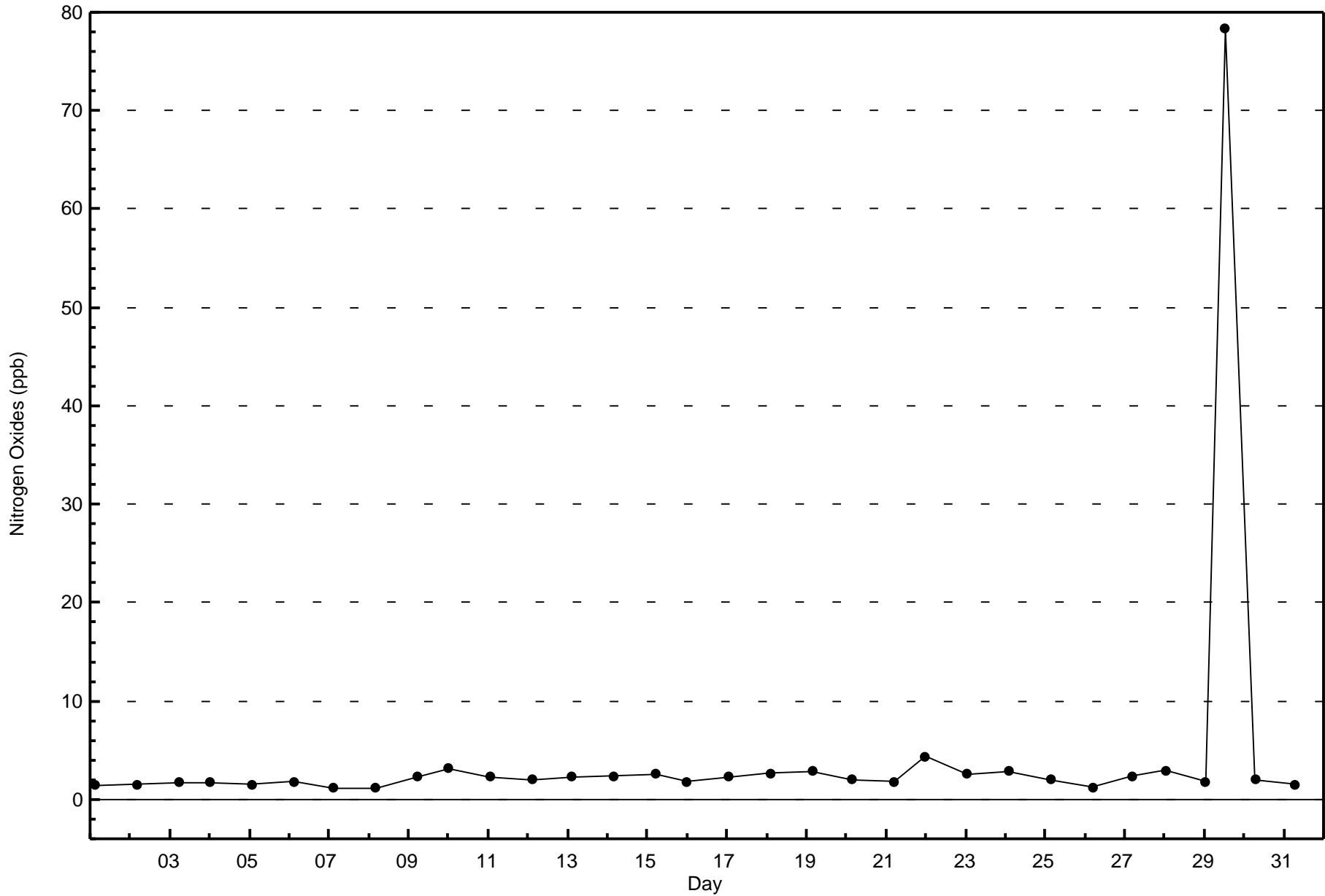
Total Number of Hours: 744

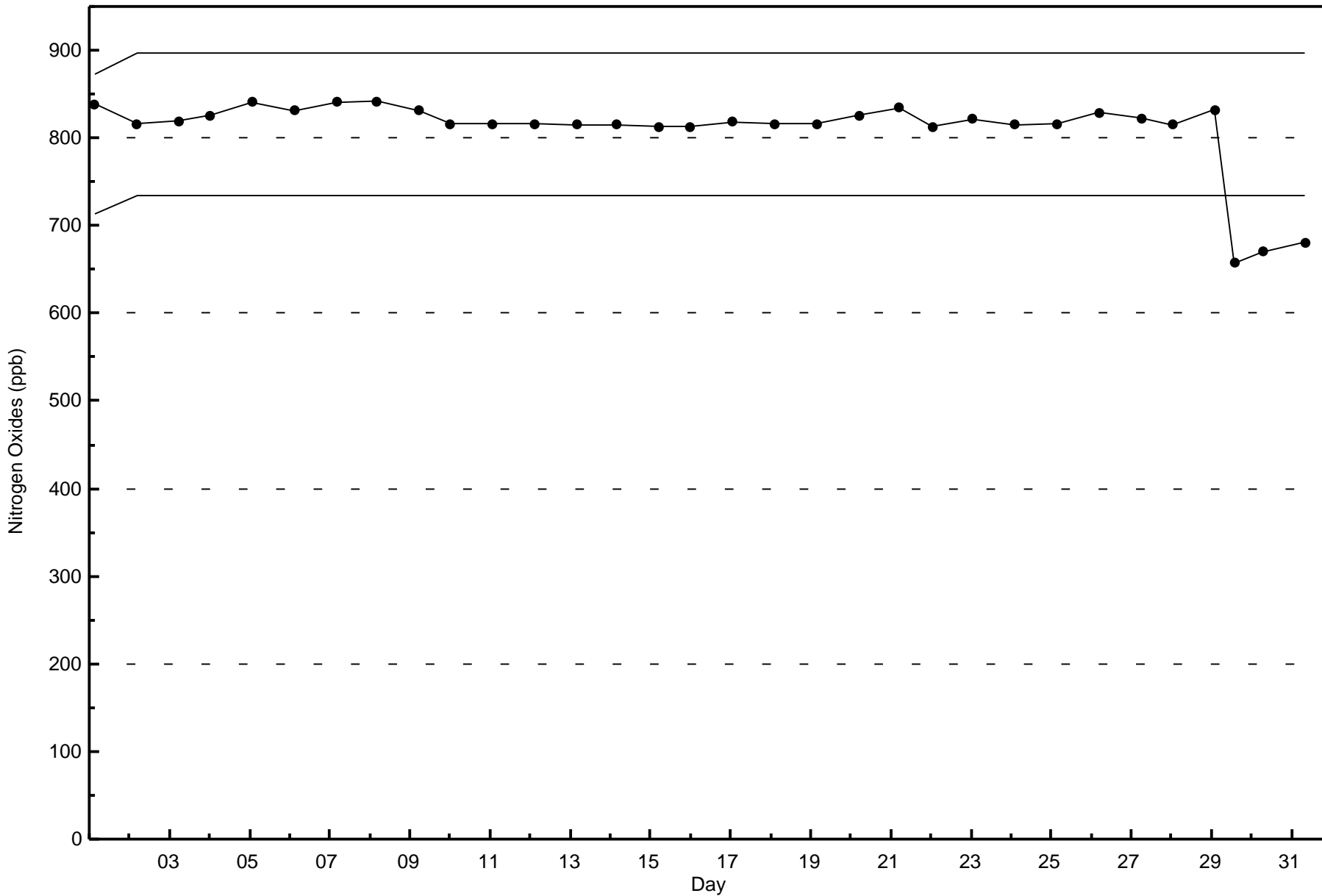


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Oxides (NO_x) - ppb
Muskeg River (AMS 16)









Summary of Hour Averages

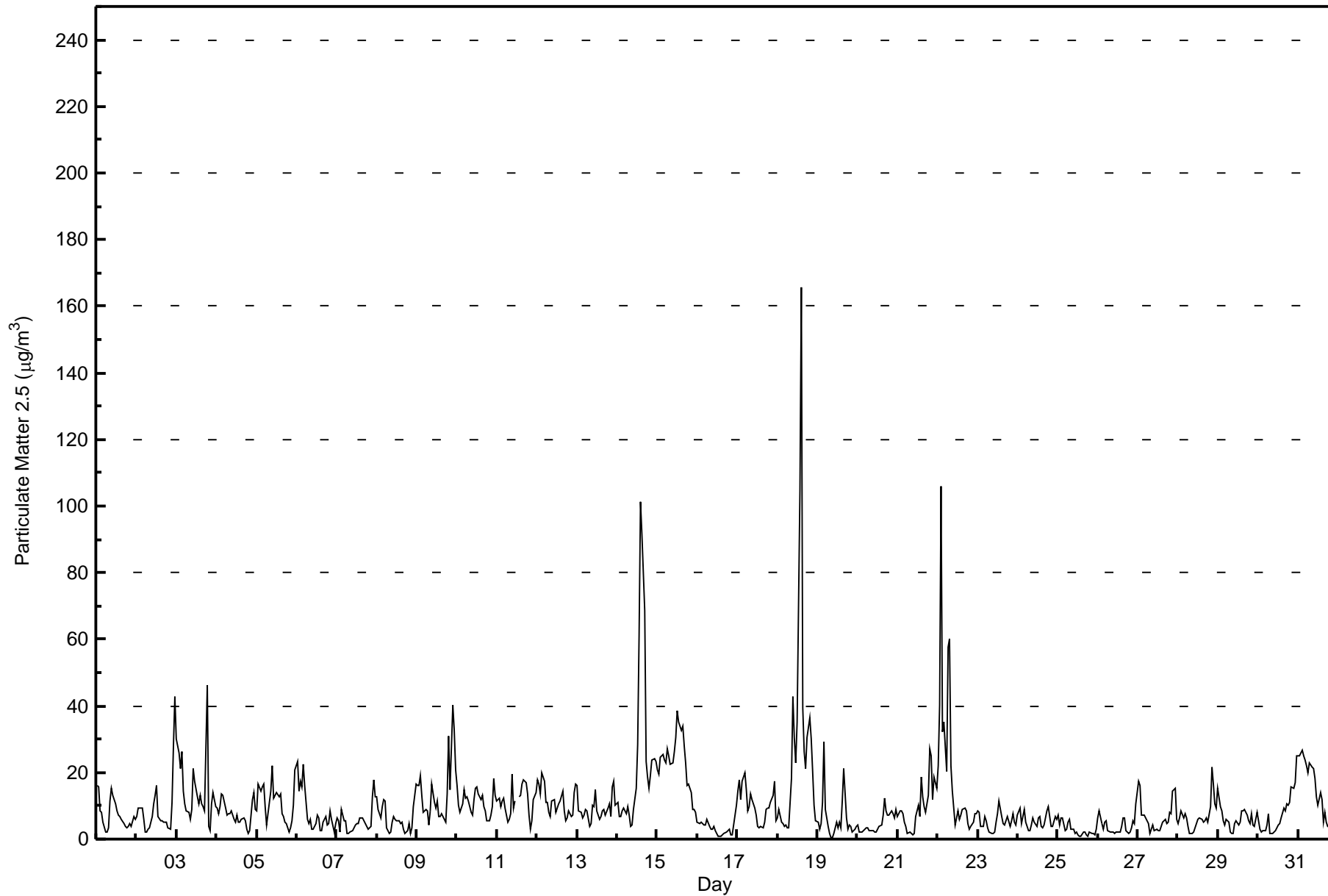
Muskeg River - August 2017

| Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 165.7 µg/m ³ on Aug 18 15:00 Minimum Value: 0.6 µg/m ³ on Aug 19 10:00 Maximum Diurnal Average: 16.0 µg/m ³ at hour 15 Monthly Average: 10.24 µg/m ³ | | Maximum Daily Average: 28.3 µg/m ³ on Aug 18 Minimum Daily Average: 2.9 µg/m ³ on Aug 25 Minimum Diurnal Average: 7.0 µg/m ³ at hour 9 Percentiles: P ₁ = 1.0 P ₁₀ = 2.3 Q ₁ = 4.1 Median = 7.0 Q ₃ = 12.4 P ₉₀ = 20.9 P ₉₉ = 53.7 | | Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 1 Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|--|-------|---|------|------|------|------|------|------|------|------|------|-------|-------|------|------|------|------|------|------|------|------|-----------------|---------------|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 15.9 | 15.9 | 8.5 | 8.0 | 5.1 | 2.1 | 2.2 | 3.4 | 11.3 | 15.4 | 13.0 | 10.8 | 8.4 | 7.0 | 7.0 | 5.7 | 4.5 | 3.9 | 3.6 | 3.7 | 4.5 | 3.9 | 6.8 | 6.1 | 7.4 | 15.9 |
| 2-Aug | 6.7 | 9.5 | 9.1 | 9.4 | 5.9 | 1.9 | 2.3 | 3.1 | 3.2 | 7.0 | 10.6 | 13.2 | 16.1 | 6.8 | 5.6 | 5.6 | 4.9 | 5.0 | 5.0 | 3.6 | 2.8 | 10.9 | 27.9 | 42.8 | 9.1 | 42.8 |
| 3-Aug | 30.1 | 25.8 | 21.2 | 26.3 | 14.5 | 10.5 | 8.6 | 8.2 | 5.7 | 8.7 | 21.0 | 17.5 | 12.7 | 10.4 | 13.1 | 10.6 | 9.8 | 8.3 | 46.0 | 3.9 | 2.5 | 10.6 | 14.2 | 9.9 | 14.6 | 46.0 |
| 4-Aug | 9.3 | 7.7 | 9.7 | 13.6 | 13.3 | 9.1 | 7.4 | 7.5 | 7.7 | 8.4 | 6.1 | 5.2 | 7.2 | 5.3 | 5.0 | 6.1 | 6.3 | 5.6 | 2.8 | 1.7 | 2.3 | 11.9 | 14.2 | 9.0 | 7.6 | 14.2 |
| 5-Aug | 8.3 | 16.4 | 14.3 | 15.7 | 16.6 | 9.7 | 4.4 | 7.4 | 14.5 | 22.1 | 12.2 | 13.0 | 14.0 | 12.9 | 13.8 | 7.6 | 6.6 | 5.1 | 4.8 | 2.3 | 3.5 | 5.5 | 10.2 | 20.8 | 10.9 | 22.1 |
| 6-Aug | 23.3 | 14.6 | 17.6 | 15.8 | 22.3 | 15.9 | 5.8 | 4.5 | 6.0 | 3.1 | 3.0 | 4.8 | 7.4 | 6.4 | 2.7 | 2.5 | 4.9 | 6.8 | 4.3 | 4.8 | 8.4 | 5.9 | 2.3 | 4.9 | 8.3 | 23.3 |
| 7-Aug | 6.2 | 5.4 | 2.2 | 8.7 | 5.4 | 5.5 | 1.8 | 1.6 | 1.9 | 2.6 | 3.4 | 4.3 | 4.5 | 4.8 | 6.4 | 6.2 | 5.7 | 4.7 | 4.0 | 3.0 | 4.0 | 12.8 | 18.0 | 12.8 | 5.7 | 18.0 |
| 8-Aug | 12.7 | 8.8 | 6.6 | 9.8 | 11.7 | 11.3 | 3.3 | 1.8 | 2.0 | 5.3 | 6.7 | 5.9 | 5.6 | 5.3 | 4.8 | 5.0 | 2.9 | 1.5 | 2.7 | 4.8 | 1.8 | 3.2 | 9.9 | 16.7 | 6.3 | 16.7 |
| 9-Aug | 16.3 | 15.9 | 19.2 | 13.2 | 8.0 | 8.8 | 8.3 | 4.2 | 8.5 | 16.6 | 11.2 | 9.2 | 11.2 | 6.7 | 6.9 | 7.5 | 6.0 | 5.1 | 13.4 | 31.0 | 14.7 | 40.3 | 32.5 | 20.6 | 14.0 | 40.3 |
| 10-Aug | 16.0 | 10.3 | 8.0 | 10.5 | 14.8 | 12.4 | 12.6 | 11.4 | 8.3 | 7.4 | 11.8 | 15.1 | 15.8 | 13.7 | 11.9 | 13.0 | 9.6 | 8.3 | 5.6 | 5.5 | 7.4 | 9.7 | 18.2 | 13.3 | 11.3 | 18.2 |
| 11-Aug | 11.6 | 12.4 | 9.9 | 11.4 | 12.5 | 9.4 | 5.3 | 6.1 | 7.7 | 19.4 | 9.5 | 11.4 | C | 12.5 | 13.1 | 16.7 | 17.6 | 16.8 | 13.6 | 7.3 | 3.0 | 5.5 | 12.0 | 13.8 | 11.2 | 19.4 |
| 12-Aug | 17.7 | 16.6 | 13.4 | 19.8 | 17.2 | 11.1 | 11.2 | 7.9 | 6.8 | 11.3 | 12.0 | 8.1 | 9.4 | 10.7 | 11.5 | 14.3 | 8.7 | 5.7 | 6.3 | 8.5 | 6.9 | 7.3 | 14.2 | 16.4 | 11.4 | 19.8 |
| 13-Aug | 16.0 | 8.4 | 8.1 | 6.4 | 7.0 | 8.7 | 8.6 | 4.0 | 4.7 | 10.1 | 9.9 | 14.9 | 8.5 | 5.9 | 6.8 | 8.5 | 9.0 | 7.3 | 9.3 | 10.8 | 6.6 | 15.8 | 17.6 | 10.2 | 9.3 | 17.6 |
| 14-Aug | 10.8 | 7.0 | 6.7 | 8.7 | 9.2 | 7.5 | 9.7 | 7.1 | 3.7 | 4.1 | 8.9 | 15.1 | 28.2 | 60.9 | 101.2 | 91.4 | 68.6 | 23.1 | 18.5 | 15.3 | 18.9 | 23.7 | 24.2 | 23.2 | 24.8 | 101.2 |
| 15-Aug | 20.8 | 19.6 | 24.6 | 25.5 | 23.6 | 23.0 | 27.3 | 25.0 | 22.5 | 22.7 | 26.2 | 30.6 | 38.7 | 35.3 | 32.4 | 33.9 | 27.8 | 23.0 | 16.0 | 16.7 | 14.2 | 9.0 | 8.8 | 8.2 | 23.1 | 38.7 |
| 16-Aug | 5.1 | 4.8 | 4.9 | 4.5 | 4.4 | 4.1 | 5.9 | 3.7 | 2.9 | 2.8 | 3.9 | 2.6 | 0.8 | 0.7 | 1.0 | 1.3 | 1.9 | 2.1 | 2.4 | 3.1 | 1.5 | 1.4 | 4.0 | 10.4 | 3.3 | 10.4 |
| 17-Aug | 14.5 | 17.6 | 12.0 | 17.2 | 19.8 | 14.9 | 8.3 | 9.7 | 13.5 | 11.7 | 9.4 | 7.0 | 3.8 | 3.4 | 3.7 | 3.3 | 5.0 | 8.8 | 9.1 | 9.2 | 10.9 | 13.0 | 17.6 | 5.5 | 10.4 | 19.8 |
| 18-Aug | 6.2 | 8.8 | 5.2 | 4.9 | 3.9 | 4.3 | 3.2 | 3.5 | 18.1 | 42.8 | 30.6 | 23.0 | 35.2 | 104.7 | 165.7 | 39.3 | 26.4 | 21.3 | 30.4 | 36.6 | 30.0 | 20.5 | 10.3 | 5.4 | 28.3 | 165.7 |
| 19-Aug | 5.2 | 2.9 | 4.5 | 11.1 | 29.4 | 9.0 | 3.6 | 1.7 | 0.6 | 0.6 | 1.7 | 5.1 | 3.6 | 5.0 | 3.6 | 11.3 | 21.2 | 6.3 | 3.1 | 4.1 | 3.9 | 2.2 | 3.1 | 3.8 | 6.1 | 29.4 |
| 20-Aug | 4.2 | 2.2 | 1.9 | 2.1 | 2.8 | 3.5 | 3.3 | 2.3 | 2.7 | 2.5 | 2.1 | 2.1 | 3.1 | 3.7 | 4.3 | 7.3 | 12.3 | 8.7 | 7.2 | 7.2 | 8.4 | 7.7 | 6.6 | 9.0 | 4.9 | 12.3 |
| 21-Aug | 6.6 | 8.6 | 8.6 | 7.4 | 5.2 | 3.8 | 1.8 | 2.1 | 1.7 | 1.5 | 1.8 | 6.7 | 10.2 | 6.9 | 18.6 | 12.7 | 9.6 | 8.1 | 13.2 | 26.9 | 25.0 | 11.9 | 18.6 | 15.1 | 9.7 | 26.9 |
| 22-Aug | 21.9 | 40.2 | 105.9 | 32.2 | 35.0 | 20.5 | 57.5 | 60.2 | 22.0 | 14.6 | 4.1 | 6.6 | 8.5 | 6.0 | 7.0 | 8.7 | 9.2 | 8.4 | 4.6 | 3.1 | 3.7 | 4.9 | 7.8 | 7.5 | 20.8 | 105.9 |
| 23-Aug | 8.5 | 7.8 | 4.0 | 3.9 | 6.7 | 5.4 | 3.4 | 2.0 | 1.9 | 1.8 | 2.2 | 5.0 | 7.5 | 11.4 | 6.6 | 4.8 | 4.4 | 5.4 | 6.6 | 3.8 | 5.6 | 7.5 | 5.2 | 4.3 | 5.2 | 11.4 |
| 24-Aug | 7.2 | 9.5 | 4.9 | 6.8 | 9.0 | 5.3 | 2.5 | 2.7 | 4.0 | 6.2 | 5.0 | 3.8 | 6.3 | 6.6 | 3.9 | 3.3 | 4.4 | 8.3 | 9.7 | 6.9 | 3.7 | 3.9 | 6.7 | 5.9 | 5.7 | 9.7 |
| 25-Aug | 7.2 | 4.4 | 6.4 | 6.4 | 2.5 | 3.0 | 4.9 | 5.9 | 3.1 | 3.0 | 1.5 | 2.0 | 1.3 | 0.7 | 0.8 | 2.1 | 2.0 | 1.2 | 1.0 | 1.9 | 1.8 | 1.6 | 1.4 | 3.0 | 2.9 | 7.2 |
| 26-Aug | 6.3 | 8.4 | 4.8 | 2.8 | 5.1 | 5.5 | 2.6 | 2.1 | 2.2 | 2.1 | 1.9 | 2.2 | 2.3 | 2.1 | 3.7 | 6.5 | 6.5 | 2.4 | 1.8 | 2.2 | 3.6 | 5.7 | 4.5 | 10.7 | 4.1 | 10.7 |
| 27-Aug | 17.3 | 15.9 | 7.3 | 7.3 | 7.1 | 5.3 | 4.8 | 1.9 | 2.9 | 4.1 | 2.6 | 2.8 | 2.6 | 2.7 | 3.8 | 5.0 | 6.1 | 4.6 | 5.0 | 8.2 | 7.7 | 14.5 | 15.3 | 5.9 | 6.7 | 17.3 |
| 28-Aug | 4.8 | 6.5 | 8.4 | 6.5 | 7.7 | 6.3 | 3.6 | 1.8 | 1.5 | 2.3 | 3.4 | 4.7 | 6.0 | 6.3 | 5.9 | 5.3 | 5.3 | 6.4 | 5.3 | 9.6 | 21.7 | 16.7 | 10.8 | 9.5 | 6.9 | 21.7 |
| 29-Aug | 15.4 | 9.9 | 8.5 | 5.6 | 4.2 | 6.1 | 5.2 | 2.1 | 1.6 | 1.6 | 4.5 | 5.5 | 4.4 | 5.1 | 8.4 | 8.6 | 8.8 | 7.4 | 5.7 | 4.6 | 7.5 | 4.0 | 4.0 | 8.2 | 6.1 | 15.4 |
| 30-Aug | 5.6 | 3.1 | 2.2 | 2.5 | 2.6 | 4.2 | 7.5 | 1.5 | 1.6 | 1.8 | 2.5 | 3.6 | 4.4 | 4.6 | 6.2 | 9.1 | 8.4 | 10.5 | 10.1 | 11.0 | 15.7 | 15.0 | 16.9 | 24.9 | 7.3 | 24.9 |
| 31-Aug | 25.1 | 25.0 | 26.6 | 24.9 | 23.8 | 22.1 | 20.0 | 22.7 | 21.5 | 21.1 | 18.4 | 12.7 | 10.2 | 14.2 | 11.7 | 5.1 | 8.0 | 5.1 | 3.8 | 3.4 | 5.0 | 4.9 | 2.1 | 2.3 | 14.2 | 26.6 |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| 12.3 11.9 12.7 11.3 11.5 8.7 8.3 7.4 7.0 9.2 8.4 8.9 9.9 12.5 16.0 11.9 10.7 7.9 8.9 8.5 8.3 10.1 11.8 11.6 30.1 40.2 105.9 32.2 35.0 23.0 57.5 60.2 22.5 42.8 30.6 30.6 38.7 104.7 165.7 91.4 68.6 23.1 46.0 36.6 30.0 40.3 32.5 42.8 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³ | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Muskeg River - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Muskeg River - August 2017

| Concentration Ranges ($\mu\text{g}/\text{m}^3$) | Number of Hours | % | Cumulative % |
|---|------------------------|----------|---------------------|
| 1 - 5 | 271 | 36.47 | 36.47 |
| 6 - 15 | 336 | 45.22 | 81.70 |
| 16 - 25 | 88 | 11.84 | 93.54 |
| 26 - 80 | 36 | 4.85 | 98.39 |
| > 81.0 | 5 | 0.67 | 99.06 |

Total Number of Valid Hours: 743

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Muskeg River - August 2017**

| Concentration Ranges (μg/m ³) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|--|----------------|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 1 - 5 | 4 | 12 | 9 | 4 | 5 | 1 | 9 | 23 | 37 | 45 | 45 | 37 | 19 | 13 | 2 | 6 | 271 |
| 6 - 15 | 1 | 11 | 23 | 3 | 6 | 8 | 4 | 50 | 76 | 58 | 33 | 21 | 11 | 22 | 6 | 3 | 336 |
| 16 - 25 | 2 | 4 | 2 | 2 | 2 | 1 | 1 | 7 | 28 | 22 | 9 | 2 | 1 | 3 | 1 | 1 | 88 |
| 26 - 80 | 1 | 1 | 0 | 4 | 1 | 0 | 0 | 1 | 10 | 5 | 7 | 3 | 0 | 2 | 1 | 0 | 36 |
| > 81.0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 5 |
| Totals | 8 | 29 | 34 | 13 | 14 | 10 | 14 | 81 | 151 | 130 | 97 | 64 | 31 | 40 | 10 | 10 | 736 |

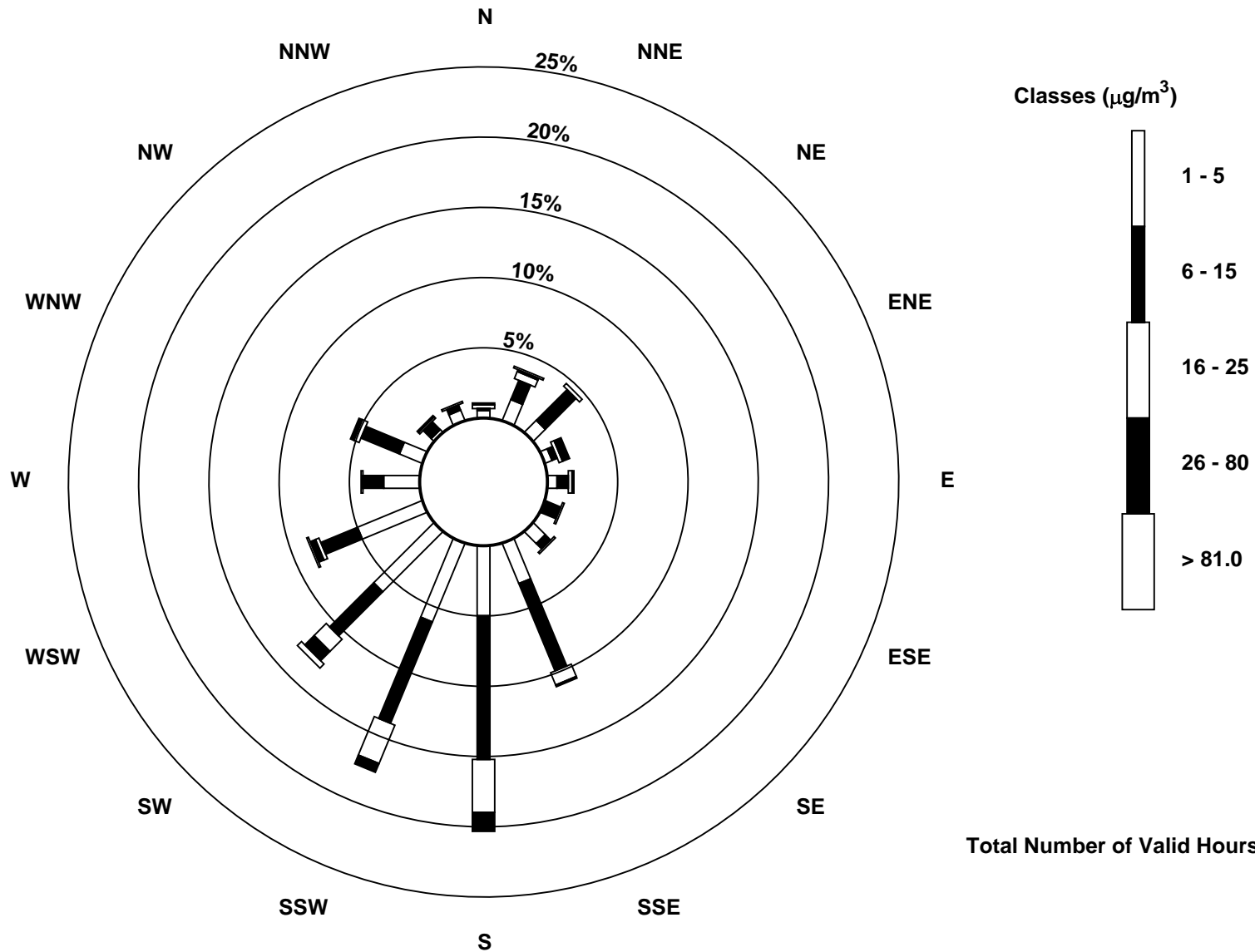
Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Muskeg River (AMS 16)



Total Number of Valid Hours: 743



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

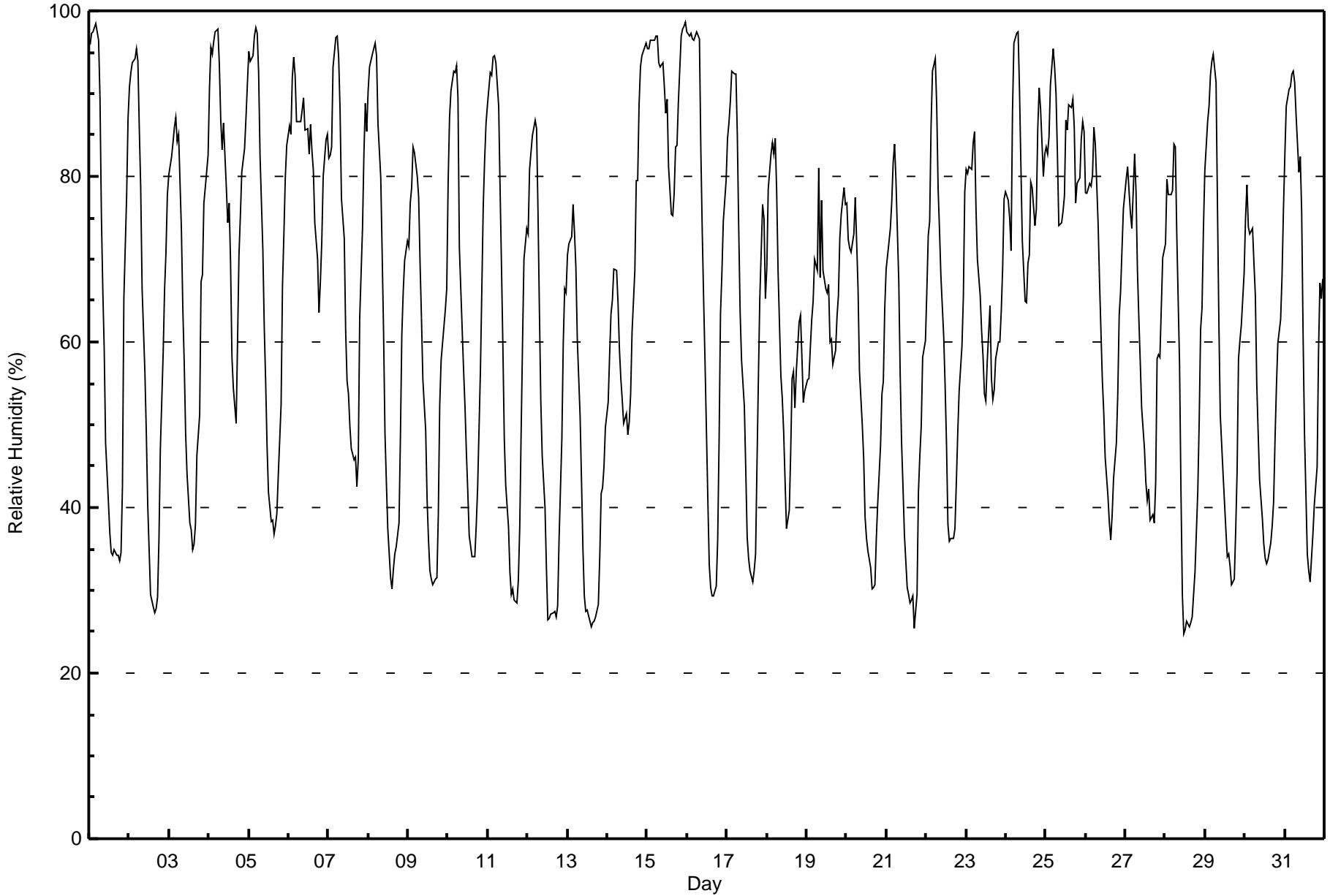
Muskeg River - August 2017

| Maximum Value: 99 % on Aug 16 00:00 Maximum Daily Average: 90.8 % on Aug 15 | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|-----------------|----|---------------|---------------|
| Minimum Value: 25 % on Aug 28 12:00 Minimum Daily Average: 45.0 % on Aug 13 Maximum Diurnal Average: 87.7 % at hour 6 Minimum Diurnal Average: 42.8 % at hour 15 Monthly Average: 64.6 % Percentiles: P ₁ = 26 P ₁₀ = 34 Q ₁ = 46 Median = 67 O ₃ = 83 P ₉₀ = 93 P ₉₉ = 98 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 96 | 97 | 97 | 98 | 98 | 96 | 90 | 75 | 66 | 59 | 48 | 41 | 37 | 35 | 34 | 35 | 34 | 34 | 34 | 35 | 43 | 65 | 78 | 87 | 63.0 | 98 |
| 2-Aug | 91 | 92 | 94 | 94 | 95 | 94 | 86 | 79 | 66 | 56 | 49 | 40 | 35 | 30 | 28 | 27 | 28 | 29 | 36 | 47 | 59 | 66 | 71 | 78 | 61.3 | 95 |
| 3-Aug | 80 | 82 | 84 | 86 | 87 | 84 | 85 | 74 | 64 | 57 | 49 | 44 | 38 | 37 | 35 | 36 | 38 | 46 | 51 | 67 | 68 | 77 | 79 | 83 | 63.8 | 87 |
| 4-Aug | 91 | 96 | 95 | 96 | 97 | 98 | 94 | 87 | 83 | 86 | 79 | 74 | 77 | 70 | 58 | 54 | 50 | 60 | 70 | 75 | 81 | 83 | 87 | 91 | 80.5 | 98 |
| 5-Aug | 95 | 94 | 95 | 97 | 98 | 97 | 92 | 82 | 71 | 62 | 55 | 47 | 42 | 38 | 38 | 37 | 38 | 39 | 44 | 52 | 67 | 73 | 80 | 84 | 67.4 | 98 |
| 6-Aug | 86 | 85 | 92 | 94 | 92 | 87 | 87 | 87 | 88 | 89 | 86 | 86 | 83 | 86 | 83 | 81 | 74 | 70 | 64 | 67 | 72 | 80 | 84 | 85 | 82.8 | 94 |
| 7-Aug | 82 | 83 | 84 | 93 | 97 | 97 | 94 | 88 | 77 | 72 | 61 | 55 | 54 | 50 | 47 | 46 | 46 | 43 | 46 | 63 | 74 | 83 | 89 | 85 | 71.2 | 97 |
| 8-Aug | 90 | 93 | 95 | 95 | 96 | 95 | 86 | 80 | 71 | 61 | 49 | 43 | 37 | 32 | 30 | 33 | 34 | 35 | 38 | 48 | 61 | 66 | 70 | 72 | 63.0 | 96 |
| 9-Aug | 72 | 77 | 79 | 84 | 83 | 80 | 78 | 69 | 63 | 55 | 49 | 41 | 36 | 32 | 31 | 31 | 31 | 32 | 39 | 52 | 58 | 62 | 64 | 66 | 56.8 | 84 |
| 10-Aug | 79 | 87 | 90 | 93 | 92 | 93 | 89 | 71 | 62 | 57 | 52 | 47 | 42 | 37 | 34 | 34 | 34 | 38 | 42 | 57 | 66 | 76 | 82 | 87 | 64.3 | 93 |
| 11-Aug | 89 | 93 | 92 | 94 | 95 | 94 | 88 | 78 | 69 | 59 | 48 | 43 | 38 | 32 | 30 | 30 | 29 | 28 | 31 | 38 | 49 | 60 | 70 | 74 | 60.5 | 95 |
| 12-Aug | 73 | 81 | 83 | 85 | 87 | 86 | 76 | 64 | 53 | 46 | 40 | 33 | 26 | 27 | 27 | 27 | 28 | 27 | 28 | 36 | 48 | 60 | 66 | 66 | 53.0 | 87 |
| 13-Aug | 70 | 72 | 73 | 77 | 73 | 69 | 60 | 51 | 43 | 35 | 29 | 27 | 28 | 26 | 26 | 26 | 26 | 27 | 28 | 34 | 42 | 42 | 45 | 50 | 45.0 | 77 |
| 14-Aug | 53 | 58 | 63 | 65 | 69 | 69 | 65 | 59 | 56 | 53 | 50 | 51 | 49 | 50 | 54 | 61 | 69 | 79 | 80 | 89 | 93 | 95 | 96 | 96 | 67.5 | 96 |
| 15-Aug | 95 | 95 | 96 | 96 | 97 | 97 | 97 | 94 | 93 | 94 | 91 | 88 | 89 | 81 | 75 | 75 | 78 | 83 | 84 | 89 | 97 | 98 | 98 | 99 | 90.8 | 99 |
| 16-Aug | 98 | 97 | 97 | 97 | 96 | 97 | 98 | 97 | 83 | 73 | 65 | 57 | 41 | 33 | 30 | 29 | 29 | 31 | 36 | 48 | 63 | 68 | 75 | 79 | 67.4 | 98 |
| 17-Aug | 85 | 87 | 89 | 93 | 92 | 92 | 85 | 74 | 64 | 58 | 52 | 45 | 36 | 34 | 32 | 31 | 32 | 34 | 45 | 56 | 65 | 77 | 75 | 65 | 62.4 | 93 |
| 18-Aug | 69 | 78 | 83 | 84 | 83 | 85 | 78 | 69 | 56 | 53 | 49 | 43 | 37 | 40 | 47 | 56 | 56 | 52 | 56 | 62 | 63 | 58 | 53 | 54 | 61.0 | 85 |
| 19-Aug | 55 | 56 | 59 | 63 | 65 | 70 | 69 | 81 | 68 | 77 | 69 | 66 | 66 | 67 | 60 | 60 | 57 | 59 | 63 | 66 | 72 | 76 | 79 | 77 | 66.6 | 81 |
| 20-Aug | 77 | 72 | 71 | 71 | 73 | 77 | 72 | 66 | 56 | 50 | 46 | 39 | 36 | 35 | 33 | 30 | 30 | 31 | 36 | 41 | 47 | 54 | 55 | 64 | 52.6 | 77 |
| 21-Aug | 69 | 72 | 74 | 77 | 82 | 84 | 80 | 67 | 56 | 48 | 43 | 37 | 30 | 30 | 28 | 29 | 29 | 26 | 30 | 42 | 46 | 50 | 58 | 60 | 51.9 | 84 |
| 22-Aug | 66 | 73 | 75 | 86 | 93 | 94 | 89 | 79 | 74 | 68 | 61 | 55 | 48 | 38 | 36 | 36 | 36 | 38 | 43 | 49 | 54 | 59 | 65 | 78 | 62.1 | 94 |
| 23-Aug | 81 | 80 | 81 | 81 | 84 | 85 | 76 | 70 | 66 | 61 | 58 | 54 | 53 | 58 | 64 | 56 | 53 | 54 | 58 | 60 | 60 | 64 | 69 | 77 | 66.8 | 85 |
| 24-Aug | 78 | 77 | 75 | 71 | 88 | 96 | 97 | 97 | 90 | 81 | 72 | 65 | 65 | 70 | 71 | 79 | 79 | 74 | 76 | 86 | 91 | 88 | 80 | 83 | 80.4 | 97 |
| 25-Aug | 84 | 83 | 85 | 91 | 95 | 93 | 90 | 83 | 74 | 74 | 76 | 78 | 87 | 86 | 89 | 88 | 89 | 86 | 77 | 79 | 80 | 85 | 87 | 85 | 84.3 | 95 |
| 26-Aug | 78 | 78 | 79 | 79 | 80 | 86 | 84 | 74 | 67 | 61 | 55 | 51 | 46 | 41 | 38 | 36 | 39 | 43 | 48 | 54 | 63 | 66 | 71 | 76 | 62.4 | 86 |
| 27-Aug | 80 | 81 | 78 | 76 | 74 | 83 | 78 | 69 | 63 | 58 | 52 | 47 | 43 | 41 | 42 | 38 | 39 | 38 | 43 | 58 | 58 | 58 | 70 | 71 | 59.9 | 83 |
| 28-Aug | 72 | 80 | 78 | 78 | 78 | 84 | 84 | 73 | 57 | 42 | 30 | 25 | 25 | 26 | 26 | 26 | 27 | 30 | 32 | 42 | 50 | 61 | 64 | 74 | 52.6 | 84 |
| 29-Aug | 81 | 87 | 89 | 92 | 94 | 95 | 91 | 77 | 63 | 51 | 48 | 44 | 37 | 34 | 34 | 33 | 31 | 31 | 37 | 44 | 58 | 60 | 62 | 68 | 60.1 | 95 |
| 30-Aug | 75 | 79 | 74 | 73 | 74 | 70 | 66 | 55 | 49 | 43 | 39 | 36 | 34 | 33 | 34 | 36 | 38 | 41 | 48 | 55 | 60 | 63 | 68 | 76 | 54.8 | 79 |
| 31-Aug | 82 | 89 | 91 | 91 | 92 | 93 | 91 | 88 | 80 | 82 | 76 | 61 | 49 | 34 | 32 | 31 | 34 | 37 | 40 | 45 | 59 | 67 | 65 | 68 | 65.7 | 93 |
| | | | | | | | | | | | | | | | | | | | 79.7 | | | | Diurnal Average | | | |
| | | | | | | | | | | | | | | | | | | | 98 | | | | Diurnal Maximum | | | |



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Muskeg River - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity (RH) - %
Muskeg River - August 2017**

| Concentration Ranges (%) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 0 | 0.00 | 0.00 |
| 20 - 40 | 141 | 18.95 | 18.95 |
| 40 - 60 | 160 | 21.51 | 40.46 |
| 60 - 80 | 228 | 30.65 | 71.10 |
| 80 - 100 | 215 | 28.90 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

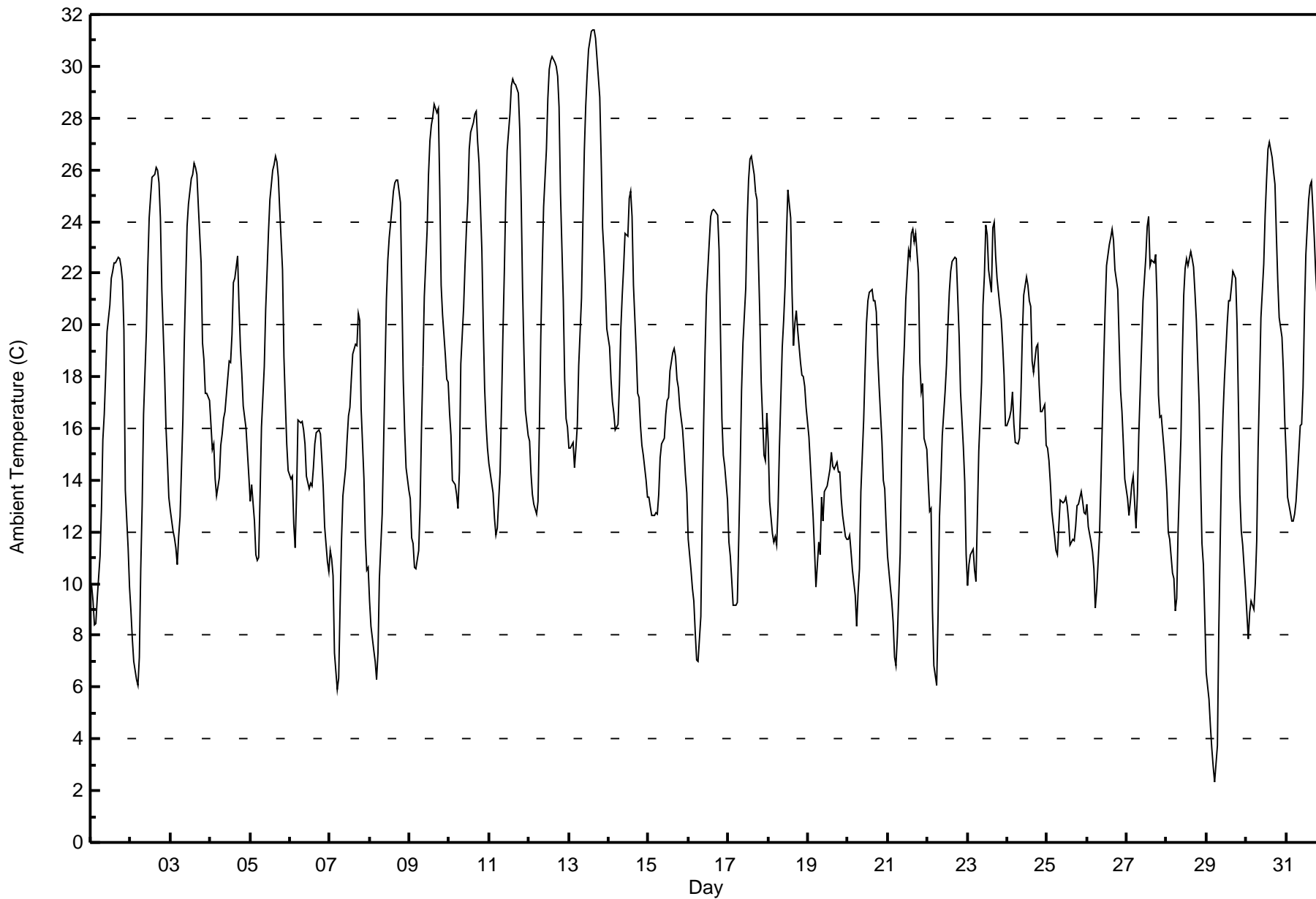
Ambient Temperature (AT) - C
Muskeg River - August 2017

| Maximum Value: 31.4 C on Aug 13 16:00 Maximum Daily Average: 23.7 C on Aug 13 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|------|------|---------------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|--|
| Minimum Value: 2.3 C on Aug 29 06:00 Minimum Daily Average: 12.8 C on Aug 25 Maximum Diurnal Average: 23.3 C at hour 15 Minimum Diurnal Average: 10.7 C at hour 5 Monthly Average: 17.27 C Percentiles: P ₁ = 6.1 P ₁₀ = 10.5 Q ₁ = 13.1 Median = 16.5 Q ₃ = 21.6 P ₉₀ = 25.1 P ₉₉ = 30.3 | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 9.9 | 9.3 | 8.4 | 8.5 | 9.4 | 11.1 | 12.8 | 15.6 | 16.6 | 18.1 | 19.8 | 20.8 | 21.8 | 22.1 | 22.4 | 22.4 | 22.6 | 22.6 | 22.2 | 21.7 | 19.8 | 13.6 | 11.4 | 9.9 | 16.4 | 22.6 | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 8.9 | 7.9 | 7.0 | 6.3 | 6.1 | 7.2 | 10.6 | 13.0 | 16.5 | 19.8 | 22.3 | 24.1 | 24.9 | 25.7 | 25.8 | 26.1 | 26.0 | 25.5 | 24.1 | 21.4 | 18.1 | 16.0 | 14.8 | 13.3 | 17.1 | 26.1 | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 12.9 | 12.0 | 11.8 | 11.4 | 10.7 | 11.8 | 12.6 | 16.3 | 19.3 | 21.6 | 23.8 | 24.7 | 25.7 | 25.8 | 26.3 | 26.1 | 25.8 | 24.6 | 22.4 | 19.3 | 18.7 | 17.4 | 17.3 | 17.1 | 19.0 | 26.3 | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 16.2 | 15.2 | 15.4 | 14.0 | 13.4 | 14.1 | 15.4 | 15.8 | 16.4 | 16.7 | 18.0 | 18.6 | 18.5 | 19.7 | 21.6 | 21.8 | 22.7 | 20.7 | 19.1 | 18.1 | 16.8 | 16.0 | 15.1 | 14.2 | 17.2 | 22.7 | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 13.2 | 13.8 | 12.4 | 11.1 | 10.9 | 11.0 | 13.4 | 16.1 | 18.4 | 20.6 | 22.1 | 23.6 | 24.8 | 26.0 | 26.2 | 26.5 | 26.3 | 25.7 | 24.5 | 22.1 | 18.7 | 17.0 | 15.4 | 14.4 | 18.9 | 26.5 | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 14.1 | 14.2 | 12.3 | 11.4 | 13.5 | 16.3 | 16.2 | 16.3 | 16.0 | 15.4 | 14.1 | 13.7 | 13.9 | 13.8 | 14.5 | 15.4 | 15.9 | 16.0 | 15.8 | 14.8 | 13.7 | 12.2 | 10.9 | 10.5 | 14.2 | 16.3 | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 11.3 | 10.9 | 10.3 | 7.3 | 5.9 | 6.4 | 9.1 | 11.7 | 13.4 | 14.5 | 15.5 | 16.5 | 16.8 | 17.9 | 18.9 | 19.3 | 19.2 | 20.4 | 20.2 | 16.8 | 14.1 | 11.8 | 10.5 | 10.6 | 13.7 | 20.4 | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 9.3 | 8.3 | 7.4 | 7.0 | 6.3 | 7.3 | 10.2 | 12.7 | 15.3 | 18.2 | 21.0 | 22.5 | 23.4 | 24.5 | 25.2 | 25.5 | 25.6 | 25.6 | 24.7 | 21.3 | 17.9 | 16.0 | 14.5 | 13.6 | 16.8 | 25.6 | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 13.3 | 11.8 | 11.6 | 10.6 | 10.6 | 11.3 | 12.9 | 16.0 | 18.4 | 21.1 | 23.6 | 25.8 | 27.1 | 27.7 | 28.1 | 28.5 | 28.2 | 28.4 | 25.3 | 21.5 | 20.4 | 18.8 | 17.9 | 17.8 | 19.9 | 28.5 | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 16.6 | 15.7 | 14.0 | 13.8 | 13.4 | 12.9 | 14.3 | 18.5 | 20.7 | 22.3 | 23.7 | 24.8 | 26.8 | 27.4 | 27.8 | 28.2 | 28.3 | 27.1 | 26.3 | 22.9 | 20.0 | 17.5 | 16.1 | 15.3 | 20.6 | 28.3 | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 14.7 | 13.9 | 13.5 | 12.5 | 11.9 | 12.2 | 14.3 | 16.9 | 19.6 | 22.0 | 24.8 | 26.8 | 28.1 | 29.2 | 29.5 | 29.3 | 29.3 | 29.0 | 27.5 | 24.9 | 21.4 | 18.9 | 16.7 | 15.7 | 20.9 | 29.5 | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 15.5 | 14.3 | 13.4 | 13.1 | 12.7 | 13.2 | 16.0 | 19.6 | 22.3 | 24.5 | 26.8 | 28.8 | 29.9 | 30.2 | 30.3 | 30.2 | 30.0 | 29.6 | 28.4 | 25.1 | 21.0 | 17.9 | 16.4 | 16.1 | 21.9 | 30.3 | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 15.3 | 15.2 | 15.5 | 14.5 | 15.2 | 16.1 | 18.5 | 21.0 | 24.0 | 26.7 | 28.5 | 29.7 | 30.7 | 31.4 | 31.4 | 31.4 | 31.1 | 30.3 | 28.8 | 26.4 | 23.8 | 22.8 | 21.5 | 19.9 | 23.7 | 31.4 | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 19.2 | 17.9 | 17.0 | 16.6 | 15.9 | 16.2 | 17.7 | 19.8 | 21.1 | 22.3 | 23.6 | 23.4 | 24.9 | 25.2 | 24.2 | 21.5 | 18.9 | 17.3 | 17.2 | 16.1 | 15.4 | 15.0 | 14.0 | 13.4 | 18.9 | 25.2 | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 13.3 | 13.0 | 12.7 | 12.6 | 12.7 | 12.7 | 13.5 | 14.9 | 15.4 | 15.6 | 16.6 | 17.1 | 17.2 | 18.2 | 18.9 | 19.1 | 18.8 | 17.9 | 17.6 | 16.8 | 15.9 | 15.2 | 14.2 | 13.5 | 15.6 | 19.1 | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 11.7 | 10.5 | 9.8 | 9.3 | 8.1 | 7.0 | 7.0 | 8.8 | 12.9 | 16.2 | 19.0 | 21.1 | 23.2 | 24.2 | 24.4 | 24.5 | 24.4 | 24.2 | 22.9 | 19.6 | 16.4 | 15.0 | 14.5 | 13.2 | 16.2 | 24.5 | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 11.6 | 11.1 | 10.1 | 9.2 | 9.2 | 9.3 | 11.7 | 14.4 | 17.5 | 19.3 | 21.4 | 24.0 | 25.6 | 26.4 | 26.5 | 25.8 | 25.1 | 24.8 | 22.6 | 20.4 | 17.8 | 15.0 | 14.8 | 16.6 | 17.9 | 26.5 | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 15.4 | 13.2 | 11.9 | 11.6 | 11.9 | 11.5 | 12.9 | 15.3 | 19.1 | 20.2 | 21.5 | 23.5 | 25.2 | 24.1 | 21.2 | 19.2 | 20.1 | 20.5 | 19.8 | 18.5 | 18.1 | 18.0 | 17.6 | 16.8 | 17.8 | 25.2 | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 15.7 | 14.7 | 13.6 | 12.6 | 11.3 | 9.9 | 11.6 | 11.1 | 13.4 | 12.4 | 13.5 | 13.8 | 14.1 | 14.4 | 15.1 | 14.5 | 14.4 | 14.7 | 14.3 | 14.3 | 13.3 | 12.7 | 11.9 | 11.7 | 13.3 | 15.7 | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 11.7 | 11.9 | 11.2 | 10.5 | 9.6 | 8.4 | 9.7 | 10.6 | 13.5 | 16.3 | 18.3 | 20.1 | 20.9 | 21.3 | 21.4 | 20.9 | 21.0 | 20.5 | 18.8 | 17.6 | 15.5 | 14.0 | 13.6 | 12.3 | 15.4 | 21.4 | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 11.1 | 9.9 | 9.3 | 8.5 | 7.1 | 6.9 | 8.0 | 11.1 | 14.8 | 18.0 | 19.3 | 21.0 | 22.9 | 22.6 | 23.5 | 23.7 | 23.2 | 23.6 | 22.0 | 18.5 | 17.4 | 17.7 | 15.6 | 15.2 | 16.3 | 23.7 | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 14.0 | 12.8 | 12.9 | 9.0 | 6.8 | 6.1 | 8.8 | 12.6 | 14.0 | 15.7 | 17.4 | 18.4 | 20.0 | 21.3 | 22.1 | 22.5 | 22.6 | 22.6 | 21.1 | 19.6 | 17.4 | 15.3 | 13.9 | 11.1 | 15.7 | 22.6 | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 9.9 | 10.7 | 11.1 | 11.3 | 10.5 | 10.1 | 12.6 | 15.1 | 17.8 | 20.8 | 21.9 | 23.9 | 23.5 | 22.1 | 21.3 | 23.8 | 24.0 | 22.7 | 21.8 | 20.7 | 20.2 | 19.3 | 18.0 | 16.1 | 17.9 | 24.0 | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 16.1 | 16.4 | 16.7 | 17.4 | 16.2 | 15.5 | 15.4 | 15.6 | 17.2 | 19.5 | 21.1 | 21.8 | 21.6 | 20.9 | 20.7 | 18.6 | 18.2 | 19.2 | 19.3 | 17.7 | 16.7 | 16.6 | 16.9 | 15.4 | 17.9 | 21.8 | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 15.3 | 14.7 | 13.9 | 12.8 | 11.8 | 11.3 | 11.1 | 12.2 | 13.2 | 13.1 | 13.2 | 13.4 | 13.0 | 12.4 | 11.5 | 11.7 | 11.7 | 12.2 | 13.0 | 13.1 | 13.5 | 13.2 | 12.7 | 12.7 | 12.8 | 15.3 | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 13.1 | 12.2 | 11.6 | 11.2 | 10.6 | 9.1 | 9.8 | 11.9 | 13.9 | 16.2 | 18.5 | 20.6 | 22.3 | 23.1 | 23.4 | 23.7 | 23.3 | 22.1 | 21.3 | 19.4 | 17.4 | 16.7 | 15.4 | 14.1 | 16.7 | 23.7 | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 13.3 | 12.6 | 13.2 | 13.9 | 14.2 | 12.1 | 13.4 | 15.8 | 17.5 | 19.2 | 20.9 | 22.6 | 23.8 | 24.2 | 22.3 | 22.5 | 22.4 | 22.7 | 20.9 | 17.3 | 16.4 | 16.5 | 15.2 | 14.4 | 17.8 | 24.2 | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 13.5 | 12.0 | 11.7 | 10.4 | 10.2 | 9.0 | 9.4 | 12.1 | 15.6 | 18.8 | 21.1 | 22.2 | 22.6 | 22.3 | 22.8 | 22.6 | 22.2 | 21.3 | 20.2 | 16.9 | 14.1 | 11.6 | 10.7 | 8.8 | 15.9 | 22.8 | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 6.5 | 5.5 | 4.5 | 3.6 | 3.0 | 2.3 | 3.8 | 8.2 | 11.6 | 14.8 | 16.5 | 17.9 | 20.1 | 21.0 | 20.9 | 21.5 | 22.1 | 21.8 | 20.0 | 16.8 | 13.4 | 12.1 | 11.5 | 9.8 | 12.9 | 22.1 | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 8.8 | 7.9 | 8.9 | 9.3 | 9.0 | 10.0 | 11.6 | 15.2 | 17.7 | 20.3 | 22.4 | 24.2 | 25.6 | 26.8 | 27.0 | 26.5 | 25.9 | 25.4 | 23.5 | 21.7 | 20.3 | 19.5 | 18.2 | 16.3 | 18.4 | 27.0 | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 14.9 | 13.3 | 12.7 | 12.4 | 12.4 | 12.7 | 13.2 | 14.1 | 16.1 | 16.2 | 17.6 | 20.4 | 22.7 | 24.9 | 25.4 | 25.5 | 24.5 | 23.4 | 22.0 | 20.0 | 15.9 | 13.9 | 14.3 | 13.4 | 17.6 | 25.5 | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | 13.1 | 12.4 | 11.8 | 11.1 | 10.7 | 10.7 | 12.2 | 14.5 | 16.8 | 18.6 | 20.3 | 21.6 | 22.6 | 23.1 | 23.3 | 23.2 | 23.0 | 22.7 | 21.5 | 19.4 | 17.4 | 15.9 | 14.9 | 14.0 | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | | | | | 19.2 | 17.9 | 17.0 | 17.4 | 16.2 | 16.3 | 18.5 | 21.0 | 24.0 | 26.7 | 28.5 | 29.7 | 30.7 | 31.4 | 31.4 | 31.4 | 31.1 | 30.3 | 28.8 | 26.4 | 23.8 | 22.8 | 21.5 | 19.9 | Diurnal Maximum | |



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Muskeg River - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Muskeg River - August 2017**

| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 65 | 8.74 | 8.74 |
| 10 - 20 | 433 | 58.20 | 66.94 |
| > 20 | 246 | 33.06 | 100.00 |

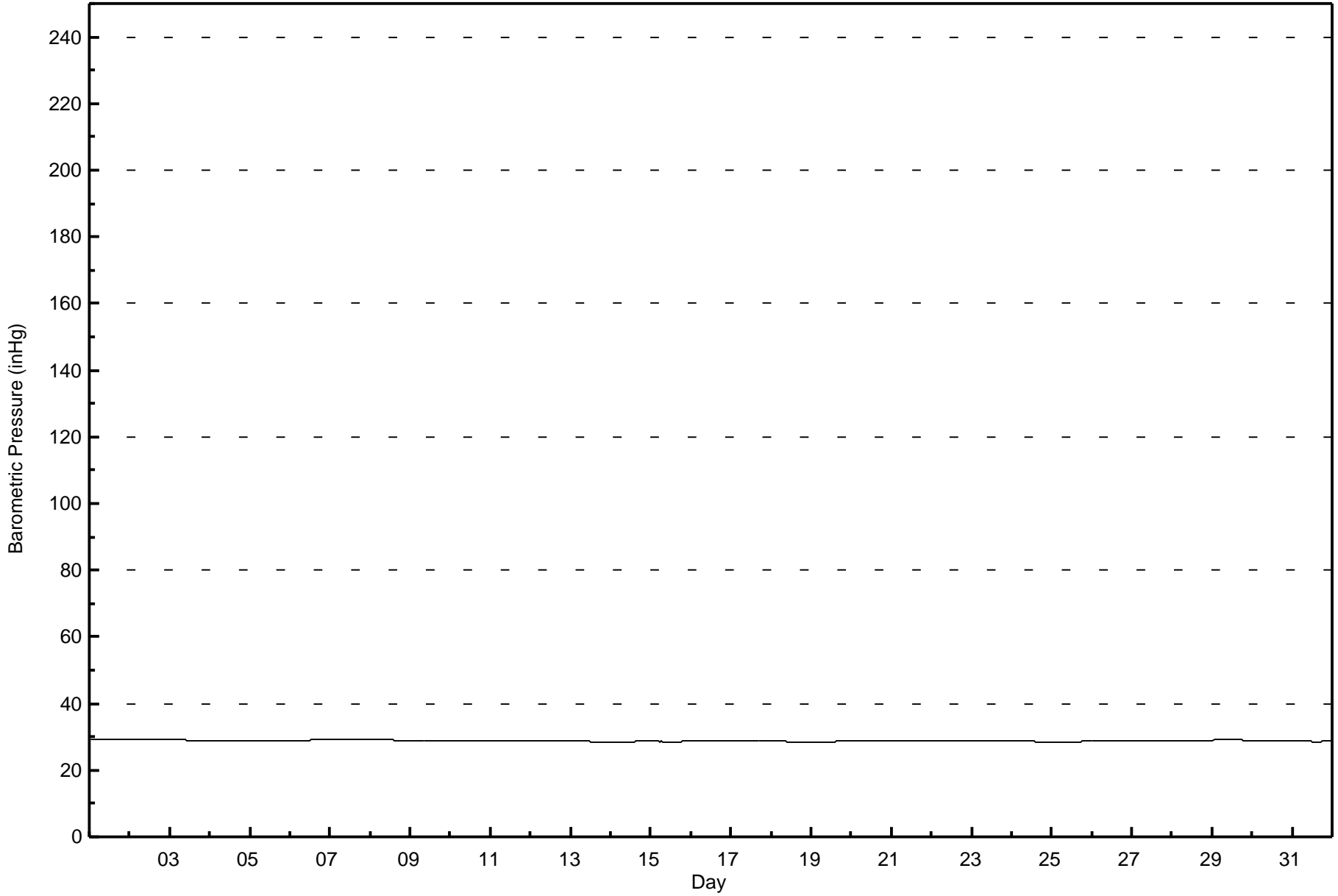
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Hourly Averages

Barometric Pressure (BP) - inHg
Muskeg River - August 2017





| | | |
|--|---|---------------------------------|
| Maximum Speed: 36 km/h on Aug 19 17:00 | Maximum Daily Speed Average: 18.7 km/h on Aug 19 | Hours in Service: 744 |
| Minimum Speed Value: 0 km/h on Aug 3 18:00 | Minimum Daily Speed Average: 1.2 km/h on Aug 15 | Hours of Data: 744 |
| Maximum Diurnal Speed Average: 8.6 km/h at hour 14 | Minimum Diurnal Speed Average: 3.9 km/h at hour 20 | Hours of Missing Data: 0 |
| Monthly Average Velocity: 5.8 km/h 214.2 deg | Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 7 Median = 9 Q ₃ = 14 P ₉₀ = 20 P ₉₉ = 32 | Percent Operational Time: 100.0 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | WSW4 | SSE5 | SSE6 | S5 | S4 | S3 | SSW2 | NNE6 | NE8 | NE9 | NE14 | NE15 | NNE14 | NE17 | NE15 | NE17 | NE15 | NE16 | NE18 | NE15 | NE12 | ENE3 | S3 | SSE3 | NE7.0 | NE18 |
| 2-Aug | S3 | S5 | S5 | S6 | S7 | SSW7 | S5 | SSW7 | SSW7 | S6 | S7 | S9 | SSW7 | SW10 | SW9 | SW9 | SW10 | SW12 | SW8 | SW6 | SSW7 | SSW6 | S6 | S7 | SSW6.8 | SW12 |
| 3-Aug | S5 | S7 | S7 | S7 | S8 | S7 | S8 | S7 | SSW7 | SSW8 | S9 | SSW10 | S9 | SW7 | SW9 | SSW7 | WSW3 | W0 | N16 | NNE18 | E9 | S5 | ENE6 | NNE8 | S3.3 | NNE18 |
| 4-Aug | ENE4 | WSW3 | NNE2 | SSW4 | SSW3 | SE4 | NE6 | E8 | NE16 | SSW2 | WNW3 | NNW7 | ESE5 | E8 | SE14 | ESE9 | SE10 | S6 | SW7 | SSW7 | SSW5 | WNW4 | SW1 | SSE4 | SE2.3 | NE16 |
| 5-Aug | SSW5 | N3 | E4 | SSW5 | SSW4 | SSE6 | S4 | SSW4 | SW4 | SW6 | SW7 | SSW6 | SSW10 | S11 | S11 | S12 | S12 | SSW13 | S12 | SSW9 | SSW7 | S7 | SSW7 | SSW8 | SSW6.7 | SSW13 |
| 6-Aug | S6 | SW3 | S3 | SSW3 | NNE10 | NE18 | NNE14 | NNE15 | N15 | N18 | NNE23 | NNE20 | NNE18 | NNE13 | NNE13 | NNE13 | NNE18 | NE21 | NNE20 | N15 | NNW10 | NNW8 | NNW7 | NW7 | NNE11.1 | NNE23 |
| 7-Aug | NW8 | NNW9 | NNW8 | SW2 | SSW3 | S4 | SSW4 | SSW3 | NNW7 | N9 | NNE8 | NNW8 | NE6 | NE4 | NW1 | W6 | SW5 | SW4 | SSW4 | SSW7 | SW7 | SSW5 | SSW7 | SW11 | W2.1 | SW11 |
| 8-Aug | SSW7 | S7 | S7 | S7 | SSE6 | SSE5 | S5 | SSW8 | SSW8 | SSW9 | SW10 | SSW9 | SW7 | SW7 | S10 | SSW10 | SSW10 | S11 | S10 | S10 | SSE7 | SSE7 | S7 | SSW7 | S7.5 | S11 |
| 9-Aug | S7 | S9 | SSW8 | SSW10 | SSW8 | SSW8 | S8 | S7 | SSW8 | SSW9 | SSW9 | SW12 | SW10 | SW9 | SW10 | SSW10 | SSW7 | S9 | S9 | S7 | SSW6 | SW6 | S6 | SSW4 | SSW7.9 | SW12 |
| 10-Aug | S8 | ESE4 | SSE5 | S5 | SSW6 | SSE6 | SE5 | SSE5 | SSW3 | SSW4 | NE3 | NE5 | ESE3 | NE6 | NE10 | NE11 | NE12 | E10 | S9 | S8 | S7 | SW5 | SSW7 | SSW6 | SE2.8 | NE12 |
| 11-Aug | S7 | SSW7 | SSE7 | S6 | S8 | S7 | S8 | S9 | S8 | SSW9 | SSW10 | SSW10 | S12 | S14 | S13 | SSW12 | S13 | SSE13 | SSE13 | SSE14 | SSE13 | S9 | SSW6 | SSW7 | S9.3 | S14 |
| 12-Aug | S9 | S7 | S9 | S10 | S9 | S8 | S8 | S11 | S13 | S14 | S16 | S20 | S22 | S19 | S22 | S22 | S18 | SSW17 | SSW13 | S10 | S10 | S8 | S8 | S9 | S13.0 | S22 |
| 13-Aug | S9 | SSE12 | SSE13 | SSE12 | SSE14 | SSE13 | SSE12 | SSE15 | SSE18 | SSE22 | SSE28 | SSE27 | SSE25 | S23 | S23 | SSE21 | SSE21 | SSE23 | SSE24 | SSE18 | SSE15 | SSE16 | SSE14 | SSE11 | SSE17.8 | SSE28 |
| 14-Aug | SSE11 | SSE8 | S8 | S8 | SSW7 | S7 | S7 | S10 | S13 | S7 | S11 | SSW12 | S13 | SSW14 | SW15 | SW19 | SW19 | SW15 | SSW9 | S6 | S7 | S8 | SSE8 | S8 | SSW9.6 | SW19 |
| 15-Aug | SSE9 | S7 | SW5 | SE5 | SSE4 | SW4 | WSW3 | WNW3 | WNW2 | N2 | SSE2 | WSW4 | WNW8 | WNW6 | SSW2 | E5 | ENE8 | E10 | ENE9 | E0 | W1 | SE4 | SW6 | WSW7 | S1.2 | E10 |
| 16-Aug | W11 | W8 | W5 | WSW9 | WSW8 | SW7 | SSW7 | SSW6 | SSW7 | SSW8 | SSW8 | S9 | SSW10 | SW12 | SW13 | SW13 | SW13 | SW14 | SW11 | SW14 | SW10 | SSW6 | S6 | SSE5 | SW8.3 | SW14 |
| 17-Aug | SSE4 | SSW5 | SSW7 | SSW6 | SSW8 | SSW6 | SSW6 | SSW7 | SSW7 | SSW10 | SW11 | SSW10 | SW11 | SSW13 | SW15 | W17 | WNW15 | WNW11 | WNW8 | W7 | SSW5 | S7 | SSW8 | WSW14 | SW7.7 | W17 |
| 18-Aug | SW9 | SSE8 | SSE6 | S7 | SSE7 | S7 | SSW8 | SSW10 | SW15 | SW19 | SW19 | WSW22 | SW26 | WSW30 | SW29 | SW22 | SSW17 | SW19 | SW18 | SSW13 | SSW13 | SW20 | SW17 | SW15 | SW14.9 | WSW30 |
| 19-Aug | SW16 | WSW16 | W14 | WSW14 | WSW14 | WSW14 | SW16 | SW15 | WSW26 | WSW22 | WSW26 | W27 | W25 | W26 | W33 | WNW35 | WNW36 | WNW26 | W19 | W14 | WSW14 | WSW10 | WSW7 | SW10 | W18.7 | WNW36 |
| 20-Aug | WSW13 | WSW18 | WSW19 | WSW20 | WSW15 | SSE6 | S6 | SW9 | WSW20 | WSW22 | WSW20 | W26 | WNW28 | W29 | W28 | WNW29 | NW27 | NW23 | WNW23 | WNW21 | W16 | W15 | WNW10 | W9 | W16.8 | W29 |
| 21-Aug | WSW10 | S8 | SSW9 | SW9 | SSW8 | SSW9 | SW12 | SW14 | SSW9 | SW15 | SW19 | WSW23 | WSW20 | W17 | W16 | WSW20 | WSW16 | WNW15 | WNW14 | NW8 | NNE11 | NNE16 | NNE15 | NNE18 | WSW8.2 | WSW23 |
| 22-Aug | NNE16 | NNE13 | NNE15 | ENE3 | S0 | ENE3 | ENE3 | ENE3 | NE8 | NE12 | NE13 | NE9 | NE8 | NE8 | NNE7 | NNE6 | ENE6 | E7 | ENE13 | ENE14 | ENE9 | E8 | E7 | E4 | NE7.6 | NNE16 |
| 23-Aug | WNW2 | SSE3 | SE3 | E3 | SSE2 | S3 | SSW6 | SW5 | SSW3 | S13 | S16 | SSW16 | SSW17 | SSW15 | S12 | S19 | S20 | SSE17 | SSE13 | SSE13 | S14 | S10 | S11 | SSE10 | S9.6 | S20 |
| 24-Aug | SSE12 | S12 | SSE12 | SSE14 | SSW13 | SSE5 | WNW2 | SE4 | SSE7 | SSE10 | SE8 | SE9 | SSE7 | S4 | ESE7 | SE12 | SE4 | NE6 | NE5 | ESE2 | S5 | S9 | SW16 | SW13 | SSE6.5 | SW16 |
| 25-Aug | SSW11 | SSW12 | SW14 | SSW11 | SSW11 | SSW13 | SSW13 | SSW15 | SW18 | SW16 | SSW17 | SSW16 | SSW15 | WSW30 | WSW35 | WSW34 | WSW34 | WSW32 | WSW27 | WSW17 | SW21 | WSW13 | WSW10 | SW13 | SW17.9 | WSW35 |
| 26-Aug | WSW21 | WSW23 | WSW23 | WSW21 | WSW16 | SSE6 | SSE9 | SSW11 | SW11 | SW14 | SW16 | SW14 | SW16 | SW18 | WSW20 | WSW20 | SW18 | WSW17 | SW15 | WSW15 | SW10 | SW11 | SW12 | SW9 | SW14.5 | WSW23 |
| 27-Aug | SW11 | SW13 | SW13 | WSW16 | WSW14 | SSE8 | S6 | SSW7 | SW10 | WSW17 | WSW21 | WSW25 | WSW23 | W20 | W15 | W16 | W13 | WNW13 | WNW10 | W9 | WNW9 | NNW7 | WSW3 | WNW5 | WSW11.0 | WSW25 |
| 28-Aug | W4 | SW6 | W6 | WSW7 | SW7 | SSW5 | SSW7 | SW9 | SW8 | WSW14 | WNW19 | WNW20 | WNW21 | WNW24 | WNW24 | WNW23 | NW19 | NW16 | WNW16 | NW10 | NW7 | NNW7 | NW8 | WNW3 | WNW10.4 | WNW24 |
| 29-Aug | WNW4 | SSE4 | S5 | SSW6 | SW3 | SSE7 | S6 | S4 | S6 | W2 | N4 | NE5 | NNE0 | NNE4 | NE11 | NE7 | ESE6 | ESE6 | ESE7 | E7 | ESE6 | SE8 | SE8 | SSE7 | SE3.0 | NE11 |
| 30-Aug | SSW5 | S5 | SSW6 | S8 | SSE10 | SSE8 | S9 | S12 | SSE15 | SSE16 | SSE22 | S21 | SSE23 | SSE24 | S25 | SSE22 | SSE19 | SSE18 | SSE14 | S14 | S12 | S12 | S9 | S9 | SSE14.0 | S25 |
| 31-Aug | SSW6 | S7 | S7 | S8 | SSW6 | S7 | S8 | S9 | S11 | SSW9 | S10 | SSW11 | SW15 | WSW23 | WSW22 | W21 | WNW23 | WNW18 | WNW18 | WNW16 | WSW11 | WSW13 | WSW14 | WSW14 | WSW9.6 | WSW23 |

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------|--------|--------|--------|--------|--------|------|-------|--------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|-----------------|-----------------|
| SSW5.3 | SSW5.3 | SSW5.3 | SSW5.3 | SSW6.6 | SSW6.2 | S5.3 | S5.2 | SSW5.8 | SSW6.0 | SSW7.0 | SSW6.8 | SW7.3 | SW7.7 | SW8.6 | SW8.6 | SW7.9 | SW6.2 | SW5.0 | SW4.1 | SW3.9 | SSW4.4 | SSW4.8 | SSW4.9 | SSW4.9 | Diurnal Average |
| WSW21 | WSW23 | WSW23 | WSW21 | WSW16 | NE18 | SW16 | SSW15 | WSW26 | SSE22 | SSE28 | W27 | WNW28 | WSW30 | WSW35 | WNW35 | WNW36 | WSW32 | WSW27 | WNW21 | SW21 | SW20 | SW17 | NNE18 | Diurnal Maximum | |

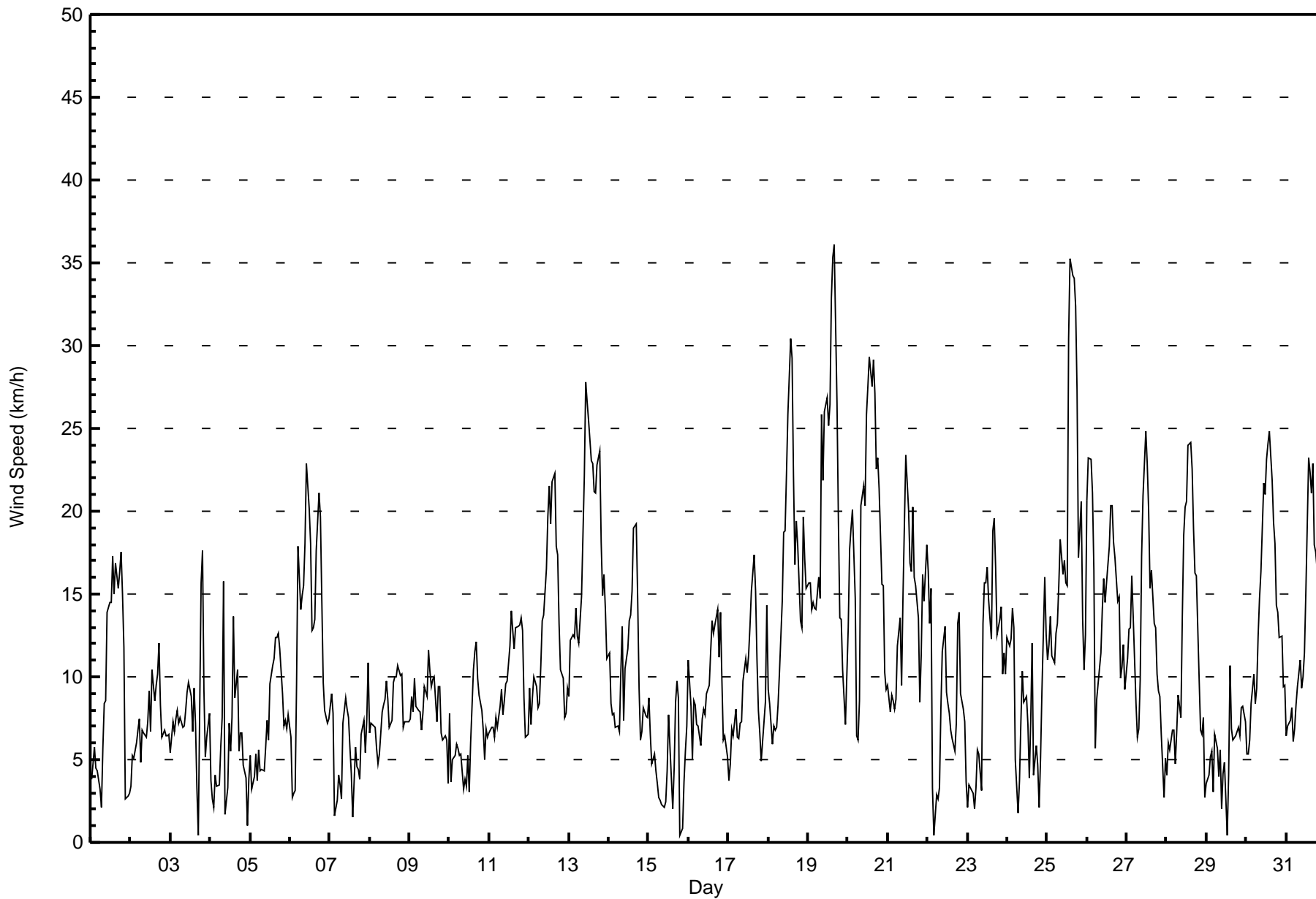
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Muskeg River - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Aug 19 17:00 | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | |
|--|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|---|----|----|----|----|----|----|---------------|----|
| Minimum Value: 1 km/h on Aug 8 02:00 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 7 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | 24 |
| 1-Aug | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 4 | 2 | 2 | 4 | 4 | 4 | 5 | 4 | 5 | 4 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 5 |
| 2-Aug | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 5 | 4 | 4 | 3 | 4 | 2 | 1 | 1 | 1 | 1 | 1 | 5 |
| 3-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 3 | 3 | 2 | 1 | 7 | 4 | 4 | 4 | 2 | 3 | 7 |
| 4-Aug | 4 | 1 | 2 | 2 | 2 | 2 | 5 | 3 | 4 | 2 | 1 | 2 | 2 | 2 | 4 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 5 |
| 5-Aug | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 3 | 4 | 4 | 5 | 4 | 4 | 3 | 3 | 1 | 1 | 1 | 2 | 5 |
| 6-Aug | 1 | 2 | 2 | 2 | 7 | 3 | 3 | 2 | 4 | 5 | 5 | 4 | 4 | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 3 | 2 | 2 | 1 | 7 |
| 7-Aug | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 4 | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 4 |
| 8-Aug | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 4 | 3 | 4 | 4 | 3 | 3 | 2 | 2 | 2 | 1 | 2 | 4 |
| 9-Aug | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 4 | 5 | 4 | 3 | 3 | 3 | 2 | 1 | 1 | 2 | 1 | 2 | 5 |
| 10-Aug | 4 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 4 | 3 | 3 | 4 | 2 | 2 | 2 | 1 | 2 | 1 | 4 |
| 11-Aug | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 5 | 4 | 4 | 4 | 3 | 3 | 2 | 2 | 3 | 1 | 2 | 5 |
| 12-Aug | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 4 | 4 | 5 | 5 | 7 | 6 | 7 | 6 | 5 | 5 | 4 | 2 | 2 | 1 | 1 | 2 | 7 |
| 13-Aug | 1 | 3 | 2 | 2 | 2 | 2 | 3 | 4 | 5 | 6 | 7 | 7 | 7 | 6 | 6 | 6 | 6 | 6 | 5 | 5 | 2 | 2 | 2 | 3 | 7 |
| 14-Aug | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 5 | 4 | 3 | 3 | 4 | 4 | 4 | 5 | 6 | 4 | 5 | 3 | 2 | 1 | 2 | 1 | 1 | 6 |
| 15-Aug | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 2 | 2 | 1 | 2 | 3 | 3 | 4 | 3 | 2 | 1 | 1 | 1 | 4 |
| 16-Aug | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 3 | 4 | 4 | 5 | 5 | 5 | 4 | 4 | 2 | 2 | 1 | 1 | 1 | 5 |
| 17-Aug | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 4 | 4 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 5 |
| 18-Aug | 4 | 1 | 1 | 1 | 1 | 1 | 2 | 4 | 5 | 6 | 5 | 5 | 8 | 7 | 9 | 7 | 6 | 6 | 6 | 4 | 3 | 5 | 5 | 4 | 9 |
| 19-Aug | 3 | 3 | 2 | 2 | 3 | 4 | 4 | 5 | 5 | 5 | 6 | 6 | 6 | 7 | 8 | 9 | 9 | 8 | 6 | 4 | 2 | 2 | 2 | 3 | 9 |
| 20-Aug | 3 | 4 | 3 | 3 | 4 | 2 | 2 | 3 | 5 | 4 | 4 | 6 | 7 | 7 | 7 | 7 | 7 | 7 | 6 | 5 | 4 | 3 | 4 | 2 | 7 |
| 21-Aug | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 6 | 3 | 4 | 6 | 5 | 5 | 5 | 6 | 5 | 4 | 2 | 6 | 3 | 4 | 3 | 6 |
| 22-Aug | 3 | 2 | 2 | 2 | 1 | 1 | 2 | 3 | 2 | 3 | 2 | 3 | 3 | 2 | 4 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 1 | 4 |
| 23-Aug | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 4 | 5 | 5 | 5 | 3 | 6 | 5 | 4 | 3 | 3 | 4 | 2 | 2 | 2 | 6 |
| 24-Aug | 2 | 2 | 2 | 3 | 6 | 2 | 3 | 2 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 5 | 3 | 6 |
| 25-Aug | 4 | 4 | 5 | 4 | 3 | 4 | 4 | 5 | 6 | 5 | 6 | 5 | 5 | 7 | 6 | 7 | 6 | 6 | 6 | 6 | 4 | 3 | 3 | 3 | 7 |
| 26-Aug | 4 | 4 | 3 | 4 | 5 | 3 | 2 | 3 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 6 | 5 | 4 | 5 | 3 | 2 | 2 | 2 | 1 | 6 |
| 27-Aug | 1 | 2 | 3 | 3 | 5 | 2 | 2 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 4 | 4 | 3 | 3 | 3 | 1 | 1 | 1 | 2 | 2 | 5 |
| 28-Aug | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 4 | 2 | 3 | 5 | 5 | 7 | 6 | 6 | 6 | 5 | 4 | 4 | 2 | 1 | 2 | 2 | 2 | 7 |
| 29-Aug | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 4 | 3 | 4 | 3 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 4 |
| 30-Aug | 1 | 1 | 1 | 3 | 2 | 2 | 2 | 3 | 3 | 4 | 5 | 6 | 6 | 6 | 6 | 5 | 5 | 4 | 3 | 3 | 3 | 3 | 3 | 2 | 6 |
| 31-Aug | 1 | 1 | 1 | 2 | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 6 | 6 | 6 | 5 | 5 | 5 | 5 | 4 | 1 | 2 | 1 | 2 | 6 |
| 4 4 5 4 7 4 5 5 6 6 7 7 8 7 9 9 9 8 7 6 6 5 5 4 Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Muskeg River - August 2017**

| Wind Speed Ranges (km/h) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 5 | 125 | 16.80 | 16.80 |
| 6 - 11 | 337 | 45.30 | 62.10 |
| 12 - 19 | 199 | 26.75 | 88.84 |
| 20 - 28 | 71 | 9.54 | 98.39 |
| 29 - 38 | 12 | 1.61 | 100.00 |
| > 38 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Muskeg River - August 2017**

| Wind Speed Ranges (km/h) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-----------------------------|----------------|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 5 | 3 | 3 | 5 | 6 | 5 | 4 | 7 | 14 | 22 | 24 | 11 | 6 | 5 | 9 | 1 | 0 | 125 |
| 6 - 11 | 1 | 8 | 13 | 5 | 9 | 6 | 5 | 28 | 97 | 86 | 39 | 10 | 7 | 7 | 6 | 10 | 337 |
| 12 - 19 | 4 | 15 | 15 | 2 | 0 | 0 | 2 | 27 | 24 | 21 | 44 | 23 | 11 | 9 | 2 | 0 | 199 |
| 20 - 28 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 12 | 9 | 0 | 4 | 23 | 6 | 12 | 1 | 0 | 71 |
| 29 - 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 2 | 3 | 0 | 0 | 12 |
| > 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 8 | 29 | 34 | 13 | 14 | 10 | 14 | 81 | 152 | 131 | 99 | 68 | 31 | 40 | 10 | 10 | 744 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Muskeg River - August 2017

| | | |
|---|---|---------------------------------|
| Direction of Maximum Speed: 293 deg on Aug 19 17:00 | | Hours in Service: 744 |
| Direction of Maximum Daily Speed Average: 261.7 deg on Aug 19 | | Hours of Data: 744 |
| Direction of Minimum Speed: 271 deg on Aug 3 18:00 | Direction of Minimum Daily Speed Average: 1.2 deg on Aug 15 | Hours of Missing Data: 0 |
| Monthly Average Direction: 215.5 deg | | Percent Operational Time: 100.0 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average |
|--------|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 244 | 167 | 168 | 179 | 177 | 180 | 194 | 28 | 34 | 45 | 44 | 34 | 28 | 35 | 35 | 51 | 45 | 46 | 48 | 48 | 56 | 64 | 184 | 152 | 49.3 |
| 2-Aug | 178 | 170 | 189 | 173 | 179 | 192 | 189 | 207 | 195 | 174 | 187 | 178 | 200 | 223 | 214 | 232 | 217 | 228 | 216 | 218 | 206 | 201 | 187 | 180 | 200.6 |
| 3-Aug | 181 | 173 | 179 | 184 | 187 | 180 | 186 | 191 | 207 | 202 | 179 | 193 | 174 | 226 | 218 | 194 | 242 | 271 | 6 | 22 | 83 | 186 | 68 | 23 | 179.9 |
| 4-Aug | 60 | 247 | 31 | 204 | 196 | 131 | 49 | 83 | 49 | 193 | 282 | 336 | 117 | 98 | 128 | 121 | 138 | 191 | 215 | 207 | 212 | 289 | 225 | 152 | 127.6 |
| 5-Aug | 195 | 6 | 92 | 197 | 204 | 157 | 181 | 192 | 224 | 227 | 233 | 207 | 196 | 185 | 189 | 185 | 184 | 192 | 183 | 195 | 200 | 191 | 197 | 196 | 192.8 |
| 6-Aug | 186 | 229 | 178 | 194 | 33 | 36 | 25 | 33 | 4 | 9 | 15 | 18 | 23 | 18 | 19 | 12 | 24 | 37 | 24 | 8 | 346 | 332 | 328 | 323 | 16.6 |
| 7-Aug | 324 | 334 | 328 | 230 | 194 | 183 | 199 | 199 | 345 | 349 | 16 | 346 | 43 | 42 | 316 | 273 | 218 | 224 | 207 | 213 | 219 | 200 | 212 | 227 | 278.0 |
| 8-Aug | 195 | 178 | 177 | 174 | 159 | 168 | 182 | 203 | 204 | 208 | 215 | 213 | 236 | 222 | 189 | 197 | 200 | 190 | 184 | 171 | 162 | 161 | 181 | 192 | 191.2 |
| 9-Aug | 180 | 175 | 200 | 207 | 196 | 193 | 188 | 181 | 209 | 196 | 195 | 217 | 222 | 216 | 228 | 195 | 210 | 178 | 178 | 188 | 195 | 220 | 180 | 205 | 198.7 |
| 10-Aug | 189 | 112 | 167 | 184 | 193 | 149 | 137 | 160 | 201 | 192 | 56 | 39 | 107 | 52 | 34 | 40 | 51 | 85 | 182 | 184 | 189 | 224 | 200 | 200 | 138.6 |
| 11-Aug | 184 | 199 | 167 | 187 | 186 | 186 | 181 | 180 | 188 | 210 | 209 | 203 | 180 | 181 | 183 | 204 | 180 | 167 | 164 | 159 | 159 | 175 | 195 | 192 | 182.4 |
| 12-Aug | 184 | 188 | 181 | 181 | 187 | 186 | 182 | 185 | 187 | 184 | 181 | 181 | 186 | 191 | 180 | 182 | 185 | 195 | 192 | 183 | 171 | 171 | 178 | 179 | 183.9 |
| 13-Aug | 174 | 163 | 160 | 158 | 161 | 158 | 157 | 166 | 164 | 161 | 159 | 162 | 159 | 171 | 176 | 164 | 162 | 156 | 167 | 167 | 158 | 164 | 160 | 154 | 162.7 |
| 14-Aug | 157 | 166 | 176 | 180 | 192 | 173 | 171 | 169 | 178 | 188 | 186 | 207 | 186 | 195 | 215 | 225 | 230 | 228 | 208 | 185 | 178 | 179 | 166 | 173 | 193.0 |
| 15-Aug | 164 | 170 | 218 | 132 | 162 | 215 | 248 | 301 | 293 | 349 | 160 | 241 | 282 | 298 | 204 | 99 | 74 | 85 | 59 | 83 | 265 | 144 | 233 | 257 | 178.7 |
| 16-Aug | 273 | 276 | 265 | 251 | 241 | 222 | 200 | 193 | 207 | 211 | 208 | 182 | 206 | 235 | 234 | 230 | 231 | 228 | 223 | 236 | 236 | 202 | 176 | 159 | 225.3 |
| 17-Aug | 163 | 206 | 211 | 194 | 207 | 197 | 202 | 201 | 199 | 211 | 219 | 197 | 224 | 211 | 226 | 269 | 286 | 288 | 282 | 263 | 202 | 190 | 201 | 252 | 227.3 |
| 18-Aug | 230 | 166 | 167 | 183 | 167 | 169 | 206 | 210 | 219 | 234 | 232 | 242 | 232 | 237 | 232 | 217 | 208 | 214 | 214 | 208 | 209 | 226 | 228 | 221 | 219.8 |
| 19-Aug | 232 | 247 | 259 | 257 | 257 | 241 | 236 | 226 | 248 | 243 | 249 | 261 | 267 | 276 | 278 | 285 | 293 | 288 | 275 | 263 | 242 | 240 | 256 | 235 | 261.7 |
| 20-Aug | 239 | 249 | 253 | 257 | 253 | 158 | 175 | 216 | 242 | 250 | 258 | 281 | 282 | 279 | 278 | 299 | 304 | 315 | 297 | 294 | 278 | 268 | 294 | 272 | 273.1 |
| 21-Aug | 251 | 188 | 200 | 217 | 210 | 212 | 225 | 230 | 204 | 227 | 236 | 240 | 248 | 267 | 262 | 237 | 256 | 293 | 303 | 314 | 16 | 29 | 19 | 22 | 255.5 |
| 22-Aug | 24 | 26 | 30 | 74 | 187 | 70 | 69 | 59 | 41 | 34 | 42 | 50 | 39 | 36 | 28 | 26 | 62 | 94 | 69 | 69 | 77 | 81 | 82 | 79 | 50.0 |
| 23-Aug | 291 | 160 | 141 | 90 | 155 | 178 | 206 | 225 | 213 | 182 | 182 | 196 | 209 | 192 | 170 | 170 | 171 | 163 | 165 | 161 | 169 | 171 | 170 | 165 | 177.4 |
| 24-Aug | 167 | 170 | 167 | 167 | 195 | 148 | 301 | 146 | 153 | 164 | 138 | 130 | 152 | 187 | 117 | 125 | 126 | 41 | 49 | 114 | 175 | 175 | 221 | 222 | 163.7 |
| 25-Aug | 200 | 203 | 215 | 210 | 199 | 209 | 212 | 205 | 215 | 214 | 210 | 202 | 211 | 240 | 237 | 238 | 242 | 249 | 256 | 240 | 236 | 238 | 247 | 233 | 228.4 |
| 26-Aug | 237 | 249 | 249 | 250 | 239 | 166 | 168 | 211 | 216 | 219 | 224 | 215 | 220 | 229 | 245 | 239 | 236 | 244 | 236 | 249 | 224 | 216 | 225 | 222 | 232.0 |
| 27-Aug | 229 | 230 | 234 | 237 | 239 | 158 | 183 | 207 | 217 | 246 | 251 | 250 | 254 | 266 | 274 | 281 | 279 | 290 | 290 | 279 | 302 | 330 | 253 | 296 | 254.6 |
| 28-Aug | 279 | 216 | 265 | 253 | 231 | 208 | 212 | 232 | 223 | 251 | 285 | 287 | 293 | 284 | 289 | 294 | 311 | 304 | 300 | 308 | 310 | 338 | 309 | 284 | 283.2 |
| 29-Aug | 286 | 161 | 169 | 200 | 225 | 168 | 173 | 173 | 190 | 262 | 2 | 43 | 15 | 21 | 52 | 54 | 105 | 106 | 111 | 98 | 106 | 130 | 141 | 166 | 125.6 |
| 30-Aug | 204 | 187 | 193 | 169 | 161 | 163 | 169 | 169 | 164 | 157 | 161 | 173 | 161 | 166 | 172 | 161 | 155 | 157 | 152 | 173 | 184 | 180 | 186 | 174 | 167.3 |
| 31-Aug | 200 | 190 | 183 | 185 | 192 | 170 | 170 | 187 | 188 | 202 | 188 | 205 | 222 | 240 | 256 | 263 | 301 | 301 | 300 | 286 | 256 | 242 | 247 | 246 | 240.2 |

211.4 204.8 206.4 205.4 203.5 178.5 188.6 193.1 205.4 213.1 213.3 221.5 221.1 232.4 230.5 231.4 235.7 231.3 232.5 222.2 204.1 203.9 207.7 213.5
 Diurnal Average

All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

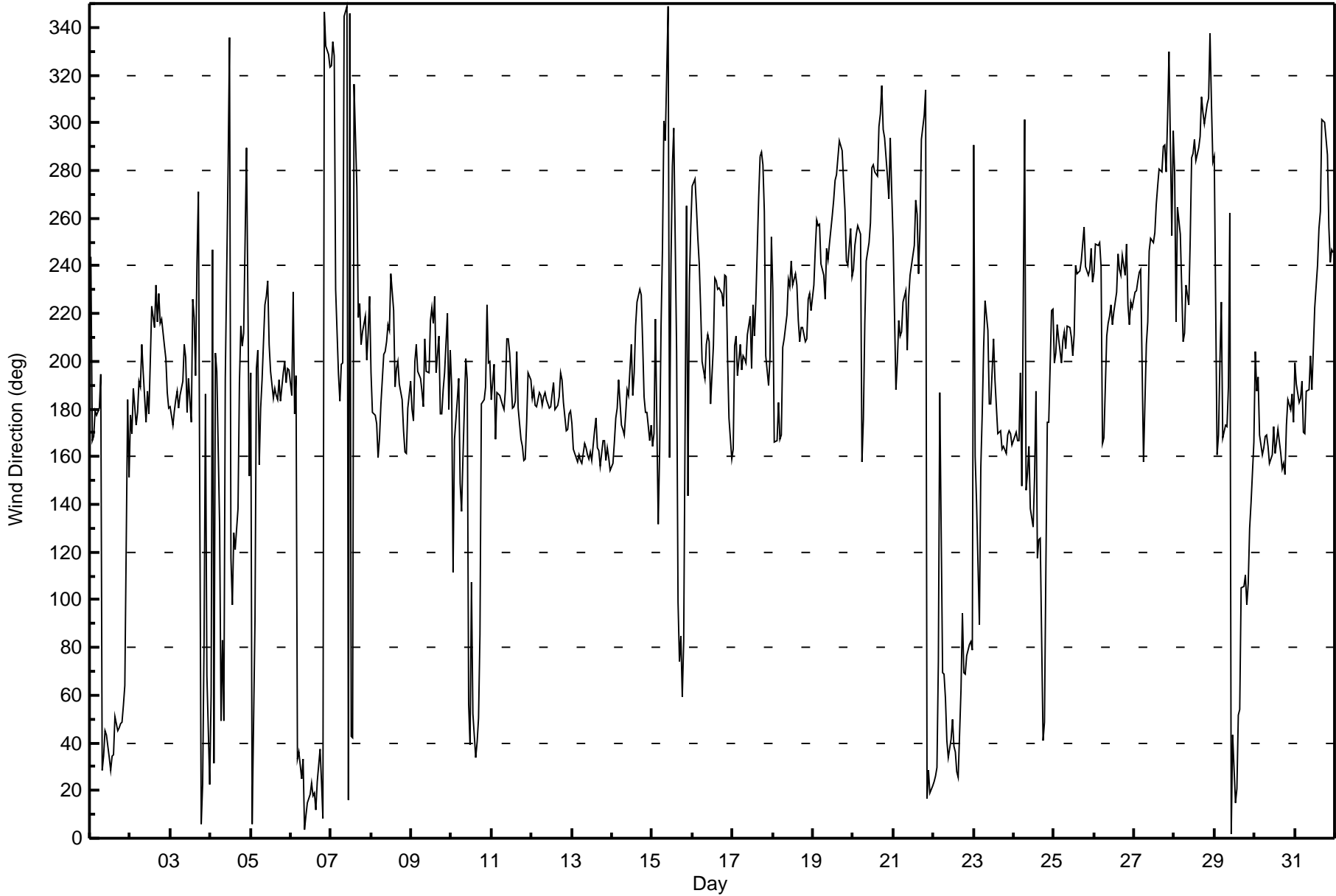
Wind Direction (WD) - deg
Muskeg River - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | | | | | | | | | | | | | | | | | | | Hours in Service: 744 | | | | | | |
|--|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|----|----|----|---------------------------------|----|----|----|----|----|---------------|
| Maximum Value: 100 deg on Aug 7 15:00 | | | | | | | | | | | | | | | | | | | Hours of Data: 744 | | | | | | |
| Minimum Value: 5 deg on Aug 27 01:00 | | | | | | | | | | | | | | | | | | | Hours of Missing Data: 0 | | | | | | |
| Percentiles: P ₁ = 7 P ₁₀ = 11 Q ₁ = 15 Median = 19 Q ₃ = 28 P ₉₀ = 43 P ₉₉ = 87 | | | | | | | | | | | | | | | | | | | Hours of Calibration: 0 | | | | | | |
| | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 34 | 25 | 16 | 24 | 17 | 21 | 32 | 78 | 19 | 21 | 19 | 24 | 29 | 20 | 28 | 19 | 20 | 15 | 9 | 9 | 9 | 70 | 38 | 35 | 78 |
| 2-Aug | 16 | 20 | 12 | 16 | 11 | 19 | 25 | 24 | 31 | 46 | 32 | 27 | 69 | 38 | 44 | 38 | 27 | 23 | 18 | 15 | 16 | 24 | 16 | 26 | 69 |
| 3-Aug | 19 | 10 | 11 | 10 | 14 | 15 | 15 | 24 | 30 | 31 | 30 | 34 | 39 | 71 | 31 | 28 | 60 | 97 | 39 | 20 | 29 | 68 | 27 | 35 | 97 |
| 4-Aug | 87 | 51 | 91 | 40 | 47 | 19 | 42 | 21 | 23 | 72 | 42 | 31 | 59 | 30 | 23 | 31 | 20 | 32 | 15 | 20 | 20 | 36 | 93 | 56 | 93 |
| 5-Aug | 26 | 70 | 39 | 43 | 22 | 16 | 20 | 31 | 28 | 32 | 29 | 43 | 35 | 29 | 34 | 30 | 27 | 25 | 18 | 21 | 15 | 15 | 15 | 15 | 70 |
| 6-Aug | 13 | 66 | 43 | 42 | 57 | 12 | 19 | 19 | 17 | 18 | 16 | 17 | 17 | 20 | 20 | 20 | 16 | 12 | 16 | 24 | 18 | 18 | 16 | 17 | 66 |
| 7-Aug | 16 | 16 | 22 | 78 | 81 | 25 | 22 | 44 | 36 | 31 | 42 | 42 | 60 | 88 | 100 | 49 | 46 | 44 | 41 | 21 | 18 | 18 | 21 | 11 | 100 |
| 8-Aug | 25 | 10 | 6 | 7 | 8 | 11 | 17 | 25 | 27 | 27 | 27 | 41 | 54 | 48 | 32 | 34 | 30 | 25 | 23 | 10 | 8 | 10 | 13 | 16 | 54 |
| 9-Aug | 11 | 9 | 18 | 15 | 15 | 19 | 15 | 22 | 22 | 25 | 28 | 29 | 39 | 39 | 42 | 30 | 38 | 21 | 14 | 17 | 16 | 24 | 14 | 46 | 46 |
| 10-Aug | 33 | 68 | 35 | 47 | 22 | 17 | 22 | 37 | 44 | 52 | 73 | 56 | 70 | 61 | 37 | 29 | 24 | 41 | 20 | 18 | 17 | 24 | 22 | 17 | 73 |
| 11-Aug | 16 | 23 | 10 | 12 | 16 | 17 | 17 | 17 | 28 | 26 | 28 | 32 | 30 | 26 | 26 | 29 | 26 | 17 | 14 | 9 | 8 | 17 | 18 | 17 | 32 |
| 12-Aug | 15 | 16 | 12 | 12 | 15 | 17 | 17 | 20 | 22 | 21 | 21 | 20 | 22 | 25 | 20 | 21 | 20 | 23 | 22 | 17 | 11 | 10 | 13 | 13 | 25 |
| 13-Aug | 11 | 9 | 9 | 7 | 8 | 9 | 13 | 14 | 16 | 14 | 15 | 16 | 15 | 20 | 20 | 19 | 18 | 15 | 13 | 12 | 9 | 10 | 10 | 13 | 20 |
| 14-Aug | 12 | 21 | 17 | 18 | 20 | 21 | 21 | 21 | 20 | 51 | 31 | 27 | 25 | 27 | 23 | 18 | 15 | 15 | 23 | 27 | 15 | 16 | 10 | 13 | 51 |
| 15-Aug | 12 | 22 | 28 | 40 | 33 | 36 | 22 | 75 | 70 | 84 | 57 | 37 | 17 | 35 | 62 | 36 | 26 | 19 | 29 | 89 | 82 | 26 | 11 | 24 | 89 |
| 16-Aug | 8 | 11 | 38 | 9 | 18 | 16 | 23 | 20 | 26 | 27 | 31 | 33 | 43 | 28 | 25 | 30 | 23 | 18 | 20 | 7 | 7 | 16 | 17 | 26 | 43 |
| 17-Aug | 63 | 42 | 16 | 16 | 15 | 15 | 22 | 26 | 29 | 24 | 23 | 33 | 32 | 30 | 26 | 16 | 22 | 17 | 8 | 9 | 25 | 11 | 18 | 9 | 63 |
| 18-Aug | 40 | 11 | 15 | 18 | 18 | 21 | 21 | 23 | 23 | 17 | 18 | 14 | 16 | 14 | 20 | 20 | 24 | 21 | 22 | 20 | 21 | 15 | 16 | 18 | 40 |
| 19-Aug | 11 | 13 | 9 | 10 | 10 | 8 | 13 | 18 | 11 | 12 | 13 | 16 | 14 | 14 | 14 | 14 | 14 | 15 | 16 | 28 | 10 | 10 | 13 | 12 | 28 |
| 20-Aug | 11 | 11 | 9 | 10 | 14 | 26 | 24 | 25 | 12 | 13 | 15 | 18 | 18 | 15 | 16 | 15 | 19 | 21 | 14 | 13 | 13 | 11 | 33 | 12 | 33 |
| 21-Aug | 20 | 15 | 23 | 19 | 32 | 24 | 13 | 11 | 27 | 21 | 12 | 12 | 20 | 20 | 20 | 15 | 20 | 17 | 17 | 12 | 37 | 13 | 17 | 11 | 37 |
| 22-Aug | 9 | 8 | 7 | 38 | 92 | 25 | 59 | 60 | 18 | 18 | 16 | 23 | 30 | 33 | 58 | 51 | 66 | 34 | 11 | 10 | 13 | 12 | 14 | 22 | 92 |
| 23-Aug | 53 | 46 | 20 | 37 | 60 | 53 | 23 | 18 | 51 | 18 | 20 | 26 | 24 | 22 | 14 | 17 | 15 | 13 | 12 | 13 | 16 | 14 | 10 | 8 | 60 |
| 24-Aug | 9 | 10 | 10 | 13 | 26 | 36 | 82 | 32 | 15 | 17 | 24 | 21 | 23 | 39 | 20 | 18 | 71 | 39 | 31 | 73 | 29 | 16 | 21 | 18 | 82 |
| 25-Aug | 22 | 23 | 21 | 22 | 21 | 21 | 22 | 23 | 22 | 22 | 23 | 24 | 23 | 13 | 10 | 11 | 10 | 11 | 12 | 19 | 11 | 13 | 17 | 11 | 24 |
| 26-Aug | 10 | 9 | 9 | 10 | 17 | 40 | 17 | 24 | 22 | 21 | 18 | 24 | 25 | 22 | 19 | 20 | 18 | 11 | 18 | 11 | 15 | 16 | 9 | 9 | 40 |
| 27-Aug | 5 | 9 | 11 | 10 | 20 | 17 | 26 | 29 | 28 | 17 | 14 | 13 | 16 | 17 | 15 | 13 | 13 | 16 | 12 | 7 | 12 | 13 | 56 | 37 | 56 |
| 28-Aug | 43 | 15 | 34 | 24 | 25 | 38 | 22 | 25 | 27 | 16 | 19 | 18 | 23 | 19 | 19 | 22 | 18 | 15 | 13 | 12 | 9 | 18 | 14 | 69 | 69 |
| 29-Aug | 65 | 63 | 17 | 22 | 48 | 6 | 15 | 34 | 28 | 87 | 50 | 36 | 99 | 73 | 17 | 63 | 51 | 26 | 16 | 12 | 16 | 14 | 20 | 16 | 99 |
| 30-Aug | 18 | 16 | 18 | 18 | 8 | 11 | 11 | 14 | 13 | 14 | 16 | 18 | 17 | 18 | 18 | 16 | 14 | 14 | 11 | 15 | 17 | 16 | 19 | 15 | 19 |
| 31-Aug | 16 | 16 | 15 | 18 | 19 | 19 | 19 | 23 | 23 | 24 | 22 | 26 | 21 | 17 | 16 | 16 | 15 | 16 | 13 | 9 | 13 | 6 | 6 | 7 | 26 |
| | 87 | 70 | 91 | 78 | 92 | 53 | 82 | 78 | 70 | 87 | 73 | 56 | 99 | 88 | 100 | 63 | 71 | 97 | 41 | 89 | 82 | 70 | 93 | 69 | |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Muskeg River - August 2017





Wood Buffalo Environmental Association

SO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|----------------|-----------------|---------------|
| Station Name: | Muskeg River | Station number: | AMS 16 |
| Calibration Date: | August 1, 2017 | Last Cal Date: | July 12, 2017 |
| Start time (MST): | 9:21 | End time (MST): | 14:11 |
| Reason: | Routine | | |

Calibration Standards

| | | | | |
|-----------------------|------------------|-----|------------------|------------------|
| Cal Gas Concentration | <u>48.2</u> | ppm | Cal Gas Exp Date | November 4, 2017 |
| Cal Gas Cylinder # | <u>EY0000638</u> | | | |
| Calibrator Make/Model | API T700 | | Serial Number | 493 |
| ZAG Make/Model | API 701 | | Serial Number | 2155 |

Analyzer Information

| | | | | | |
|----------------------|--------------|--------------------|--------------|---------------|-------|
| Analyzer make: | Thermo 43i | Analyzer serial #: | 1118148498 | | |
| | <u>Start</u> | <u>Finish</u> | <u>Start</u> | <u>Finish</u> | |
| Analyzer Range | 0 - 1000 ppb | PMT voltage | -710.4 | -710 | |
| Calculated slope | 0.993423 | 1.006237 | Lamp voltage | 808 | 807 |
| Calculated intercept | 1.612115 | -0.074329 | Pressure | 721.0 | 721.6 |
| Analyzer Background | 8.6 | 8.5 | Flow | 0.441 | 0.451 |
| Analyzer Coefficient | 1.032 | 1.032 | Intensity | 90 | 91 |

SO₂ Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 4998 | 0.0 | 0.0 | 0.2 | ---- |
| as found span | 4931 | 76.6 | 737.3 | 732.2 | 1.007 |
| calibrator zero | 4998 | 0.0 | 0.0 | 0.2 | ---- |
| high point | 4933 | 76.6 | 737.0 | 732.2 | 1.007 |
| second point | 4972 | 38.5 | 370.4 | 369.2 | 1.003 |
| third point | 4993 | 19.4 | 186.6 | 184.6 | 1.011 |
| as left zero | 4998 | 0.0 | 0.0 | 0.4 | ---- |
| as left span | 4931 | 76.6 | 737.3 | 740.6 | 0.996 |
| Average Correction Factor | | | | | 1.007 |
| Corrected As found | 732.00 | Previous response | 740.57 | *% change | 1.2% |

* = > +/-5% change initiates investigation

Notes:

Changed inlet filter after as founds. No adjustments made.

Calibration Performed By: Jayme Marcoux



Wood Buffalo Environmental Association

SO₂ Calibration Summary

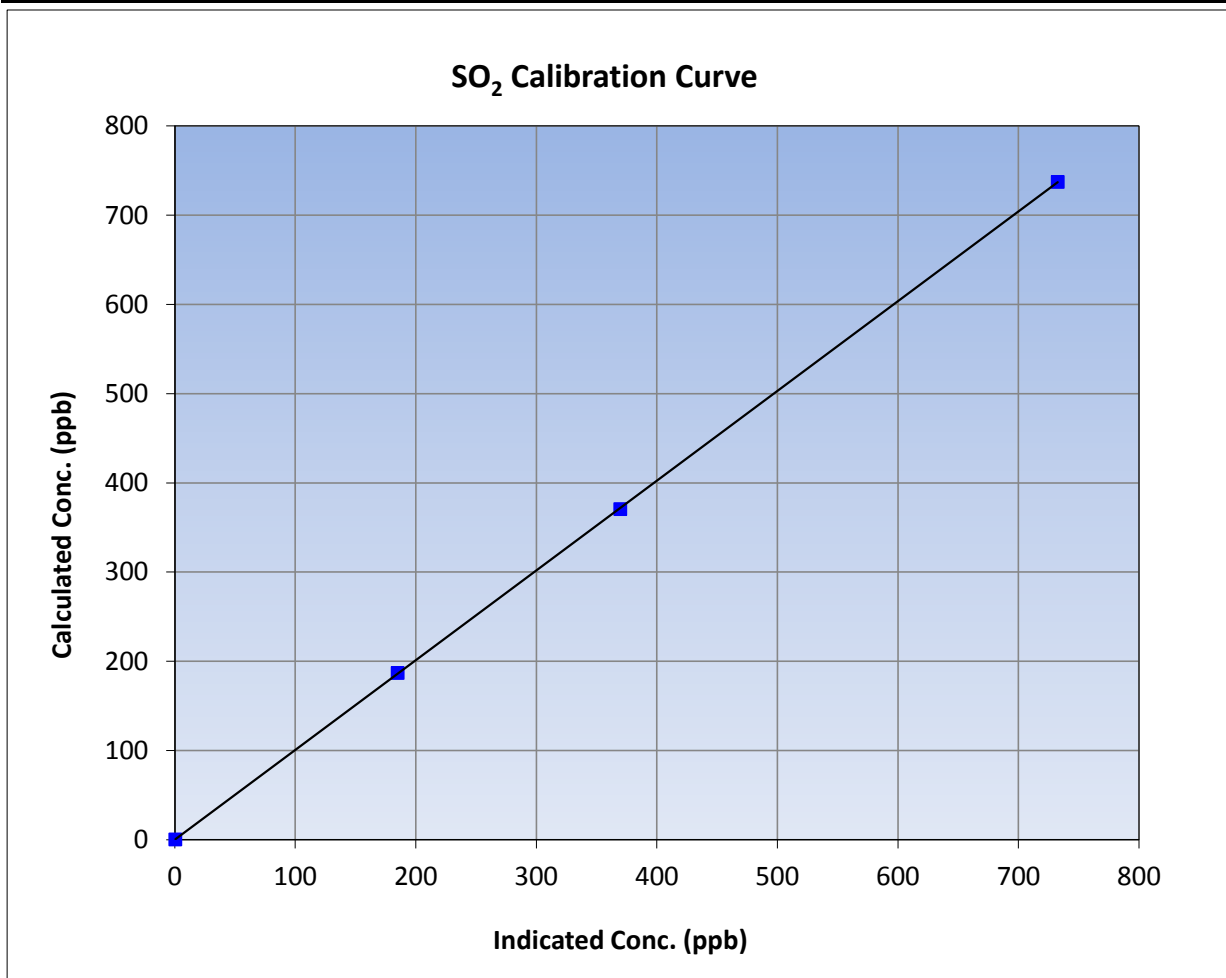
Version-03-2017

Station Information

| | | | |
|------------------|----------------|----------------------|---------------|
| Calibration Date | August 1, 2017 | Previous Calibration | July 12, 2017 |
| Station Name | Muskeg River | Station Number | AMS 16 |
| Start Time (MST) | 8:39 | End Time (MST) | 14:11 |
| Analyzer make | Thermo 43i | Analyzer serial # | 1118148498 |

Calibration Data

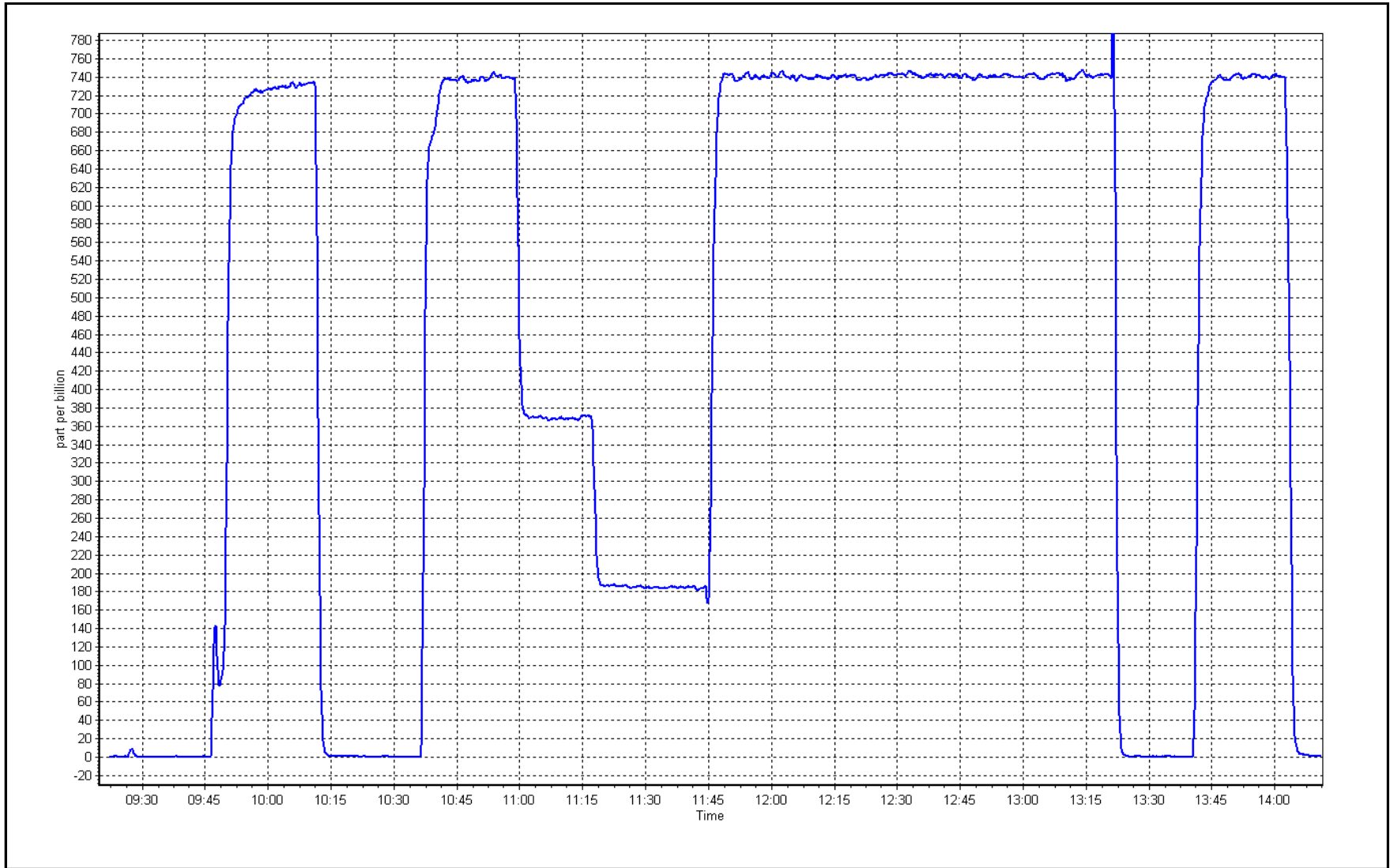
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|-------------|
| 0.0 | 0.2 | ---- | Correlation Coefficient | 0.999993 | |
| 737.0 | 732.2 | 1.0066 | | | ≥0.995 |
| 370.4 | 369.2 | 1.0031 | Slope | 1.006237 | |
| 186.6 | 184.6 | 1.0106 | | | 0.90 - 1.10 |
| | | | Intercept | -0.074329 | +/-30 |



SO2 Calibration Plot

Date: August 1, 2017

Location: Muskeg River





Wood Buffalo Environmental Association

THC Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|----------------|-----------------|---------------|
| Station Name: | Muskeg River | Station number: | AMS 16 |
| Calibration Date: | August 1, 2017 | Last Cal Date: | July 12, 2017 |
| Start time (MST): | 9:21 | End time (MST): | 14:04 |
| Reason: | Maintenance | | |

Calibration Standards

| | | | |
|-----------------------|------------------|---------------------|------------------|
| Gas Cert Reference | EY0000638 | Cal Gas Expiry Date | November 4, 2017 |
| CH4 Cal Gas Conc. | <u>502.0</u> ppm | CH4 Equiv Conc. | 1035.5 ppm |
| C3H8 Cal Gas Conc. | <u>194.0</u> ppm | Station temp. | 23 Deg C |
| Calibrator Make/Model | API T700 | Serial Number | 493 |
| ZAG Make/Model | API 701 | Serial Number | 2155 |

Analyzer Information

| | | | |
|----------------------|---------------|---------------------|--------------|
| Analyzer make: | Thermo 51i-LT | Analyzer serial #: | 1218153458 |
| | <u>Start</u> | <u>Finish</u> | <u>Start</u> |
| Analyzer Range | 0 - 25 ppm | Bias voltage supply | -287 |
| Calculated slope | 1.010741 | Sample pressure | 8.2 |
| Calculated intercept | -0.078005 | Fuel pressure | 24.2 |
| Analyzer Background | 2.07 | Air pressure | 34.9 |
| Analyzer Coefficient | 4.796 | Flame temperature | 157.5 |

THC Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 4998 | 0.0 | 0.00 | 0.21 | ---- |
| as found span | 4932 | 76.5 | 15.82 | 16.17 | 0.978 |
| calibrator zero | 4998 | 0.0 | 0.00 | 0.12 | ---- |
| high point | 4933 | 76.5 | 15.81 | 15.86 | 0.997 |
| second point | 4970 | 38.5 | 7.96 | 7.99 | 0.996 |
| third point | 4992 | 19.4 | 4.01 | 4.09 | 0.981 |
| as left zero | 4998 | 0.0 | 0.00 | -0.12 | ---- |
| as left span | 4932 | 76.5 | 15.82 | 15.75 | 1.004 |
| Average Correction Factor | | | | | 0.991 |
| Corrected As found | 15.96 | Previous response | 15.73 | *% change | -1.5% |

* = > +/-5% change initiates investigation

Notes: Changed inlet filter after as founds. Adjusted the zero and the span.

Calibration Performed By: Jayme Marcoux



Wood Buffalo Environmental Association

THC Calibration Summary

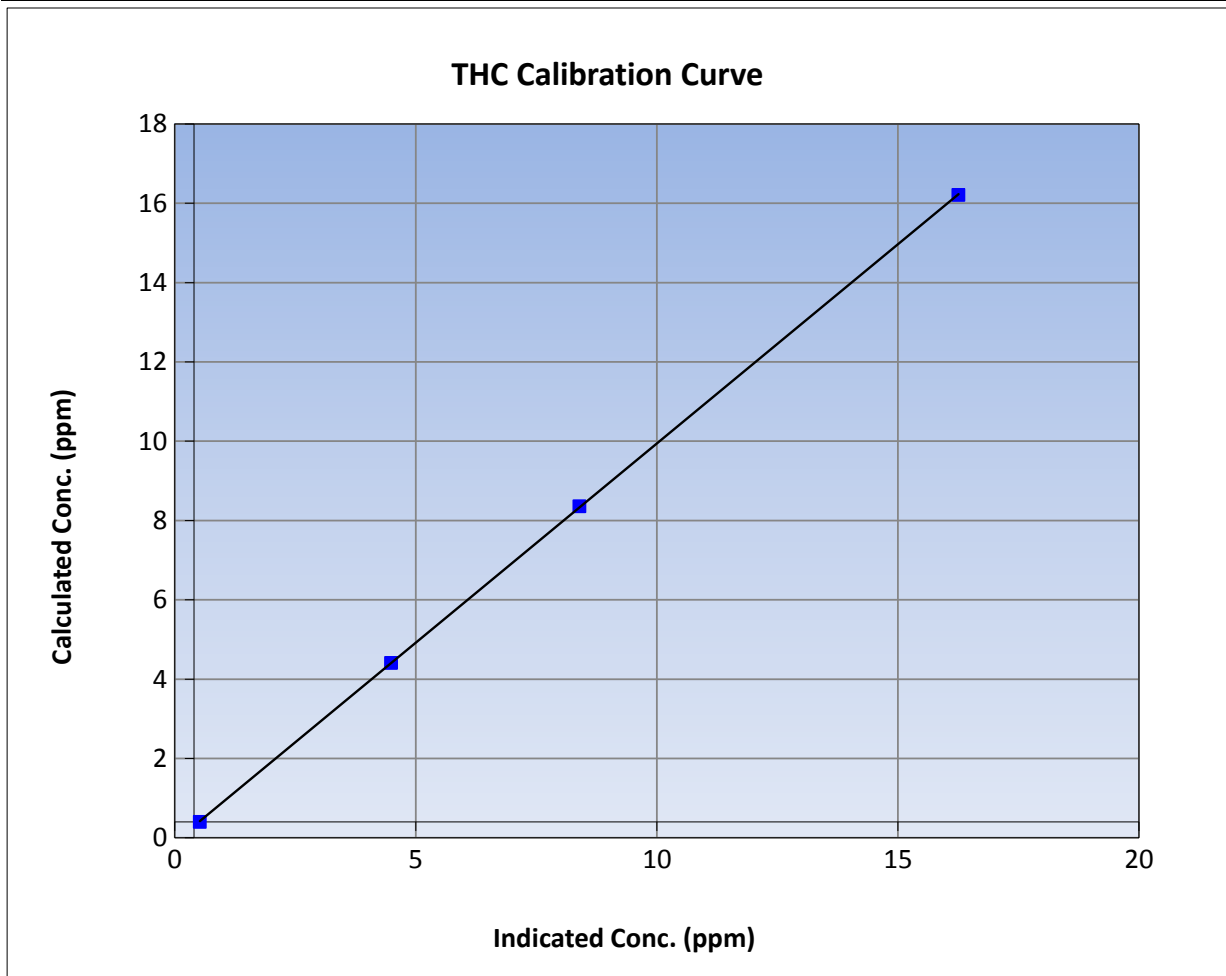
Version-03-2017

Station Information

| | | | |
|------------------|----------------|----------------------|---------------|
| Calibration Date | August 1, 2017 | Previous Calibration | July 12, 2017 |
| Station Name | Muskeg River | Station Number | AMS 16 |
| Start Time (MST) | 8:37 | End Time (MST) | 14:04 |
| Analyzer make | Thermo 51i-LT | Analyzer serial # | 1218153458 |

Calibration Data

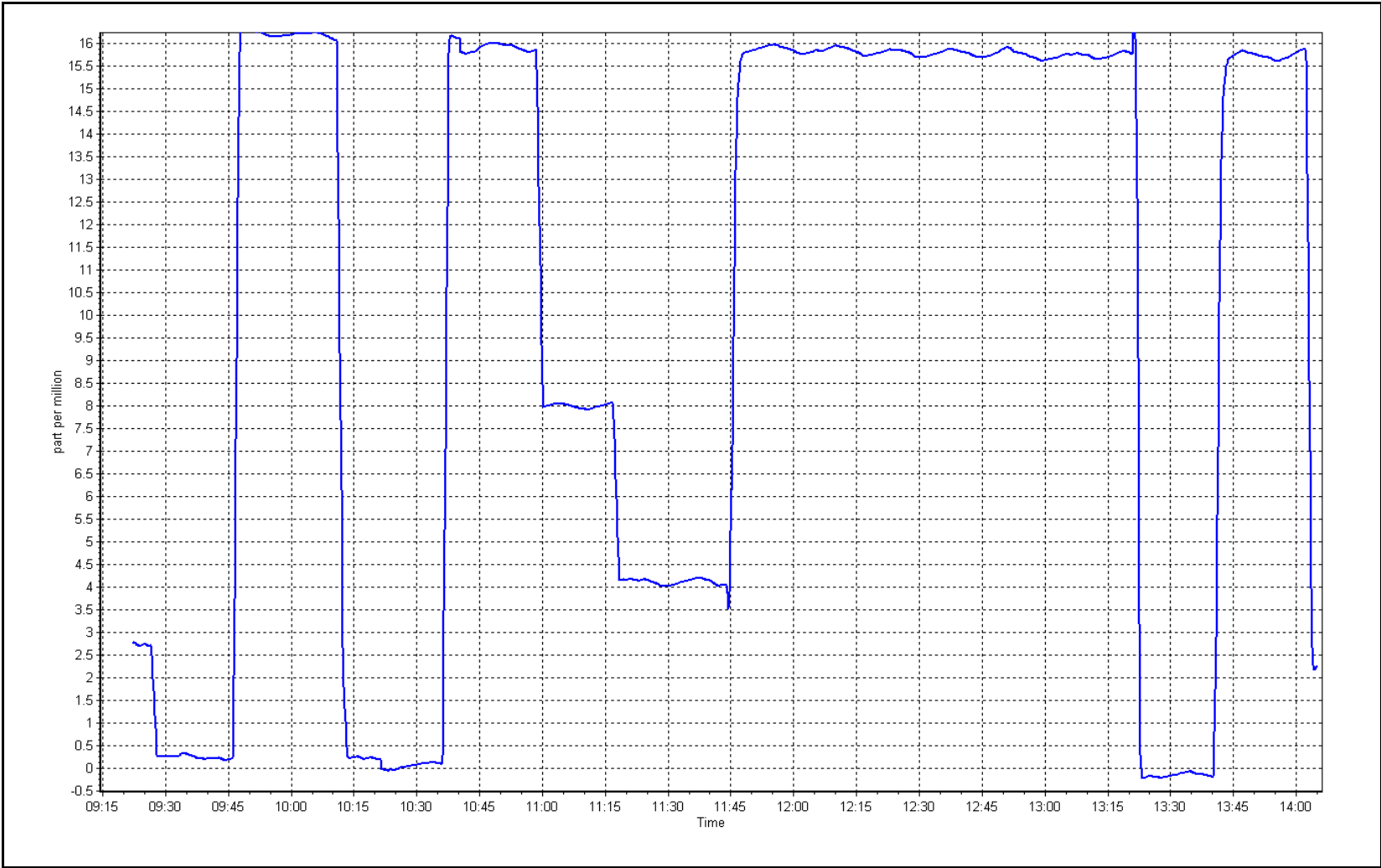
| Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (lc) | Correction factor (Cc/lc) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|-------------|
| 0.0 | 0.1 | ---- | Correlation Coefficient | 0.999987 | |
| 15.8 | 15.9 | 0.9972 | | | ≥0.995 |
| 8.0 | 8.0 | 0.9960 | Slope | 1.004718 | |
| 4.0 | 4.1 | 0.9806 | | | 0.90 - 1.10 |
| | | | Intercept | -0.102463 | +/-1.5 |



THC Calibration Plot

Date: August 1, 2017

Location: Muskeg River





Wood Buffalo Environmental Association

NO_x - NO - NO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|----------------|-----------------|---------------|
| Station Name: | Muskeg River | Station number: | AMS 16 |
| Calibration Date: | August 1, 2017 | Last Cal Date: | July 18, 2017 |
| Start time (MST): | 9:21 | End time (MST): | 14:08 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|-------------------|-----------------|---------------------|-----------------|
| NO Gas Cylinder # | EY0000638 | Cal Gas Expiry Date | November-04-19 |
| NOX Cal Gas Conc. | <u>52.4</u> ppb | NO Cal Gas Conc. | <u>52.4</u> ppb |
| Calibrator Model | API T700 | Serial Number | 493 |
| ZAG make/model | API T701 | Serial Number | 2155 |

Analyzer Information

| | | | | | |
|-----------------------------|--------------|---------------|-------------------------------|--------------|---------------|
| Analyzer make: Thermo 42i | | | Analyzer serial #: 1426262593 | | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| NO coefficient | 1.071 | 1.061 | NOX Range (ppb) | 0 - 1000 ppb | |
| NOX coefficient | 0.998 | 0.997 | PMT Temperature | -3.0 | -3.0 |
| NO ₂ coefficient | 1.000 | 1.000 | Reaction cell Press | 161.3 | 160.7 |
| NO bkgrnd | 8.9 | 8.8 | Sample Flow | 0.983 | 0.964 |
| NOX bkgrnd | 9.1 | 9.0 | PMT Voltage | -744.8 | -745.2 |

Calibration Statistics

| | | |
|----------------------------|--------------|---------------|
| | <u>Start</u> | <u>Finish</u> |
| NO _x Cal Slope | 1.001852 | 1.000436 |
| NO _x Cal Offset | 0.233603 | 1.055525 |
| NO Cal Slope | 1.000737 | 0.999649 |
| NO Cal Offset | 0.674853 | 1.356558 |
| NO ₂ Cal Slope | 0.997366 | 0.998012 |
| NO ₂ Cal Offset | -0.142940 | -0.009671 |



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Version-03-2017

Dilution Calibration Data

| Set Point | Dilution flow rate (sccm) | Dilution flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|---------------------------|---------------------------|---------------------------|---|--|---|--|---------------------------------------|--|---|--|
| as found zero | 4998 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | ---- | ---- |
| as found span | 4930 | 76.6 | 801.7 | 801.7 | 0.0 | 815.3 | 814.1 | 1.3 | 0.9833 | 0.9848 |
| calibrator zero | 4998 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | ---- | ---- |
| high point | 4933 | 76.6 | 801.2 | 801.2 | 0.0 | 800.4 | 800.8 | -0.4 | 1.0010 | 1.0005 |
| second point | 4970 | 38.5 | 402.8 | 402.8 | 0.0 | 400.9 | 401.0 | 0.0 | 1.0047 | 1.0045 |
| third point | 4993 | 19.4 | 202.8 | 202.8 | 0.0 | 200.7 | 200.1 | 0.6 | 1.0105 | 1.0135 |
| as left zero | 4998 | 0.0 | 0.0 | 0.0 | 0.0 | 2.5 | 0.2 | 2.4 | ---- | ---- |
| as left span | 4930 | 76.6 | 801.7 | 418.7 | 383.0 | 799.0 | 403.7 | 395.4 | 1.0034 | 1.0372 |
| Average Correction Factor | | | | | | | | | 1.0054 | 1.0062 |

Corrected As found NO_x = 815.3 ppb NO = 814.1 ppb *Percent Change NO_x = -1.9%
 Previous Response NO_x = 800.0 ppb NO = 800.4 ppb *Percent Change NO = -1.7%
 * = > +/-5% change initiates investigation

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO drop conc (ppb) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | Converter Efficiency <i>Limit = 96-104%</i> |
|---------------------------|------------------------------|---|--|---------------------------------------|--|---|--|---|--|
| 1st NO ref point | | 0.0 | 799.7 | 798.7 | 1.1 | 1.0019 | 1.0032 | ---- | ---- |
| 1st NO2 (400 ppb O3) | 418.7 | 380.0 | 799.5 | 418.7 | 380.8 | 1.0022 | ---- | 0.9979 | 100.2% |
| 2nd NO2 (200 ppb O3) | 599.4 | 199.3 | 799.0 | 599.4 | 199.6 | 1.0028 | ---- | 0.9985 | 100.2% |
| 3rd NO2 (100 ppb O3) | 694.8 | 103.9 | 799.0 | 694.8 | 104.2 | 1.0028 | ---- | 0.9971 | 100.3% |
| 2nd NO ref point | ---- | 0.0 | 798.4 | 797.3 | 1.1 | 1.0035 | 1.0049 | ---- | ---- |
| Average Correction Factor | | | | | | 1.0028 | 1.0040 | 0.9978 | 100.2% |

Notes: Changed inlet filter after asfinds. Adjusted the span.

Calibration Performed By: Jayme Marcoux



Wood Buffalo Environmental Association

NO_x Calibration Summary

Version-03-2017

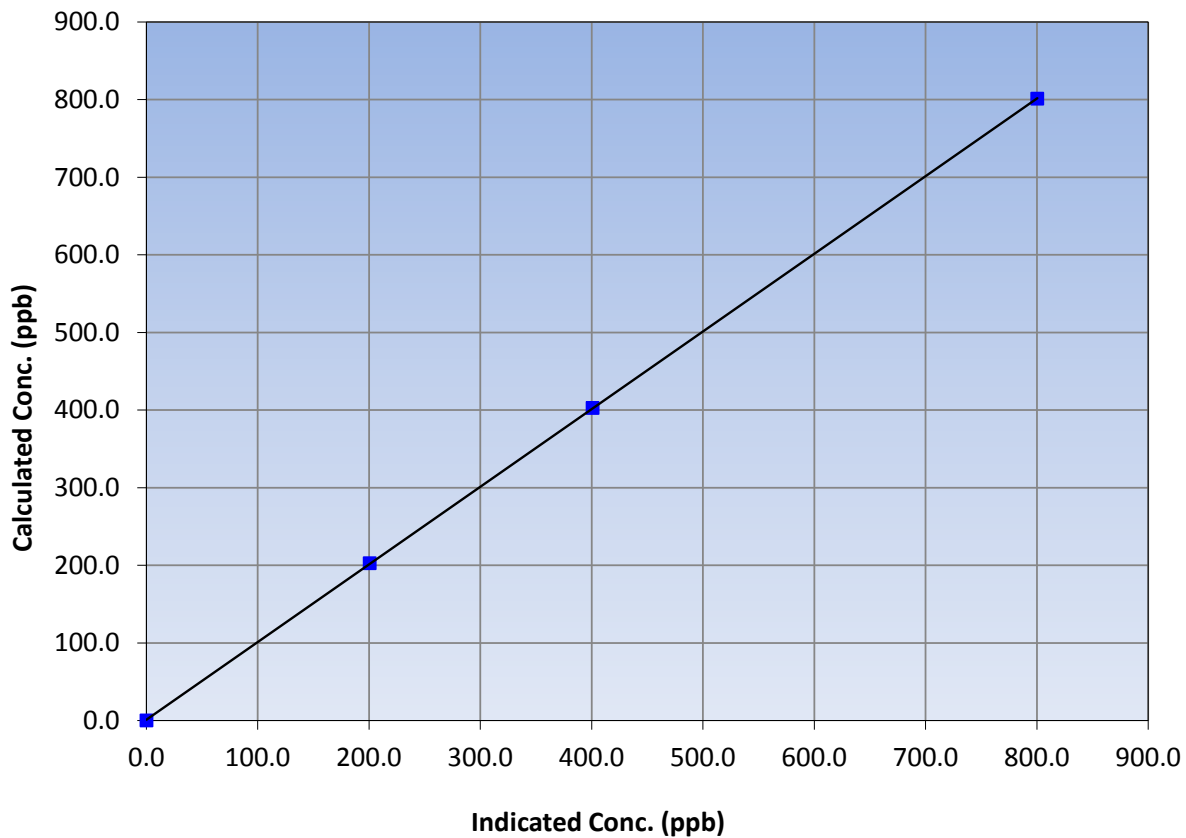
Station Information

| | | | |
|------------------|----------------|----------------------|---------------|
| Calibration Date | August 1, 2017 | Previous Calibration | July 18, 2017 |
| Station Name | Muskeg River | Station Number | AMS 16 |
| Start Time (MST) | 9:21 | End Time (MST) | 14:08 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1426262593 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | ≥0.995 | |
| 801.2 | 800.4 | 1.0010 | | | |
| 402.8 | 400.9 | 1.0047 | | | |
| 202.8 | 200.7 | 1.0105 | | | |
| | | | Slope | 1.000436 | 0.90 - 1.10 |
| | | | Intercept | 1.055525 | +/-20 |

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

Version-03-2017

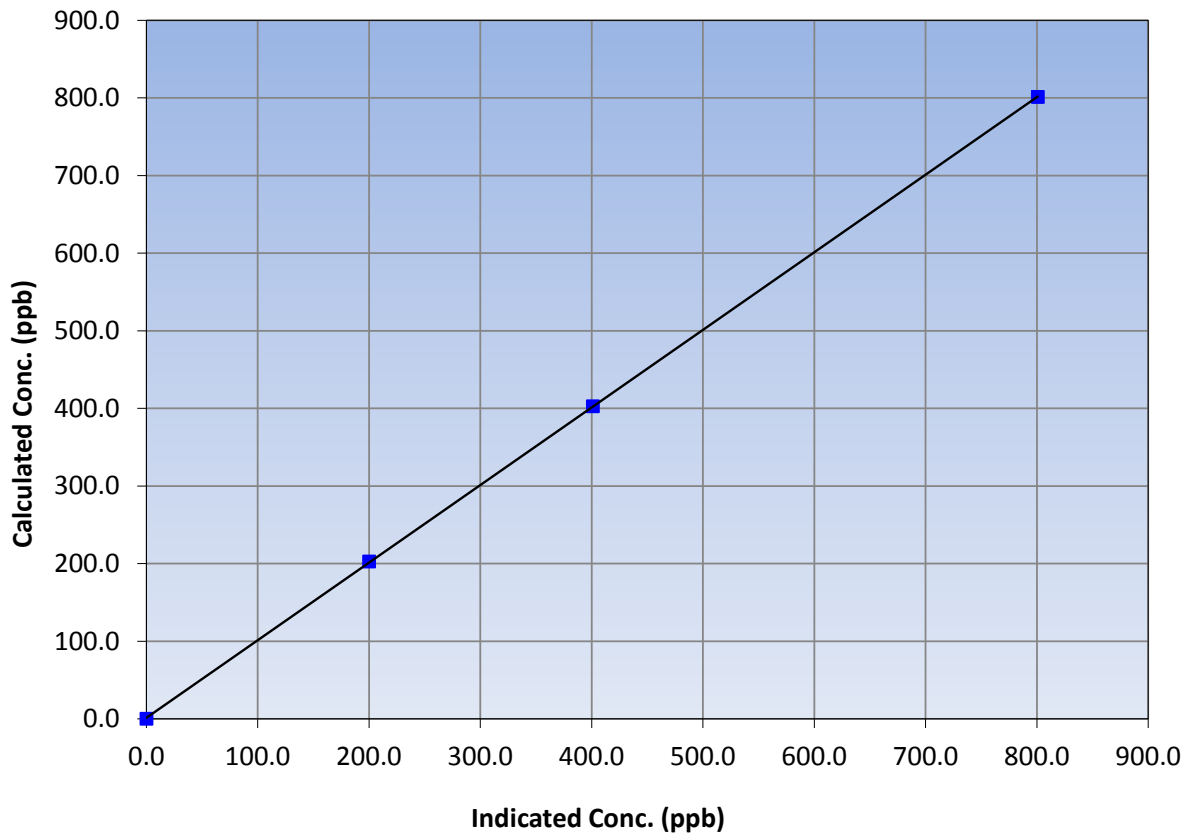
Station Information

| | | | |
|------------------|----------------|----------------------|---------------|
| Calibration Date | August 1, 2017 | Previous Calibration | July 18, 2017 |
| Station Name | Muskeg River | Station Number | AMS 16 |
| Start Time (MST) | 9:21 | End Time (MST) | 14:08 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1426262593 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | ≥0.995 | |
| 801.2 | 800.8 | 1.0005 | | | |
| 402.8 | 401.0 | 1.0045 | | | |
| 202.8 | 200.1 | 1.0135 | | | |
| | | | Slope | 0.999649 | 0.90 - 1.10 |
| | | | Intercept | 1.356558 | +/-20 |

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

Version-03-2017

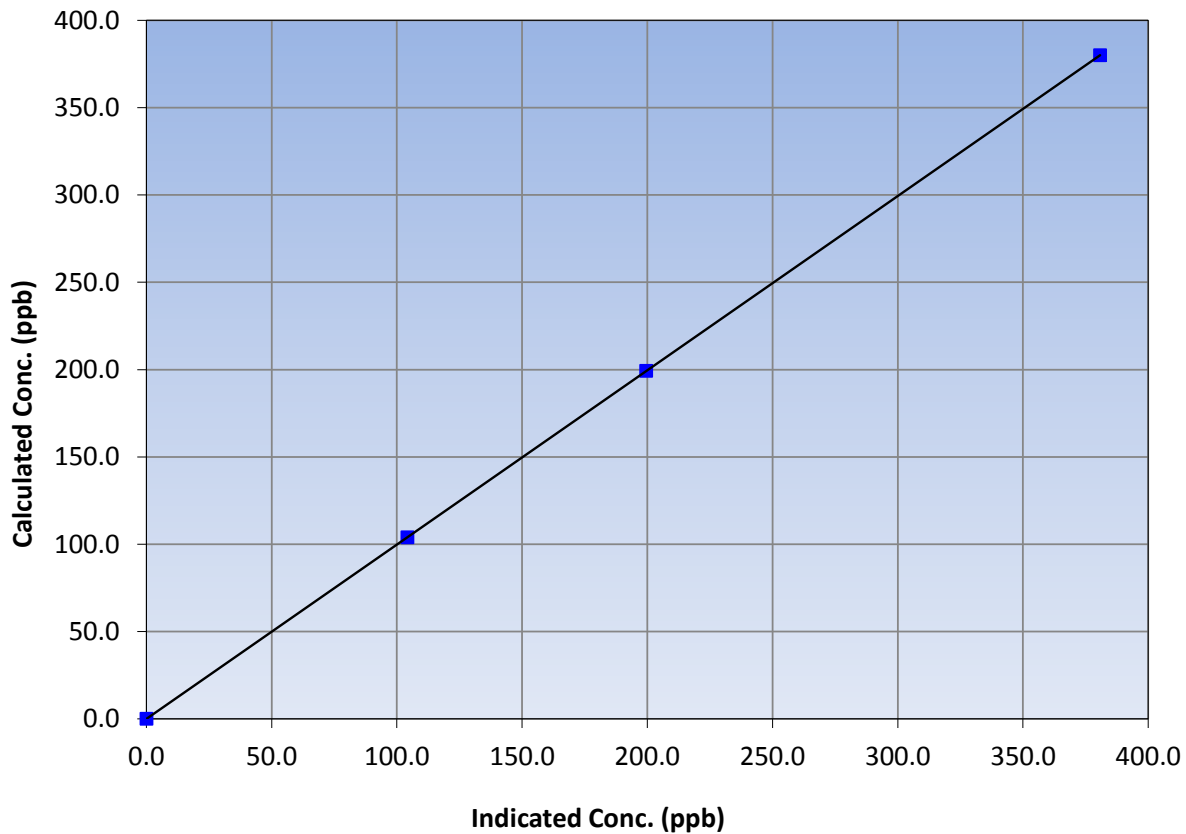
Station Information

| | | | |
|------------------|----------------|----------------------|---------------|
| Calibration Date | August 1, 2017 | Previous Calibration | July 18, 2017 |
| Station Name | Muskeg River | Station Number | AMS 16 |
| Start Time (MST) | 9:21 | End Time (MST) | 14:08 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1426262593 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | ≥0.995 | |
| 380.0 | 380.8 | 0.9979 | | | |
| 199.3 | 199.6 | 0.9985 | | | |
| 103.9 | 104.2 | 0.9971 | | | |
| | | | Slope | 0.998012 | 0.90 - 1.10 |
| | | | Intercept | -0.009671 | +/-20 |

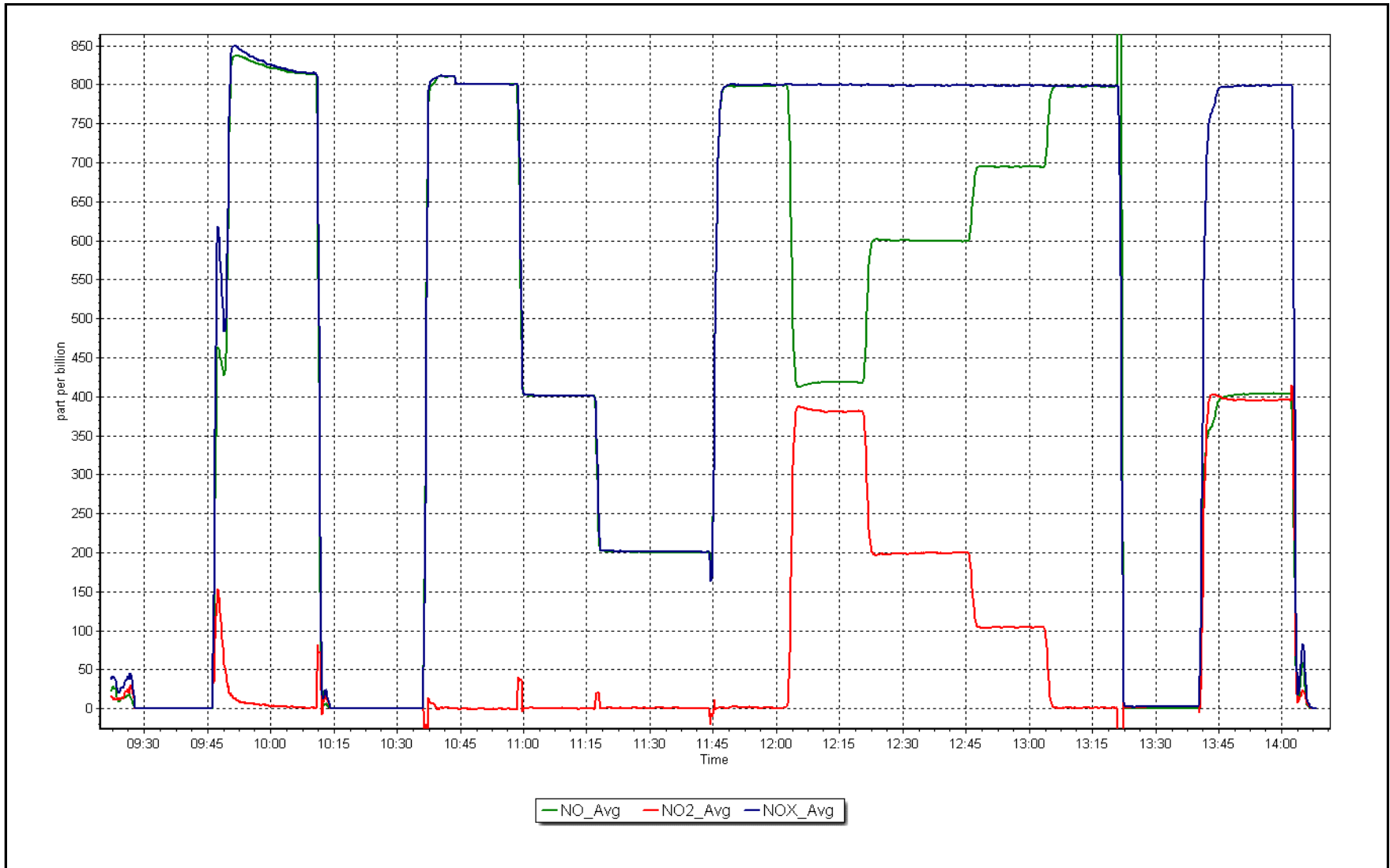
NO₂ Calibration Curve



NO_x Calibration Plot

Date: August 1, 2017

Location: Muskeg River





Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-02-2017

Station Information

| | | | |
|------------------------|-------------------|-----------------|---------------|
| Station Name: | Muskeg River | Station number: | AMS 16 |
| Calibration Date: | August 11, 2017 | Last Cal Date: | July 12, 2017 |
| Start time (MST): | 12:13 | End time (MST): | 13:03 |
| Sharp Model: | Thermo/Sharp 5030 | S/N: | E-798 |
| Particulate Fraction: | PM2.5 | C14 Source S/N: | 4142 |
| Flow Meter Make/Model: | DeltaCal | S/N: | 628 |
| Temp/RH standard: | NA | S/N: | NA |

Monthly Calibration Test

| <u>Parameter</u> | <u>As found</u> | <u>Measured</u> | <u>As left</u> | <u>Adjusted</u> | (Limits) |
|-----------------------------|-----------------|-------------------------------------|----------------|-------------------------------------|-----------------|
| T1 (°C) | 28.3 | 27.7 | 28.3 | <input type="checkbox"/> | +/- 2 °C |
| P3 (hPa) | 981 | 982 | 981 | <input type="checkbox"/> | +/- 13 hPa |
| flow (LPH) | 1000 | 1008 | 1000 | <input type="checkbox"/> | +/- 50 LPH |
| Nephelometer zero | 1.7 | NA | 0 | <input checked="" type="checkbox"/> | +/- 0.5 ug/m3 |
| Instrument Clock: | Verified | <input type="checkbox"/> | | | |
| Cyclone cleaning : | PM10 Cyclone | <input checked="" type="checkbox"/> | PM2.5 Cyclone | <input checked="" type="checkbox"/> | |
| Date Filter Tape Installed: | | | | | |

Quarterly Calibration Test

Leak Test: Date of check: August 11, 2017 Last Cal Date: May 10, 2017
 Flow w/o adaptor: 16.8 Flow w/ adaptor: 16.68

(Limit) 0.4 LPM

| <u>Adjusted</u> | <u>Current Test</u> | <u>Previous Test</u> | <u>% Change</u> |
|-----------------------------------|--------------------------|--|-----------------|
| <input type="checkbox"/> | Foil S/N: _____ | Foil S/N: <u>8074</u> | |
| Foil Calibration | Foil Mass: _____ | Foil Mass: <u>1258</u> | |
| | Calibration Date: _____ | Calibration Date: <u>July 12, 2017</u> | |
| (Limit) +/- 5% of previous | Correction Factor: _____ | Correction Factor: <u>7151</u> | --- |

Annual Calibration Test

| <u>Parameter</u> | <u>As found</u> | <u>Measured</u> | <u>As left</u> | <u>Adjusted</u> | (Limits) |
|-----------------------------|-----------------|-----------------|----------------|--------------------------|-----------------|
| T2 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| T3 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| T4 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| RH (%) | | | | <input type="checkbox"/> | +/- 10% |
| Date Sample Tube Cleaned: | | | | | |
| Date Pump Rebuilt/Replaced: | | | | | |

Notes: Cleaned the cyclone head. Completed leak check. Adjusted the nephelometer.

Calibration by: Jayme Marcoux



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 17
WAPASU
AUGUST 2017**

Operations, Data Collection,
QA/QC, Data Validation and Reporting by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

September 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
AUGUST 2017

MONTHLY SUMMARY for
AMD SECTION III.B.1(c)

| Parameter | Hours of Data | Hours of Calibration | Hours without Data | Operational Time | Maximum 1-Hour Value | 1-Hour Exceedances | Maximum 24-Hour Value | 24-Hour Exceedances |
|-----------------------------------|---------------|----------------------|--------------------|------------------|----------------------|--------------------|-----------------------|---------------------|
| SO2 (ppb) Average | 710 | 34 | 34 | 100 | 31 | 0 | 6 | 0 |
| H2S (ppb) Average | 710 | 34 | 34 | 100 | 1 | 0 | 0 | 0 |
| THC (ppm) Average | 710 | 34 | 34 | 100 | 2.8 | - | 2.2 | - |
| O3 (ppb) Average | 710 | 34 | 34 | 100 | 56 | 0 | 50 | - |
| NO2 (ppb) Average | 709 | 35 | 35 | 100 | 12 | 0 | 5 | - |
| NO (ppb) Average | 709 | 35 | 35 | 100 | 11 | - | 2 | - |
| NOX (ppb) Average | 709 | 35 | 35 | 100 | 21 | - | 6 | - |
| PM2.5 (ug/m3) Average | 743 | 1 | 1 | 100 | 113.4 | - | 23.8 | 0 |
| Temperature 2 m (C) Average | 744 | 0 | 0 | 100 | 28.8 | - | 23.1 | - |
| Relative Humidity (%) Average | 744 | 0 | 0 | 100 | 100 | - | 95 | - |
| Precipitation (mm) Total | 744 | 0 | 0 | 100 | 3.3 | - | 9.6 | - |
| Wind Speed 10 m (km/h) Average | 743 | 1 | 1 | 100 | 24 | - | 17 | - |
| Wind Direction 10 m (deg) Average | 743 | 1 | 1 | 100 | - | - | - | - |

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
AUGUST 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

| Parameter | Number | Mean | StnDev | Total | Percentile | | | | | | |
|-----------------------------------|--------|------|--------|-------|------------|-----|------|--------|------|------|-------|
| | | | | | Min | P10 | Q1 | Median | Q3 | P90 | Max |
| SO2 (ppb) Average | 710 | 1.1 | 3 | - | 0 | 0 | 0 | 0 | 1 | 3 | 31 |
| H2S (ppb) Average | 710 | 0.1 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| THC (ppm) Average | 710 | 2.11 | 0.1 | - | 1.9 | 2 | 2 | 2.1 | 2.2 | 2.2 | 2.8 |
| O3 (ppb) Average | 710 | 25.9 | 12 | - | 2 | 10 | 17 | 26 | 34 | 43 | 56 |
| NO2 (ppb) Average | 709 | 2 | 2 | - | 0 | 0 | 0 | 1 | 3 | 6 | 12 |
| NO (ppb) Average | 709 | 0.5 | 1 | - | 0 | 0 | 0 | 0 | 0 | 1 | 11 |
| NOX (ppb) Average | 709 | 2.5 | 3 | - | 0 | 0 | 1 | 1 | 3 | 7 | 21 |
| PM2.5 (ug/m3) Average | 743 | 8.18 | 8.6 | - | 0.7 | 2.2 | 3.4 | 5.7 | 9.3 | 18.1 | 113.4 |
| Temperature 2 m (C) Average | 744 | 16.5 | 5.6 | - | 0 | 9.6 | 12.8 | 16.6 | 20.5 | 23.6 | 28.8 |
| Relative Humidity (%) Average | 744 | 63.3 | 21 | - | 26 | 34 | 45 | 62 | 82 | 94 | 100 |
| Precipitation (mm) Total | 744 | - | - | 30.83 | - | - | - | - | - | - | - |
| Wind Speed 10 m (km/h) Average | 743 | 9.2 | 5 | - | 1 | 4 | 6 | 8 | 12 | 16 | 24 |
| Wind Direction 10 m (deg) Average | 743 | - | - | - | - | - | - | - | - | - | - |

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
AUGUST 2017

OPERATIONAL NOTES

| Parameter | Period Start | Period End | Duration (Hours) | Notes |
|-----------|-----------------|---------------|---------------------|-------|
|-----------|-----------------|---------------|---------------------|-------|

No operational issues to report



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

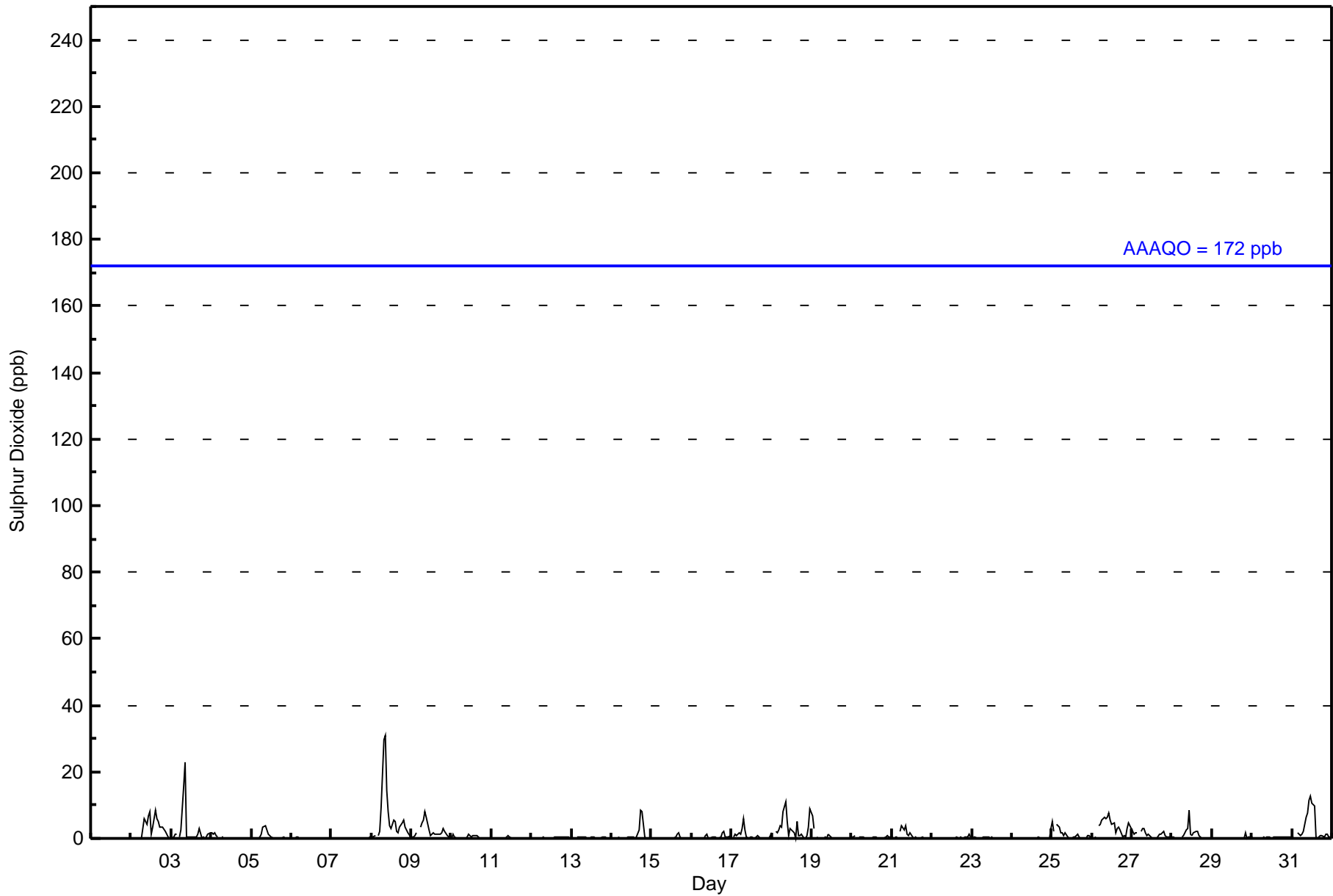
Wapasu - August 2017

| | | | | |
|--|---|----------|---------------------------|-------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 31 ppb on Aug 8 09:00 | Maximum Daily Average: 6.1 ppb on Aug 8 | | Hours of Data: | 710 |
| Minimum Value: 0 ppb on Aug 4 12:00 | Minimum Daily Average: 0.0 ppb on Aug 7 | | Hours of Missing Data: | 34 |
| Maximum Diurnal Average: 3.7 ppb at hour 9 | Minimum Diurnal Average: 0.5 ppb at hour 22 | | Hours of Calibration: | 34 |
| Monthly Average: 1.1 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 11 | | Percent Operational Time: | 100.0 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 2-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 3 | 6 | 4 | 7 | 8 | 1 | 4 | 8 | 6 | 5 | 4 | 3 | 3 | 2 | 1 | 0 | 0 | 2.9 | 8 |
| 3-Aug | 0 | 0 | 1 | 1 | Z | 0 | 2 | 16 | 23 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 1 | 2 | 2.4 | 23 |
| 4-Aug | 2 | 1 | 2 | 1 | 1 | Z | 0 | 0 | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 2 |
| 5-Aug | Z | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 4 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 4 |
| 6-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 7-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 8-Aug | 0 | 1 | 1 | Z | 1 | 2 | 9 | 30 | 31 | 15 | 8 | 4 | 3 | 5 | 5 | 2 | 2 | 3 | 5 | 6 | 3 | 3 | 2 | 0 | 6.1 | 31 |
| 9-Aug | 0 | 1 | 1 | 2 | Z | 3 | 5 | 6 | 8 | 6 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 3 | 2 | 1 | 0 | 0 | 2.2 | 8 |
| 10-Aug | 0 | 1 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 11-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 |
| 12-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 13-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 14-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 9 | 8 | 4 | 0 | 0 | 0 | 0 | 1.2 | 9 |
| 15-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 2 |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 1 | 0 | 0 | 1 | 0.4 | 2 |
| 17-Aug | Z | 1 | 1 | 1 | 2 | 1 | 3 | 6 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.9 | 6 |
| 18-Aug | 2 | Z | 2 | 2 | 2 | 4 | 3 | 8 | 11 | 5 | 1 | 3 | 3 | 2 | 0 | 5 | 1 | 1 | 1 | 0 | 0 | 1 | 4 | 9 | 3.0 | 11 |
| 19-Aug | 7 | 3 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 7 |
| 20-Aug | 0 | 0 | 1 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0.3 | 1 |
| 21-Aug | 0 | 0 | 0 | 1 | Z | 2 | 4 | 3 | 4 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.8 | 4 |
| 22-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0.2 | 1 |
| 23-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 24-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0.2 | 3 |
| 25-Aug | 5 | 2 | Z | 4 | 3 | 2 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1.1 | 5 |
| 26-Aug | 0 | 0 | 0 | Z | 4 | 4 | 6 | 6 | 6 | 6 | 8 | 6 | 4 | 5 | 2 | 3 | 3 | 3 | 1 | 1 | 1 | 3 | 5 | 4 | 3.5 | 8 |
| 27-Aug | 2 | 1 | 2 | 2 | Z | 2 | 3 | 3 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 1 | 0 | 0 | 0 | 1.2 | 3 |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 1 | 3 | 3 | 8 | 1 | 1 | 2 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.1 | 8 |
| 29-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0.2 | 2 |
| 30-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 31-Aug | 0 | 0 | Z | 2 | 1 | 1 | 1 | 2 | 6 | 8 | 12 | 13 | 11 | 10 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 3.2 | 13 |

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|--|
| 0.8 | 0.5 | 0.5 | 0.6 | 0.6 | 0.9 | 1.4 | 2.9 | 3.7 | 1.9 | 1.8 | 1.4 | 0.9 | 1.1 | 0.8 | 0.8 | 0.7 | 0.9 | 0.9 | 0.8 | 0.5 | 0.5 | 0.6 | 0.8 | Diurnal Average | |
| 7 | 3 | 2 | 4 | 4 | 4 | 9 | 30 | 31 | 15 | 12 | 13 | 11 | 10 | 8 | 6 | 5 | 9 | 8 | 6 | 3 | 3 | 5 | 9 | Diurnal Maximum | |

Z - zerospan C - Calibration
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Wapasu - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 10 | 701 | 98.73 | 98.73 |
| 11 - 20 | 6 | 0.85 | 99.58 |
| 21 - 60 | 3 | 0.42 | 100.00 |
| 61 - 110 | 0 | 0.00 | 100.00 |
| 111 - 172 | 0 | 0.00 | 100.00 |
| > 172 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Wapasu - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 10 | 30 | 19 | 12 | 20 | 14 | 19 | 50 | 162 | 70 | 64 | 88 | 58 | 33 | 30 | 17 | 14 | 700 |
| 11 - 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 3 | 1 | 0 | 0 | 0 | 0 | 6 |
| 21 - 60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 3 |
| 61 - 110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 111 - 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 30 | 19 | 12 | 20 | 14 | 19 | 50 | 162 | 71 | 67 | 92 | 59 | 33 | 30 | 17 | 14 | 709 |

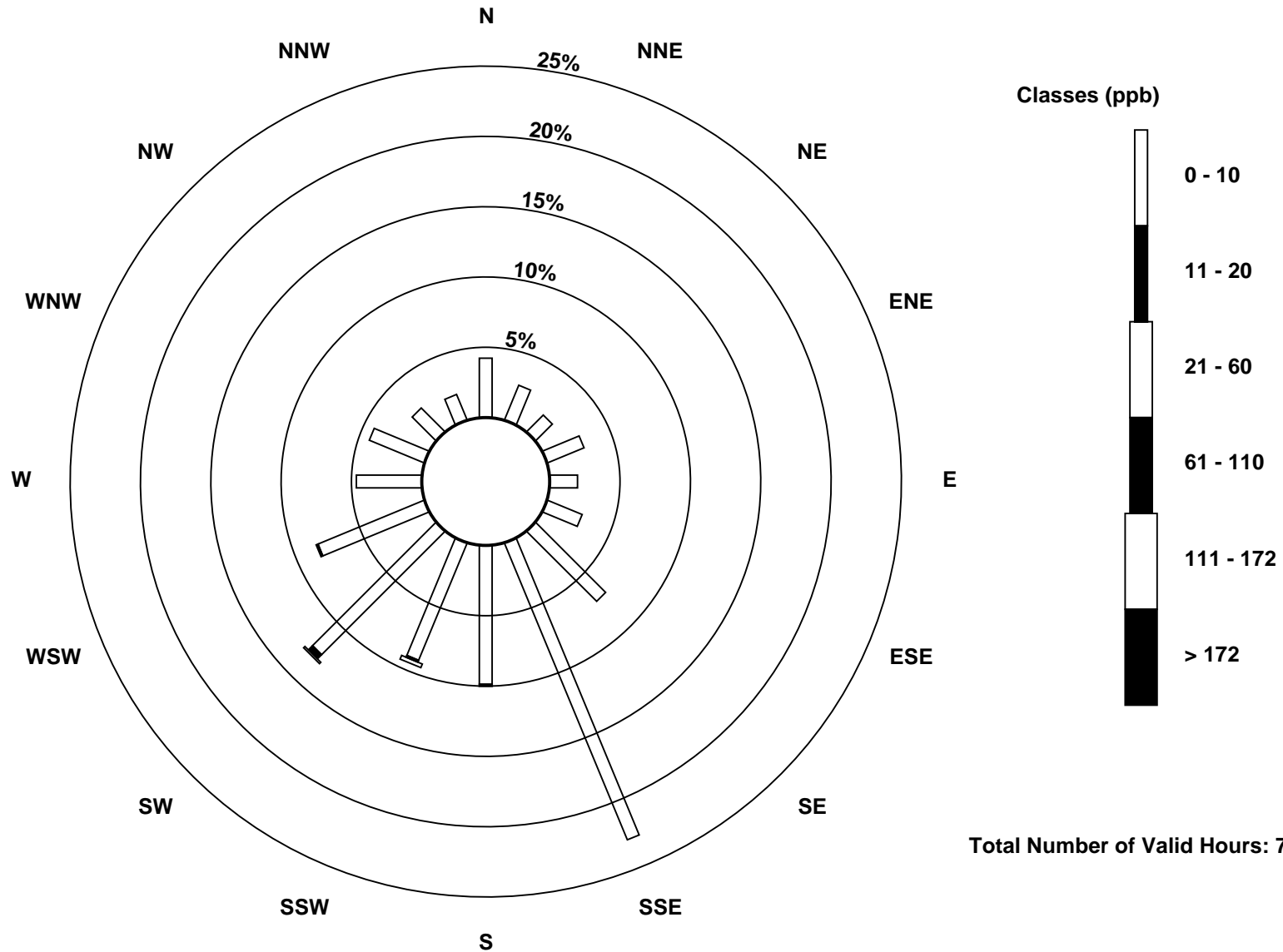
Total Number of Valid Hours: 709

Total Number of Hours: 744

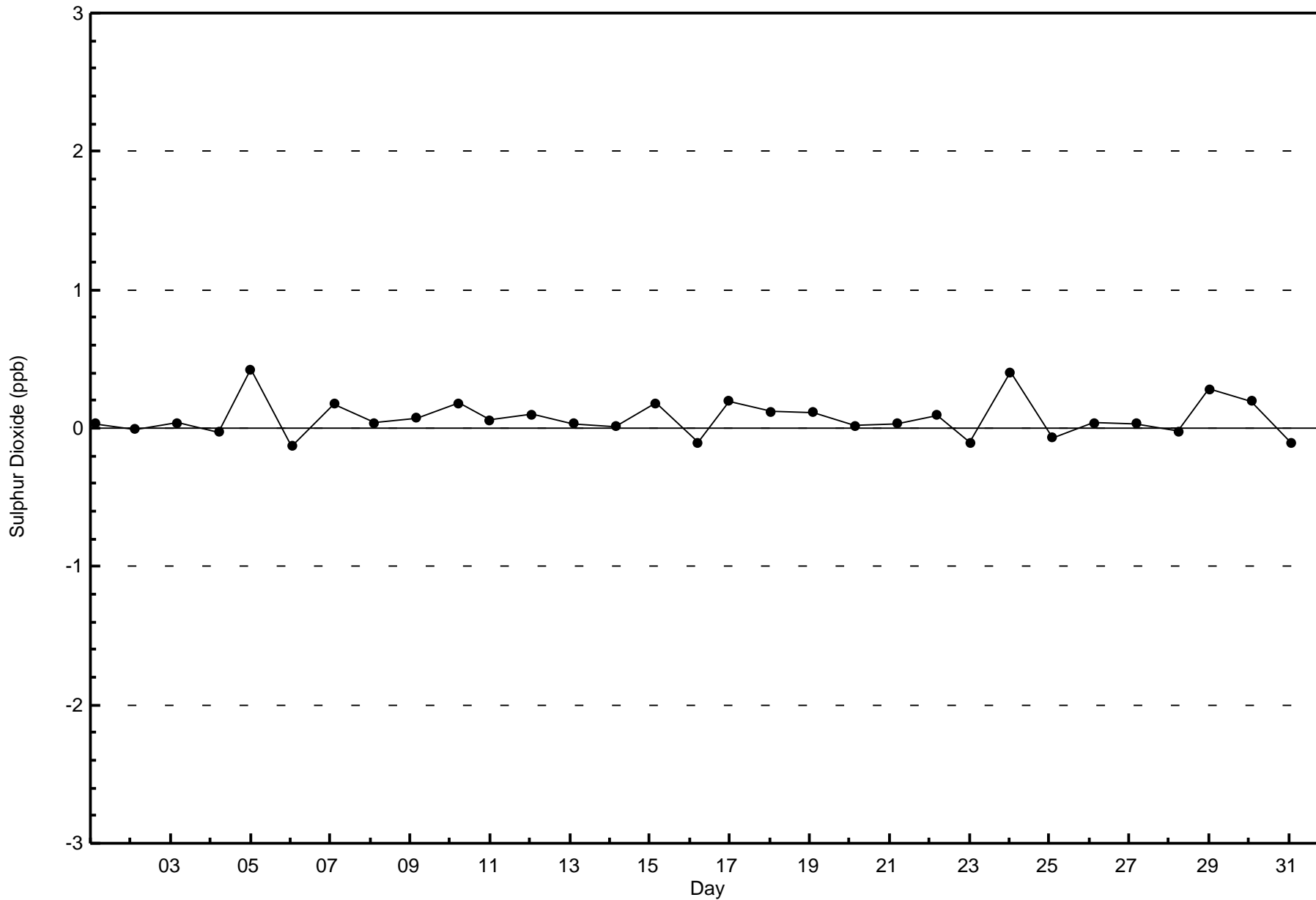


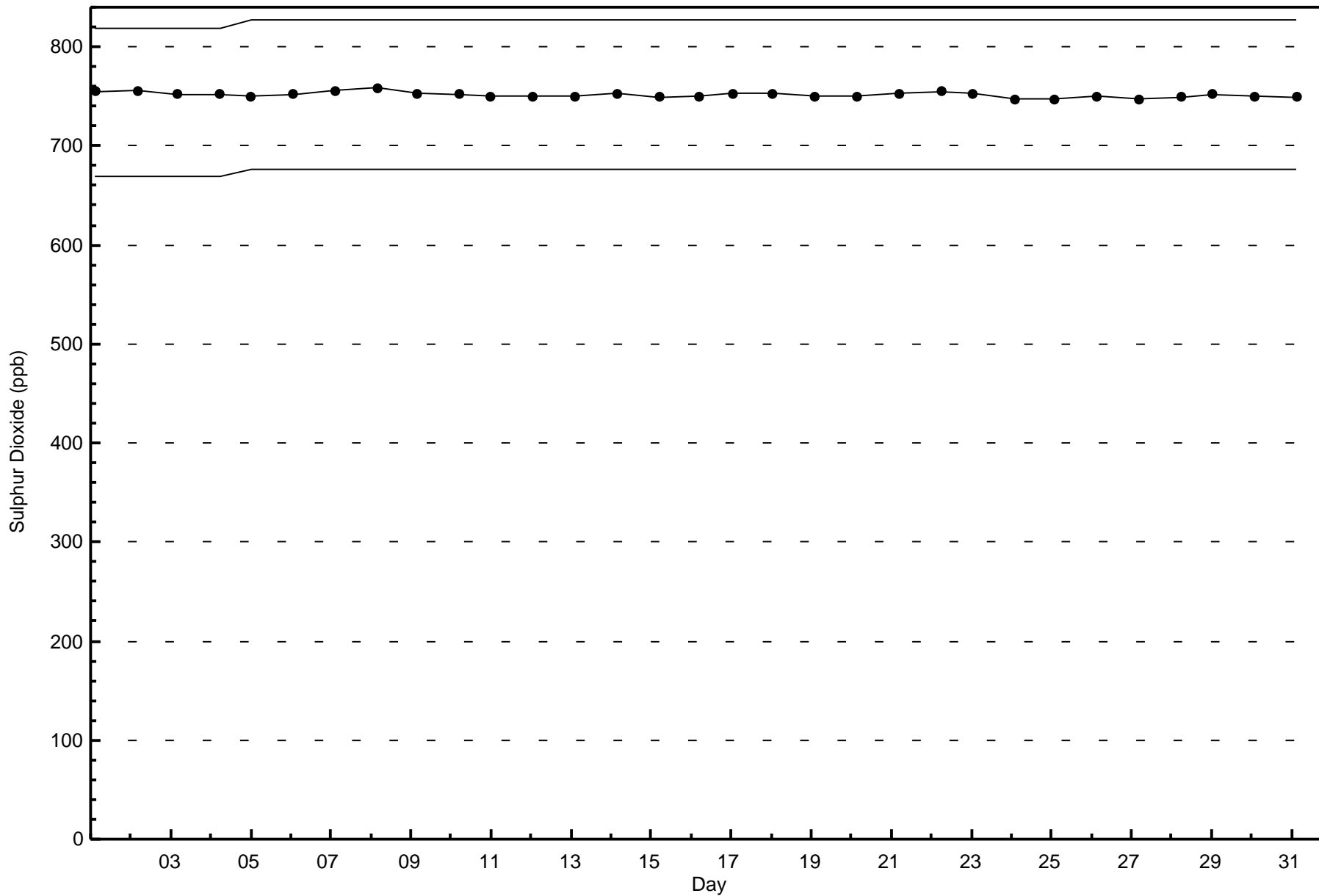
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Sulphur Dioxide (SO₂) - ppb
Wapasu (AMS 17)



Total Number of Valid Hours: 709







| | | | | |
|--|--|----------|---------------------------|-------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 1 ppb on Aug 17 08:00 | Maximum Daily Average: 0.3 ppb on Aug 17 | | Hours of Data: | 710 |
| Minimum Value: 0 ppb on Aug 1 01:00 | Minimum Daily Average: 0.0 ppb on Aug 1 | | Hours of Missing Data: | 34 |
| Maximum Diurnal Average: 0.3 ppb at hour 8 | Minimum Diurnal Average: 0.1 ppb at hour 18 | | Hours of Calibration: | 34 |
| Monthly Average: 0.1 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1 | | Percent Operational Time: | 100.0 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
|--------|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|---------------|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 2-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 4-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 5-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 6-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 7-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 8-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 9-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 10-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 11-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 12-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 13-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 14-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 15-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.2 | 1 |
| 17-Aug | 1 | Z | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 18-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 19-Aug | 1 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 |
| 20-Aug | 0 | 0 | 1 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 21-Aug | 0 | 1 | 0 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 22-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 23-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 24-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 25-Aug | 0 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 26-Aug | 0 | 0 | 0 | 0 | Z | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.3 | 1 |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 29-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 30-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 31-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |

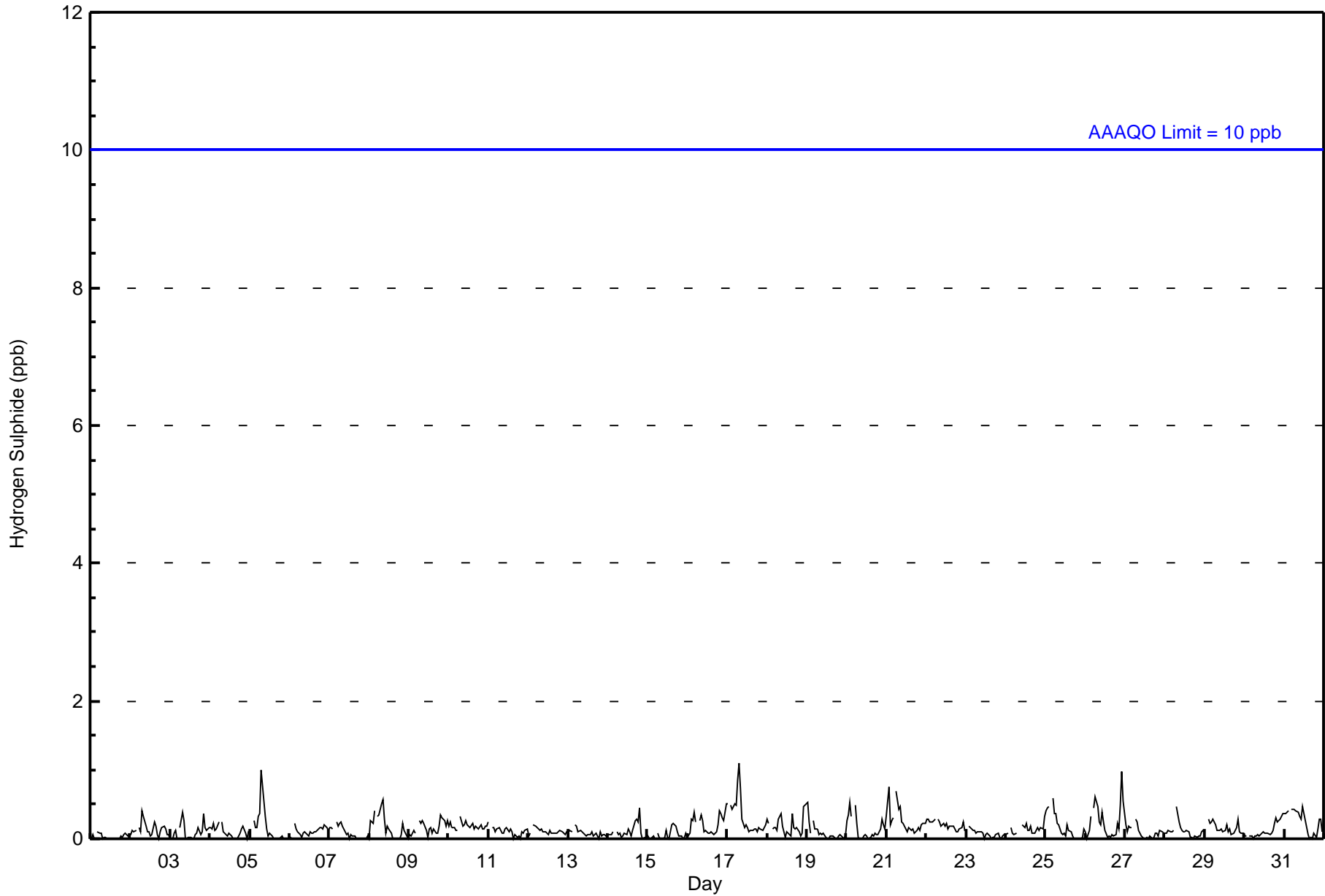
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|
| 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | Diurnal Average |
| 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | Diurnal Maximum |

Z - zerospan C - Calibration
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb



Wood Buffalo Environmental Association
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Wapasu - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Wapasu - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2 | 710 | 100.00 | 100.00 |
| 3 - 4 | 0 | 0.00 | 100.00 |
| 5 - 7 | 0 | 0.00 | 100.00 |
| 8 - 11 | 0 | 0.00 | 100.00 |
| > 11 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 710

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Wapasu - August 2017

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2 | 30 | 19 | 13 | 15 | 16 | 19 | 49 | 161 | 74 | 67 | 91 | 61 | 33 | 30 | 17 | 14 | 709 |
| 3 - 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 - 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 - 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 30 | 19 | 13 | 15 | 16 | 19 | 49 | 161 | 74 | 67 | 91 | 61 | 33 | 30 | 17 | 14 | 709 |

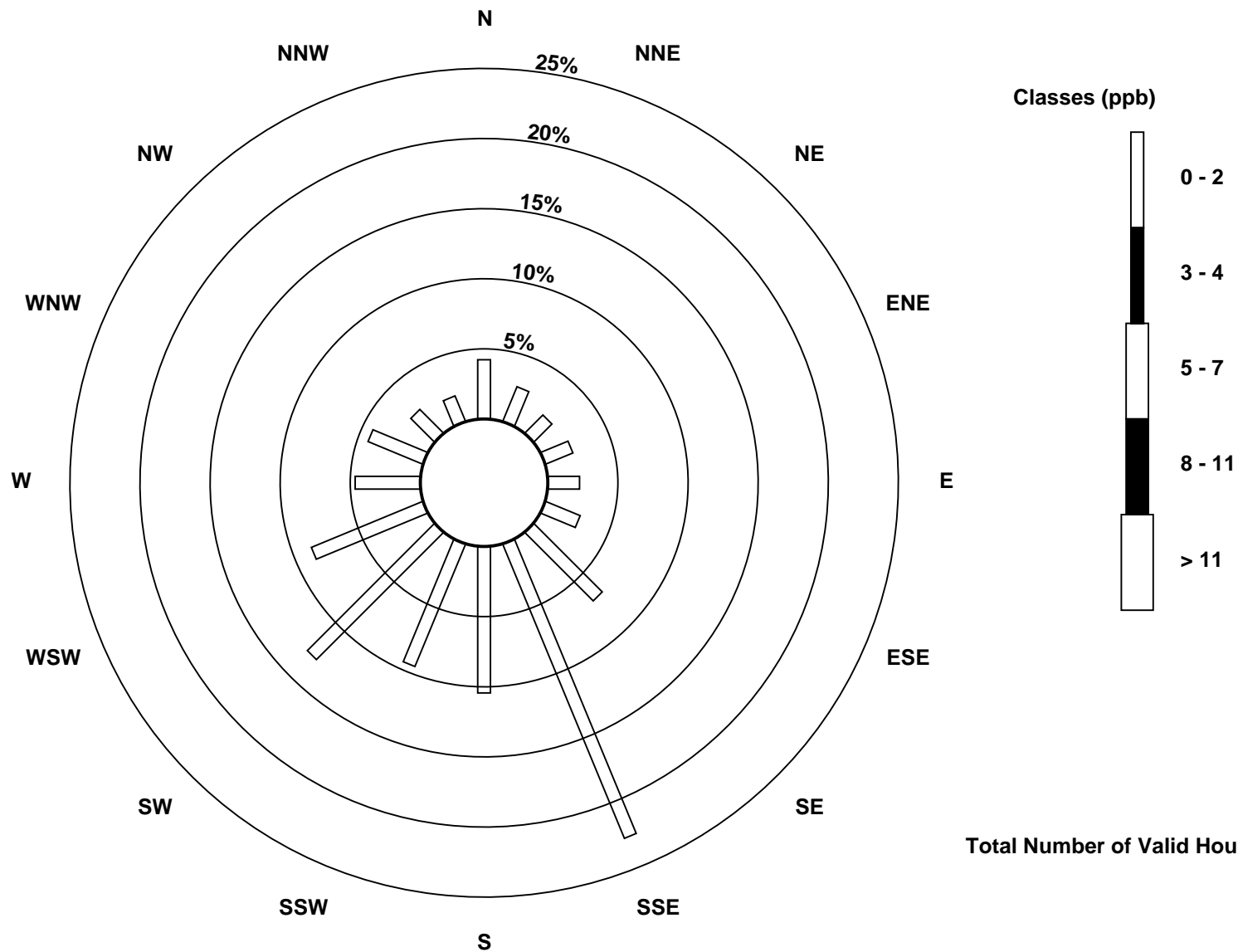
Total Number of Valid Hours: 709

Total Number of Hours: 744

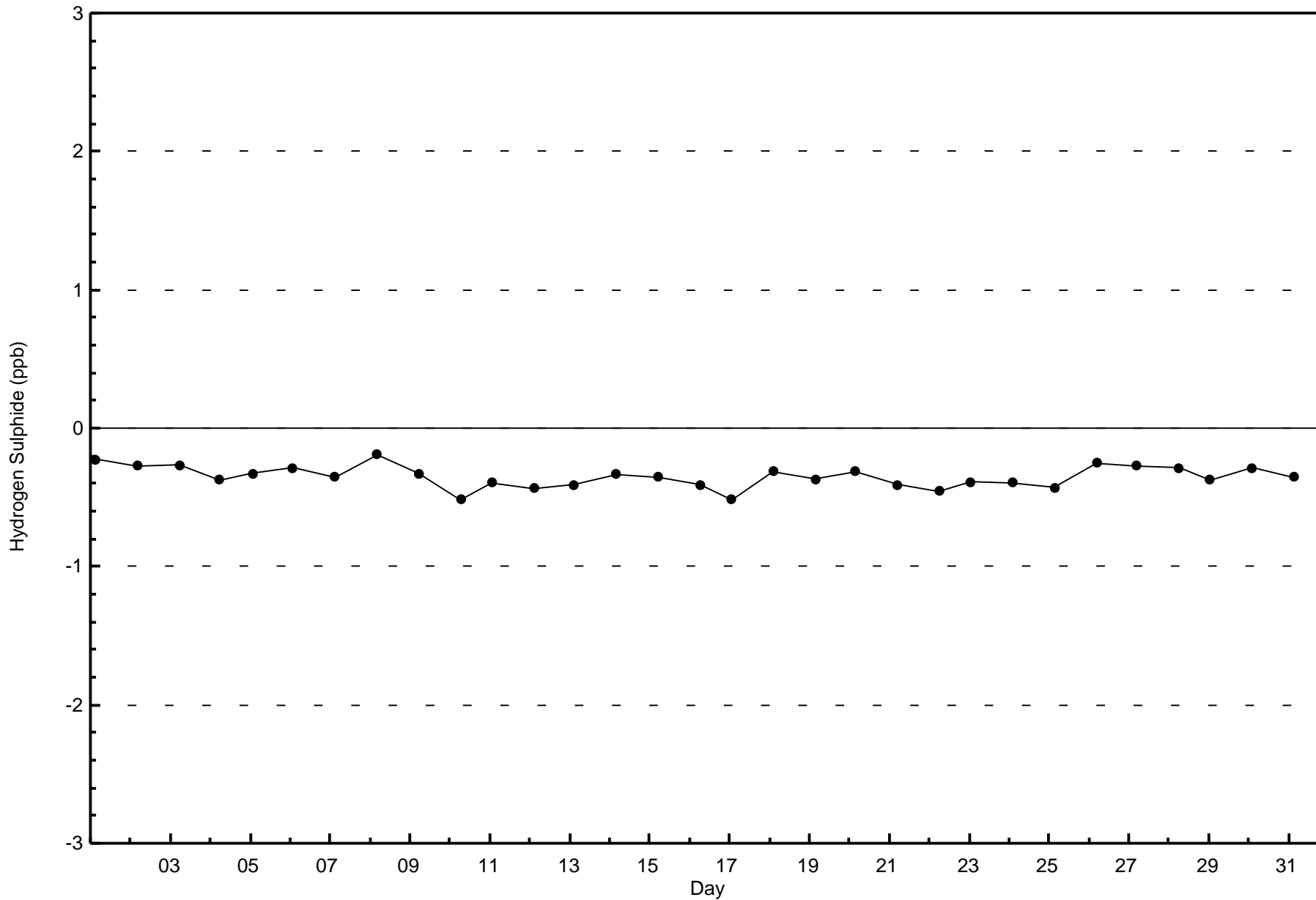


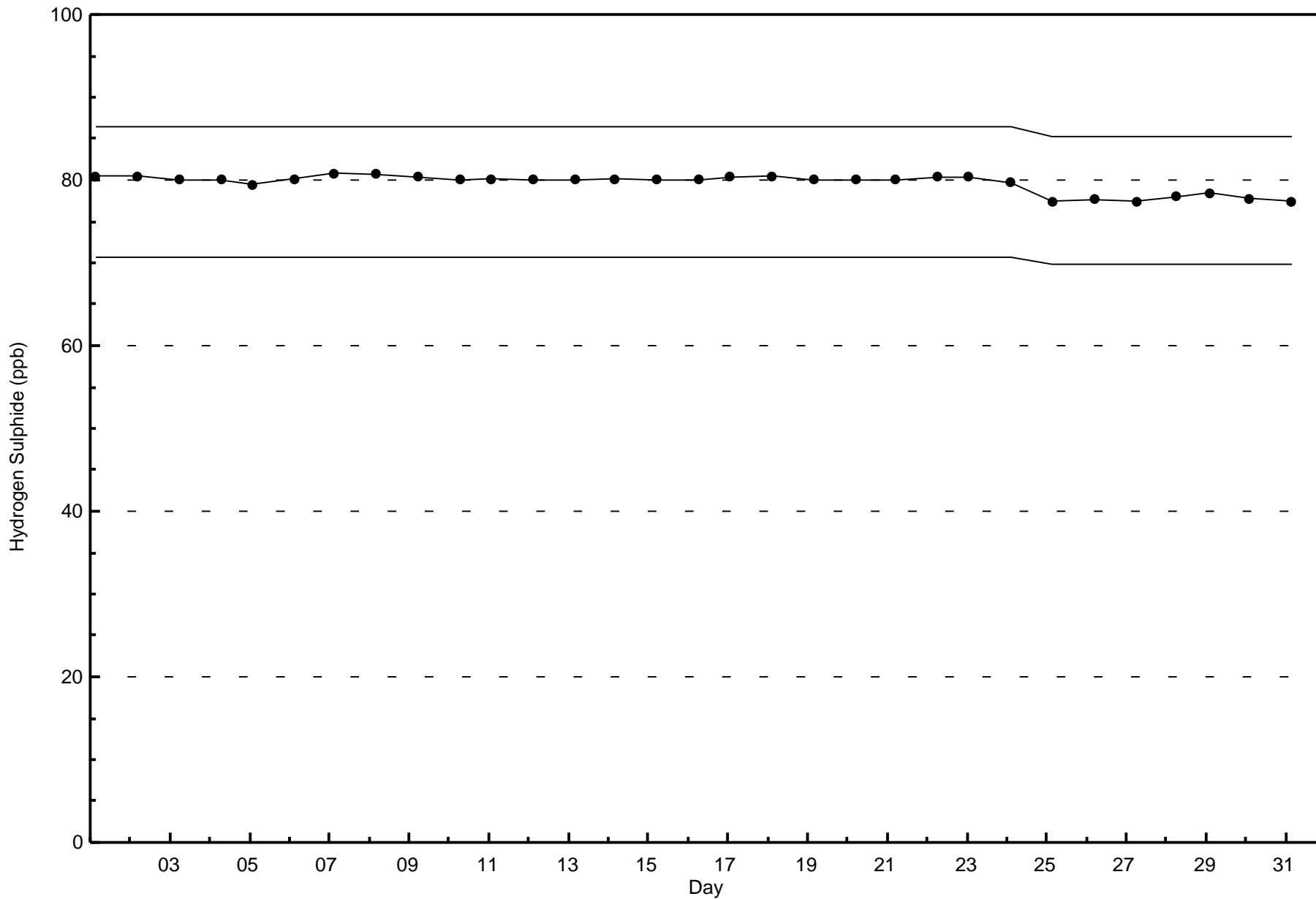
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Hydrogen Sulphide (H₂S) - ppb
Wapasu (AMS 17)



Total Number of Valid Hours: 709

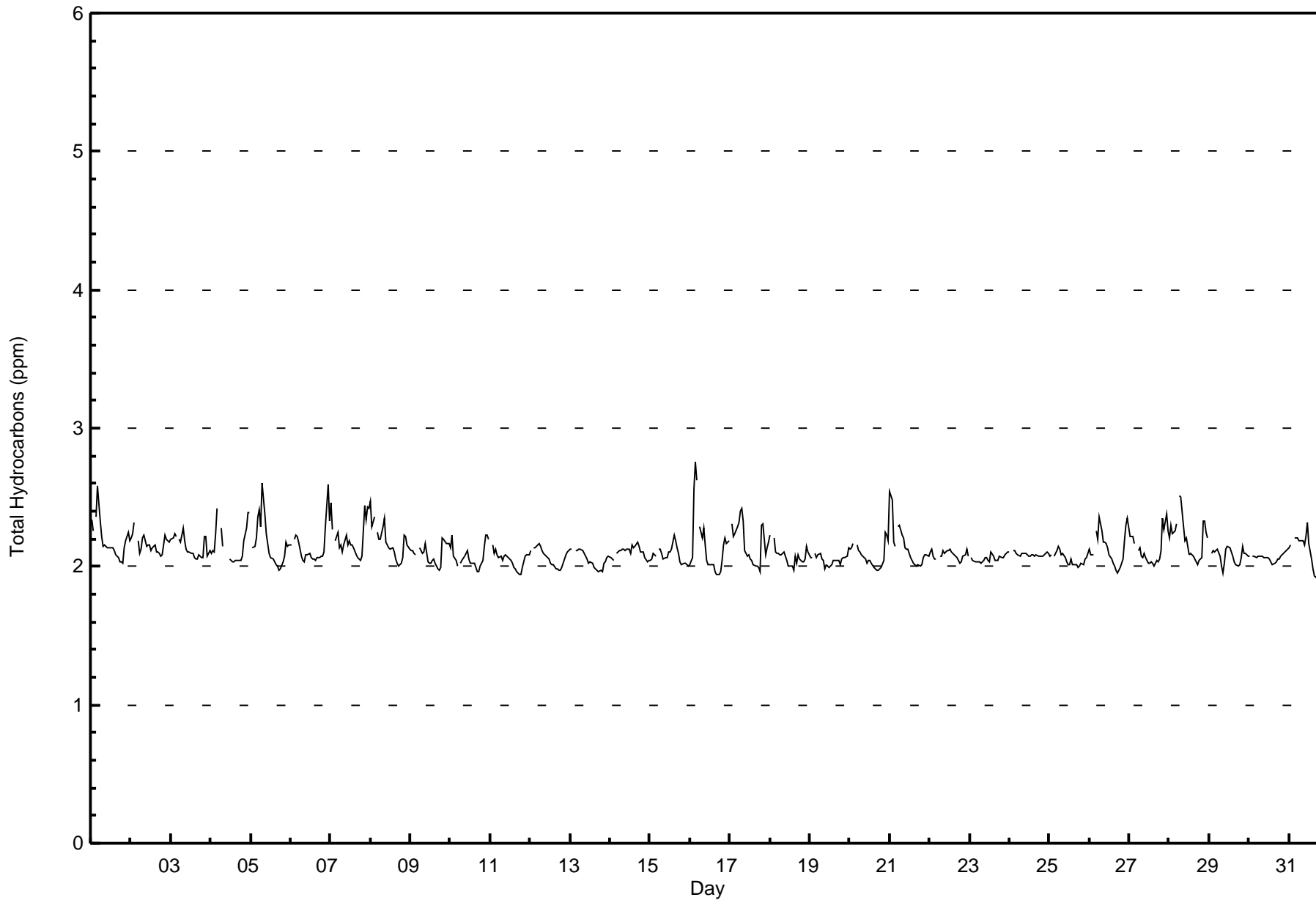






Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Wapasu - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Wapasu - August 2017

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2.0 | 198 | 27.89 | 27.89 |
| 2.1 - 3.0 | 512 | 72.11 | 100.00 |
| 3.1 - 10.0 | 0 | 0.00 | 100.00 |
| > 10.0 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 710

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Wapasu - August 2017

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---|-----------------------|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2.0 | 6 | 7 | 4 | 3 | 2 | 2 | 6 | 35 | 16 | 15 | 17 | 35 | 22 | 16 | 7 | 4 | 197 |
| 2.1 - 3.0 | 24 | 12 | 8 | 17 | 12 | 17 | 44 | 127 | 55 | 52 | 75 | 24 | 11 | 14 | 10 | 10 | 512 |
| 3.1 - 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 30 | 19 | 12 | 20 | 14 | 19 | 50 | 162 | 71 | 67 | 92 | 59 | 33 | 30 | 17 | 14 | 709 |

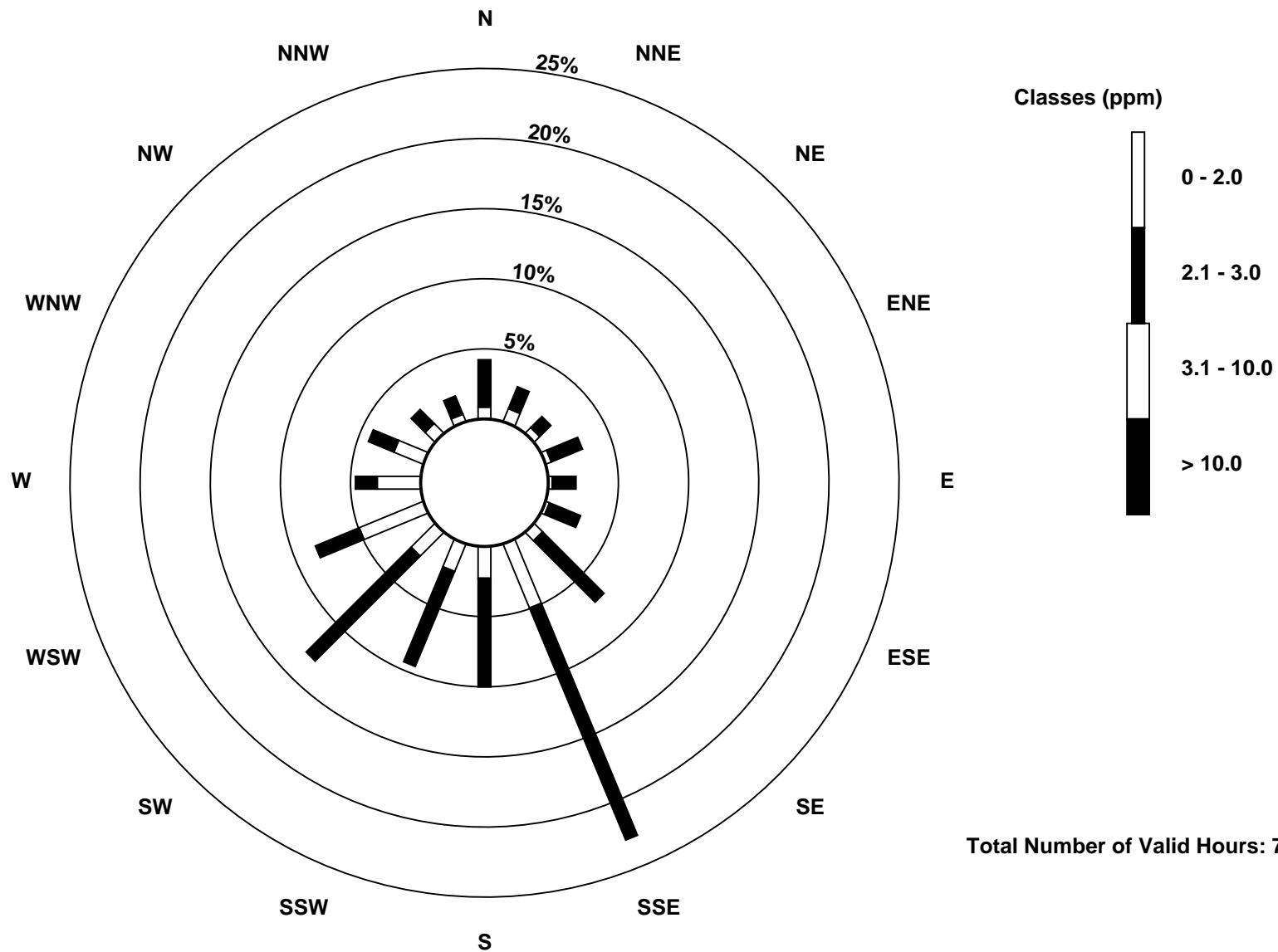
Total Number of Valid Hours: 709

Total Number of Hours: 744

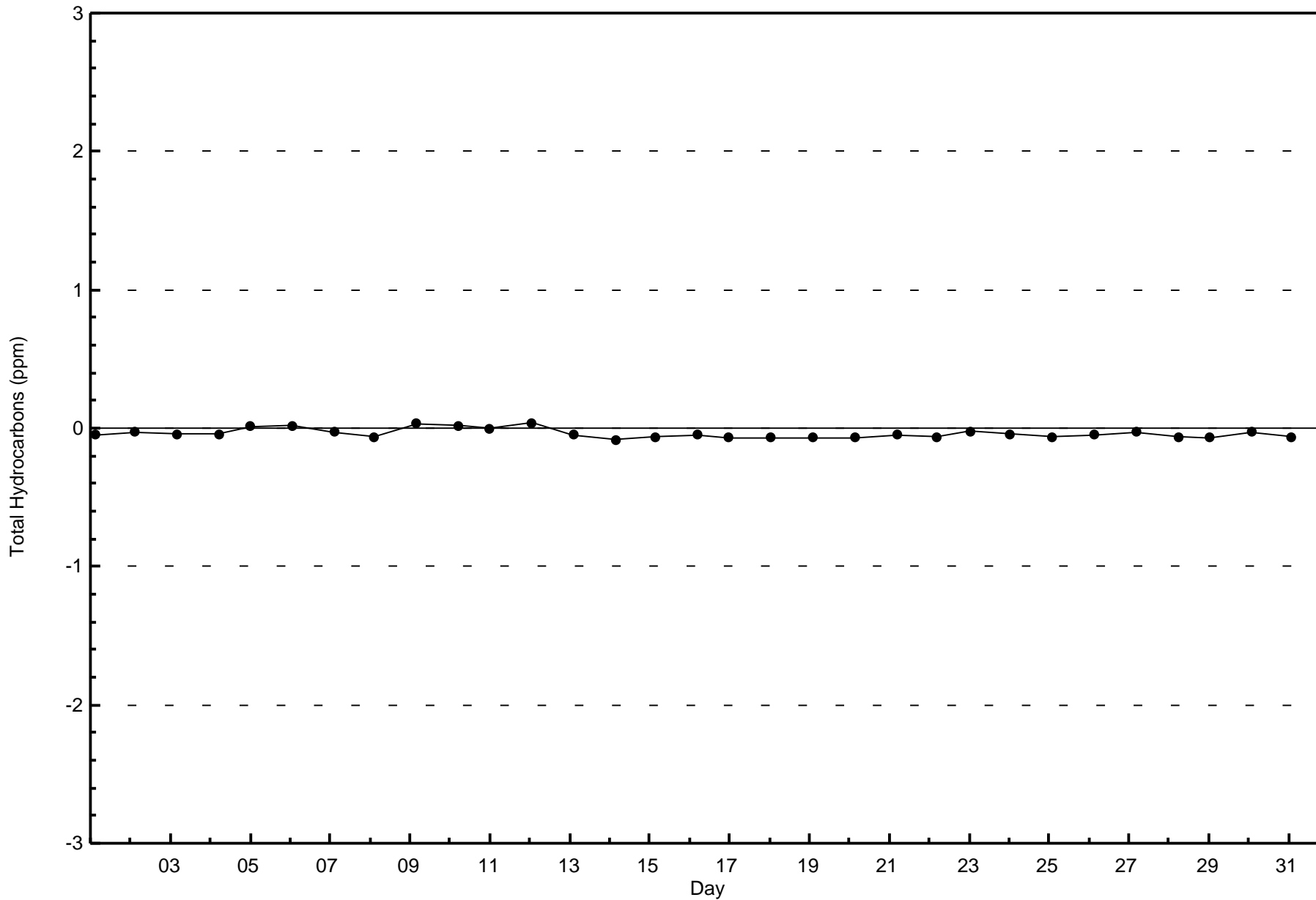


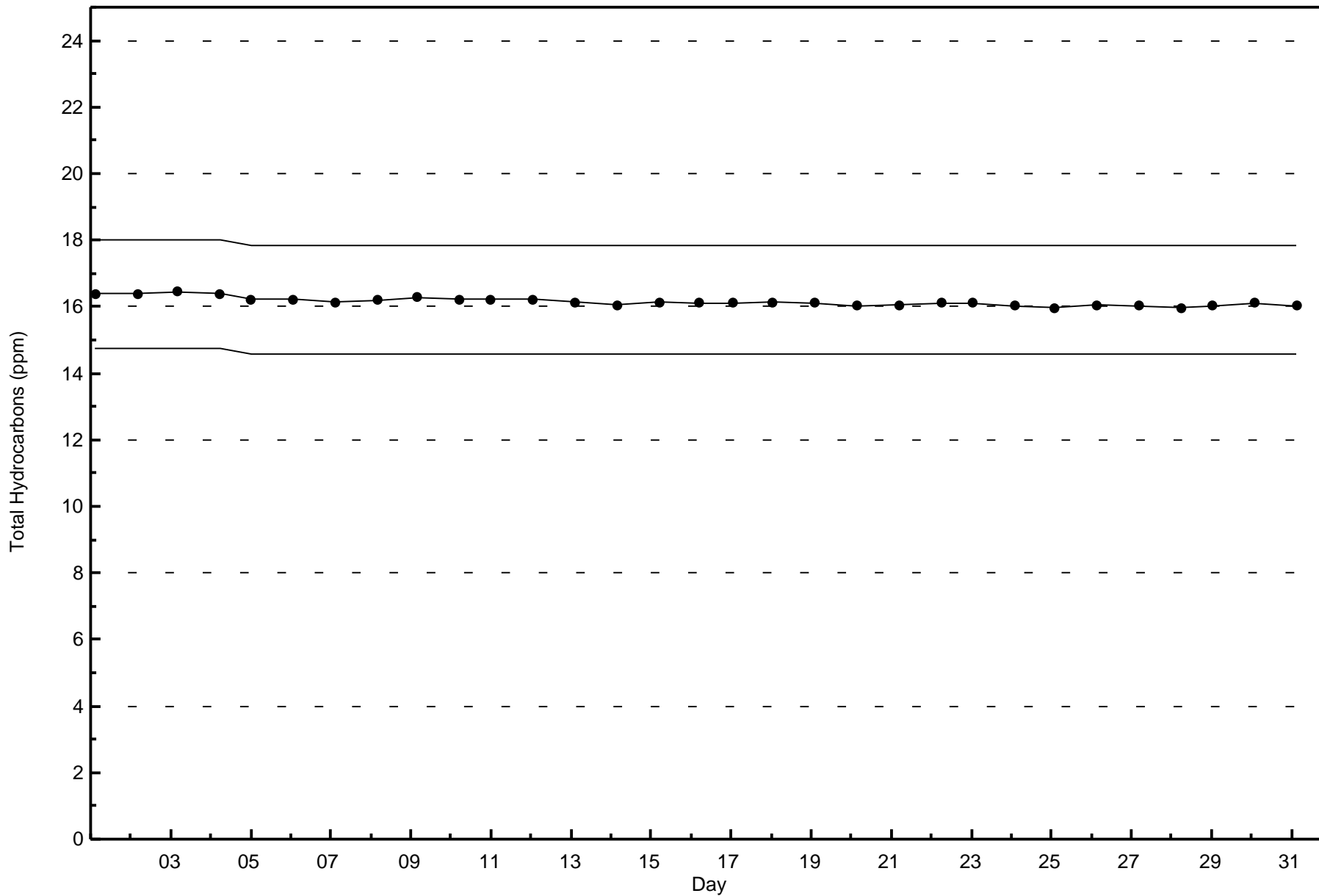
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Total Hydrocarbons (THC) - ppm
Wapasu (AMS 17)



Total Number of Valid Hours: 709







Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

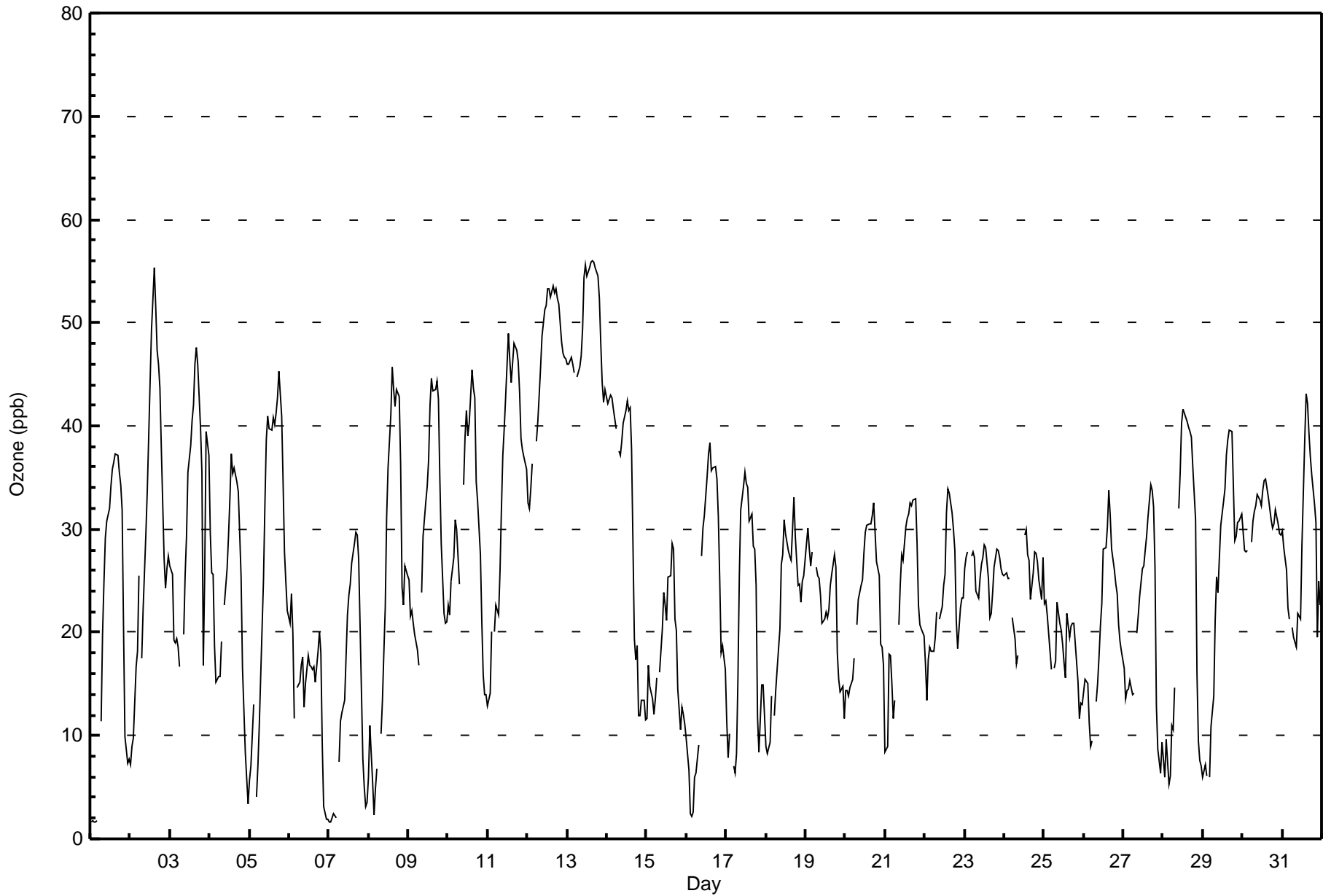
Wapasu - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|--|----|----|----|----|----|----|----|----|----|---------------------------------|----|----|----|------|---------------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|-----------------|--|
| Maximum Value: 56 ppb on Aug 13 16:00 | | | | | | | | | | Maximum Daily Average: 49.7 ppb on Aug 13 | | | | | | | | | | Hours of Data: 710 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum Value: 2 ppb on Aug 1 01:00 | | | | | | | | | | Minimum Daily Average: 14.1 ppb on Aug 7 | | | | | | | | | | Hours of Missing Data: 34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 35.9 ppb at hour 15 | | | | | | | | | | Minimum Diurnal Average: 16.3 ppb at hour 5 | | | | | | | | | | Hours of Calibration: 34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 25.9 ppb | | | | | | | | | | Percentiles: P ₁ = 2 P ₁₀ = 10 Q ₁ = 17 Median = 26 Q ₃ = 34 P ₉₀ = 43 P ₉₉ = 55 | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 2 | 2 | 2 | 2 | 2 | Z | 11 | 20 | 25 | 29 | 31 | 32 | 34 | 36 | 36 | 37 | 37 | 35 | 34 | 32 | 21 | 10 | 7 | 8 | 21.1 | 37 | | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 7 | 9 | 10 | 17 | 18 | 26 | Z | 17 | 22 | 30 | 34 | 39 | 44 | 49 | 55 | 51 | 47 | 46 | 44 | 38 | 27 | 24 | 26 | 27 | 30.8 | 55 | | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 26 | 26 | 19 | 19 | 19 | 19 | 17 | Z | 20 | 26 | 29 | 36 | 38 | 41 | 42 | 46 | 48 | 46 | 40 | 35 | 17 | 26 | 39 | 37 | 30.9 | 48 | | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 29 | 26 | 26 | 19 | 15 | 16 | 16 | 19 | Z | 23 | 26 | 29 | 33 | 37 | 35 | 36 | 35 | 34 | 30 | 25 | 17 | 8 | 6 | 3 | 23.6 | 37 | | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 6 | 7 | 13 | Z | 4 | 7 | 11 | 16 | 25 | 32 | 39 | 41 | 40 | 40 | 41 | 40 | 41 | 43 | 45 | 41 | 35 | 28 | 25 | 22 | 27.8 | 45 | | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 21 | 24 | 20 | 12 | Z | 15 | 15 | 17 | 18 | 13 | 15 | 18 | 17 | 17 | 16 | 17 | 15 | 18 | 20 | 18 | 9 | 3 | 2 | 2 | 14.8 | 24 | | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 2 | 2 | 2 | 2 | 2 | Z | 7 | 11 | 12 | 13 | 18 | 22 | 24 | 25 | 27 | 29 | 30 | 29 | 27 | 21 | 8 | 5 | 3 | 4 | 14.1 | 30 | | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 6 | 11 | 5 | 2 | 5 | 7 | Z | 10 | 13 | 18 | 22 | 31 | 36 | 41 | 46 | 43 | 42 | 43 | 43 | 36 | 24 | 23 | 26 | 25 | 24.4 | 46 | | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 25 | 22 | 22 | 21 | 20 | 18 | 17 | Z | 24 | 29 | 33 | 34 | 37 | 42 | 45 | 43 | 44 | 44 | 43 | 35 | 29 | 22 | 21 | 21 | 30.0 | 45 | | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 23 | 22 | 25 | 27 | 31 | 30 | 27 | 25 | Z | 34 | 39 | 42 | 39 | 40 | 45 | 44 | 43 | 35 | 33 | 27 | 21 | 16 | 14 | 14 | 30.2 | 45 | | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 13 | 14 | 20 | Z | 20 | 23 | 22 | 26 | 32 | 37 | 40 | 43 | 49 | 46 | 44 | 46 | 48 | 47 | 46 | 43 | 39 | 38 | 37 | 36 | 35.2 | 49 | | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 33 | 32 | 34 | 36 | Z | 39 | 40 | 43 | 46 | 49 | 51 | 52 | 53 | 53 | 52 | 54 | 53 | 53 | 52 | 52 | 48 | 47 | 47 | 47 | 46.3 | 54 | | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 46 | 46 | 47 | 46 | 45 | Z | 45 | 46 | 47 | 49 | 54 | 56 | 54 | 55 | 56 | 56 | 56 | 55 | 55 | 52 | 48 | 44 | 42 | 44 | 49.7 | 56 | | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 42 | 43 | 43 | 43 | 42 | 40 | Z | 38 | 37 | 39 | 40 | 41 | 42 | 41 | 42 | 38 | 19 | 17 | 19 | 12 | 12 | 13 | 13 | 11 | 31.6 | 43 | | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 12 | 17 | 15 | 14 | 12 | 14 | 16 | Z | 16 | 20 | 24 | 23 | 21 | 25 | 26 | 29 | 28 | 21 | 20 | 15 | 11 | 13 | 12 | 11 | 17.9 | 29 | | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 10 | 7 | 3 | 2 | 3 | 6 | 6 | 9 | Z | 27 | 30 | 31 | 35 | 37 | 38 | 36 | 36 | 36 | 35 | 31 | 25 | 18 | 19 | 16 | 21.6 | 38 | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 11 | 8 | 10 | Z | 7 | 6 | 8 | 15 | 25 | 32 | 34 | 36 | 34 | 34 | 31 | 31 | 28 | 28 | 24 | 12 | 8 | 15 | 15 | 12 | 20.3 | 36 | | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 9 | 8 | 9 | 14 | Z | 12 | 14 | 16 | 20 | 27 | 27 | 31 | 30 | 28 | 27 | 27 | 30 | 33 | 29 | 25 | 25 | 23 | 25 | 25 | 22.4 | 33 | | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 29 | 30 | 28 | 27 | 28 | Z | 26 | 26 | 25 | 24 | 21 | 21 | 22 | 21 | 22 | 25 | 26 | 28 | 26 | 18 | 15 | 14 | 15 | 12 | 22.9 | 30 | | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 14 | 14 | 14 | 15 | 16 | 17 | Z | 21 | 23 | 24 | 25 | 28 | 30 | 30 | 31 | 31 | 31 | 33 | 30 | 27 | 25 | 19 | 19 | 17 | 23.2 | 33 | | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 8 | 9 | 18 | 18 | 15 | 12 | 13 | Z | 21 | 25 | 28 | 27 | 30 | 31 | 31 | 33 | 32 | 33 | 33 | 29 | 23 | 21 | 20 | 20 | 23.0 | 33 | | | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 17 | 13 | 17 | 19 | 18 | 18 | 20 | 22 | Z | 21 | 22 | 25 | 26 | 32 | 34 | 33 | 32 | 30 | 28 | 21 | 18 | 22 | 23 | 23 | 23.3 | 34 | | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 26 | 27 | 28 | Z | 27 | 28 | 27 | 24 | 23 | 25 | 27 | 27 | 29 | 28 | 25 | 21 | 22 | 24 | 26 | 28 | 28 | 27 | 26 | 26 | 26.1 | 29 | | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 25 | 26 | 25 | 25 | Z | 21 | 19 | 17 | 18 | C | C | C | 29 | 30 | 28 | 27 | 23 | 26 | 28 | 28 | 27 | 25 | 23 | 27 | 24.9 | 30 | | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 23 | 23 | 22 | 20 | 16 | Z | 17 | 17 | 23 | 21 | 20 | 19 | 17 | 16 | 22 | 20 | 21 | 21 | 21 | 19 | 15 | 12 | 13 | 13 | 18.7 | 23 | | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 14 | 16 | 15 | 11 | 9 | 9 | Z | 13 | 15 | 18 | 21 | 23 | 28 | 28 | 30 | 34 | 31 | 28 | 26 | 25 | 24 | 21 | 19 | 18 | 20.7 | 34 | | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 17 | 14 | 14 | 14 | 15 | 14 | 14 | Z | 20 | 22 | 23 | 26 | 27 | 28 | 29 | 31 | 34 | 34 | 32 | 26 | 13 | 9 | 6 | 9 | 20.5 | 34 | | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 8 | 6 | 10 | 5 | 6 | 11 | 11 | 15 | Z | 32 | 36 | 40 | 42 | 41 | 40 | 40 | 39 | 39 | 36 | 31 | 16 | 9 | 8 | 7 | 22.9 | 42 | | | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 6 | 7 | 6 | Z | 6 | 11 | 14 | 21 | 25 | 24 | 27 | 30 | 33 | 34 | 37 | 39 | 40 | 39 | 34 | 29 | 29 | 31 | 31 | 31 | 25.4 | 40 | | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 30 | 28 | 28 | 28 | Z | 29 | 31 | 32 | 32 | 33 | 33 | 32 | 34 | 35 | 35 | 33 | 32 | 31 | 30 | 30 | 32 | 30 | 30 | 29 | 31.1 | 35 | | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 30 | 28 | 26 | 22 | 21 | Z | 20 | 20 | 19 | 22 | 22 | 21 | 28 | 39 | 43 | 42 | 39 | 37 | 35 | 32 | 31 | 20 | 25 | 23 | 28.0 | 43 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 18.4 | 18.2 | 18.5 | 18.4 | 16.3 | 17.8 | 18.7 | 21.3 | 24.1 | 27.3 | 29.7 | 31.8 | 33.4 | 34.9 | 35.9 | 35.8 | 34.9 | 34.4 | 33.0 | 28.8 | 23.2 | 20.5 | 20.6 | 20.1 | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 46 | 46 | 47 | 46 | 45 | 40 | 45 | 46 | 47 | 49 | 54 | 56 | 54 | 55 | 56 | 56 | 56 | 55 | 55 | 55 | 52 | 48 | 47 | 47 | 47 | Diurnal Maximum | |
| Z - zerospan C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Ozone (O₃) - ppb
Wapasu - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ozone (O₃) - ppb
Wapasu - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 240 | 33.80 | 33.80 |
| 21 - 50 | 448 | 63.10 | 96.90 |
| 51 - 82 | 22 | 3.10 | 100.00 |
| > 83 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Wapasu - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 10 | 8 | 9 | 13 | 10 | 9 | 32 | 51 | 25 | 22 | 30 | 10 | 2 | 3 | 3 | 3 | 240 |
| 21 - 50 | 20 | 11 | 3 | 5 | 4 | 10 | 21 | 101 | 37 | 42 | 61 | 49 | 31 | 27 | 14 | 11 | 447 |
| 51 - 82 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 8 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 22 |
| > 83 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 30 | 19 | 12 | 18 | 14 | 19 | 53 | 163 | 70 | 65 | 92 | 60 | 33 | 30 | 17 | 14 | 709 |

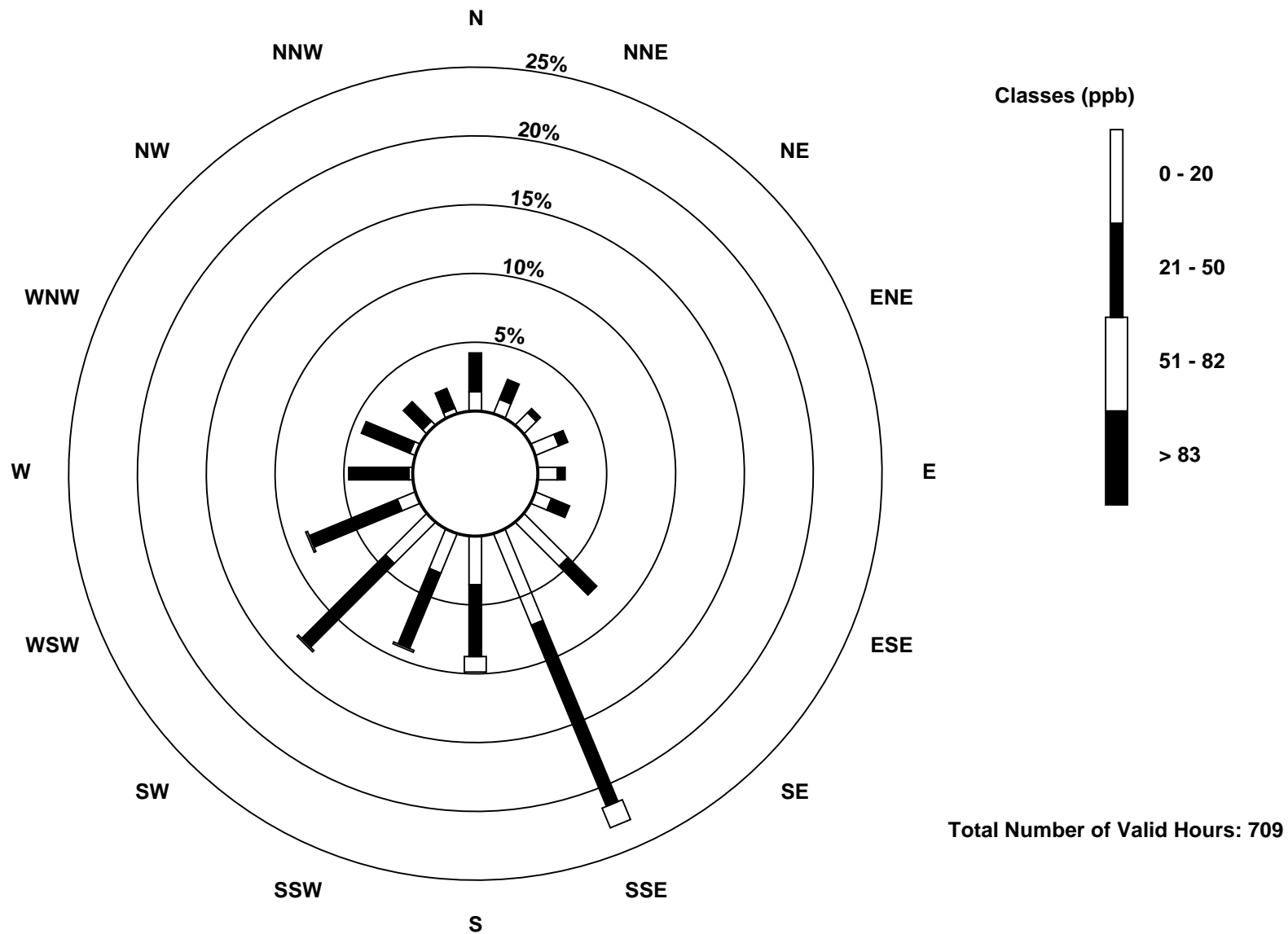
Total Number of Valid Hours: 709

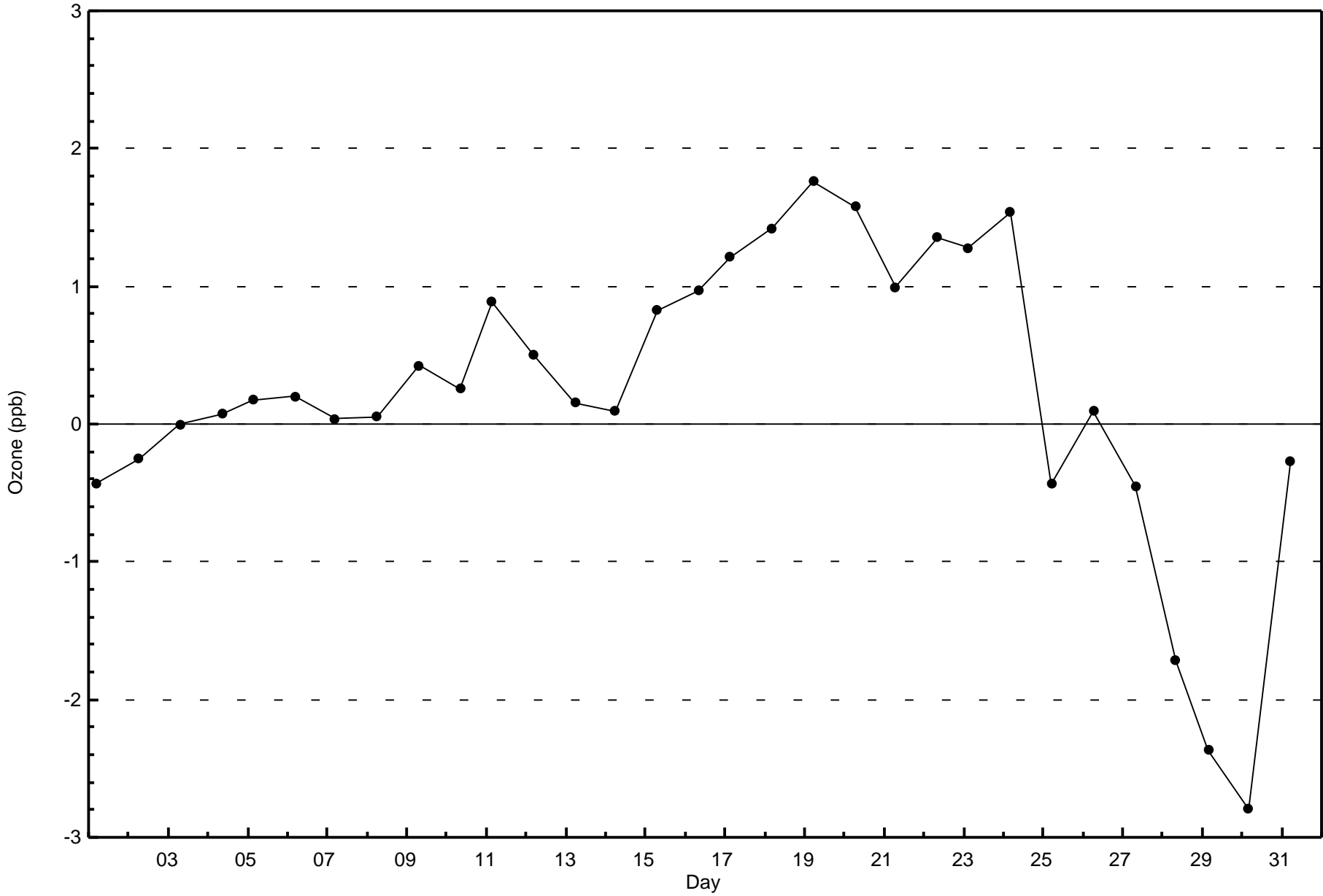
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Ozone (O₃) - ppb
Wapasu (AMS 17)

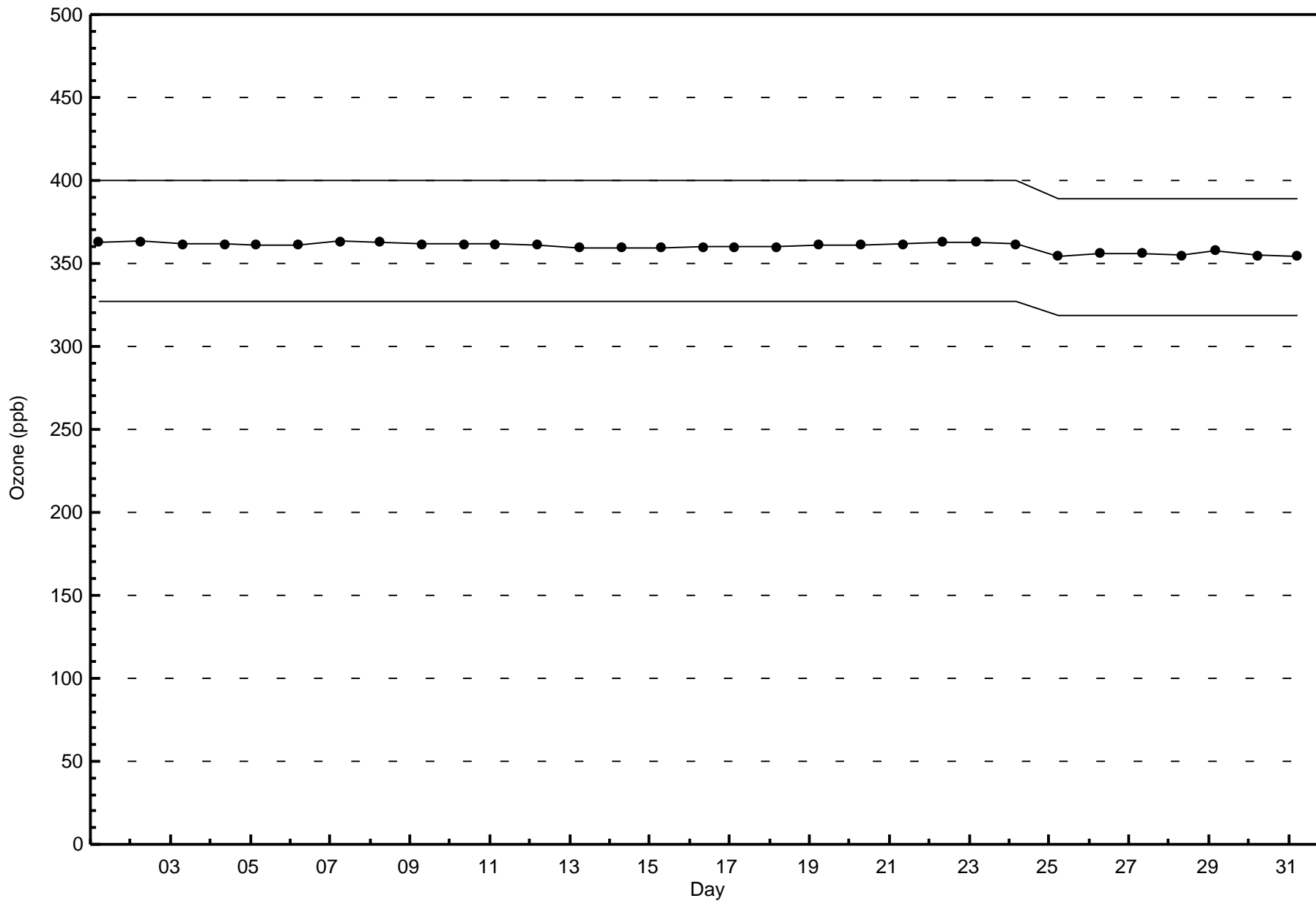






Wood Buffalo Environmental Association
Span Responses

Ozone (O₃) - ppb
Wapasu - August 2017





Wood Buffalo Environmental Association
Summary of Hour Averages

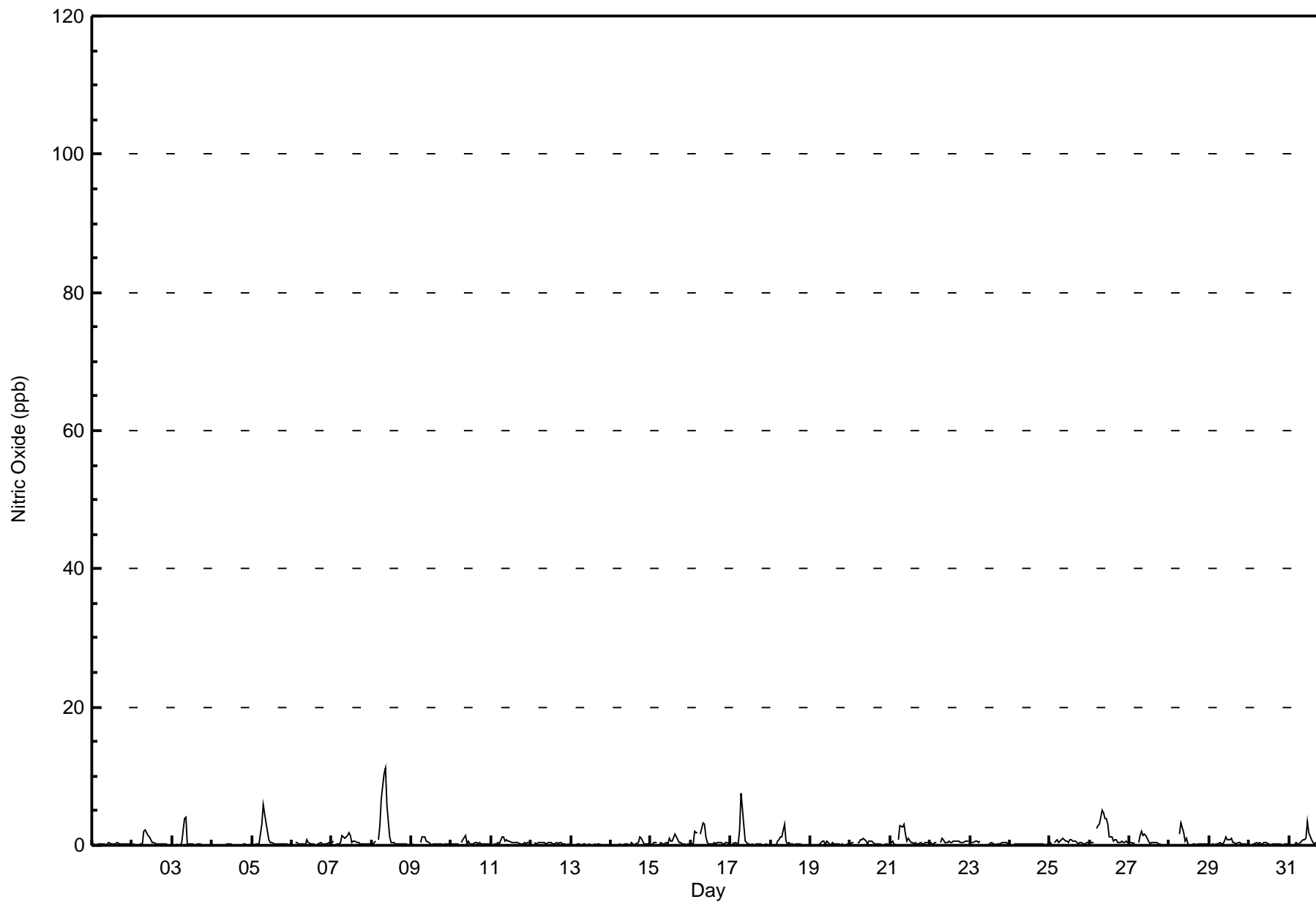
Nitric Oxide (NO) - ppb
Wapasu - August 2017

| Maximum Value: 11 ppb on Aug 8 09:00 | | | | | | | | | | | | | | | | | Maximum Daily Average: 2.0 ppb on Aug 8 | | | | | | | | | | | | | | | | | Hours in Service: 744 | |
|---|-------------------------------|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|--|----|----|----|----|----|----|-----------------|---------------|---------------|--|--|--|--|--|--|--|---------------------------|--|
| Minimum Value: 0 ppb on Aug 3 01:00 | | | | | | | | | | | | | | | | | Minimum Daily Average: 0.1 ppb on Aug 4 | | | | | | | | | | | | | | | | | Hours of Data: 709 | |
| Maximum Diurnal Average: 1.8 ppb at hour 8 | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 0.2 ppb at hour 22 | | | | | | | | | | | | | | | | | Hours of Missing Data: 35 | |
| Monthly Average: 0.5 ppb | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 5 | | | | | | | | | | | | | | | | | Hours of Calibration: 35 | |
| | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | |
| 1-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | |
| 2-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 2 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 2 | | | | | | | | | |
| 3-Aug | 0 | 0 | 0 | 0 | Z | 0 | 1 | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 4 | | | | | | | | | |
| 4-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | |
| 5-Aug | Z | 0 | 0 | 0 | 0 | 2 | 3 | 6 | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.9 | 6 | | | | | | | | | |
| 6-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | |
| 7-Aug | 0 | 1 | Z | 0 | 0 | 0 | 2 | 1 | 1 | 1 | 2 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 2 | | | | | | | | | |
| 8-Aug | 0 | 0 | 1 | Z | 1 | 3 | 7 | 10 | 11 | 6 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.0 | 11 | | | | | | | | | |
| 9-Aug | 0 | 0 | 0 | 0 | Z | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | |
| 10-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | |
| 11-Aug | Z | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.5 | 1 | | | | | | | | | |
| 12-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | |
| 13-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | |
| 14-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | |
| 15-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 2 | | | | | | | | | |
| 16-Aug | 0 | 0 | 2 | 2 | 2 | Z | 2 | 3 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.8 | 3 | | | | | | | | | |
| 17-Aug | Z | 0 | 0 | 0 | 0 | 2 | 7 | 5 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.9 | 7 | | | | | | | | | |
| 18-Aug | 0 | Z | 0 | 0 | 1 | 1 | 1 | 1 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 3 | | | | | | | | | |
| 19-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | |
| 20-Aug | 0 | 0 | 0 | Z | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | |
| 21-Aug | 0 | 1 | 0 | 0 | Z | 1 | 3 | 3 | 3 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.8 | 3 | | | | | | | | | |
| 22-Aug | 0 | 0 | 0 | 0 | 1 | Z | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0.5 | 1 | | | | | | | | | |
| 23-Aug | Z | 0 | 0 | 1 | 1 | 0 | 1 | C | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | |
| 24-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | |
| 25-Aug | 0 | 0 | Z | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 1 | | | | | | | | | |
| 26-Aug | 0 | 0 | 0 | Z | 2 | 3 | 3 | 5 | 5 | 4 | 4 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1.6 | 5 | | | | | | | | | |
| 27-Aug | 0 | 0 | 0 | 0 | Z | 0 | 1 | 2 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 2 | | | | | | | | | |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | Z | 2 | 3 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 3 | | | | | | | | | |
| 29-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | |
| 30-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | |
| 31-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0.7 | 3 | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | | | | | | | |
| 0.2 0.2 0.3 0.3 0.4 0.6 1.3 1.8 1.7 1.0 0.8 0.6 0.4 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.2 0.2 0.2 0.2 0.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 1 2 2 2 3 7 10 11 6 4 3 2 1 2 1 1 1 1 1 1 0 1 1 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Z - zerospan C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Wapasu - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Wapasu - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 709 | 100.00 | 100.00 |
| 21 - 40 | 0 | 0.00 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Wapasu - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 30 | 19 | 12 | 20 | 14 | 19 | 50 | 161 | 71 | 67 | 92 | 59 | 33 | 30 | 17 | 14 | 708 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 41 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 30 | 19 | 12 | 20 | 14 | 19 | 50 | 161 | 71 | 67 | 92 | 59 | 33 | 30 | 17 | 14 | 708 |

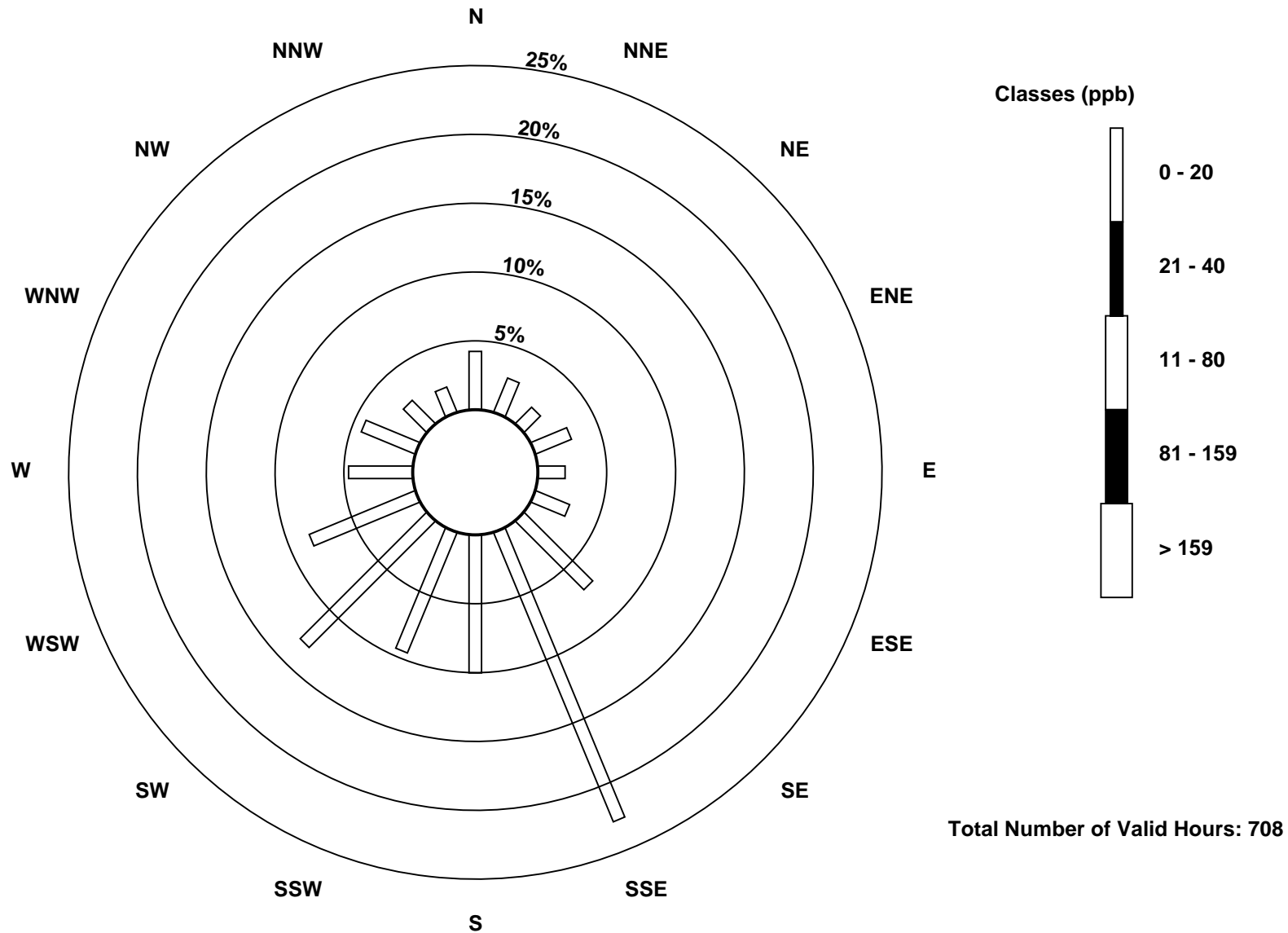
Total Number of Valid Hours: 708

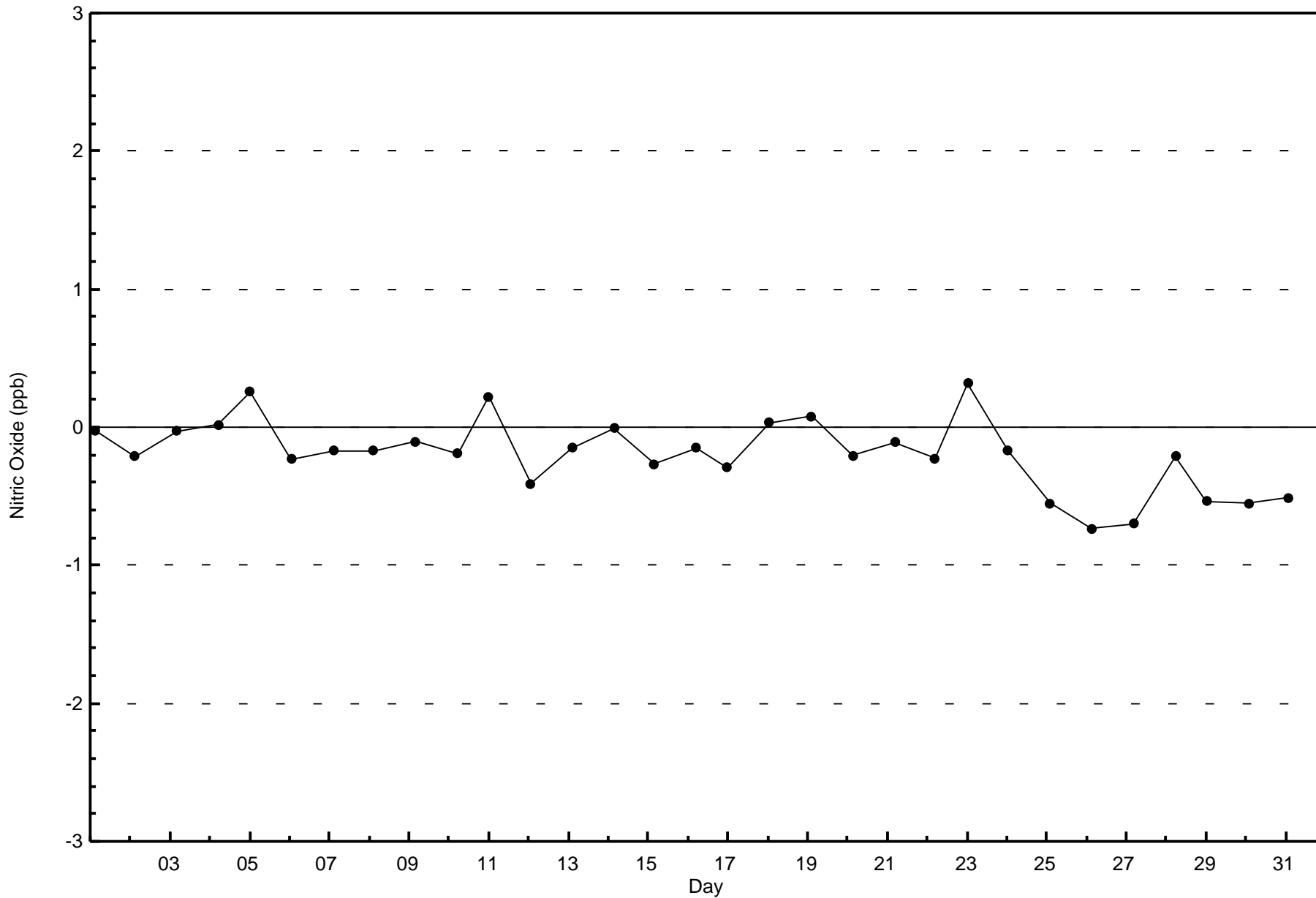
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitric Oxide (NO) - ppb
Wapasu (AMS 17)

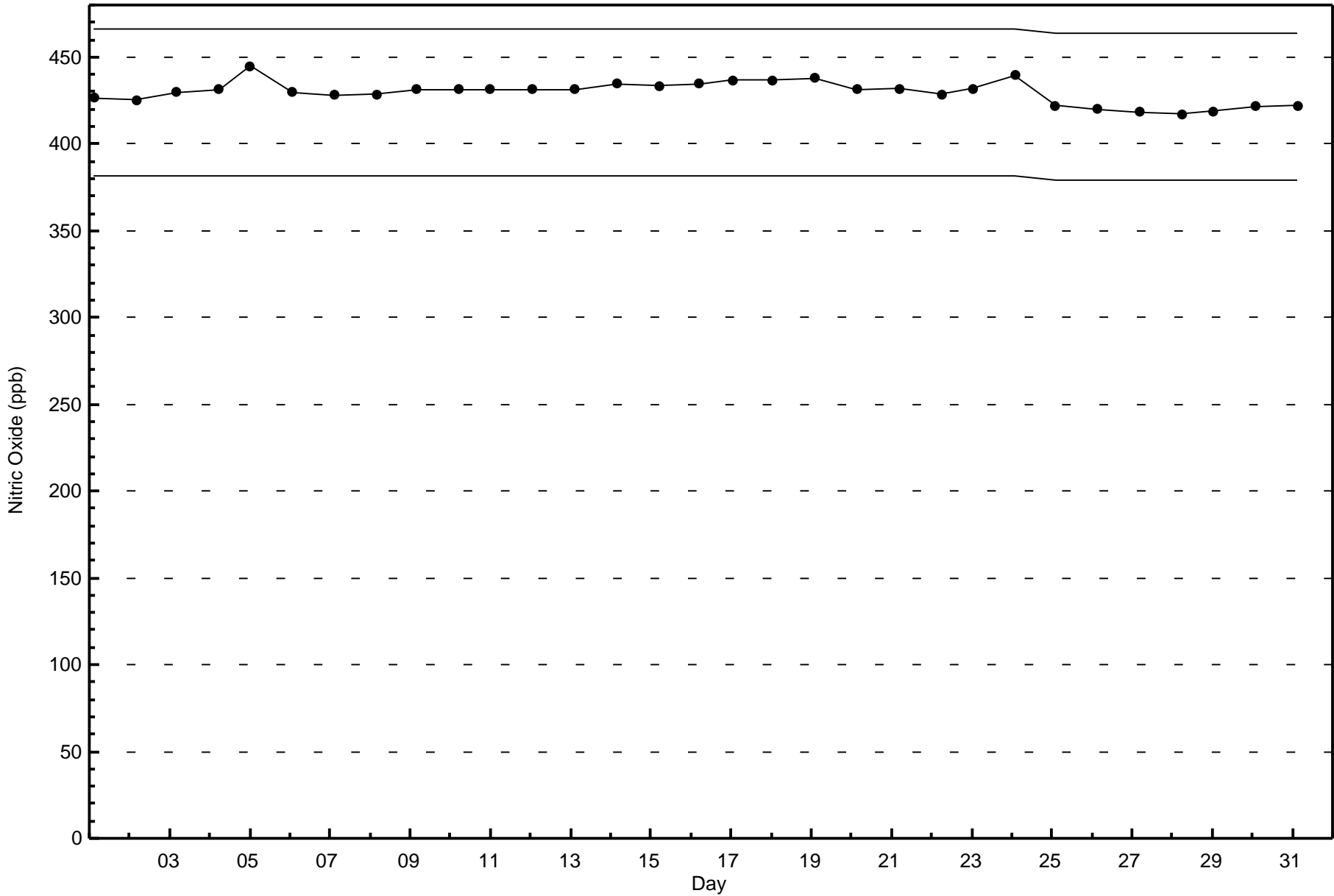






Wood Buffalo Environmental Association
Span Responses

Nitric Oxide (NO) - ppb
Wapasu - August 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Wapasu - August 2017

| | | | | |
|--|---|----------|---------------------------|-------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 12 ppb on Aug 17 02:00 | Maximum Daily Average: 5.0 ppb on Aug 18 | | Hours of Data: | 709 |
| Minimum Value: 0 ppb on Aug 1 02:00 | Minimum Daily Average: 0.1 ppb on Aug 1 | | Hours of Missing Data: | 35 |
| Maximum Diurnal Average: 3.4 ppb at hour 8 | Minimum Diurnal Average: 1.0 ppb at hour 18 | | Hours of Calibration: | 35 |
| Monthly Average: 2.0 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 3 P ₉₀ = 6 P ₉₉ = 11 | | Percent Operational Time: | 100.0 |

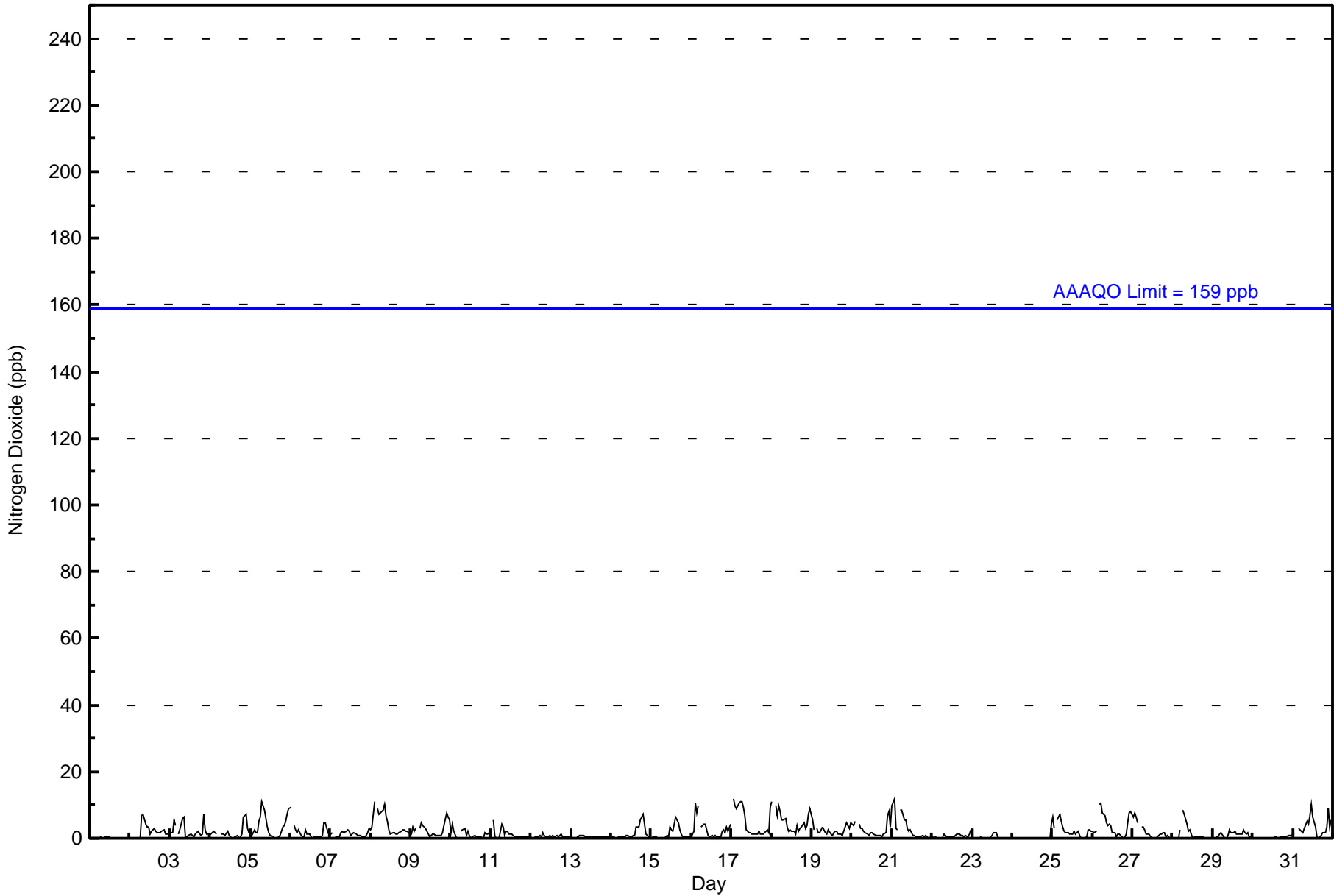
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
|--------|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|---------------|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | |
| 2-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 7 | 7 | 4 | 4 | 4 | 1 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 2.1 | 7 | |
| 3-Aug | 2 | 2 | 6 | 4 | Z | 1 | 3 | 6 | 6 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 7 | 2 | 1 | 1 | 2.3 | 7 | | |
| 4-Aug | 1 | 2 | 2 | 2 | 1 | Z | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 7 | 7 | 3 | 2 | 1.7 | 7 | | |
| 5-Aug | Z | 1 | 3 | 2 | 2 | 5 | 7 | 11 | 8 | 6 | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 4 | 4 | 5 | 7 | 3.5 | 11 | | |
| 6-Aug | 9 | Z | 4 | 3 | 2 | 3 | 1 | 0 | 0 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 5 | 2 | 1 | 1.8 | 9 | |
| 7-Aug | 1 | 2 | Z | 1 | 1 | 0 | 2 | 2 | 2 | 2 | 3 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 1.4 | 3 | |
| 8-Aug | 3 | 4 | 11 | Z | 9 | 7 | 8 | 8 | 10 | 7 | 5 | 3 | 1 | 2 | 2 | 1 | 1 | 2 | 2 | 3 | 3 | 2 | 2 | 1 | 4.2 | 11 | |
| 9-Aug | 1 | 4 | 2 | 3 | Z | 3 | 5 | 4 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 4 | 8 | 6 | 5 | 2.7 | 8 | |
| 10-Aug | 2 | 4 | 2 | 0 | 0 | Z | 2 | 3 | 3 | 1 | 2 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 2 | 1 | 1 | 2 | 1.3 | 4 | |
| 11-Aug | Z | 5 | 1 | 0 | 0 | 0 | 4 | 3 | 1 | 2 | 2 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1.2 | 5 | |
| 12-Aug | 0 | Z | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0.7 | 2 | |
| 13-Aug | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0.5 | 1 | |
| 14-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 3 | 6 | 6 | 7 | 4 | 1 | 0 | 0 | 1.7 | 7 | |
| 15-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 4 | 2 | 2 | 6 | 6 | 5 | 3 | 1 | 1 | 0 | 1 | 0 | 0 | 1.4 | 6 |
| 16-Aug | 0 | 2 | 11 | 8 | 10 | Z | 3 | 4 | 4 | 3 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 2 | 2 | 2 | 3 | 2 | 4 | 2.8 | 11 | | |
| 17-Aug | Z | 12 | 10 | 9 | 11 | 11 | 11 | 9 | 7 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 3 | 2 | 9 | 4.9 | 12 | |
| 18-Aug | 11 | Z | 10 | 7 | 10 | 8 | 5 | 6 | 6 | 3 | 2 | 3 | 2 | 2 | 1 | 4 | 2 | 3 | 4 | 5 | 3 | 4 | 7 | 9 | 5.0 | 11 | |
| 19-Aug | 5 | 3 | Z | 3 | 2 | 2 | 3 | 3 | 2 | 1 | 3 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 3 | 5 | 3 | 5 | 2.4 | 5 | |
| 20-Aug | 4 | 4 | 5 | Z | 4 | 3 | 3 | 2 | 2 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 7 | 8 | 3 | 2.6 | 8 | |
| 21-Aug | 10 | 12 | 3 | 3 | Z | 8 | 9 | 6 | 6 | 3 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 3.0 | 12 | |
| 22-Aug | 1 | 0 | 0 | 0 | 0 | Z | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 3 | 0.7 | 3 | |
| 23-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | C | C | C | C | 0 | 1 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 2 | |
| 24-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0.2 | 4 | |
| 25-Aug | 6 | 3 | Z | 5 | 7 | 5 | 4 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 3 | 3 | 2 | 2.3 | 7 | |
| 26-Aug | 2 | 2 | 2 | Z | 10 | 10 | 8 | 7 | 5 | 4 | 4 | 4 | 2 | 2 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 5 | 8 | 8 | 3.8 | 10 | |
| 27-Aug | 6 | 8 | 6 | 5 | Z | 3 | 4 | 3 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 0 | 0 | 2.0 | 8 | |
| 28-Aug | 0 | 0 | 0 | 0 | 3 | Z | 8 | 7 | 4 | 2 | 3 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1.4 | 8 | |
| 29-Aug | Z | 0 | 1 | 1 | 1 | 2 | 1 | 0 | 0 | 1 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 3 | 2 | 1 | 2 | 1 | 0 | 1.2 | 3 | |
| 30-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0.3 | 1 | |
| 31-Aug | 1 | 1 | Z | 3 | 3 | 2 | 2 | 3 | 5 | 4 | 7 | 10 | 7 | 3 | 1 | 0 | 1 | 1 | 2 | 2 | 3 | 9 | 4 | 6 | 3.4 | 10 | |
| | 2.6 | 2.7 | 3.2 | 2.2 | 3.0 | 2.9 | 3.1 | 3.4 | 3.0 | 2.0 | 1.8 | 1.6 | 1.1 | 1.1 | 1.0 | 1.1 | 1.0 | 1.0 | 1.1 | 1.4 | 1.9 | 2.5 | 2.1 | 2.6 | Diurnal Average | | |
| | 11 | 12 | 11 | 9 | 11 | 11 | 11 | 11 | 10 | 7 | 7 | 10 | 7 | 3 | 6 | 6 | 5 | 6 | 6 | 7 | 7 | 9 | 8 | 9 | Diurnal Maximum | | |

Z - zerospan C - Calibration
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Wapasu - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Wapasu - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 709 | 100.00 | 100.00 |
| 21 - 40 | 0 | 0.00 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Wapasu - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 30 | 19 | 12 | 20 | 14 | 19 | 50 | 161 | 71 | 67 | 92 | 59 | 33 | 30 | 17 | 14 | 708 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 41 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 30 | 19 | 12 | 20 | 14 | 19 | 50 | 161 | 71 | 67 | 92 | 59 | 33 | 30 | 17 | 14 | 708 |

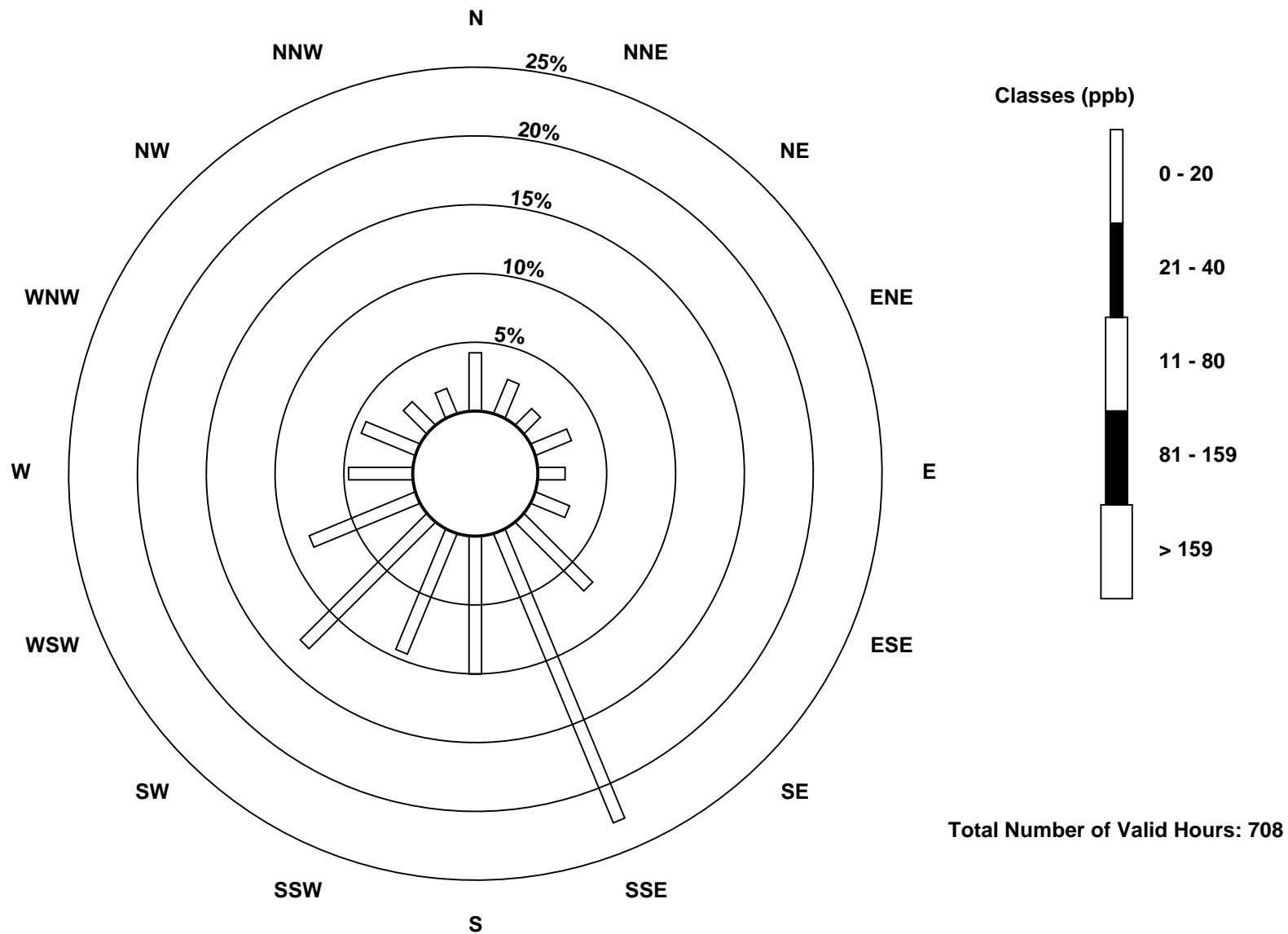
Total Number of Valid Hours: 708

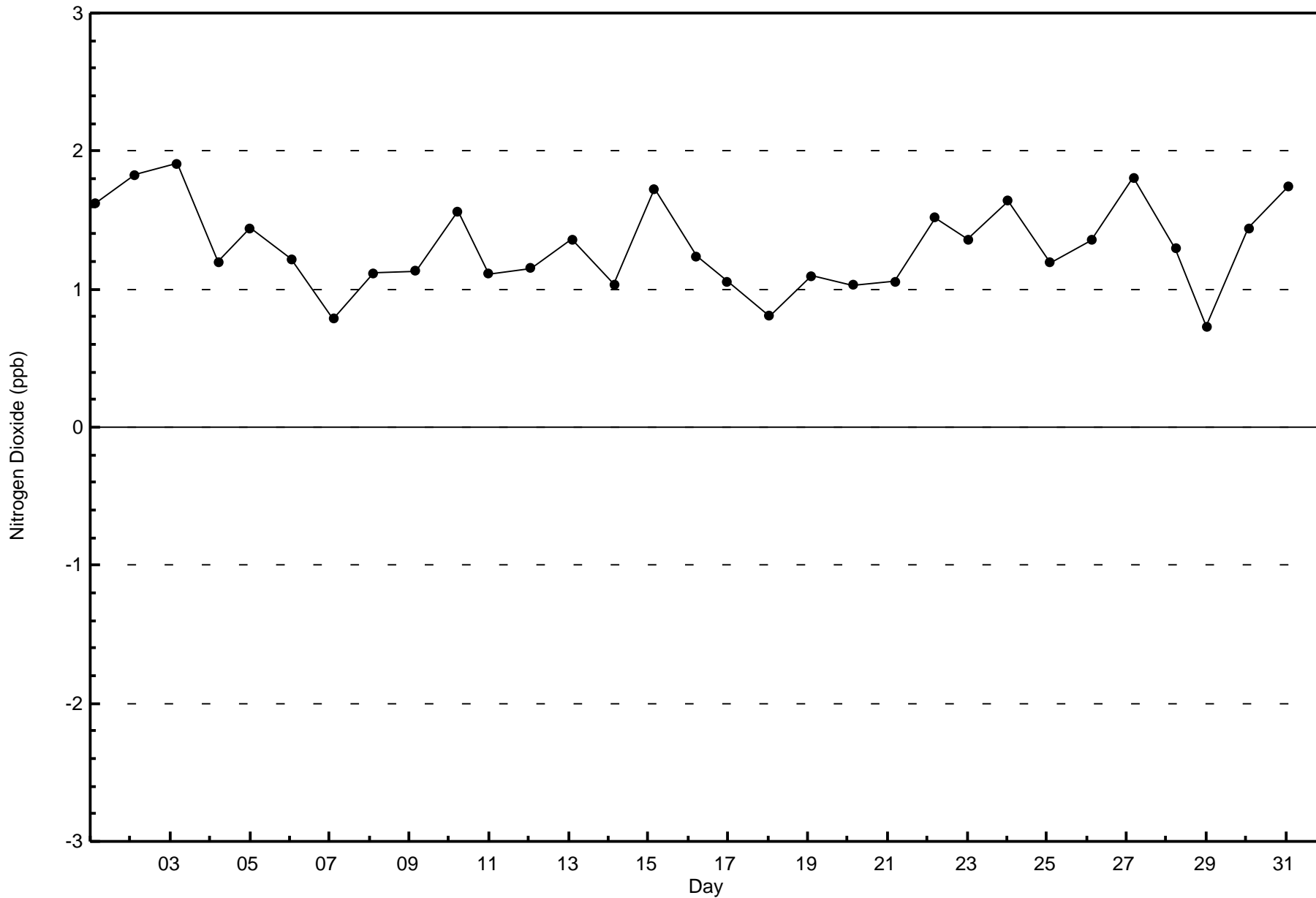
Total Number of Hours: 744

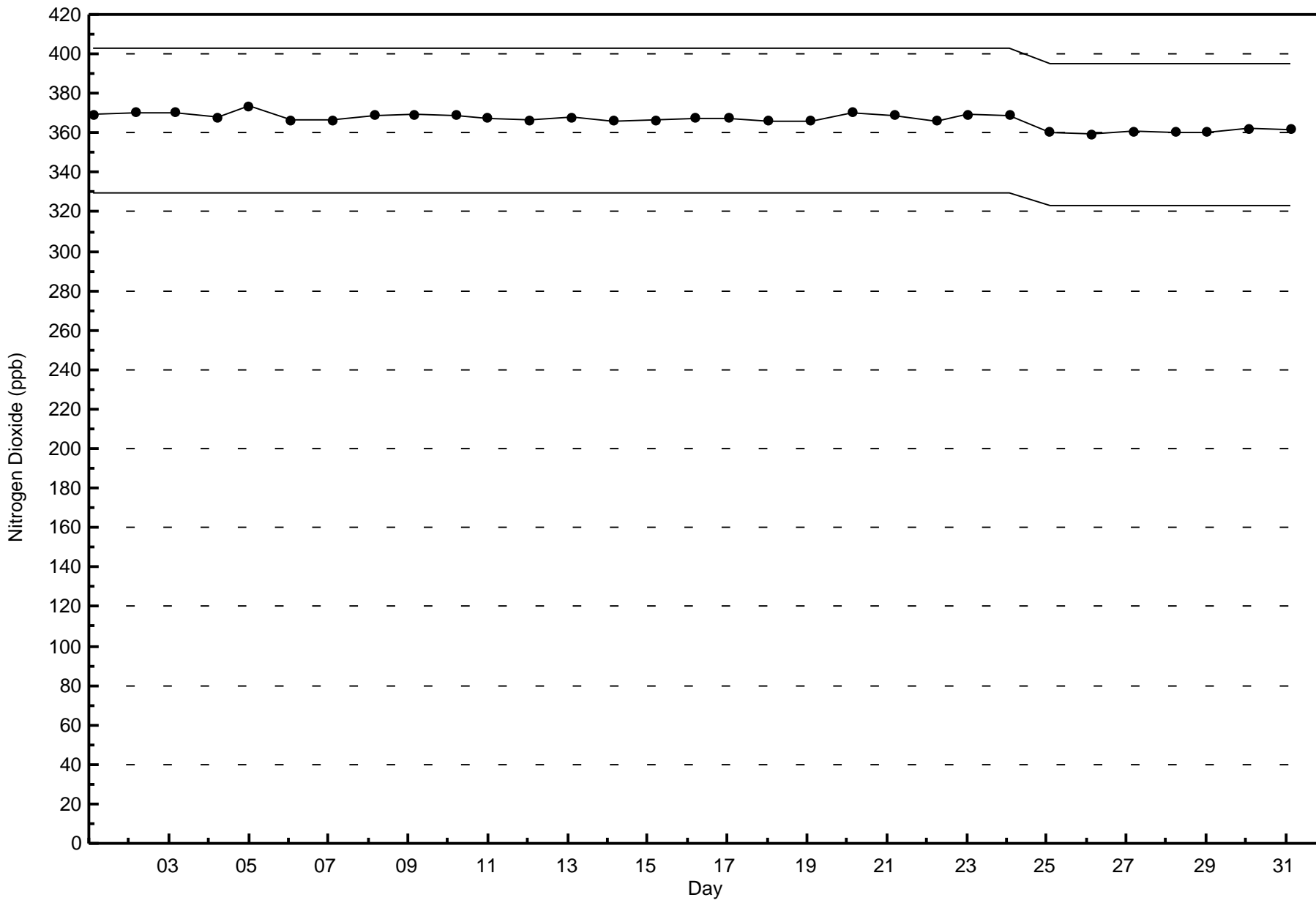


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Dioxide (NO₂) - ppb
Wapasu (AMS 17)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb

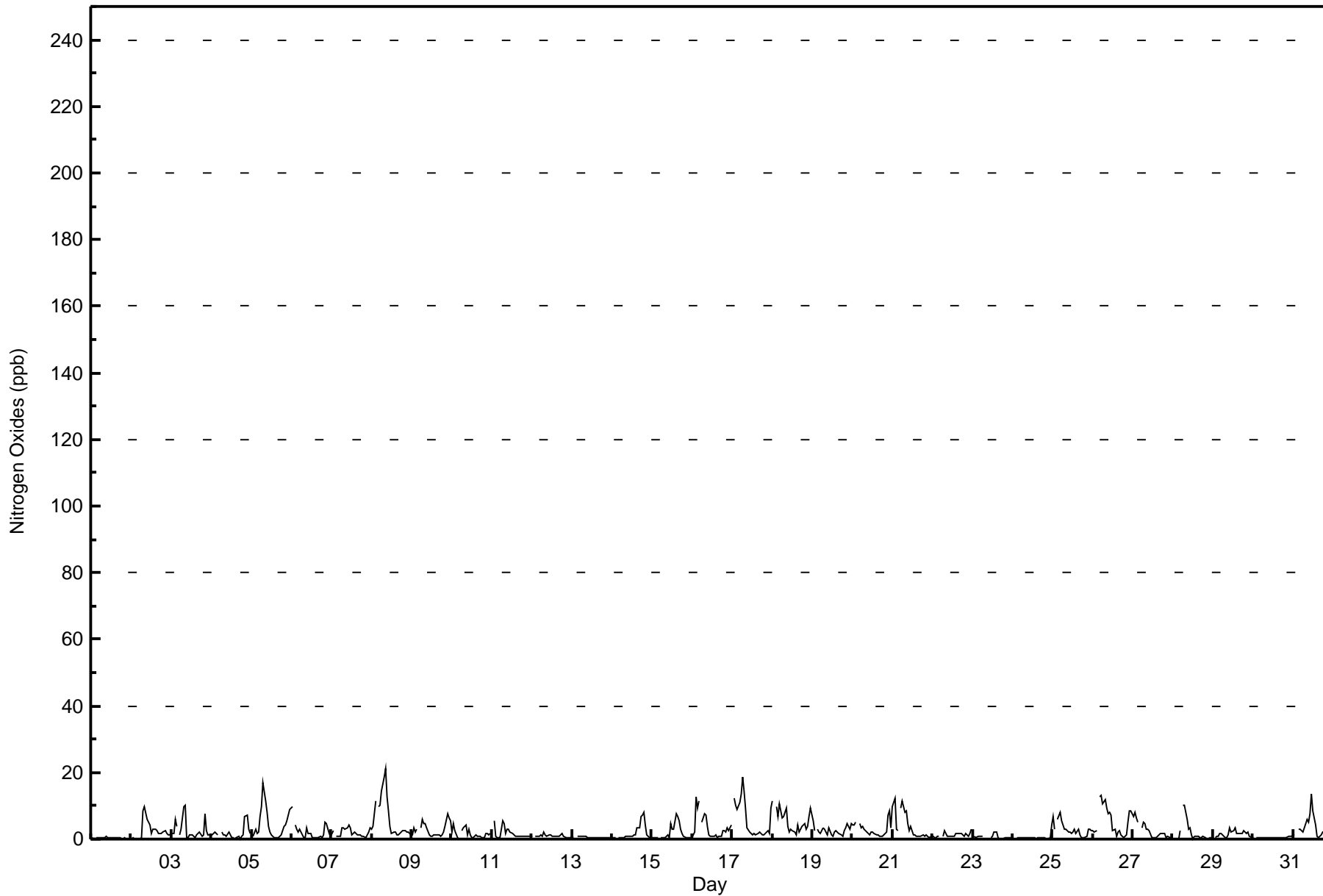
Wapasu - August 2017

| Maximum Value: 21 ppb on Aug 8 09:00 | | | | | | | | | | | | | | | | | | Maximum Daily Average: 6.2 ppb on Aug 8 | | | | | | Hours in Service: 744 | | | |
|---|-------------------------------|----|----|---|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|---------------------------|---------------|---------------|---|
| Minimum Value: 0 ppb on Aug 4 15:00 | | | | | | | | | | | | | | | | | | Minimum Daily Average: 0.3 ppb on Aug 1 | | | | | | Hours of Data: 709 | | | |
| Maximum Diurnal Average: 5.2 ppb at hour 8 | | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 1.3 ppb at hour 18 | | | | | | Hours of Missing Data: 35 | | | |
| Monthly Average: 2.5 ppb | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 3 P ₉₀ = 7 P ₉₉ = 13 | | | | | | Hours of Calibration: 35 | | | |
| | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | |
| 2-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 9 | 10 | 6 | 5 | 4 | 2 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2.6 | 10 | |
| 3-Aug | 2 | 2 | 6 | 4 | Z | 1 | 3 | 10 | 10 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 8 | 2 | 1 | 1 | 2.7 | 10 | | |
| 4-Aug | 1 | 2 | 2 | 2 | 1 | Z | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 7 | 7 | 3 | 2 | 1.7 | 7 | |
| 5-Aug | Z | 1 | 3 | 2 | 2 | 7 | 10 | 17 | 12 | 8 | 4 | 2 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 4 | 4 | 5 | 7 | 9 | 4.4 | 17 | |
| 6-Aug | 10 | Z | 4 | 3 | 2 | 3 | 1 | 1 | 0 | 3 | 2 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 5 | 5 | 2 | 1 | 2.1 | 10 | |
| 7-Aug | 2 | 2 | Z | 1 | 1 | 1 | 3 | 3 | 3 | 3 | 4 | 4 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 2.0 | 4 | |
| 8-Aug | 3 | 4 | 12 | Z | 10 | 10 | 14 | 19 | 21 | 13 | 9 | 4 | 2 | 2 | 2 | 1 | 1 | 2 | 2 | 3 | 3 | 2 | 2 | 1 | 6.2 | 21 | |
| 9-Aug | 1 | 4 | 2 | 3 | Z | 3 | 6 | 5 | 4 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 4 | 8 | 7 | 5 | 3.0 | 8 | |
| 10-Aug | 2 | 5 | 3 | 0 | 0 | Z | 2 | 3 | 4 | 1 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 2 | 2 | 1 | 2 | 1.6 | 5 | |
| 11-Aug | Z | 5 | 1 | 0 | 1 | 0 | 6 | 5 | 2 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.6 | 6 | |
| 12-Aug | 1 | Z | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 0 | 1 | 1 | 1.0 | 2 | |
| 13-Aug | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0.6 | 1 | |
| 14-Aug | 0 | 0 | 1 | Z | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 3 | 7 | 7 | 8 | 4 | 1 | 0 | 0 | 1.9 | 8 | |
| 15-Aug | 0 | 1 | 1 | 1 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 3 | 3 | 8 | 7 | 6 | 3 | 2 | 1 | 0 | 1 | 1 | 1 | 1.9 | 8 | |
| 16-Aug | 1 | 2 | 13 | 9 | 12 | Z | 5 | 8 | 7 | 4 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 2 | 3 | 3 | 4 | 3.7 | 13 | |
| 17-Aug | Z | 12 | 10 | 9 | 11 | 13 | 19 | 14 | 9 | 3 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 2 | 3 | 2 | 9 | 5.8 | 19 | |
| 18-Aug | 11 | Z | 10 | 7 | 10 | 9 | 6 | 7 | 9 | 4 | 2 | 3 | 2 | 2 | 1 | 4 | 2 | 3 | 4 | 5 | 3 | 4 | 7 | 9 | 5.4 | 11 | |
| 19-Aug | 5 | 3 | Z | 3 | 2 | 1 | 3 | 3 | 2 | 1 | 3 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 3 | 5 | 3 | 5 | 2.5 | 5 |
| 20-Aug | 4 | 4 | 5 | Z | 5 | 3 | 4 | 3 | 3 | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 7 | 8 | 3 | 2.9 | 8 | |
| 21-Aug | 10 | 12 | 3 | 3 | Z | 9 | 11 | 8 | 9 | 5 | 3 | 4 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3.8 | 12 | |
| 22-Aug | 1 | 1 | 0 | 1 | 1 | Z | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 2 | 3 | 1.2 | 3 |
| 23-Aug | Z | 1 | 1 | 1 | 1 | 1 | 1 | C | C | C | C | 0 | 1 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 2 | |
| 24-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0.5 | 4 | |
| 25-Aug | 7 | 3 | Z | 6 | 8 | 5 | 4 | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 1 | 0 | 0 | 0 | 1 | 3 | 3 | 2 | 2.9 | 8 | |
| 26-Aug | 2 | 2 | 2 | Z | 13 | 13 | 10 | 12 | 9 | 8 | 8 | 7 | 3 | 3 | 1 | 2 | 2 | 1 | 0 | 1 | 1 | 5 | 8 | 8 | 5.4 | 13 | |
| 27-Aug | 7 | 8 | 6 | 5 | Z | 4 | 5 | 5 | 3 | 3 | 3 | 1 | 0 | 0 | 0 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 2.5 | 8 | |
| 28-Aug | 0 | 0 | 0 | 0 | 3 | Z | 10 | 10 | 6 | 3 | 4 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1.9 | 10 | |
| 29-Aug | Z | 0 | 1 | 1 | 1 | 2 | 1 | 1 | 0 | 1 | 4 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 1 | 0 | 1.6 | 4 | |
| 30-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0.5 | 1 | |
| 31-Aug | 1 | 1 | Z | 3 | 3 | 3 | 2 | 3 | 6 | 5 | 8 | 14 | 8 | 4 | 1 | 1 | 1 | 1 | 2 | 2 | 4 | 9 | 4 | 6 | 4.0 | 14 | |
| 2.8 2.9 3.5 2.5 3.4 3.6 4.3 5.2 4.7 3.0 2.6 2.2 1.5 1.4 1.3 1.5 1.3 1.3 1.4 1.6 2.1 2.7 2.3 2.8 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | |
| 11 12 13 9 13 13 19 19 21 13 9 14 8 4 8 7 6 7 7 8 8 9 8 9 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | |
| Z - zerospan C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Wapasu - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Wapasu - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 708 | 99.86 | 99.86 |
| 21 - 40 | 1 | 0.14 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Wapasu - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 30 | 19 | 12 | 20 | 14 | 19 | 50 | 161 | 71 | 67 | 91 | 59 | 33 | 30 | 17 | 14 | 707 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 30 | 19 | 12 | 20 | 14 | 19 | 50 | 161 | 71 | 67 | 92 | 59 | 33 | 30 | 17 | 14 | 708 |

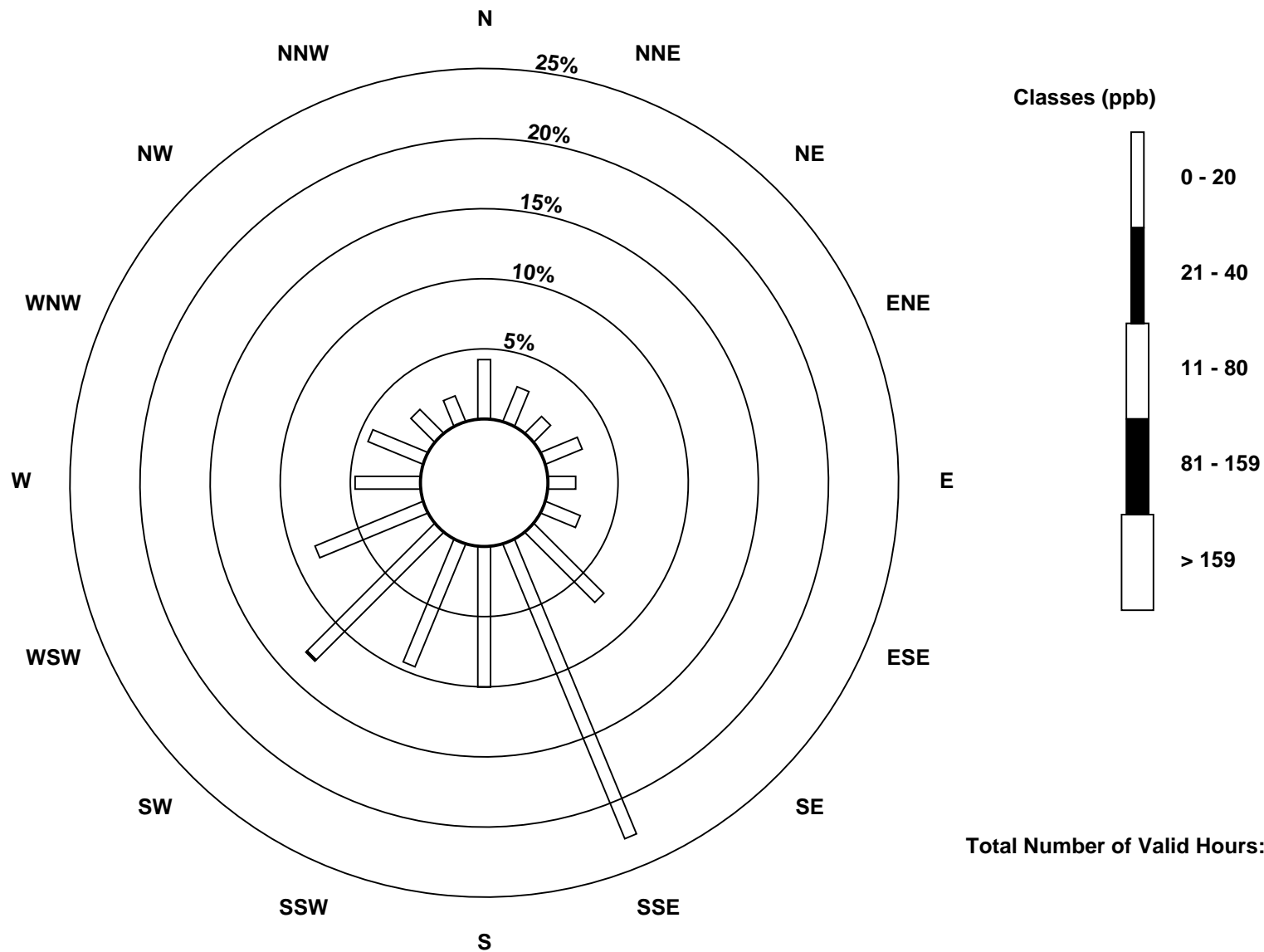
Total Number of Valid Hours: 708

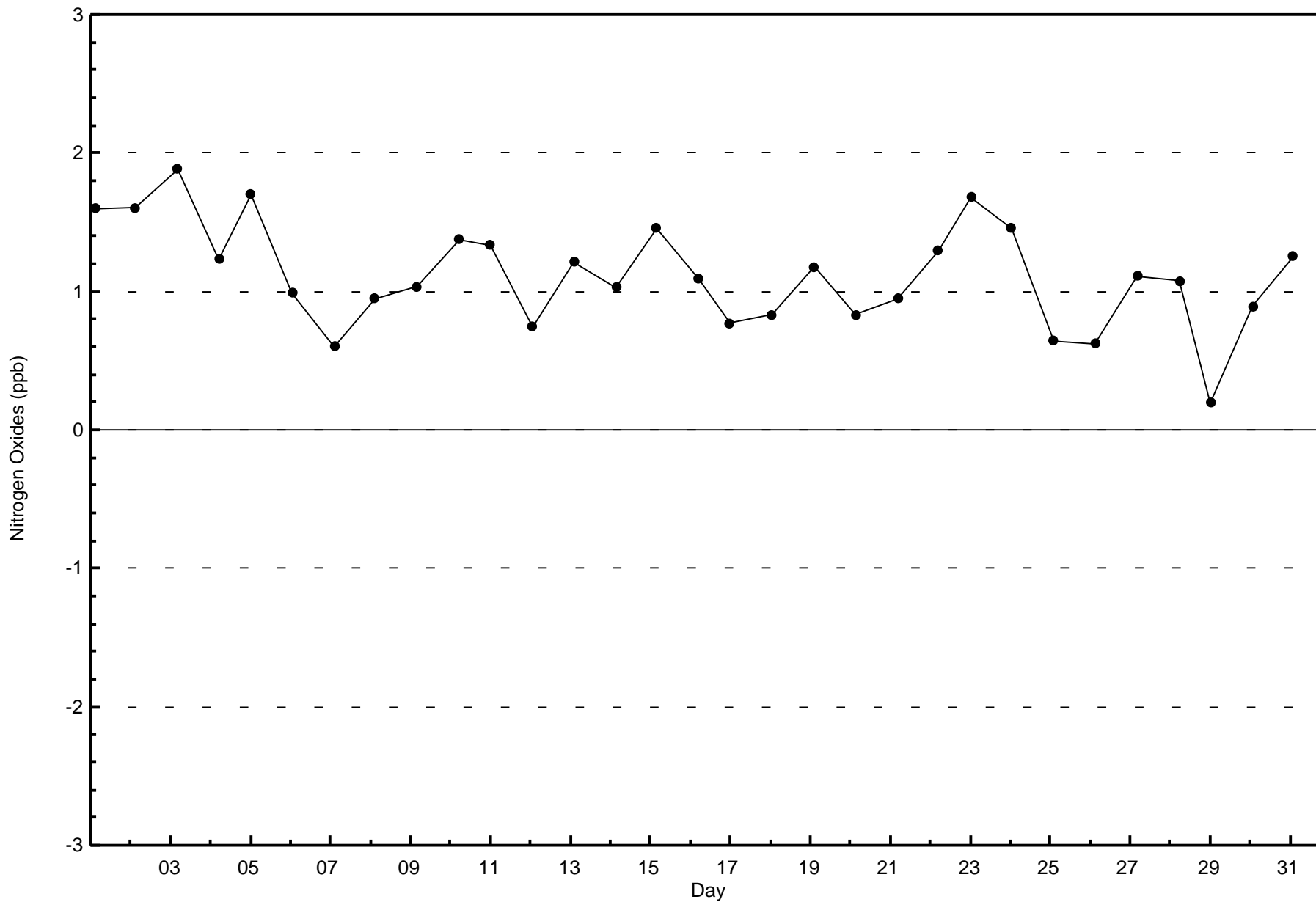
Total Number of Hours: 744

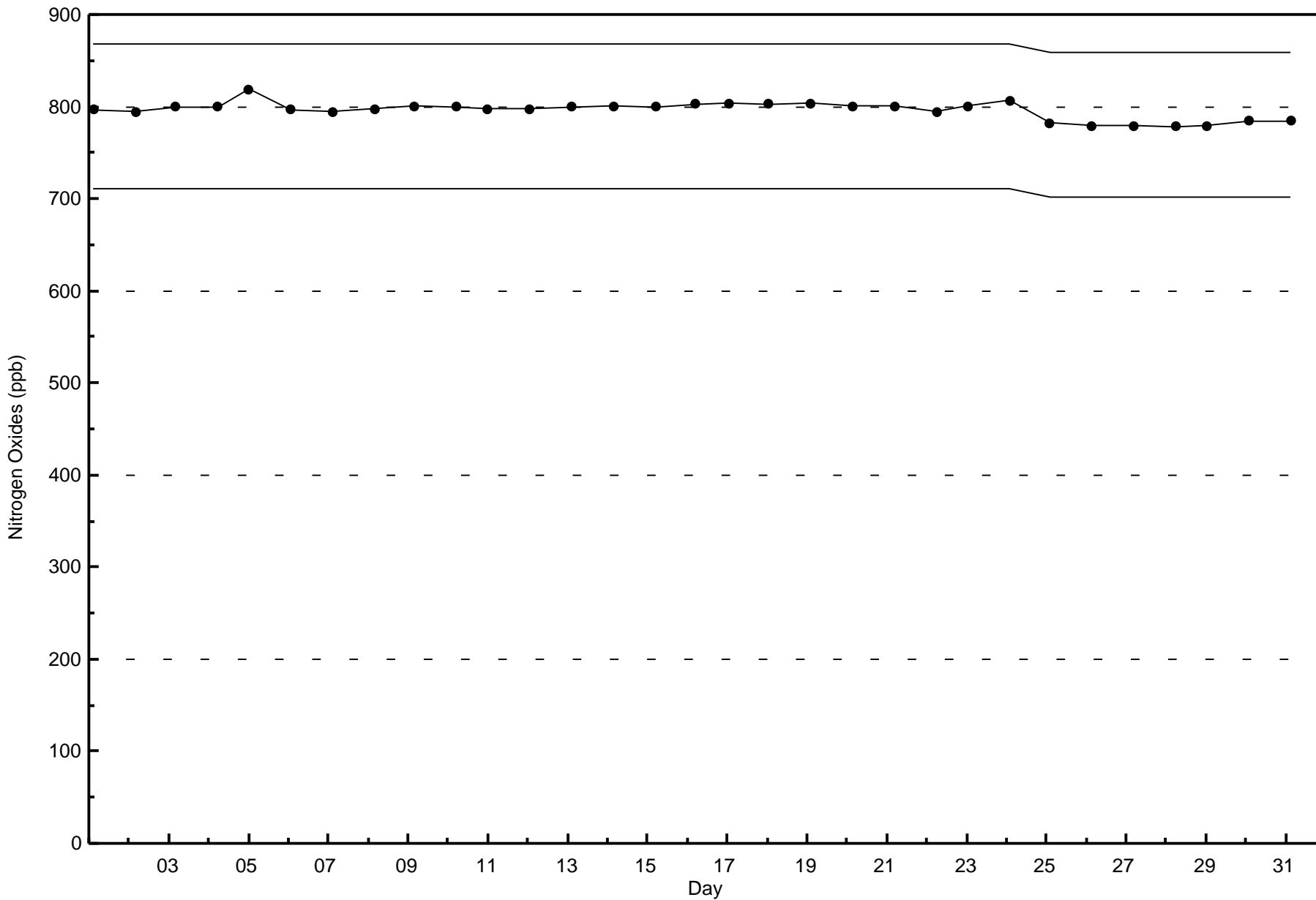


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Oxides (NO_x) - ppb
Wapasu (AMS 17)





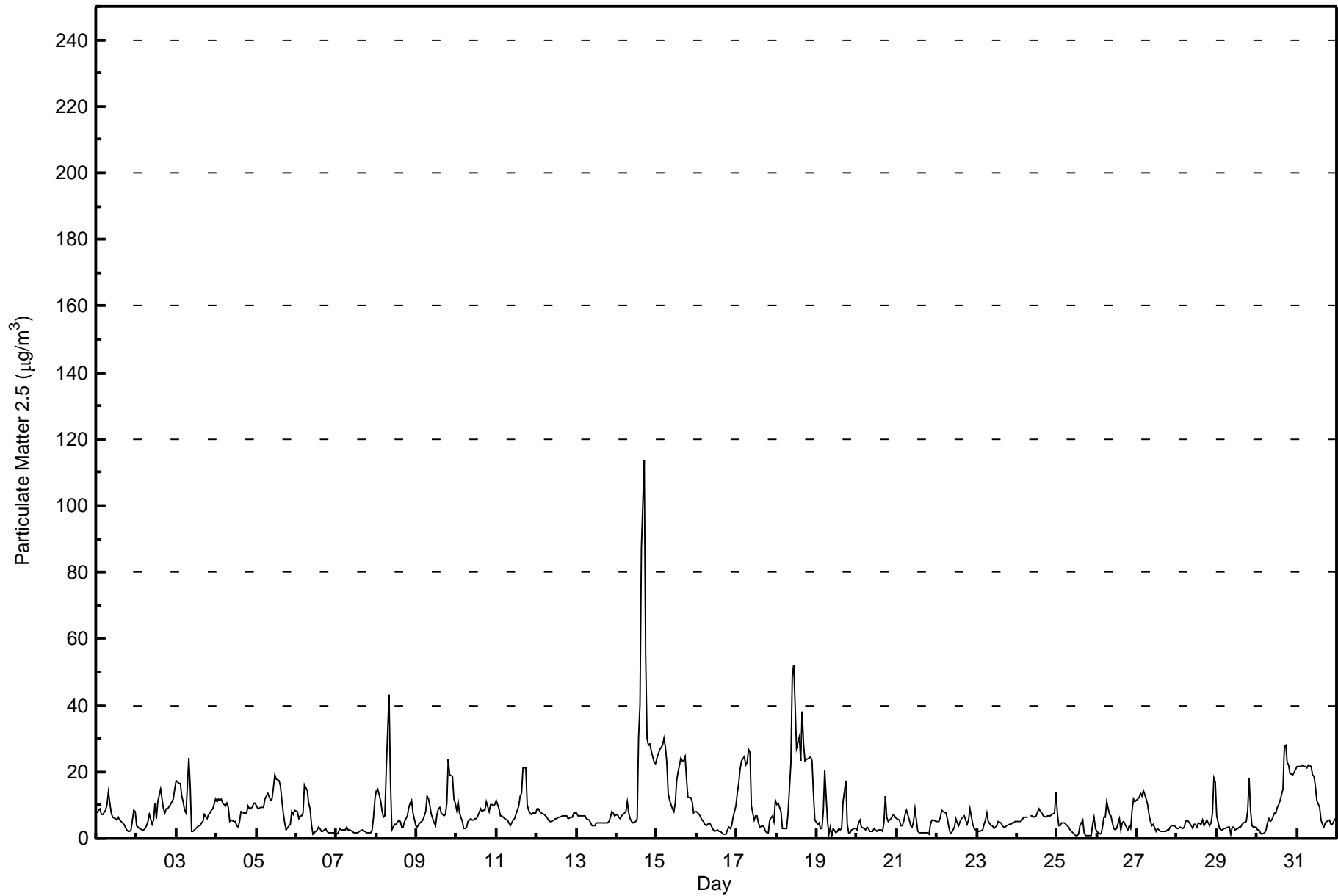




| | | | |
|--|--|---|---------------------------------|
| Number of Exceedences (AAAQO): 24-hr: 0 | Maximum Value: 113.4 µg/m ³ on Aug 14 17:00 | Maximum Daily Average: 23.8 µg/m ³ on Aug 14 | Hours in Service: 744 |
| Minimum Value: 0.7 µg/m ³ on Aug 19 10:00 | Maximum Diurnal Average: 11.0 µg/m ³ at hour 17 | Minimum Daily Average: 2.8 µg/m ³ on Aug 7 | Hours of Data: 743 |
| Monthly Average: 8.18 µg/m ³ | Percentiles: P ₁ = 1.2 P ₁₀ = 2.2 Q ₁ = 3.4 Median = 5.7 Q ₃ = 9.3 P ₉₀ = 18.1 P ₉₉ = 37.6 | Minimum Diurnal Average: 6.2 µg/m ³ at hour 13 | Hours of Missing Data: 1 |
| | | | Hours of Calibration: 1 |
| | | | Percent Operational Time: 100.0 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|------|------|------|------|------|------|------|---------------|-----------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 7.8 | 8.7 | 8.8 | 7.0 | 7.0 | 8.5 | 10.3 | 13.9 | 10.6 | 7.7 | 6.5 | 5.8 | 5.3 | 6.5 | 5.6 | 5.1 | 4.3 | 3.6 | 2.7 | 2.1 | 2.1 | 2.7 | 8.5 | 8.0 | 6.6 | 13.9 |
| 2-Aug | 3.9 | 3.4 | 3.1 | 2.4 | 2.4 | 3.0 | 3.7 | 5.2 | 7.2 | 4.3 | 5.7 | 10.7 | 5.8 | 10.9 | 14.7 | 11.9 | 8.8 | 7.7 | 8.7 | 8.7 | 10.2 | 11.1 | 11.8 | 14.7 | 7.5 | 14.7 |
| 3-Aug | 17.2 | 16.7 | 16.6 | 12.6 | 11.1 | 8.3 | 7.7 | 24.2 | 15.5 | 2.0 | 1.9 | 2.7 | 3.4 | 3.9 | 4.0 | 4.8 | 5.2 | 7.3 | 6.1 | 7.1 | 7.5 | 8.5 | 8.9 | 12.0 | 9.0 | 24.2 |
| 4-Aug | 11.0 | 11.7 | 11.6 | 11.7 | 10.6 | 9.6 | 10.4 | 9.5 | 5.3 | 5.4 | 5.3 | 5.2 | 4.0 | 3.5 | 4.9 | 8.0 | 7.8 | 7.6 | 7.8 | 9.7 | 8.8 | 9.3 | 10.6 | 10.6 | 8.3 | 11.7 |
| 5-Aug | 9.8 | 8.8 | 9.3 | 9.5 | 9.5 | 11.7 | 12.8 | 13.6 | 11.5 | 11.8 | 15.2 | 18.9 | 17.7 | 17.2 | 15.6 | 11.6 | 7.6 | 4.5 | 2.6 | 3.7 | 4.4 | 8.1 | 7.2 | 8.6 | 10.5 | 18.9 |
| 6-Aug | 8.0 | 5.8 | 6.9 | 6.7 | 7.6 | 16.3 | 14.3 | 10.5 | 8.9 | 4.2 | 1.4 | 1.9 | 2.4 | 3.2 | 3.0 | 2.2 | 2.0 | 3.1 | 2.3 | 1.5 | 1.7 | 1.8 | 1.6 | 1.3 | 4.9 | 16.3 |
| 7-Aug | 1.4 | 1.8 | 2.8 | 2.6 | 2.7 | 2.7 | 3.5 | 2.6 | 2.4 | 2.2 | 1.7 | 1.6 | 1.6 | 1.7 | 2.2 | 2.4 | 2.1 | 2.1 | 1.7 | 1.6 | 1.6 | 2.6 | 6.5 | 12.0 | 2.8 | 12.0 |
| 8-Aug | 14.3 | 14.6 | 11.5 | 8.3 | 6.5 | 6.9 | 20.3 | 43.4 | 17.2 | 2.5 | 3.3 | 4.2 | 4.1 | 5.7 | 5.2 | 3.3 | 3.5 | 5.2 | 6.8 | 9.5 | 10.4 | 11.3 | 7.5 | 3.9 | 9.6 | 43.4 |
| 9-Aug | 3.5 | 4.3 | 4.6 | 5.1 | 5.6 | 8.0 | 12.7 | 12.1 | 9.5 | 7.1 | 4.8 | 3.6 | 7.4 | 8.9 | 9.5 | 7.7 | 6.9 | 7.2 | 10.7 | 23.7 | 19.0 | 18.6 | 11.7 | 10.8 | 9.3 | 23.7 |
| 10-Aug | 8.3 | 10.8 | 7.6 | 4.9 | 3.1 | 2.9 | 3.2 | 5.0 | 6.0 | 5.6 | 5.7 | 6.0 | 6.0 | 6.9 | 8.9 | 8.2 | 8.6 | 8.4 | 11.2 | 7.8 | 10.1 | 10.1 | 9.7 | 10.1 | 7.3 | 11.2 |
| 11-Aug | 11.5 | 9.0 | 6.9 | 6.6 | 6.5 | 5.8 | 5.7 | 4.8 | 3.8 | 4.7 | 5.4 | 5.9 | 8.4 | 9.5 | 12.9 | 13.5 | 21.2 | 21.3 | 10.2 | 8.6 | 7.5 | 7.1 | 7.6 | 7.8 | 8.8 | 21.3 |
| 12-Aug | 9.0 | 9.0 | 7.9 | 7.5 | 7.2 | 7.0 | 6.2 | 5.7 | 5.0 | 4.9 | 5.4 | 5.9 | 6.1 | 6.3 | 6.4 | 6.8 | 6.8 | 6.6 | 6.6 | 5.8 | 6.5 | 6.5 | 7.4 | 7.6 | 6.7 | 9.0 |
| 13-Aug | 7.6 | 6.8 | 6.6 | 6.7 | 6.8 | 6.8 | 5.9 | 5.4 | 4.7 | 3.9 | 3.8 | 3.9 | 4.6 | 4.7 | 4.7 | 4.8 | 4.9 | 4.7 | 4.7 | 5.1 | 6.3 | 7.9 | 7.7 | 7.0 | 5.7 | 7.9 |
| 14-Aug | 7.2 | 6.4 | 6.1 | 6.7 | 7.1 | 8.3 | 11.0 | 7.5 | 5.9 | 5.1 | 4.8 | 5.2 | 6.1 | 30.6 | 40.1 | 87.2 | 113.4 | 55.1 | 30.1 | 28.0 | 28.4 | 26.3 | 22.9 | 22.6 | 23.8 | 113.4 |
| 15-Aug | 24.3 | 25.4 | 26.7 | 27.9 | 29.9 | 27.7 | 22.8 | 13.5 | 11.2 | 9.1 | 8.0 | 10.4 | 17.5 | 20.0 | 24.2 | 23.4 | 23.4 | 24.7 | 17.7 | 12.5 | 12.3 | 11.1 | 7.8 | 7.9 | 18.3 | 29.9 |
| 16-Aug | 8.2 | 7.3 | 6.3 | 5.3 | 4.9 | 4.2 | 3.9 | 4.6 | 4.4 | 3.3 | 2.4 | 2.1 | 2.7 | 2.2 | 2.1 | 1.7 | 1.4 | 1.4 | 2.5 | 3.4 | 3.0 | 3.9 | 6.3 | 9.8 | 4.1 | 9.8 |
| 17-Aug | 13.4 | 16.5 | 20.6 | 23.5 | 24.6 | 22.2 | 22.9 | 26.9 | 25.9 | 9.8 | 5.5 | 6.6 | 6.6 | 4.8 | 3.6 | 3.9 | 3.4 | 2.2 | 1.8 | 1.9 | 5.6 | 6.9 | 4.9 | 11.6 | 11.5 | 26.9 |
| 18-Aug | 10.4 | 10.6 | 7.9 | 2.8 | 3.2 | 3.0 | 3.1 | 7.5 | 22.5 | 48.6 | 51.9 | 40.4 | 27.3 | 30.5 | 23.5 | 38.3 | 28.2 | 23.3 | 23.7 | 24.2 | 24.8 | 23.4 | 13.4 | 5.4 | 20.8 | 51.9 |
| 19-Aug | 4.1 | 4.6 | 3.1 | 3.2 | 8.1 | 20.5 | 5.2 | 1.4 | 3.2 | 0.7 | 3.1 | 1.8 | 2.2 | 2.8 | 2.6 | 3.1 | 11.2 | 17.2 | 4.4 | 1.8 | 1.7 | 2.7 | 2.8 | 2.8 | 4.8 | 20.5 |
| 20-Aug | 2.6 | 4.7 | 5.5 | 3.2 | 3.2 | 2.6 | 3.4 | 2.8 | 2.1 | 2.1 | 3.0 | 2.7 | 2.0 | 2.5 | 2.7 | 2.3 | 4.7 | 12.6 | 6.3 | 5.2 | 6.1 | 6.7 | 7.1 | 6.3 | 4.3 | 12.6 |
| 21-Aug | 5.7 | 5.6 | 3.9 | 3.9 | 5.1 | 7.2 | 8.3 | 5.6 | 3.9 | 3.3 | 5.2 | 8.9 | 1.9 | 1.8 | 1.6 | 1.7 | 1.5 | 1.9 | 1.9 | 1.3 | 4.2 | 5.6 | 5.4 | 5.0 | 4.2 | 8.9 |
| 22-Aug | 5.1 | 5.0 | 6.3 | 8.4 | 8.2 | 7.7 | 6.1 | 3.2 | 1.6 | 1.7 | 3.3 | 5.9 | 4.9 | 3.9 | 5.3 | 6.1 | 6.6 | 5.6 | 4.3 | 5.6 | 8.8 | 4.2 | 2.9 | 2.5 | 5.1 | 8.8 |
| 23-Aug | 2.7 | 2.3 | 2.1 | 2.6 | 4.3 | 5.6 | 7.5 | 5.0 | 3.8 | 3.7 | 3.2 | 3.3 | 3.9 | 5.2 | 4.7 | 3.9 | 3.4 | 3.3 | 3.8 | 4.3 | 4.4 | 4.7 | 4.8 | 4.9 | 4.1 | 7.5 |
| 24-Aug | 5.0 | 5.0 | 5.3 | 5.7 | 6.2 | 6.3 | 6.4 | C | 6.9 | 6.6 | 6.5 | 6.7 | 8.0 | 8.8 | 8.2 | 7.6 | 6.9 | 6.6 | 6.9 | 6.8 | 6.9 | 7.2 | 7.6 | 13.9 | 7.0 | 13.9 |
| 25-Aug | 7.5 | 3.9 | 4.0 | 4.8 | 4.7 | 4.4 | 3.8 | 3.2 | 2.7 | 1.8 | 1.3 | 1.0 | 0.9 | 1.4 | 3.9 | 5.7 | 1.8 | 0.9 | 0.7 | 0.7 | 0.9 | 4.3 | 6.4 | 3.1 | 3.1 | 7.5 |
| 26-Aug | 2.2 | 1.6 | 1.4 | 3.4 | 6.5 | 6.4 | 10.9 | 7.4 | 6.8 | 4.7 | 3.2 | 2.4 | 3.0 | 5.7 | 2.6 | 4.5 | 5.0 | 4.4 | 2.5 | 3.8 | 2.8 | 8.4 | 12.0 | 11.1 | 5.1 | 12.0 |
| 27-Aug | 11.9 | 12.2 | 13.8 | 12.5 | 14.4 | 11.7 | 10.1 | 7.2 | 5.0 | 3.9 | 4.3 | 2.0 | 2.8 | 2.3 | 2.0 | 2.0 | 2.0 | 2.2 | 2.5 | 2.7 | 3.3 | 3.7 | 3.8 | 3.5 | 5.9 | 14.4 |
| 28-Aug | 3.1 | 2.9 | 3.2 | 2.9 | 3.6 | 5.1 | 5.5 | 5.2 | 3.7 | 3.1 | 4.3 | 4.2 | 3.3 | 4.6 | 4.4 | 5.7 | 3.7 | 4.8 | 5.7 | 4.0 | 4.8 | 7.7 | 18.3 | 16.8 | 5.4 | 18.3 |
| 29-Aug | 6.7 | 3.0 | 2.6 | 2.4 | 2.9 | 3.1 | 3.3 | 3.4 | 1.2 | 3.4 | 3.5 | 2.7 | 3.1 | 3.4 | 3.5 | 4.4 | 4.5 | 5.1 | 8.6 | 18.3 | 8.3 | 3.6 | 3.3 | 3.5 | 4.5 | 18.3 |
| 30-Aug | 2.6 | 2.4 | 1.5 | 1.2 | 1.6 | 2.6 | 4.7 | 5.8 | 5.1 | 5.7 | 7.6 | 7.7 | 9.4 | 10.2 | 11.5 | 14.8 | 27.3 | 27.8 | 22.7 | 21.9 | 19.6 | 19.2 | 19.7 | 20.8 | 11.4 | 27.8 |
| 31-Aug | 21.7 | 21.8 | 21.6 | 22.0 | 21.6 | 21.8 | 21.4 | 21.9 | 21.6 | 19.0 | 18.8 | 15.5 | 11.4 | 9.2 | 5.7 | 4.3 | 3.3 | 4.5 | 5.2 | 5.5 | 4.3 | 4.4 | 5.1 | 5.8 | 13.2 | 22.0 |
| | 8.3 | 8.2 | 7.9 | 7.5 | 8.0 | 8.6 | 8.9 | 9.6 | 7.9 | 6.5 | 6.6 | 6.6 | 6.2 | 7.7 | 8.1 | 10.0 | 11.0 | 9.4 | 7.5 | 8.0 | 8.0 | 8.4 | 8.4 | 8.8 | | Diurnal Average |
| | 24.3 | 25.4 | 26.7 | 27.9 | 29.9 | 27.7 | 22.9 | 43.4 | 25.9 | 48.6 | 51.9 | 40.4 | 27.3 | 30.6 | 40.1 | 87.2 | 113.4 | 55.1 | 30.1 | 28.0 | 28.4 | 26.3 | 22.9 | 22.6 | | Diurnal Maximum |

C - Calibration
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Wapasu - August 2017**

| Concentration Ranges ($\mu\text{g}/\text{m}^3$) | Number of Hours | % | Cumulative % |
|---|------------------------|----------|---------------------|
| 1 - 5 | 339 | 45.63 | 45.63 |
| 6 - 15 | 307 | 41.32 | 86.94 |
| 16 - 25 | 65 | 8.75 | 95.69 |
| 26 - 80 | 23 | 3.10 | 98.79 |
| > 81.0 | 2 | 0.27 | 99.06 |

Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Wapasu - August 2017

| Concentration Ranges (μg/m ³) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|--|----------------|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 1 - 5 | 18 | 11 | 4 | 8 | 3 | 11 | 22 | 57 | 27 | 24 | 57 | 36 | 27 | 14 | 11 | 8 | 338 |
| 6 - 15 | 11 | 7 | 7 | 12 | 13 | 7 | 23 | 100 | 33 | 24 | 25 | 16 | 6 | 13 | 5 | 5 | 307 |
| 16 - 25 | 1 | 1 | 2 | 0 | 0 | 1 | 5 | 15 | 16 | 13 | 6 | 0 | 0 | 3 | 1 | 1 | 65 |
| 26 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 4 | 2 | 5 | 4 | 5 | 0 | 0 | 0 | 0 | 23 |
| > 81.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 |
| Totals | 30 | 19 | 13 | 20 | 16 | 19 | 53 | 176 | 78 | 66 | 94 | 57 | 33 | 30 | 17 | 14 | 735 |

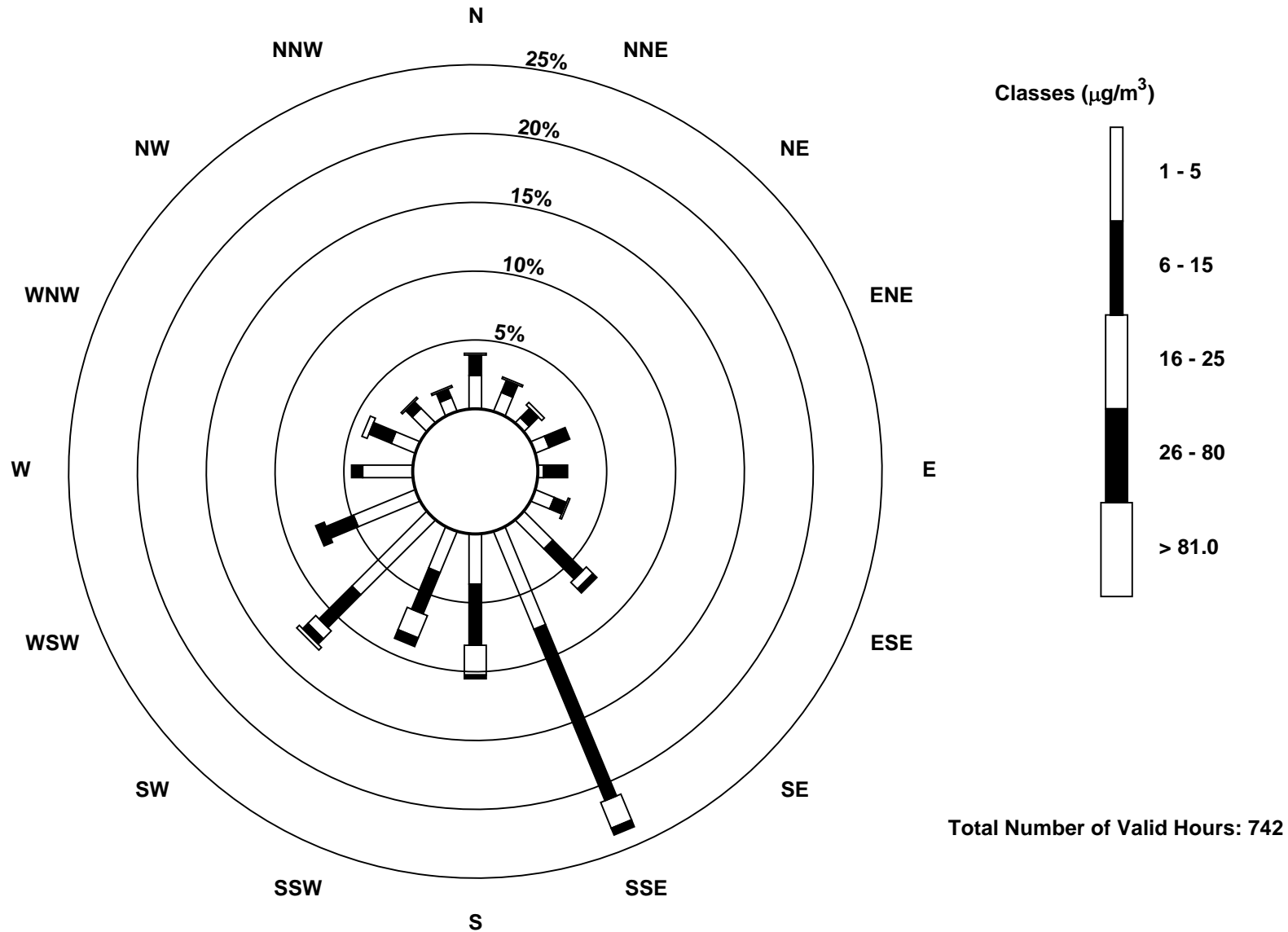
Total Number of Valid Hours: 742

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Wapasu (AMS 17)



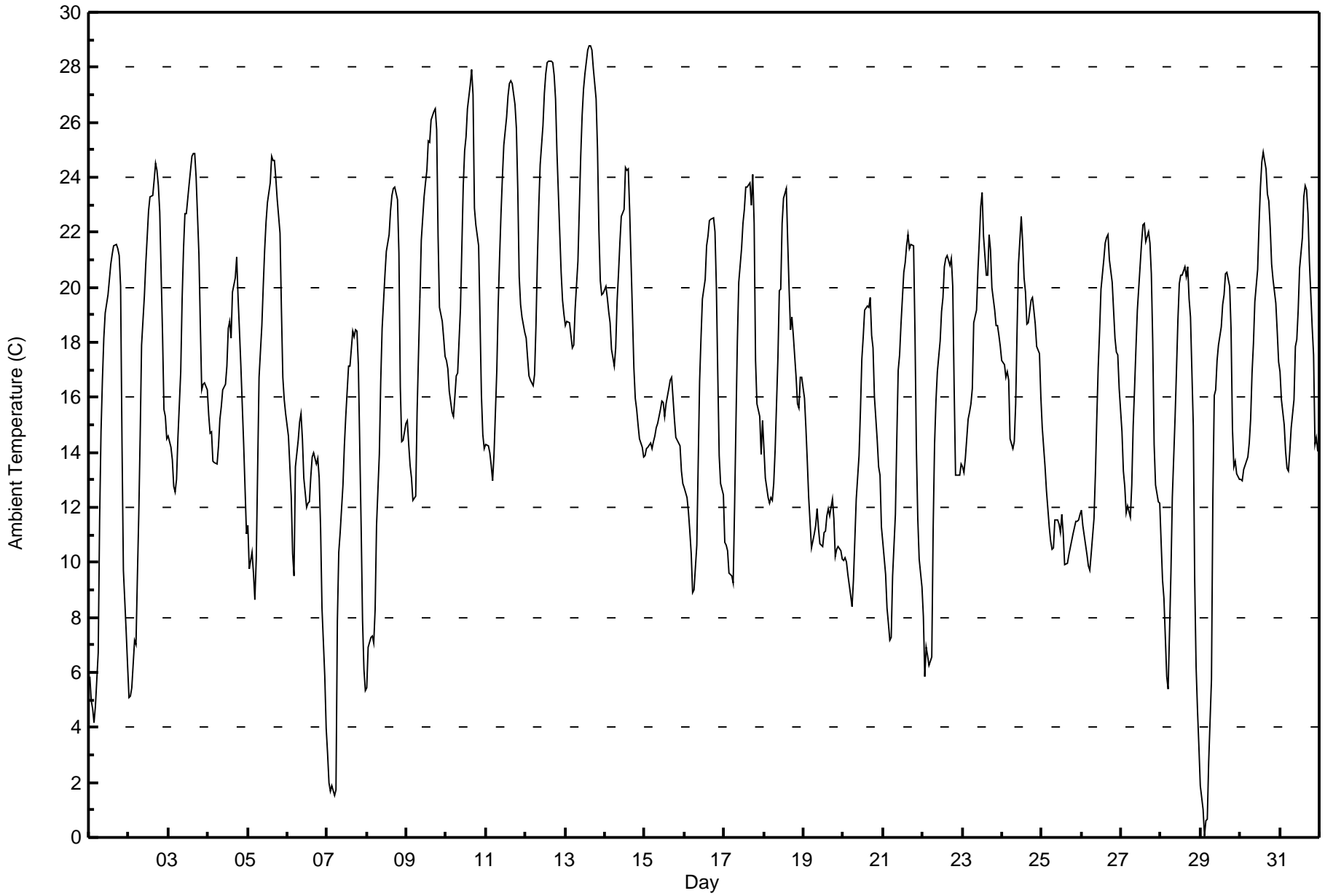


| Maximum Value: 28.8 C on Aug 13 15:00 | | Maximum Daily Average: 23.1 C on Aug 13 | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|---|------|---------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|
| Minimum Value: 0.0 C on Aug 29 03:00 | | Minimum Daily Average: 10.6 C on Aug 7 | | Hours of Data: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 21.6 C at hour 16 | | Minimum Diurnal Average: 10.8 C at hour 5 | | Hours of Missing Data: 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 16.50 C | | Percentiles: P ₁ = 1.9 P ₁₀ = 9.6 Q ₁ = 12.8 Median = 16.6 Q ₃ = 20.5 P ₉₀ = 23.6 P ₉₉ = 28.1 | | Hours of Calibration: 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 5.8 | 5.0 | 4.7 | 4.2 | 4.8 | 6.7 | 11.5 | 14.7 | 16.6 | 18.2 | 19.1 | 19.7 | 20.3 | 20.9 | 21.2 | 21.5 | 21.6 | 21.4 | 21.1 | 20.0 | 14.4 | 9.7 | 7.5 | 6.2 | 14.0 | 21.6 | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 5.1 | 5.1 | 5.4 | 7.1 | 7.0 | 9.5 | 11.7 | 14.6 | 17.9 | 19.7 | 20.9 | 21.8 | 22.8 | 23.3 | 23.3 | 23.9 | 24.5 | 24.3 | 23.7 | 22.7 | 18.2 | 15.6 | 15.3 | 14.5 | 16.6 | 24.5 | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 14.6 | 14.2 | 13.7 | 12.8 | 12.6 | 13.0 | 14.5 | 16.9 | 19.6 | 21.4 | 22.7 | 22.7 | 23.7 | 24.2 | 24.8 | 24.9 | 24.9 | 24.0 | 21.2 | 18.6 | 16.2 | 16.5 | 16.5 | 16.2 | 18.8 | 24.9 | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 15.4 | 14.7 | 14.7 | 13.7 | 13.6 | 13.6 | 14.2 | 15.2 | 15.6 | 16.3 | 16.5 | 17.2 | 18.5 | 18.8 | 18.2 | 19.8 | 20.3 | 21.1 | 19.6 | 18.4 | 17.2 | 14.3 | 12.7 | 11.0 | 16.3 | 21.1 | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 11.3 | 9.8 | 10.4 | 9.6 | 8.6 | 10.1 | 13.4 | 16.7 | 18.6 | 20.0 | 21.4 | 22.4 | 23.1 | 23.8 | 24.8 | 24.6 | 24.6 | 24.0 | 23.2 | 22.0 | 19.2 | 16.7 | 15.9 | 15.4 | 17.9 | 24.8 | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 14.6 | 13.5 | 12.4 | 10.3 | 9.5 | 13.5 | 14.4 | 15.1 | 15.4 | 14.5 | 13.1 | 12.0 | 12.2 | 13.1 | 13.8 | 14.0 | 13.6 | 13.8 | 13.1 | 11.3 | 8.3 | 5.8 | 3.9 | 12.2 | 15.4 | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 3.0 | 2.0 | 1.7 | 1.9 | 1.5 | 1.7 | 7.9 | 10.4 | 11.1 | 12.8 | 14.3 | 15.3 | 16.2 | 17.1 | 17.1 | 18.4 | 18.2 | 18.5 | 18.4 | 17.2 | 11.3 | 7.9 | 6.1 | 5.3 | 10.6 | 18.5 | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 5.4 | 6.9 | 7.3 | 7.3 | 7.1 | 8.3 | 11.3 | 13.9 | 16.6 | 18.5 | 19.5 | 20.4 | 21.3 | 21.9 | 22.8 | 23.3 | 23.6 | 23.6 | 23.2 | 21.3 | 16.4 | 14.4 | 14.4 | 15.0 | 16.0 | 23.6 | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 15.2 | 14.3 | 13.5 | 13.1 | 12.3 | 12.4 | 15.5 | 17.5 | 19.6 | 21.7 | 23.3 | 23.8 | 24.3 | 25.3 | 25.3 | 26.1 | 26.4 | 26.5 | 25.7 | 21.9 | 19.3 | 18.8 | 18.2 | 17.5 | 19.9 | 26.5 | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 17.4 | 17.0 | 16.2 | 15.5 | 15.3 | 16.0 | 16.8 | 16.9 | 19.2 | 21.5 | 23.7 | 25.0 | 25.5 | 26.5 | 27.3 | 27.9 | 27.0 | 22.9 | 22.3 | 21.5 | 18.8 | 16.1 | 14.6 | 14.2 | 20.2 | 27.9 | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 14.3 | 14.2 | 14.0 | 13.5 | 13.0 | 13.9 | 17.0 | 19.4 | 21.1 | 22.7 | 24.0 | 25.2 | 26.2 | 27.0 | 27.4 | 27.5 | 27.4 | 26.7 | 25.8 | 23.6 | 20.4 | 19.4 | 18.9 | 18.4 | 20.9 | 27.5 | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 18.2 | 17.4 | 16.8 | 16.6 | 16.4 | 16.8 | 18.6 | 21.0 | 22.9 | 24.5 | 25.9 | 27.1 | 27.8 | 28.2 | 28.2 | 28.2 | 28.2 | 27.7 | 26.8 | 24.9 | 22.0 | 20.5 | 19.5 | 19.0 | 22.6 | 28.2 | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 18.6 | 18.7 | 18.7 | 18.3 | 17.8 | 17.9 | 19.2 | 21.0 | 22.9 | 24.8 | 26.2 | 27.2 | 27.7 | 28.6 | 28.8 | 28.8 | 28.7 | 28.0 | 26.9 | 25.0 | 22.1 | 20.2 | 19.7 | 19.8 | 23.1 | 28.8 | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 20.0 | 19.6 | 19.1 | 18.7 | 17.8 | 17.1 | 17.8 | 19.5 | 20.5 | 21.6 | 22.6 | 22.8 | 24.4 | 24.2 | 24.3 | 22.8 | 19.0 | 17.1 | 16.0 | 15.6 | 15.0 | 14.5 | 14.2 | 13.9 | 19.1 | 24.4 | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 13.9 | 14.1 | 14.2 | 14.3 | 14.2 | 14.4 | 14.6 | 14.9 | 15.1 | 15.5 | 15.9 | 15.8 | 15.3 | 15.8 | 16.3 | 16.6 | 16.7 | 16.0 | 15.2 | 14.6 | 14.3 | 14.2 | 13.3 | 12.9 | 14.9 | 16.7 | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 12.7 | 12.3 | 11.8 | 11.1 | 10.3 | 8.9 | 9.0 | 10.6 | 13.6 | 16.6 | 18.2 | 19.6 | 20.3 | 21.5 | 21.9 | 22.4 | 22.5 | 22.5 | 22.0 | 20.0 | 16.8 | 13.9 | 12.8 | 12.4 | 16.0 | 22.5 | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 10.7 | 10.6 | 10.4 | 9.6 | 9.5 | 9.3 | 12.0 | 15.1 | 18.0 | 20.2 | 21.4 | 22.3 | 22.8 | 23.6 | 23.6 | 23.8 | 23.0 | 24.1 | 22.3 | 17.4 | 15.8 | 15.3 | 13.9 | 15.2 | 17.1 | 24.1 | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 14.1 | 13.1 | 12.3 | 12.2 | 12.3 | 12.3 | 12.8 | 14.1 | 17.4 | 19.9 | 19.9 | 22.3 | 23.2 | 23.6 | 21.6 | 19.9 | 18.5 | 18.9 | 18.3 | 16.7 | 15.7 | 15.6 | 16.7 | 16.7 | 17.0 | 23.6 | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 16.0 | 14.9 | 13.7 | 12.4 | 11.4 | 10.5 | 11.0 | 11.3 | 12.0 | 11.2 | 10.7 | 10.6 | 11.1 | 11.1 | 11.7 | 11.9 | 11.7 | 12.3 | 11.6 | 10.2 | 10.5 | 10.6 | 10.4 | 10.1 | 11.6 | 16.0 | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 10.1 | 10.2 | 10.0 | 9.5 | 8.8 | 8.4 | 9.3 | 10.8 | 12.3 | 13.9 | 15.5 | 17.4 | 18.2 | 19.2 | 19.3 | 19.3 | 19.6 | 18.3 | 17.8 | 16.0 | 14.5 | 13.5 | 13.1 | 11.3 | 14.0 | 19.6 | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 10.7 | 9.5 | 8.3 | 7.8 | 7.2 | 7.3 | 9.5 | 11.7 | 14.5 | 17.0 | 17.5 | 18.7 | 20.6 | 20.9 | 21.5 | 21.9 | 21.4 | 21.5 | 21.5 | 18.3 | 14.1 | 11.6 | 10.1 | 9.1 | 14.7 | 21.9 | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 8.0 | 5.9 | 6.9 | 6.6 | 6.2 | 6.6 | 11.2 | 14.3 | 15.9 | 16.9 | 18.1 | 19.1 | 19.6 | 20.7 | 21.0 | 21.2 | 20.8 | 21.1 | 20.0 | 16.4 | 13.2 | 13.1 | 13.2 | 13.6 | 14.6 | 21.2 | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 13.5 | 13.3 | 13.8 | 15.2 | 15.5 | 15.8 | 16.3 | 18.7 | 19.2 | 20.6 | 21.7 | 23.0 | 23.4 | 21.9 | 20.4 | 20.4 | 21.9 | 21.3 | 20.0 | 19.2 | 18.6 | 18.6 | 18.2 | 17.8 | 18.7 | 23.4 | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 17.3 | 17.2 | 16.7 | 16.9 | 16.6 | 14.5 | 14.1 | 14.4 | 15.8 | 18.4 | 20.8 | 22.6 | 21.6 | 20.3 | 19.8 | 18.7 | 18.7 | 19.5 | 19.6 | 19.2 | 18.6 | 17.9 | 17.6 | 16.0 | 18.0 | 22.6 | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 14.9 | 14.2 | 13.5 | 12.6 | 11.3 | 10.8 | 10.5 | 10.5 | 11.5 | 11.5 | 11.4 | 11.1 | 11.7 | 11.0 | 9.9 | 10.0 | 10.2 | 10.5 | 10.8 | 11.0 | 11.5 | 11.5 | 11.6 | 11.8 | 11.5 | 14.9 | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 11.9 | 11.3 | 10.6 | 10.3 | 9.9 | 9.7 | 10.3 | 11.6 | 13.2 | 15.3 | 17.1 | 18.4 | 19.9 | 21.0 | 21.6 | 21.8 | 21.9 | 21.0 | 20.2 | 19.2 | 18.1 | 17.6 | 17.5 | 16.3 | 16.1 | 21.9 | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 14.7 | 13.3 | 12.8 | 11.8 | 12.0 | 11.6 | 12.8 | 14.9 | 16.3 | 17.8 | 19.2 | 20.8 | 21.6 | 22.3 | 22.3 | 21.6 | 22.0 | 21.6 | 20.5 | 18.0 | 14.3 | 12.8 | 12.2 | 12.2 | 16.6 | 22.3 | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 10.7 | 9.4 | 8.7 | 5.9 | 5.4 | 7.5 | 9.6 | 12.3 | 15.3 | 17.1 | 18.8 | 20.1 | 20.4 | 20.4 | 20.8 | 20.4 | 20.8 | 19.6 | 18.9 | 15.0 | 9.4 | 6.2 | 4.6 | 3.3 | 13.4 | 20.8 | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 1.9 | 1.0 | 0.0 | 0.6 | 0.6 | 2.7 | 5.7 | 12.4 | 16.1 | 16.3 | 17.3 | 17.9 | 18.6 | 19.4 | 19.8 | 20.5 | 20.5 | 20.0 | 18.4 | 14.8 | 13.5 | 13.7 | 13.2 | 13.0 | 12.4 | 20.5 | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 13.0 | 12.9 | 13.4 | 13.5 | 13.8 | 14.3 | 15.2 | 16.9 | 17.9 | 19.5 | 20.6 | 22.2 | 23.6 | 24.5 | 24.9 | 24.3 | 23.4 | 23.1 | 22.2 | 20.8 | 20.3 | 19.4 | 18.4 | 17.3 | 19.0 | 24.9 | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 16.9 | 15.9 | 15.0 | 14.0 | 13.4 | 13.3 | 14.1 | 14.9 | 15.9 | 17.9 | 18.1 | 19.2 | 20.7 | 21.8 | 23.3 | 23.7 | 23.5 | 22.7 | 21.0 | 18.5 | 17.5 | 14.3 | 14.5 | 14.1 | 17.7 | 23.7 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 12.6 | 12.0 | 11.6 | 11.2 | 10.8 | 11.2 | 13.0 | 14.9 | 16.7 | 18.2 | 19.2 | 20.1 | 20.9 | 21.3 | 21.5 | 21.6 | 21.5 | 21.1 | 20.3 | 18.4 | 16.1 | 14.6 | 13.9 | 13.3 | Diurnal Average |
| | | | | | | | | | | | | | | | | | | | | | | | | 20.0 | 19.6 | 19.1 | 18.7 | 17.8 | 17.9 | 19.2 | 21.0 | 22.9 | 24.8 | 26.2 | 27.2 | 27.8 | 28.6 | 28.8 | 28.8 | 28.7 | 28.0 | 26.9 | 25.0 | 22.1 | 20.5 | 19.7 | 19.8 | Diurnal Maximum |



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Wapasu - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Wapasu - August 2017**

| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 81 | 10.89 | 10.89 |
| 10 - 20 | 450 | 60.48 | 71.37 |
| > 20 | 213 | 28.63 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

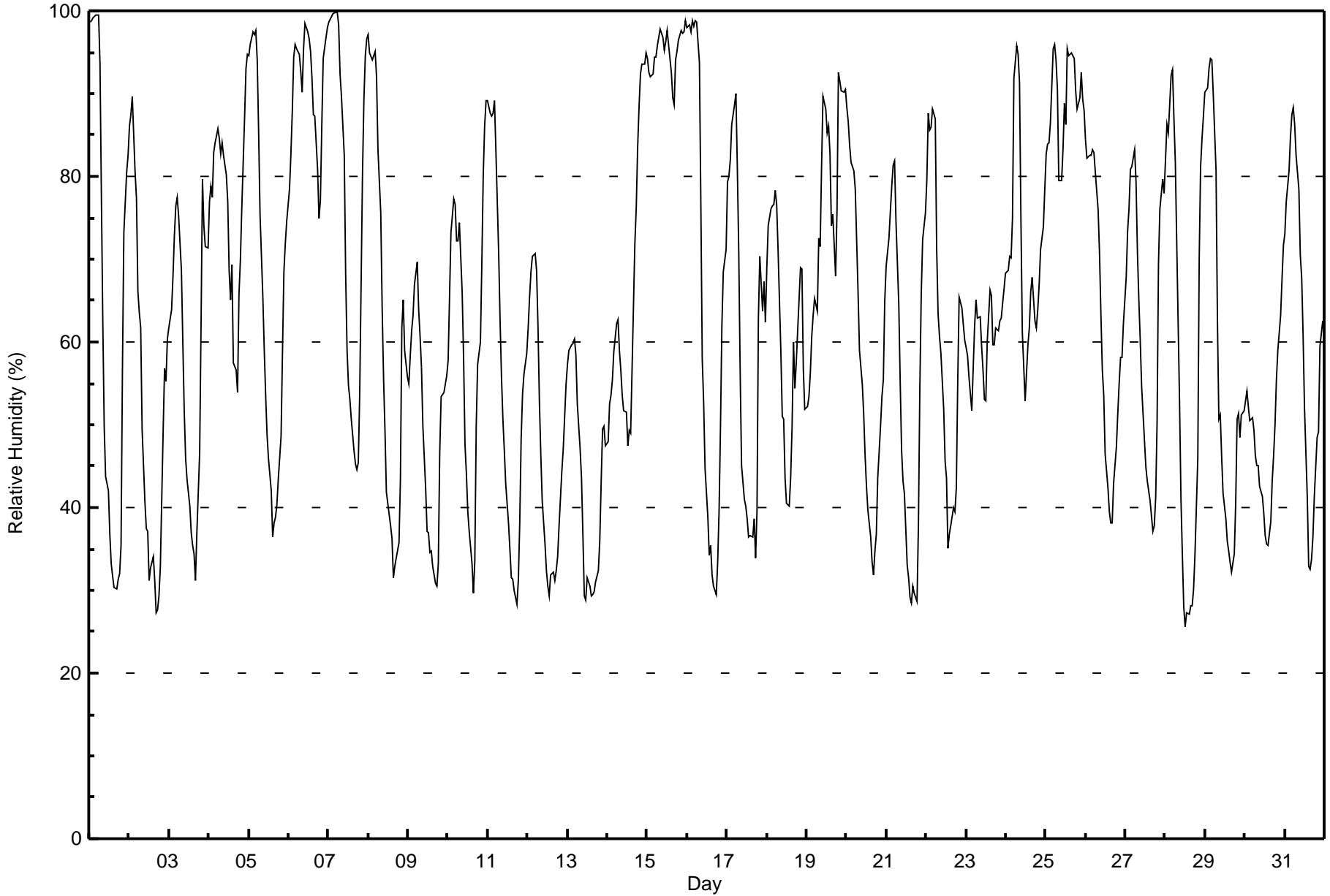
Wapasu - August 2017

| Maximum Value: 100 % on Aug 7 06:00 Maximum Daily Average: 95.0 % on Aug 15 | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | |
|---|-------------------------------|----|----|-----|-----|-----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|-----------------|----|---------------|---------------|
| Minimum Value: 26 % on Aug 28 13:00 Minimum Daily Average: 43.0 % on Aug 13 Maximum Diurnal Average: 81.8 % at hour 5 Minimum Diurnal Average: 44.8 % at hour 16 Monthly Average: 63.3 % Percentiles: P ₁ = 28 P ₁₀ = 34 Q ₁ = 45 Median = 62 O ₃ = 82 P ₉₀ = 94 P ₉₉ = 99 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 99 | 99 | 99 | 99 | 100 | 100 | 94 | 78 | 62 | 50 | 44 | 42 | 37 | 33 | 32 | 30 | 30 | 31 | 32 | 35 | 57 | 73 | 81 | 83 | 63.3 | 100 |
| 2-Aug | 86 | 87 | 90 | 81 | 77 | 66 | 64 | 62 | 50 | 41 | 38 | 37 | 31 | 33 | 34 | 31 | 27 | 28 | 29 | 33 | 49 | 57 | 55 | 60 | 51.9 | 90 |
| 3-Aug | 62 | 64 | 68 | 73 | 76 | 77 | 75 | 69 | 60 | 52 | 46 | 43 | 40 | 37 | 35 | 34 | 31 | 37 | 47 | 62 | 80 | 74 | 71 | 71 | 57.7 | 80 |
| 4-Aug | 77 | 79 | 77 | 83 | 84 | 86 | 85 | 83 | 84 | 83 | 80 | 77 | 69 | 65 | 69 | 57 | 54 | 66 | 70 | 76 | 87 | 93 | 95 | 95 | 76.4 | 95 |
| 5-Aug | 95 | 96 | 97 | 97 | 98 | 94 | 85 | 75 | 65 | 59 | 54 | 49 | 46 | 42 | 36 | 38 | 39 | 40 | 43 | 49 | 59 | 69 | 72 | 75 | 65.5 | 98 |
| 6-Aug | 78 | 83 | 88 | 94 | 96 | 95 | 95 | 93 | 90 | 95 | 98 | 97 | 97 | 95 | 92 | 87 | 87 | 81 | 75 | 77 | 86 | 94 | 97 | 98 | 90.4 | 98 |
| 7-Aug | 99 | 99 | 99 | 100 | 100 | 100 | 98 | 92 | 90 | 83 | 68 | 59 | 55 | 53 | 51 | 47 | 45 | 45 | 45 | 54 | 80 | 89 | 95 | 97 | 76.7 | 100 |
| 8-Aug | 97 | 95 | 94 | 95 | 95 | 92 | 83 | 76 | 64 | 56 | 49 | 42 | 40 | 38 | 36 | 31 | 33 | 34 | 36 | 43 | 62 | 65 | 59 | 56 | 61.3 | 97 |
| 9-Aug | 55 | 58 | 61 | 63 | 67 | 70 | 64 | 61 | 57 | 50 | 42 | 37 | 37 | 35 | 35 | 33 | 31 | 31 | 33 | 47 | 53 | 54 | 55 | 56 | 49.3 | 70 |
| 10-Aug | 58 | 65 | 73 | 77 | 77 | 72 | 72 | 74 | 66 | 58 | 48 | 44 | 39 | 37 | 33 | 30 | 34 | 50 | 57 | 60 | 69 | 80 | 86 | 89 | 60.4 | 89 |
| 11-Aug | 89 | 88 | 87 | 88 | 89 | 83 | 71 | 63 | 56 | 51 | 47 | 43 | 38 | 35 | 32 | 31 | 30 | 28 | 31 | 38 | 48 | 54 | 56 | 59 | 55.6 | 89 |
| 12-Aug | 62 | 65 | 69 | 70 | 71 | 69 | 62 | 53 | 46 | 41 | 36 | 32 | 30 | 29 | 32 | 32 | 31 | 32 | 34 | 38 | 44 | 47 | 51 | 55 | 47.2 | 71 |
| 13-Aug | 57 | 59 | 60 | 60 | 60 | 59 | 53 | 47 | 43 | 37 | 29 | 29 | 31 | 30 | 29 | 30 | 30 | 31 | 32 | 36 | 43 | 49 | 50 | 47 | 43.0 | 60 |
| 14-Aug | 48 | 53 | 54 | 55 | 59 | 62 | 63 | 59 | 57 | 54 | 52 | 51 | 47 | 49 | 49 | 57 | 72 | 76 | 84 | 89 | 92 | 94 | 94 | 95 | 65.1 | 95 |
| 15-Aug | 94 | 93 | 92 | 92 | 94 | 94 | 96 | 97 | 98 | 97 | 95 | 96 | 98 | 96 | 93 | 89 | 89 | 94 | 95 | 97 | 98 | 97 | 97 | 99 | 95.0 | 99 |
| 16-Aug | 98 | 98 | 98 | 99 | 98 | 99 | 99 | 94 | 77 | 58 | 53 | 45 | 39 | 34 | 35 | 32 | 30 | 29 | 33 | 40 | 50 | 62 | 69 | 71 | 64.1 | 99 |
| 17-Aug | 79 | 80 | 82 | 86 | 89 | 90 | 81 | 71 | 57 | 45 | 41 | 40 | 39 | 36 | 37 | 37 | 39 | 34 | 39 | 63 | 70 | 64 | 67 | 62 | 59.5 | 90 |
| 18-Aug | 69 | 74 | 76 | 76 | 77 | 78 | 77 | 71 | 59 | 51 | 51 | 44 | 41 | 40 | 44 | 50 | 60 | 54 | 58 | 65 | 69 | 69 | 57 | 52 | 60.9 | 78 |
| 19-Aug | 52 | 53 | 56 | 61 | 63 | 65 | 64 | 73 | 72 | 81 | 90 | 88 | 85 | 86 | 83 | 74 | 75 | 68 | 76 | 92 | 92 | 90 | 90 | 91 | 75.9 | 92 |
| 20-Aug | 88 | 87 | 84 | 82 | 81 | 78 | 72 | 66 | 59 | 55 | 51 | 46 | 43 | 40 | 36 | 33 | 32 | 35 | 37 | 44 | 50 | 53 | 55 | 65 | 57.1 | 88 |
| 21-Aug | 69 | 73 | 76 | 79 | 81 | 82 | 75 | 65 | 55 | 47 | 43 | 42 | 33 | 32 | 29 | 28 | 30 | 30 | 29 | 38 | 54 | 66 | 72 | 76 | 54.3 | 82 |
| 22-Aug | 80 | 88 | 86 | 86 | 88 | 87 | 71 | 63 | 61 | 59 | 52 | 46 | 44 | 35 | 37 | 38 | 40 | 39 | 42 | 55 | 65 | 64 | 62 | 60 | 60.3 | 88 |
| 23-Aug | 59 | 58 | 56 | 52 | 57 | 62 | 65 | 63 | 63 | 59 | 57 | 53 | 53 | 60 | 66 | 66 | 60 | 60 | 62 | 61 | 62 | 63 | 65 | 66 | 60.3 | 66 |
| 24-Aug | 68 | 69 | 70 | 70 | 75 | 92 | 96 | 95 | 91 | 75 | 61 | 53 | 56 | 60 | 62 | 66 | 68 | 63 | 62 | 64 | 67 | 71 | 74 | 78 | 71.1 | 96 |
| 25-Aug | 83 | 84 | 84 | 86 | 95 | 96 | 94 | 91 | 79 | 80 | 83 | 89 | 86 | 95 | 95 | 95 | 95 | 94 | 90 | 88 | 89 | 93 | 89 | 88 | 89.3 | 96 |
| 26-Aug | 84 | 82 | 83 | 82 | 83 | 83 | 81 | 76 | 71 | 63 | 57 | 54 | 46 | 42 | 39 | 38 | 38 | 43 | 47 | 51 | 55 | 58 | 58 | 62 | 61.6 | 84 |
| 27-Aug | 68 | 73 | 76 | 81 | 81 | 83 | 79 | 71 | 65 | 60 | 55 | 48 | 45 | 43 | 42 | 41 | 37 | 38 | 41 | 50 | 69 | 76 | 80 | 78 | 61.7 | 83 |
| 28-Aug | 82 | 86 | 85 | 92 | 93 | 87 | 82 | 72 | 53 | 41 | 34 | 28 | 26 | 27 | 27 | 28 | 28 | 30 | 34 | 46 | 70 | 81 | 85 | 87 | 58.6 | 93 |
| 29-Aug | 90 | 91 | 93 | 94 | 94 | 90 | 81 | 62 | 51 | 51 | 46 | 42 | 39 | 36 | 35 | 33 | 32 | 34 | 40 | 51 | 51 | 48 | 51 | 52 | 57.9 | 94 |
| 30-Aug | 53 | 54 | 52 | 51 | 51 | 49 | 46 | 45 | 45 | 43 | 41 | 39 | 37 | 36 | 35 | 38 | 43 | 46 | 50 | 55 | 59 | 63 | 68 | 72 | 48.8 | 72 |
| 31-Aug | 73 | 77 | 81 | 85 | 87 | 88 | 86 | 82 | 79 | 71 | 68 | 61 | 52 | 41 | 33 | 33 | 34 | 36 | 41 | 48 | 49 | 59 | 61 | 63 | 62.0 | 88 |
| | | | | | | | | | | | | | | | | | | | 75.9 77.7 78.9 80.3 81.8 81.6 77.6 72.2 65.3 59.4 55.1 51.5 48.3 46.8 45.9 44.8 45.4 46.0 49.1 56.1 65.2 69.8 71.4 72.8 | | | | Diurnal Average | | | |
| | | | | | | | | | | | | | | | | | | | 99 99 99 100 100 100 99 97 98 97 98 97 98 96 95 95 95 94 95 97 98 97 97 99 | | | | Diurnal Maximum | | | |



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Wapasu - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity (RH) - %
Wapasu - August 2017**

| Concentration Ranges (%) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 0 | 0.00 | 0.00 |
| 20 - 40 | 137 | 18.41 | 18.41 |
| 40 - 60 | 212 | 28.49 | 46.91 |
| 60 - 80 | 187 | 25.13 | 72.04 |
| 80 - 100 | 208 | 27.96 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Precipitation (PC) - mm

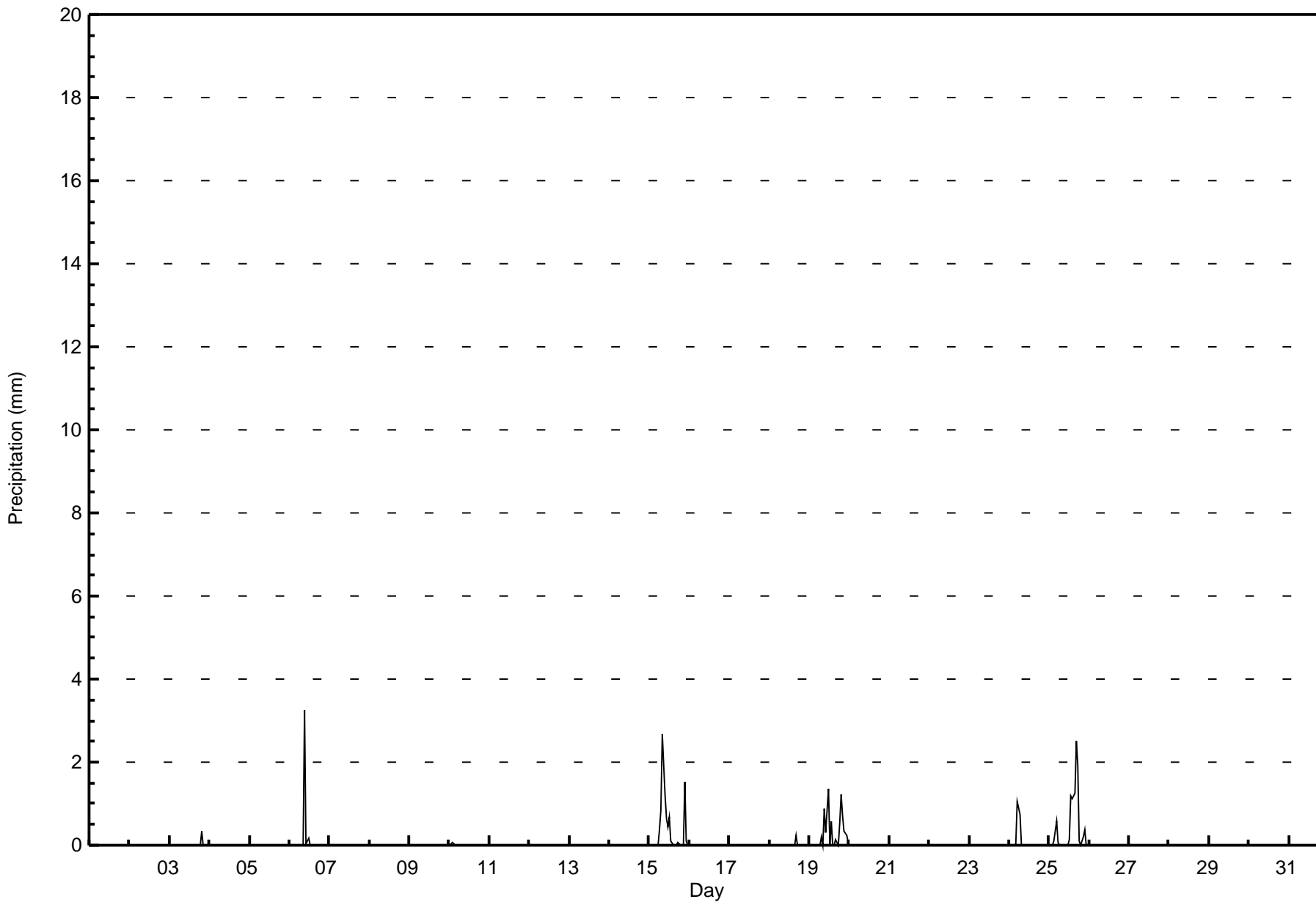
Wapasu - August 2017

| Maximum Value: 3.3 mm on Aug 6 10:00 | | Maximum Daily Total: 9.6 mm on Aug 25 | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|--|-----|---------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------|-----------------|-----|-----|
| Minimum Value: 0.0 mm on Aug 1 01:00 | | Minimum Daily Total: 0.0 mm on Aug 1 | | Hours of Data: 744 | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Total: 5.3 mm at hour 10 | | Minimum Diurnal Total: 0.0 mm at hour 1 | | Hours of Missing Data: 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Total: 30.83 mm | | Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 1.2 | | Hours of Calibration: 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | |
| 1-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 2-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 3-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 4-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 5-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 6-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.3 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 7-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 8-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 9-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 10-Aug | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 11-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 12-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 13-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 14-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 15-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 0.8 | 2.7 | 1.2 | 0.6 | 0.5 | 0.7 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 1.5 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| 16-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 17-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 18-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 19-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | 0.9 | 0.3 | 1.3 | 0.0 | 0.6 | 0.0 | 0.0 | 0.1 | 0.0 | 0.5 | 1.2 | 0.7 | 0.4 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| 20-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 21-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 22-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 23-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 24-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 1.1 | 0.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 25-Aug | 0.0 | 0.0 | 0.0 | 0.1 | 0.6 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 1.2 | 1.1 | 1.3 | 2.5 | 1.9 | 0.1 | 0.0 | 0.2 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 26-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 27-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 28-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 29-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 30-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 31-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | | 0.0 | 0.1 | 0.1 | 0.1 | 0.6 | 1.1 | 1.1 | 1.0 | 2.7 | 5.3 | 1.0 | 2.0 | 0.8 | 1.9 | 1.1 | 1.3 | 2.9 | 2.0 | 0.7 | 1.6 | 0.9 | 2.3 | 0.3 | 0.1 | Diurnal Average | | |
| | | 0.0 | 0.1 | 0.1 | 0.1 | 0.6 | 1.1 | 0.8 | 0.8 | 2.7 | 3.3 | 0.6 | 1.3 | 0.7 | 1.2 | 1.1 | 1.3 | 2.5 | 1.9 | 0.5 | 1.2 | 0.7 | 1.5 | 0.2 | 0.1 | Diurnal Maximum | | |



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Wapasu - August 2017





| | | |
|--|---|---------------------------------|
| Maximum Speed: 24 km/h on Aug 25 16:00 | Maximum Daily Speed Average: 16.8 km/h on Aug 30 | Hours in Service: 744 |
| Minimum Speed Value: 1 km/h on Aug 6 23:00 | Minimum Daily Speed Average: 0.8 km/h on Aug 15 | Hours of Data: 743 |
| Maximum Diurnal Speed Average: 7.1 km/h at hour 14 | Minimum Diurnal Speed Average: 3.5 km/h at hour 20 | Hours of Missing Data: 1 |
| Monthly Average Velocity: 5.0 km/h 196.4 deg | Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 6 Median = 8 Q ₃ = 12 P ₉₀ = 16 P ₉₉ = 21 | Percent Operational Time: 100.0 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
|--------|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|---------------|-------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | SE3 | E3 | E3 | ENE3 | ENE3 | E4 | NE6 | NNE6 | N8 | NNE10 | N12 | N13 | N13 | N12 | N11 | N11 | N10 | N9 | N8 | NNE4 | ENE2 | ESE3 | ESE3 | ESE3 | NNE5.5 | N13 | |
| 2-Aug | SE4 | SE6 | SE5 | SSE6 | SSE7 | SSE8 | SSE7 | SSE5 | SSW4 | SW7 | SSW5 | SSW6 | SW6 | SW7 | WSW8 | SW9 | WSW10 | WSW8 | SW8 | SW7 | S4 | SSE6 | SSE6 | SSE6 | SSW5.0 | WSW10 | |
| 3-Aug | SSE7 | SSE7 | SSE7 | SSE7 | SSE7 | SSE7 | SSE7 | S7 | SSW8 | SSW9 | SSW10 | SW10 | SW10 | SW10 | SSW9 | SSW8 | SW7 | NNW2 | SE11 | N2 | NE5 | SE9 | SE11 | SE5 | S5.8 | SE11 | |
| 4-Aug | ESE1 | E6 | NNE2 | NE2 | SSE2 | WSW1 | ENE4 | E3 | S5 | S7 | S3 | NE5 | SE2 | SSE10 | SE8 | ENE10 | E5 | NNE3 | W3 | SW6 | SW4 | ENE3 | SSE4 | SE3 | SE2.2 | ENE10 | |
| 5-Aug | SSE5 | ENE5 | ENE6 | E4 | SE4 | S5 | SSE5 | SSW5 | SSW6 | SSW6 | SW7 | SSW5 | SW7 | SSW9 | SSW10 | SSW10 | SSW11 | S10 | S9 | SW8 | SSW4 | S6 | S6 | S7 | S5.4 | SSW11 | |
| 6-Aug | S7 | SSE6 | SSE4 | SE4 | ENE2 | NNE5 | NE6 | NE7 | NNE5 | NNW10 | N13 | N13 | N10 | NNE7 | NNE8 | N8 | N8 | N9 | N8 | N6 | NNW5 | NW2 | ESE1 | ESE3 | NNE4.3 | N13 | |
| 7-Aug | SE3 | E3 | NE3 | ENE3 | ENE2 | ENE4 | NNE5 | NNE7 | N6 | N6 | N7 | NNE7 | N7 | NNW8 | N6 | NW8 | W7 | W4 | W4 | W2 | S2 | SE4 | SE6 | SSE6 | N2.1 | NW8 | |
| 8-Aug | SSE6 | SSE6 | SSE7 | SSE7 | SSE6 | SSE7 | S7 | SSW7 | SW8 | WSW8 | W9 | SW9 | W8 | W9 | SW8 | WSW4 | SW7 | SW6 | SSW6 | SSE5 | SE5 | SSE5 | SSE6 | SSE7 | SSW4.9 | W9 | |
| 9-Aug | SSE8 | SSE7 | SSE8 | S7 | SSE7 | SSE7 | S6 | S7 | SSW7 | SW7 | WSW6 | WSW8 | WSW9 | WSW7 | WNW5 | WSW6 | W4 | SW2 | WSW4 | SSW4 | S4 | SSE5 | SSE5 | SSE6 | SSW4.5 | WSW9 | |
| 10-Aug | S1 | SSE6 | SSE11 | SSE10 | SSE9 | S6 | S6 | S6 | S8 | SSW6 | SSW5 | WNW2 | NNE2 | NNW7 | N10 | N10 | N1 | SSE8 | SSE4 | SSE4 | S4 | SSE5 | SSE5 | SSE7 | SSE3.2 | SSE11 | |
| 11-Aug | SSE7 | SSE7 | SSE7 | SSE7 | SSE8 | SSE7 | S7 | S7 | SSW9 | SSW10 | SW11 | SW9 | SW9 | SSW10 | SSW11 | S10 | SSW11 | SSE11 | SSE9 | SSE8 | SSE8 | SSE9 | SSE8 | SSE10 | S7.9 | SW11 | |
| 12-Aug | SSE10 | SSE9 | SSE8 | SSE8 | SSE8 | SSE10 | SSE11 | S11 | SSW12 | SSW14 | SSW14 | S15 | S16 | S16 | S15 | S15 | S15 | S14 | S12 | SSE10 | SSE9 | SSE10 | SSE11 | SSE12 | S11.6 | S16 | |
| 13-Aug | SSE13 | SSE15 | SSE15 | SSE14 | SSE15 | SSE16 | SSE16 | SSE17 | SSE16 | SSE18 | SSE21 | SSE19 | SSE20 | SSE18 | SSE18 | SSE18 | SSE18 | SSE19 | SSE16 | SSE12 | SSE9 | SE11 | SSE12 | SSE13 | SSE15.8 | SSE21 | |
| 14-Aug | SSE14 | SSE14 | SE15 | SSE13 | SSE12 | SE13 | SE13 | SSE12 | SSE12 | S10 | S11 | S11 | S12 | SSW13 | SW12 | SW14 | SW16 | SW13 | SSW7 | S5 | S6 | SSE7 | SE8 | SE8 | S9.6 | SW16 | |
| 15-Aug | SE8 | SE9 | SE6 | SE9 | SE8 | SE9 | SE8 | SE2 | E3 | NE3 | N4 | NW8 | WNW7 | WNW7 | NW7 | NNW5 | N5 | NE7 | NE6 | NE4 | NNW2 | WNW4 | WNW3 | WNW3 | ENE0.8 | SE9 | |
| 16-Aug | NW3 | W2 | WSW1 | SW2 | S3 | S4 | SSE4 | S5 | S4 | SW4 | WSW10 | W10 | W10 | W9 | WSW9 | WSW10 | WSW10 | WSW10 | SW10 | SW7 | SSW5 | SSE5 | SSE6 | S6 | SW5.0 | WSW10 | |
| 17-Aug | SSE6 | S6 | SSE6 | SSE6 | SSE6 | SSE6 | S5 | SSW6 | SW5 | WNW4 | WNW8 | WNW8 | WNW8 | W12 | W10 | WSW10 | WNW5 | WNW6 | W4 | ESE2 | SSE6 | SE6 | SSE7 | S6 | SW3.4 | W12 | |
| 18-Aug | S6 | SSE6 | SSE7 | SSE8 | S8 | S8 | S8 | SSW10 | SW16 | WSW18 | WSW17 | WSW18 | SW20 | WSW20 | SW22 | SW22 | SSW12 | SSW16 | SSW13 | SSW9 | S9 | S9 | SW12 | SW16 | SW11.7 | SW22 | |
| 19-Aug | SW14 | SW13 | WSW10 | SW8 | WSW10 | SW9 | SW11 | WSW15 | SW17 | WSW15 | SW15 | WSW13 | WSW12 | W13 | W13 | W17 | WNW16 | WNW17 | WNW12 | WSW9 | WSW7 | WSW7 | WSW7 | SW6 | WSW11.2 | WSW17 | |
| 20-Aug | SW10 | SW10 | SW10 | SW10 | SW9 | SW10 | SW11 | SW13 | SW16 | WSW14 | WSW15 | W15 | W17 | WNW17 | WNW18 | WNW19 | NW18 | NW16 | NW13 | WNW10 | W8 | W7 | NW7 | WSW3 | W10.5 | WNW19 | |
| 21-Aug | SSW4 | SW6 | SSW6 | SSW6 | SSW6 | SSW6 | SSW7 | SSW9 | SW8 | WSW14 | WSW14 | WSW16 | WSW17 | W13 | WSW15 | WSW14 | WSW11 | W11 | NW9 | NNW4 | ENE4 | E5 | E5 | ENE5 | WSW6.3 | WSW17 | |
| 22-Aug | E5 | ENE5 | ENE5 | E5 | ENE5 | E5 | ENE5 | ENE7 | NE6 | NNE7 | N7 | N7 | NW5 | NNW8 | NNW9 | NNE5 | NNW6 | N6 | NE6 | ENE5 | E6 | ESE8 | ESE10 | ESE11 | NE4.2 | ESE11 | |
| 23-Aug | SE12 | SE11 | SE12 | SSE12 | SSE12 | SSE12 | SSE14 | S14 | S12 | SSE13 | S13 | SSW13 | SSW14 | SSW10 | S11 | S11 | S15 | SSE14 | SSE15 | SSE16 | SSE16 | SSE16 | SSE15 | SSE14 | SSE12.6 | SSE16 | |
| 24-Aug | SSE13 | SSE13 | SSE14 | SSE15 | S11 | SSE9 | SE8 | SE10 | SE10 | SSE11 | SSE12 | SSE14 | SE16 | SE15 | SE11 | SSE8 | ESE11 | SE13 | SE16 | SE14 | SSE11 | SSE10 | SSE9 | SW12 | SSE11.3 | SE16 | |
| 25-Aug | SW16 | SW13 | SW16 | SW15 | SW15 | SSW12 | SSW13 | SSW14 | SW16 | SSW13 | SSW14 | SSW13 | SSW14 | SW18 | SW22 | WSW24 | WSW24 | WSW22 | WSW19 | WSW16 | SW14 | SW10 | SW11 | SW10 | SW15.3 | WSW24 | |
| 26-Aug | SW15 | SW14 | SW11 | SW12 | SW12 | SW13 | SSW10 | SSW11 | SSW11 | SW12 | SW16 | SW16 | SW16 | SW16 | SW16 | SW17 | SW18 | SW15 | SW11 | WSW11 | SW8 | SW9 | SW10 | S6 | SW12.4 | SW18 | |
| 27-Aug | S6 | S6 | S6 | S6 | S7 | S7 | SSW9 | SW13 | SW13 | SW15 | SW18 | WSW18 | WSW18 | W16 | W14 | W12 | W11 | W9 | W6 | W3 | SE2 | ESE1 | SE3 | SE3 | SW7.3 | SW18 | |
| 28-Aug | SE3 | SE4 | SE4 | SE5 | SSE5 | SSE6 | S6 | S5 | WSW9 | WSW11 | W11 | WNW13 | NW17 | WNW15 | WNW16 | WNW14 | NW14 | NW9 | WNW6 | NW4 | SE2 | ESE3 | SE3 | SE4 | W4.2 | NW17 | |
| 29-Aug | SE4 | SE4 | SE4 | SSE5 | SSE5 | SSE6 | SSE5 | SSE4 | C | NNW7 | N5 | NW7 | NW8 | WNW7 | NNW4 | NNE4 | NNE3 | E6 | E6 | ESE8 | ESE9 | ESE11 | SE11 | SE14 | ESE2.6 | SE14 | |
| 30-Aug | SSE15 | SE16 | SSE16 | SSE17 | SSE17 | SSE18 | SSE18 | SSE19 | SSE18 | SSE19 | SSE20 | SSE21 | SSE19 | SSE20 | SSE21 | SSE20 | SSE20 | SSE20 | SSE18 | SSE15 | SSE14 | S15 | S13 | S12 | S10 | SSE16.8 | SSE21 |
| 31-Aug | SSW10 | SSW9 | S7 | S7 | S7 | SSE7 | S4 | S8 | S9 | SSW8 | SSW11 | SW13 | SW16 | WSW18 | WSW19 | WSW17 | W13 | WNW13 | WNW10 | WNW5 | W6 | SW5 | SW8 | SW7 | SW7.7 | WSW19 | |

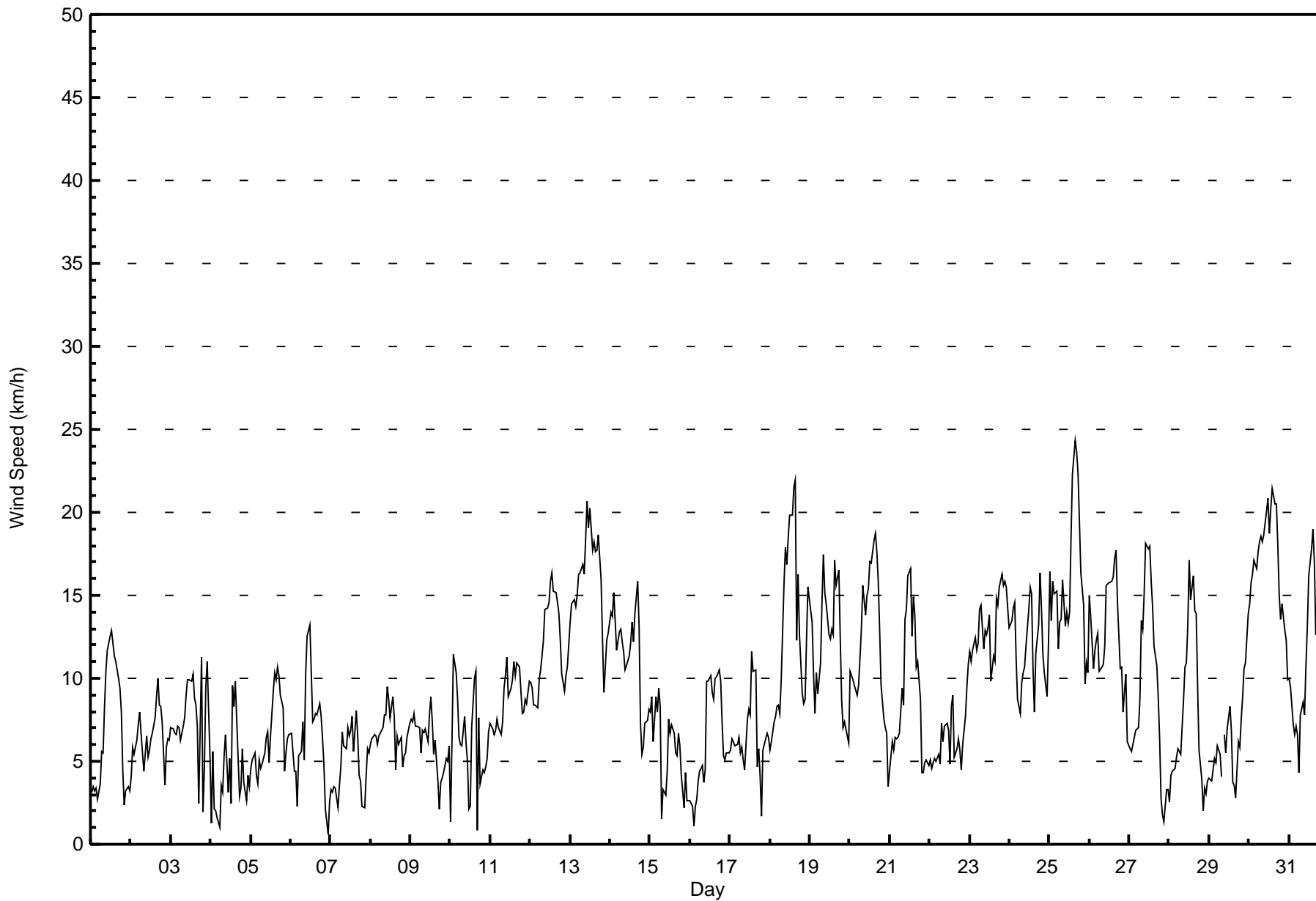
| | |
|---|-----------------|
| S6.1 SSE6.1 SSE6.1 SSE6.4 SSE6.3 SSE6.5 SSE6.0 S6.2SSW6.7 SW6.3 SW6.5 SW6.3 SW6.8WSW7.1WSW6.7WSW6.3WSW5.5 SW4.5SSW3.6SSW3.5 S3.9 SSE5.0 SSE5.6 S5.9 | Diurnal Average |
| SW16 SE16 SSE16 SSE17 SSE17 SSE18 SSE18 SSE19 SSE18 SSE19 SSE21 SSE21 SSE20 SSE20 SW22WSW24WSW24WSW22WSW19WSW16 SSE16 SSE16 SSE15 SW16 | Diurnal Maximum |

C - Calibration
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Wapasu - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Wapasu - August 2017**

| Wind Speed Ranges (km/h) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 5 | 168 | 22.61 | 22.61 |
| 6 - 11 | 360 | 48.45 | 71.06 |
| 12 - 19 | 199 | 26.78 | 97.85 |
| 20 - 28 | 16 | 2.15 | 100.00 |
| 29 - 38 | 0 | 0.00 | 100.00 |
| > 38 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 743

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Wapasu - August 2017**

| Wind Speed Ranges (km/h) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------------|-----------------------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 5 | 5 | 10 | 6 | 17 | 13 | 11 | 22 | 22 | 16 | 9 | 5 | 6 | 8 | 8 | 4 | 6 | 168 |
| 6 - 11 | 20 | 9 | 7 | 3 | 3 | 8 | 20 | 87 | 47 | 42 | 47 | 26 | 15 | 11 | 8 | 7 | 360 |
| 12 - 19 | 5 | 0 | 0 | 0 | 0 | 0 | 12 | 59 | 15 | 17 | 39 | 25 | 10 | 11 | 5 | 1 | 199 |
| 20 - 28 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 4 | 4 | 0 | 0 | 0 | 0 | 16 |
| 29 - 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 30 | 19 | 13 | 20 | 16 | 19 | 54 | 176 | 78 | 68 | 95 | 61 | 33 | 30 | 17 | 14 | 743 |

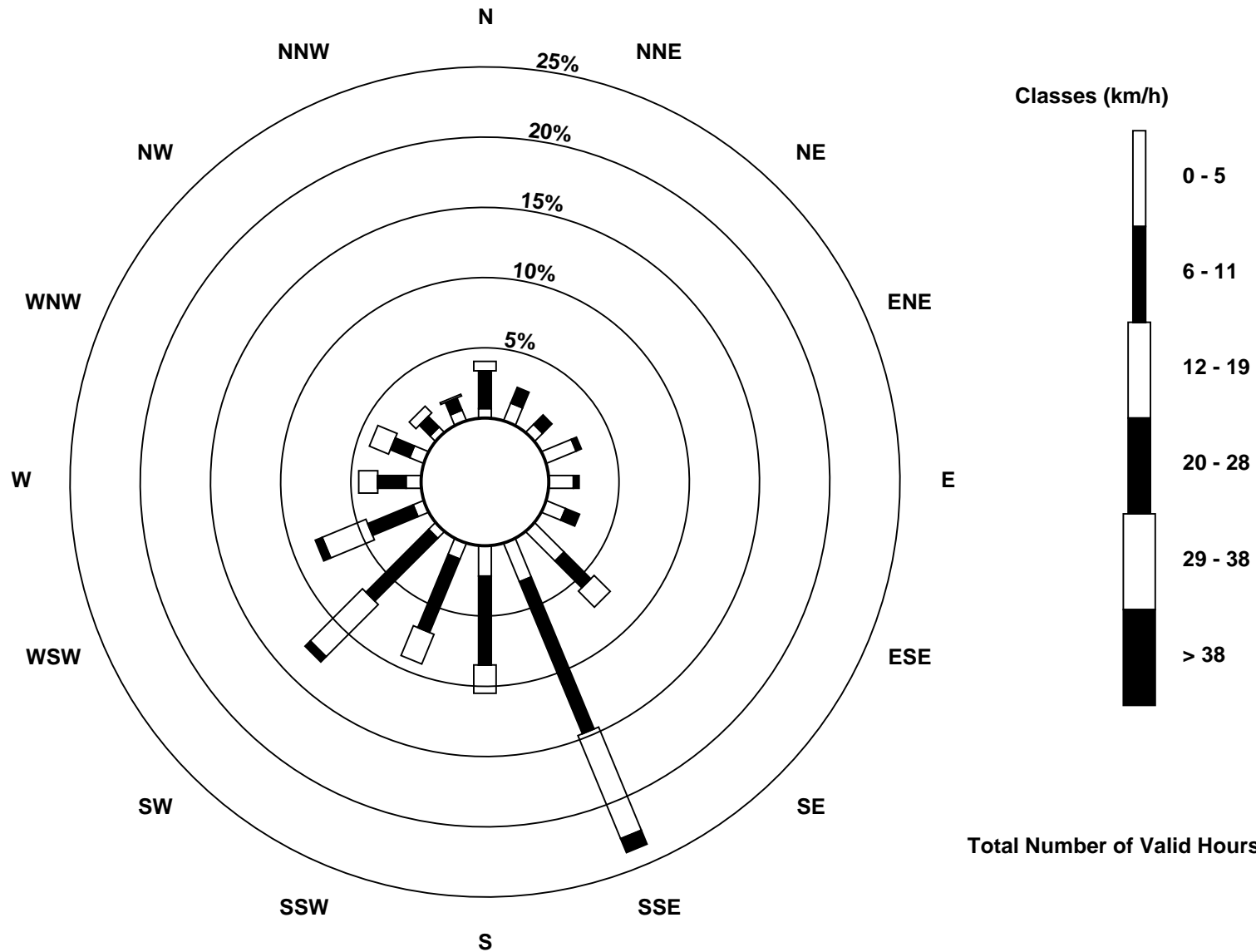
Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Wind Speed (WS) - km/h
Wapasu (AMS 17)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Wapasu - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Aug 30 15:00 | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 1 Percent Operational Time: 100.0 | | | | | | | | |
|--|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|---|----|----|----|----|----|----|---------------|----|
| Minimum Value: 0 km/h on Aug 7 04:00 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 7 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | 24 |
| 1-Aug | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 2 | 2 | 3 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 1 | 1 | 1 | 1 | 0 | 5 |
| 2-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 4 | 4 | 3 | 2 | 3 | 1 | 1 | 1 | 1 | 4 |
| 3-Aug | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 3 | 3 | 4 | 3 | 3 | 4 | 3 | 4 | 3 | 2 | 3 | 3 | 1 | 3 | 2 | 2 | 4 |
| 4-Aug | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 2 | 2 | 3 | 4 | 3 | 2 | 1 | 2 | 3 | 2 | 1 | 1 | 1 | 4 |
| 5-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 4 | 4 | 4 | 2 | 3 | 3 | 1 | 1 | 1 | 1 | 4 |
| 6-Aug | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 4 | 4 | 4 | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 4 |
| 7-Aug | 1 | 1 | 1 | 0 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 3 |
| 8-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 3 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 4 |
| 9-Aug | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 3 | 4 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 4 |
| 10-Aug | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 4 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 4 |
| 11-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 3 | 4 | 4 | 4 | 3 | 3 | 2 | 1 | 2 | 2 | 2 | 4 |
| 12-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 5 | 5 | 5 | 6 | 6 | 6 | 5 | 5 | 4 | 4 | 3 | 2 | 2 | 2 | 3 | 6 |
| 13-Aug | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 6 | 7 | 6 | 6 | 6 | 6 | 5 | 5 | 6 | 5 | 4 | 2 | 3 | 3 | 3 | 7 |
| 14-Aug | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 4 | 4 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 4 |
| 15-Aug | 2 | 2 | 2 | 3 | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 3 |
| 16-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 4 |
| 17-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 4 | 3 | 2 | 2 | 3 | 2 | 1 | 1 | 1 | 1 | 4 |
| 18-Aug | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 5 | 5 | 5 | 6 | 6 | 6 | 6 | 7 | 4 | 5 | 5 | 3 | 3 | 3 | 4 | 4 | 7 |
| 19-Aug | 4 | 3 | 2 | 2 | 2 | 2 | 3 | 5 | 5 | 4 | 4 | 4 | 4 | 5 | 5 | 6 | 6 | 6 | 6 | 2 | 2 | 2 | 2 | 2 | 6 |
| 20-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 4 | 4 | 5 | 6 | 6 | 6 | 7 | 6 | 5 | 5 | 4 | 3 | 2 | 3 | 1 | 7 |
| 21-Aug | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 3 | 2 | 4 | 4 | 4 | 5 | 5 | 6 | 5 | 5 | 5 | 3 | 2 | 1 | 1 | 1 | 1 | 6 |
| 22-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 3 | 2 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 4 |
| 23-Aug | 3 | 2 | 3 | 3 | 3 | 3 | 4 | 5 | 4 | 5 | 4 | 4 | 5 | 3 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 |
| 24-Aug | 3 | 3 | 4 | 4 | 4 | 2 | 2 | 3 | 3 | 4 | 4 | 4 | 5 | 5 | 6 | 3 | 3 | 5 | 5 | 4 | 3 | 3 | 3 | 3 | 6 |
| 25-Aug | 4 | 4 | 5 | 4 | 5 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 | 5 | 4 | 3 | 2 | 3 | 2 | 6 |
| 26-Aug | 3 | 3 | 3 | 4 | 4 | 4 | 3 | 3 | 3 | 4 | 4 | 5 | 4 | 5 | 5 | 5 | 5 | 4 | 3 | 3 | 2 | 4 | 3 | 2 | 5 |
| 27-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 3 | 5 | 4 | 5 | 6 | 5 | 5 | 4 | 4 | 3 | 2 | 2 | 2 | 1 | 1 | 2 | 6 |
| 28-Aug | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 3 | 3 | 4 | 4 | 5 | 5 | 5 | 4 | 5 | 4 | 2 | 2 | 1 | 1 | 1 | 1 | 5 |
| 29-Aug | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | C | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 2 | 2 | 3 | 3 | 3 |
| 30-Aug | 3 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 6 | 7 | 6 | 6 | 7 | 7 | 7 | 7 | 6 | 5 | 4 | 4 | 5 | 4 | 3 | 7 |
| 31-Aug | 3 | 3 | 2 | 1 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 5 | 6 | 5 | 4 | 5 | 4 | 2 | 2 | 1 | 2 | 2 | 6 |
| | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | | | | |
| C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Summary of Hour Averages

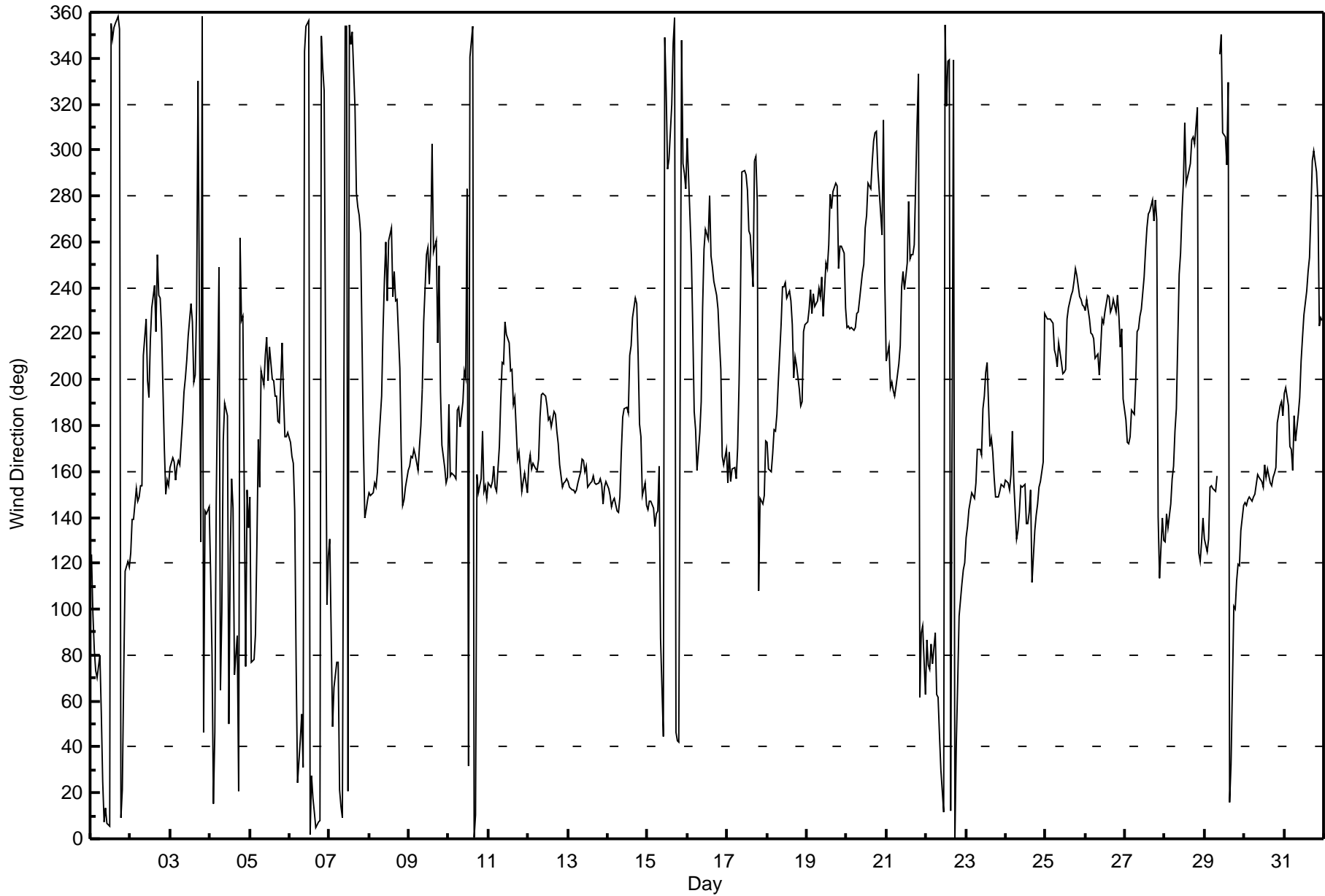
Wind Direction (WD) - deg
Wapasu - August 2017

| | | |
|---|---|---------------------------------|
| Direction of Maximum Speed: 237 deg on Aug 25 16:00 | | Hours in Service: 744 |
| Direction of Maximum Daily Speed Average: 158.0 deg on Aug 30 | | Hours of Data: 743 |
| Direction of Minimum Speed: 102 deg on Aug 6 23:00 | Direction of Minimum Daily Speed Average: 0.8 deg on Aug 15 | Hours of Missing Data: 1 |
| Monthly Average Direction: 210.9 deg | | Percent Operational Time: 100.0 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average |
|--------|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 124 | 98 | 82 | 73 | 70 | 80 | 55 | 25 | 8 | 13 | 7 | 6 | 355 | 349 | 354 | 355 | 358 | 353 | 9 | 22 | 71 | 116 | 121 | 118 | 16.9 |
| 2-Aug | 125 | 139 | 139 | 152 | 147 | 149 | 154 | 154 | 211 | 226 | 200 | 192 | 217 | 231 | 241 | 221 | 254 | 237 | 235 | 222 | 170 | 150 | 156 | 154 | 191.6 |
| 3-Aug | 162 | 166 | 164 | 156 | 163 | 165 | 163 | 182 | 194 | 201 | 209 | 219 | 233 | 225 | 199 | 202 | 232 | 330 | 130 | 358 | 46 | 143 | 142 | 144 | 181.1 |
| 4-Aug | 115 | 80 | 15 | 46 | 147 | 249 | 65 | 99 | 174 | 190 | 184 | 50 | 124 | 157 | 144 | 71 | 89 | 21 | 262 | 226 | 228 | 75 | 152 | 136 | 127.8 |
| 5-Aug | 149 | 77 | 78 | 89 | 128 | 174 | 153 | 204 | 198 | 211 | 218 | 200 | 214 | 200 | 199 | 193 | 193 | 182 | 181 | 216 | 193 | 175 | 175 | 177 | 184.5 |
| 6-Aug | 173 | 166 | 164 | 143 | 76 | 25 | 43 | 54 | 31 | 343 | 354 | 356 | 2 | 27 | 18 | 11 | 5 | 8 | 8 | 350 | 336 | 326 | 102 | 123 | 14.8 |
| 7-Aug | 131 | 90 | 49 | 66 | 77 | 77 | 21 | 14 | 9 | 354 | 354 | 21 | 355 | 346 | 352 | 318 | 281 | 275 | 271 | 264 | 172 | 140 | 143 | 147 | 7.0 |
| 8-Aug | 151 | 150 | 151 | 155 | 153 | 160 | 173 | 193 | 221 | 243 | 260 | 234 | 261 | 266 | 236 | 247 | 234 | 235 | 205 | 167 | 145 | 148 | 153 | 160 | 199.8 |
| 9-Aug | 162 | 166 | 166 | 170 | 167 | 161 | 171 | 180 | 196 | 225 | 255 | 258 | 242 | 258 | 302 | 255 | 261 | 216 | 250 | 195 | 171 | 162 | 155 | 158 | 200.1 |
| 10-Aug | 189 | 158 | 159 | 158 | 157 | 187 | 188 | 179 | 191 | 204 | 201 | 283 | 32 | 340 | 354 | 1 | 10 | 159 | 151 | 157 | 177 | 151 | 154 | 148 | 167.1 |
| 11-Aug | 155 | 153 | 155 | 162 | 153 | 151 | 171 | 191 | 207 | 207 | 225 | 220 | 216 | 204 | 204 | 189 | 192 | 166 | 168 | 161 | 151 | 156 | 159 | 151 | 180.2 |
| 12-Aug | 163 | 167 | 161 | 164 | 161 | 160 | 166 | 184 | 194 | 194 | 193 | 189 | 182 | 184 | 180 | 186 | 185 | 178 | 172 | 163 | 153 | 155 | 156 | 157 | 175.0 |
| 13-Aug | 155 | 153 | 152 | 152 | 151 | 152 | 155 | 160 | 165 | 165 | 160 | 162 | 153 | 155 | 156 | 158 | 155 | 155 | 155 | 157 | 154 | 146 | 153 | 156 | 156.0 |
| 14-Aug | 152 | 149 | 144 | 147 | 148 | 143 | 142 | 149 | 168 | 183 | 187 | 188 | 185 | 211 | 215 | 227 | 236 | 233 | 211 | 181 | 175 | 150 | 155 | 145 | 176.0 |
| 15-Aug | 143 | 147 | 147 | 144 | 136 | 141 | 143 | 162 | 87 | 45 | 349 | 326 | 292 | 296 | 320 | 346 | 357 | 46 | 43 | 42 | 348 | 294 | 290 | 283 | 77.1 |
| 16-Aug | 305 | 271 | 253 | 222 | 186 | 178 | 161 | 177 | 190 | 231 | 257 | 265 | 261 | 280 | 254 | 249 | 243 | 237 | 231 | 216 | 204 | 167 | 163 | 170 | 231.6 |
| 17-Aug | 155 | 169 | 155 | 161 | 162 | 157 | 170 | 198 | 236 | 291 | 291 | 289 | 283 | 265 | 263 | 241 | 295 | 297 | 277 | 108 | 148 | 146 | 150 | 173 | 218.3 |
| 18-Aug | 173 | 161 | 160 | 168 | 178 | 178 | 185 | 199 | 224 | 240 | 240 | 242 | 236 | 239 | 234 | 224 | 201 | 210 | 206 | 196 | 188 | 190 | 221 | 224 | 215.1 |
| 19-Aug | 225 | 231 | 239 | 229 | 237 | 232 | 234 | 240 | 236 | 244 | 227 | 251 | 249 | 259 | 281 | 275 | 282 | 286 | 284 | 249 | 258 | 258 | 255 | 231 | 250.8 |
| 20-Aug | 223 | 223 | 222 | 223 | 221 | 223 | 229 | 230 | 235 | 246 | 250 | 266 | 271 | 286 | 283 | 295 | 304 | 308 | 308 | 292 | 273 | 263 | 313 | 242 | 263.3 |
| 21-Aug | 208 | 215 | 197 | 199 | 195 | 193 | 197 | 207 | 215 | 241 | 247 | 239 | 251 | 278 | 253 | 255 | 255 | 259 | 311 | 333 | 62 | 90 | 93 | 63 | 238.9 |
| 22-Aug | 87 | 76 | 74 | 85 | 76 | 90 | 63 | 62 | 45 | 30 | 11 | 354 | 319 | 338 | 339 | 12 | 339 | 0 | 41 | 68 | 97 | 111 | 117 | 120 | 50.6 |
| 23-Aug | 131 | 136 | 143 | 151 | 150 | 148 | 155 | 170 | 169 | 167 | 187 | 193 | 203 | 207 | 171 | 175 | 169 | 157 | 149 | 149 | 151 | 154 | 154 | 153 | 161.4 |
| 24-Aug | 156 | 155 | 152 | 159 | 177 | 155 | 130 | 134 | 142 | 154 | 153 | 138 | 137 | 142 | 152 | 112 | 134 | 141 | 146 | 153 | 156 | 164 | 229 | 150.1 | |
| 25-Aug | 228 | 226 | 227 | 226 | 225 | 213 | 210 | 206 | 216 | 208 | 202 | 203 | 204 | 227 | 231 | 237 | 239 | 243 | 248 | 245 | 236 | 235 | 233 | 232 | 226.7 |
| 26-Aug | 230 | 235 | 227 | 220 | 220 | 218 | 209 | 211 | 202 | 214 | 226 | 224 | 229 | 236 | 236 | 229 | 231 | 235 | 229 | 237 | 227 | 214 | 222 | 191 | 224.8 |
| 27-Aug | 182 | 173 | 172 | 175 | 187 | 185 | 199 | 221 | 222 | 228 | 230 | 245 | 256 | 266 | 272 | 273 | 279 | 269 | 278 | 269 | 140 | 113 | 140 | 130 | 234.1 |
| 28-Aug | 130 | 141 | 136 | 146 | 157 | 163 | 177 | 187 | 246 | 255 | 273 | 286 | 312 | 286 | 291 | 294 | 305 | 306 | 303 | 319 | 125 | 121 | 130 | 140 | 272.0 |
| 29-Aug | 131 | 125 | 131 | 153 | 154 | 152 | 151 | 158 | C | 342 | 351 | 308 | 306 | 293 | 329 | 16 | 32 | 101 | 100 | 112 | 120 | 119 | 134 | 145 | 121.6 |
| 30-Aug | 147 | 145 | 148 | 149 | 147 | 149 | 150 | 154 | 159 | 158 | 155 | 153 | 163 | 158 | 161 | 155 | 154 | 157 | 159 | 162 | 182 | 189 | 191 | 184 | 158.0 |
| 31-Aug | 194 | 196 | 188 | 171 | 169 | 161 | 184 | 173 | 185 | 192 | 208 | 218 | 228 | 238 | 247 | 253 | 273 | 296 | 300 | 290 | 278 | 223 | 227 | 226 | 227.3 |

| | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 170.8 | 166.4 | 163.5 | 164.6 | 167.6 | 165.3 | 167.5 | 181.2 | 198.9 | 214.7 | 223.0 | 230.1 | 234.2 | 239.7 | 238.2 | 237.5 | 236.5 | 227.5 | 210.2 | 194.3 | 174.9 | 163.6 | 167.5 | 169.5 |
| Diurnal Average | | | | | | | | | | | | | | | | | | | | | | | |

C - Calibration
 All monthly, daily, and diurnal averages have been calculated using vector methods





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Wapasu - August 2017

| | |
|--|---------------------------------|
| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | Hours in Service: 744 |
| Maximum Value: 100 deg on Aug 4 06:00 | Hours of Data: 743 |
| Minimum Value: 3 deg on Aug 7 23:00 | Hours of Missing Data: 1 |
| | Hours of Calibration: 1 |
| | Percent Operational Time: 100.0 |
| Percentiles: P ₁ = 6 P ₁₀ = 14 Q ₁ = 18 Median = 25 Q ₃ = 32 P ₉₀ = 44 P ₉₉ = 78 | |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
|--------|-------------------------------|----|----|----|----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 17 | 21 | 26 | 21 | 40 | 21 | 17 | 32 | 28 | 32 | 36 | 37 | 30 | 36 | 40 | 34 | 34 | 29 | 32 | 31 | 35 | 15 | 14 | 16 | 40 |
| 2-Aug | 19 | 5 | 6 | 5 | 7 | 6 | 10 | 15 | 32 | 31 | 50 | 59 | 56 | 63 | 53 | 37 | 35 | 34 | 23 | 19 | 20 | 6 | 12 | 10 | 63 |
| 3-Aug | 14 | 17 | 18 | 12 | 16 | 18 | 19 | 28 | 32 | 31 | 38 | 35 | 38 | 35 | 34 | 37 | 42 | 74 | 19 | 88 | 31 | 19 | 16 | 25 | 88 |
| 4-Aug | 79 | 23 | 69 | 62 | 55 | 100 | 34 | 30 | 37 | 29 | 46 | 31 | 51 | 28 | 33 | 25 | 29 | 53 | 44 | 20 | 69 | 40 | 11 | 20 | 100 |
| 5-Aug | 9 | 16 | 9 | 16 | 46 | 28 | 17 | 31 | 38 | 38 | 48 | 70 | 65 | 35 | 35 | 37 | 33 | 33 | 29 | 26 | 23 | 14 | 18 | 19 | 70 |
| 6-Aug | 16 | 15 | 17 | 9 | 47 | 30 | 29 | 26 | 35 | 25 | 23 | 23 | 27 | 30 | 32 | 31 | 26 | 29 | 32 | 21 | 15 | 29 | 77 | 40 | 77 |
| 7-Aug | 24 | 24 | 18 | 15 | 12 | 15 | 32 | 26 | 28 | 36 | 43 | 50 | 66 | 45 | 55 | 43 | 47 | 66 | 40 | 38 | 35 | 5 | 3 | 5 | 66 |
| 8-Aug | 5 | 7 | 7 | 8 | 8 | 13 | 23 | 31 | 30 | 39 | 34 | 40 | 59 | 44 | 46 | 67 | 47 | 45 | 31 | 20 | 9 | 11 | 10 | 13 | 67 |
| 9-Aug | 15 | 14 | 17 | 19 | 17 | 13 | 24 | 28 | 30 | 29 | 55 | 42 | 41 | 63 | 57 | 69 | 81 | 83 | 44 | 23 | 18 | 11 | 13 | 12 | 83 |
| 10-Aug | 81 | 22 | 21 | 20 | 20 | 31 | 30 | 28 | 33 | 39 | 54 | 90 | 89 | 51 | 38 | 38 | 93 | 30 | 81 | 16 | 25 | 11 | 9 | 5 | 93 |
| 11-Aug | 9 | 10 | 10 | 14 | 11 | 12 | 23 | 29 | 26 | 28 | 26 | 39 | 39 | 34 | 32 | 34 | 34 | 25 | 25 | 18 | 13 | 16 | 18 | 16 | 39 |
| 12-Aug | 22 | 19 | 16 | 20 | 21 | 20 | 24 | 31 | 30 | 28 | 32 | 34 | 35 | 33 | 33 | 33 | 32 | 30 | 26 | 21 | 15 | 16 | 17 | 19 | 35 |
| 13-Aug | 17 | 18 | 19 | 20 | 19 | 18 | 20 | 22 | 27 | 26 | 26 | 27 | 24 | 27 | 26 | 24 | 26 | 24 | 23 | 19 | 16 | 15 | 17 | 18 | 27 |
| 14-Aug | 18 | 18 | 17 | 18 | 17 | 16 | 17 | 26 | 29 | 29 | 35 | 32 | 37 | 29 | 29 | 22 | 17 | 19 | 33 | 26 | 26 | 19 | 18 | 16 | 37 |
| 15-Aug | 16 | 17 | 35 | 22 | 16 | 16 | 18 | 91 | 30 | 37 | 33 | 20 | 27 | 25 | 28 | 27 | 33 | 24 | 26 | 39 | 64 | 34 | 47 | 50 | 91 |
| 16-Aug | 44 | 33 | 69 | 51 | 34 | 24 | 19 | 24 | 36 | 51 | 29 | 36 | 36 | 42 | 46 | 32 | 30 | 24 | 19 | 22 | 21 | 9 | 9 | 10 | 69 |
| 17-Aug | 8 | 13 | 10 | 11 | 12 | 12 | 22 | 28 | 37 | 64 | 44 | 49 | 47 | 36 | 35 | 28 | 37 | 32 | 39 | 62 | 6 | 6 | 9 | 16 | 64 |
| 18-Aug | 19 | 16 | 12 | 18 | 26 | 28 | 29 | 29 | 22 | 20 | 21 | 24 | 23 | 22 | 17 | 20 | 29 | 25 | 27 | 29 | 26 | 28 | 19 | 18 | 29 |
| 19-Aug | 20 | 16 | 17 | 17 | 18 | 14 | 17 | 20 | 20 | 19 | 18 | 26 | 22 | 27 | 29 | 29 | 29 | 27 | 31 | 20 | 27 | 26 | 26 | 19 | 31 |
| 20-Aug | 18 | 17 | 17 | 19 | 18 | 18 | 17 | 18 | 16 | 23 | 24 | 29 | 32 | 32 | 32 | 31 | 28 | 26 | 26 | 31 | 28 | 29 | 33 | 27 | 33 |
| 21-Aug | 17 | 18 | 18 | 20 | 20 | 22 | 24 | 23 | 23 | 20 | 22 | 21 | 27 | 33 | 30 | 28 | 33 | 30 | 29 | 40 | 17 | 14 | 12 | 27 | 40 |
| 22-Aug | 15 | 18 | 10 | 9 | 9 | 10 | 22 | 25 | 37 | 41 | 37 | 44 | 69 | 40 | 43 | 76 | 46 | 35 | 31 | 20 | 10 | 14 | 14 | 17 | 76 |
| 23-Aug | 17 | 15 | 16 | 18 | 18 | 18 | 19 | 25 | 27 | 27 | 29 | 30 | 30 | 25 | 27 | 29 | 27 | 21 | 19 | 18 | 18 | 20 | 19 | 19 | 30 |
| 24-Aug | 19 | 19 | 17 | 22 | 28 | 23 | 21 | 17 | 18 | 26 | 27 | 29 | 22 | 23 | 25 | 30 | 20 | 20 | 20 | 19 | 19 | 18 | 25 | 20 | 30 |
| 25-Aug | 16 | 18 | 19 | 17 | 18 | 22 | 23 | 27 | 24 | 28 | 27 | 27 | 27 | 24 | 18 | 18 | 18 | 20 | 21 | 19 | 16 | 17 | 17 | 15 | 28 |
| 26-Aug | 16 | 16 | 18 | 20 | 20 | 23 | 25 | 27 | 28 | 29 | 20 | 24 | 20 | 22 | 24 | 21 | 19 | 18 | 16 | 18 | 20 | 26 | 22 | 29 | 29 |
| 27-Aug | 23 | 24 | 23 | 19 | 23 | 23 | 28 | 19 | 21 | 21 | 18 | 23 | 27 | 32 | 34 | 29 | 30 | 30 | 30 | 47 | 61 | 46 | 20 | 41 | 61 |
| 28-Aug | 30 | 21 | 30 | 13 | 12 | 21 | 26 | 28 | 28 | 28 | 35 | 31 | 28 | 33 | 30 | 29 | 31 | 28 | 29 | 23 | 36 | 38 | 30 | 17 | 38 |
| 29-Aug | 25 | 19 | 18 | 13 | 12 | 10 | 10 | 19 | C | 37 | 61 | 55 | 44 | 56 | 80 | 83 | 83 | 30 | 14 | 13 | 13 | 15 | 16 | 16 | 83 |
| 30-Aug | 16 | 17 | 17 | 18 | 18 | 18 | 19 | 20 | 22 | 21 | 23 | 23 | 28 | 24 | 24 | 23 | 21 | 21 | 21 | 21 | 29 | 29 | 29 | 28 | 29 |
| 31-Aug | 29 | 28 | 26 | 15 | 16 | 21 | 66 | 24 | 31 | 29 | 25 | 25 | 19 | 23 | 25 | 26 | 29 | 30 | 29 | 32 | 33 | 17 | 15 | 17 | 66 |
| | 81 | 33 | 69 | 62 | 55 | 100 | 66 | 91 | 38 | 64 | 61 | 90 | 89 | 63 | 80 | 83 | 93 | 83 | 81 | 88 | 69 | 46 | 77 | 50 | |
| | Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | |

C - Calibration



Wood Buffalo Environmental Association

SO₂ Calibration Summary

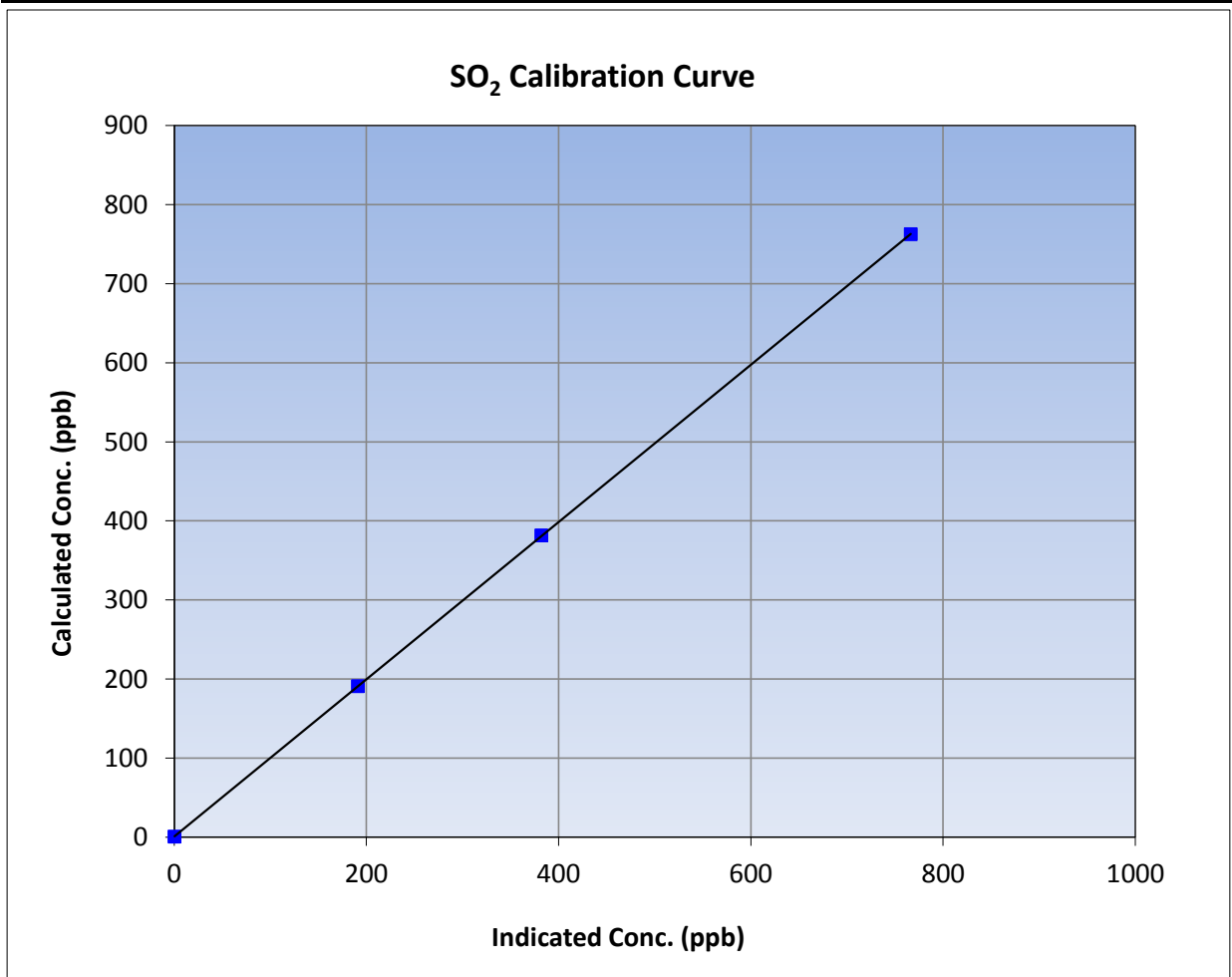
Version-03-2017

Station Information

| | | | |
|------------------|----------------|----------------------|---------------|
| Calibration Date | August 4, 2017 | Previous Calibration | July 12, 2017 |
| Station Name | Wapasu | Station Number | AMS 17 |
| Start Time (MST) | 7:00 | End Time (MST) | 10:39 |
| Analyzer make | Routine | Analyzer serial # | 1218153459 |

Calibration Data

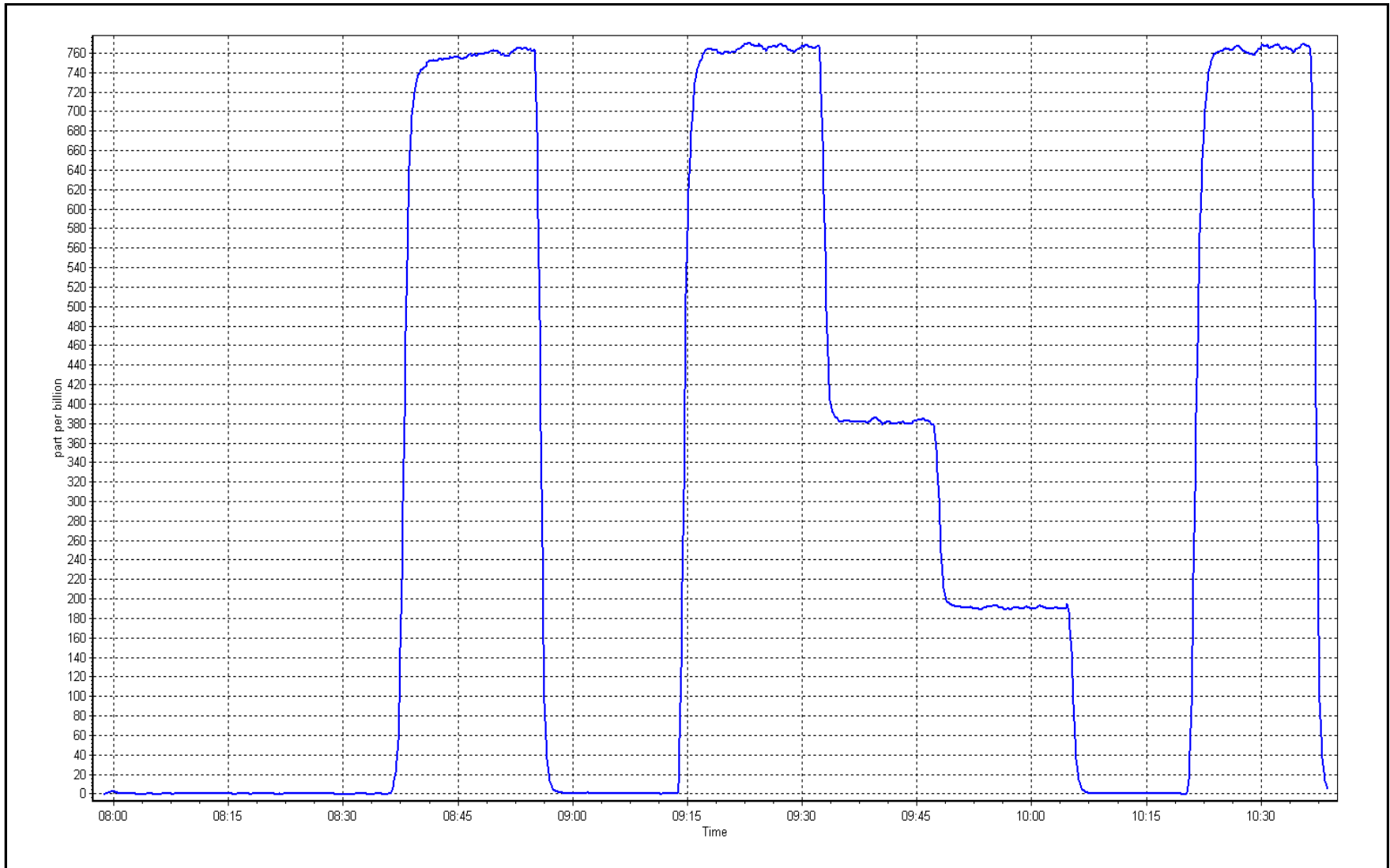
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> |
|--|---------------------------------------|------------------------------|-------------------------|---------------|
| 0.0 | 0.2 | ---- | Correlation Coefficient | ≥0.995 |
| 762.0 | 766.1 | 0.9946 | | |
| 381.1 | 381.8 | 0.9981 | Slope | 0.90 - 1.10 |
| 190.5 | 191.0 | 0.9975 | | |
| | | | Intercept | +/-30 |



SO2 Calibration Plot

Date: August 4, 2017

Location: Wapasu





Wood Buffalo Environmental Association

H₂S Calibration Report

Version-06-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|---------------|
| Station Name: | Wapasu | Station number: | AMS 17 |
| Calibration Date: | August 24, 2017 | Last Cal Date: | July 12, 2017 |
| Start time (MST): | 6:55 | End time (MST): | 9:17 |
| Reason: | Routine | | |

Calibration Standards

| | | | | |
|-----------------------|-----------------|-----|------------------|-------------------|
| Cal Gas Concentration | <u>5.10</u> | ppm | Cal Gas Exp Date | September 9, 2017 |
| Cal Gas Cylinder # | <u>CC107167</u> | | | |
| Calibrator Make/Model | API T700 | | Serial Number | 997 |
| ZAG Make/Model | API T701 | | Serial Number | 4427 |

Analyzer Information

Analyzer make: Thermo 450i

Analyzer serial #: 1218153583

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|----------------------|--------------|---------------|--------------|--------------|---------------|
| Analyzer Range | 0 - 100 ppb | | PMT voltage | -627.2 | -627.2 |
| Calculated slope | 0.989522 | 0.991670 | Lamp voltage | 819 | 819 |
| Calculated intercept | 0.042743 | 0.340314 | Pressure | 553.7 | 553.7 |
| Analyzer Background | 11.4 | 11.0 | Flow | 0.987 | 0.987 |
| Analyzer Coefficient | 1.016 | 0.988 | Intensity | 91 | 91 |

H₂S Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|-----------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5095 | 0.0 | 0.0 | -0.3 | ---- |
| as found span | 5025 | 78.4 | 78.3 | 80.4 | 0.974 |
| calibrator zero | 5095 | 0.0 | 0.0 | -0.3 | ---- |
| high point | 5025 | 78.4 | 78.3 | 78.7 | 0.996 |
| second point | 5063 | 39.2 | 39.2 | 39.1 | 1.002 |
| third point | 5083 | 19.6 | 19.6 | 19.4 | 1.010 |
| as left zero | 5095 | 0.0 | 0.0 | -0.1 | ---- |
| as left span | 5025 | 78.4 | 78.3 | 77.9 | 1.006 |

SO₂ Scrubber Check

| | | | | Average Correction Factor | 1.002 |
|--------------------|-------|-------------------|-------|---------------------------|-------|
| Corrected As found | 80.70 | Previous response | 79.13 | *% change | -1.9% |

* = > +/-5% change initiates investigation

Notes:

No Maintenance done; span adjusted

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

H₂S Calibration Summary

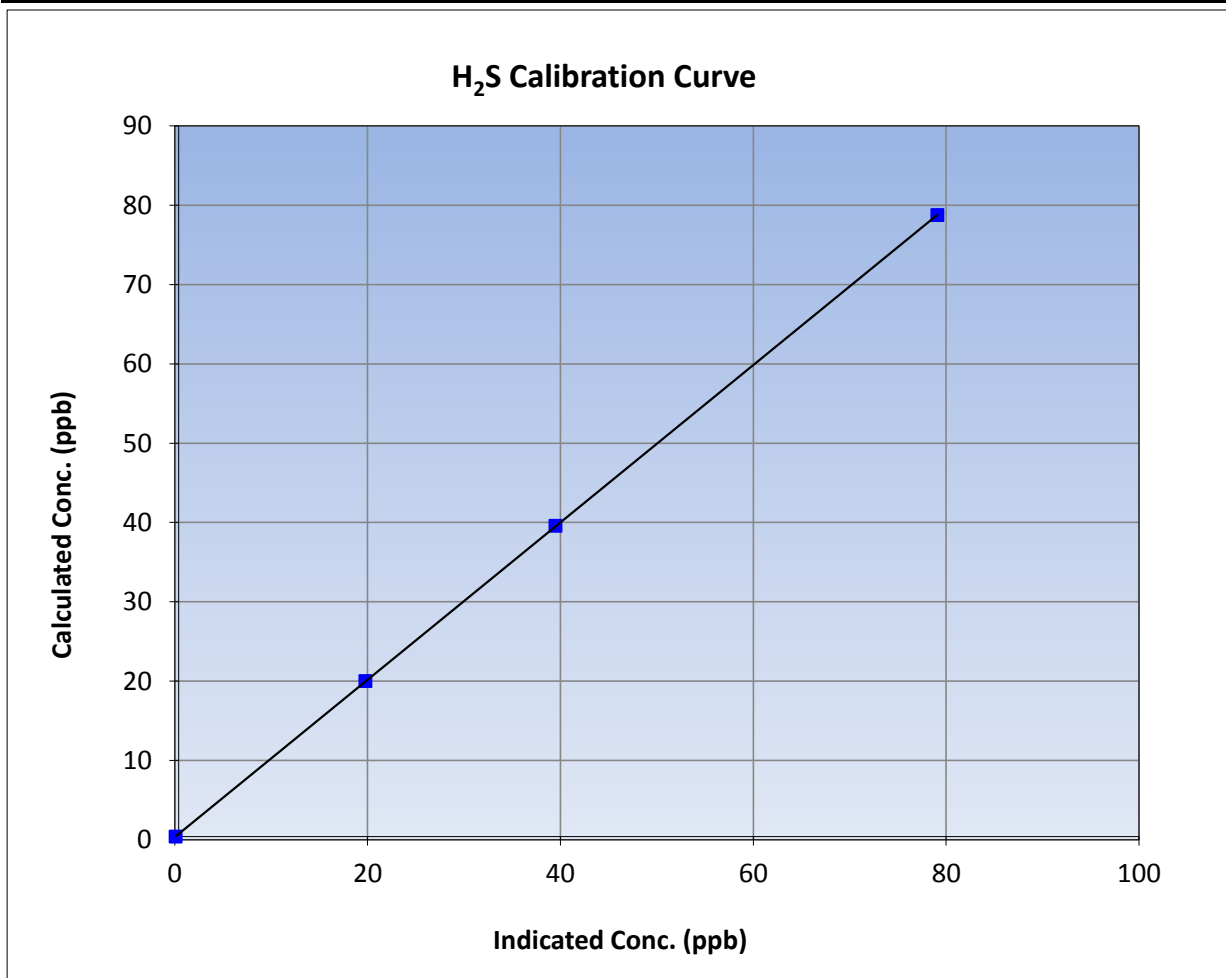
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 24, 2017 | Previous Calibration | July 12, 2017 |
| Station Name | Wapasu | Station Number | AMS 17 |
| Start Time (MST) | 6:55 | End Time (MST) | 9:17 |
| Analyzer make | Thermo 450i | Analyzer serial # | 1218153583 |

Calibration Data

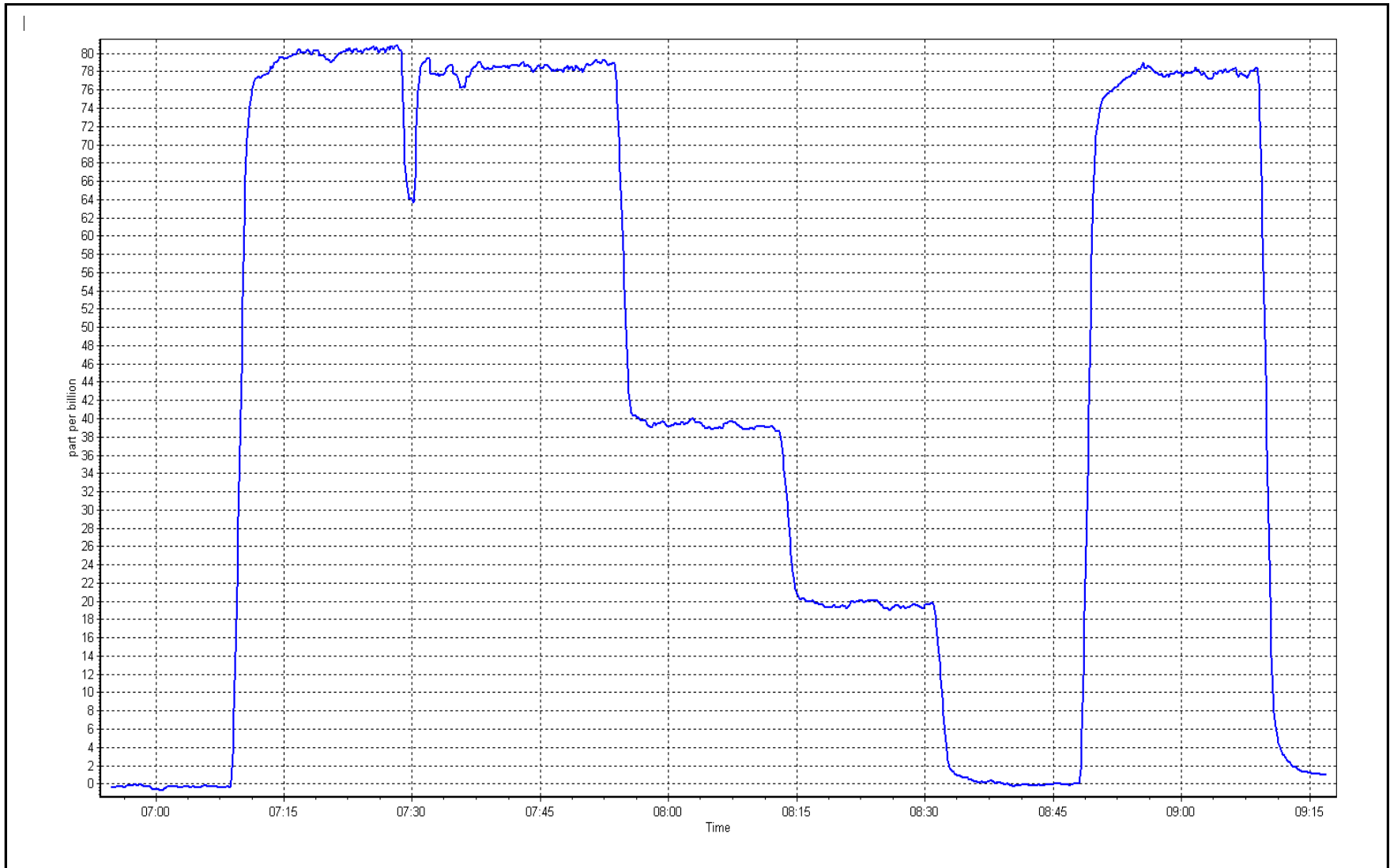
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-------------|
| 0.0 | -0.3 | ---- | Correlation Coefficient | ≥0.995 |
| 78.3 | 78.7 | 0.9955 | | |
| 39.2 | 39.1 | 1.0021 | Slope | 0.90 - 1.10 |
| 19.6 | 19.4 | 1.0098 | | |
| | | | Intercept | +/-3 |



H₂S Calibration Plot

Date: August 24, 2017

Location: Wapasu





Wood Buffalo Environmental Association

THC Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|----------------|-----------------|---------------|
| Station Name: | Wapasu | Station number: | AMS 17 |
| Calibration Date: | August 4, 2017 | Last Cal Date: | July 12, 2017 |
| Start time (MST): | 7:59 | End time (MST): | 10:38 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|-----------------------|------------------|---------------------|------------|
| Gas Cert Reference | EY0000753 | Cal Gas Expiry Date | 2/22/2020 |
| CH4 Cal Gas Conc. | <u>505.0</u> ppm | CH4 Equiv Conc. | 1055.0 ppm |
| C3H8 Cal Gas Conc. | <u>200.0</u> ppm | Station temp. | 22 Deg C |
| Calibrator Make/Model | API T700 | Serial Number | 997 |
| ZAG Make/Model | API T701 | Serial Number | 4427 |

Analyzer Information

| | | | |
|----------------------|---------------|---------------------|---------------|
| Analyzer make: | Thermo 51i-LT | Analyzer serial #: | 1218153352 |
| | <u>Start</u> | <u>Finish</u> | <u>Start</u> |
| Analyzer Range | 0 - 25 ppm | Bias voltage supply | -296.5 |
| Calculated slope | 0.994896 | Sample pressure | 8.5 |
| Calculated intercept | -0.027180 | Fuel pressure | 24.8 |
| Analyzer Background | 4.348 | Air pressure | 38.4 |
| Analyzer Coefficient | 3.110 | Flame temperature | 159.9 |
| | | | <u>Finish</u> |

THC Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5097 | 0.0 | 0.00 | -0.01 | ---- |
| as found span | 5025 | 78.4 | 16.21 | 16.42 | 0.987 |
| calibrator zero | 5097 | 0.0 | 0.00 | 0.00 | ---- |
| high point | 5025 | 78.4 | 16.21 | 16.24 | 0.998 |
| second point | 5063 | 39.2 | 8.11 | 8.15 | 0.995 |
| third point | 5083 | 19.6 | 4.05 | 4.08 | 0.993 |
| as left zero | 5097 | 0.0 | 0.00 | -0.01 | ---- |
| as left span | 5025 | 78.4 | 16.21 | 16.22 | 0.999 |
| Average Correction Factor | | | | | 0.995 |
| Corrected As found | 16.43 | Previous response | 16.32 | *% change | -0.7% |

* = > +/-5% change initiates investigation

Notes: Hydrogen and Nitrogen changed out; Span adjusted

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

THC Calibration Summary

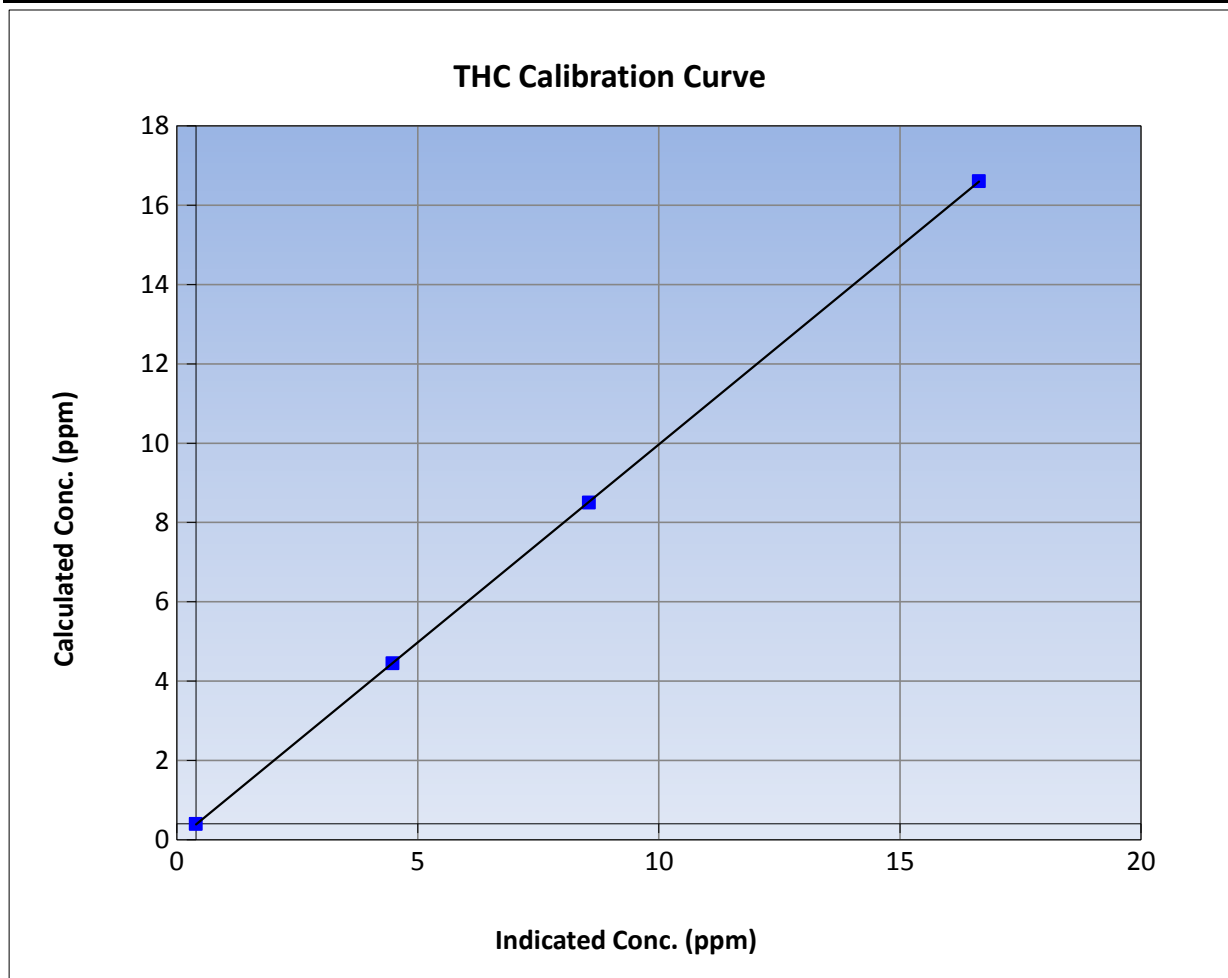
Version-03-2017

Station Information

| | | | |
|------------------|----------------|----------------------|---------------|
| Calibration Date | August 4, 2017 | Previous Calibration | July 12, 2017 |
| Station Name | Wapasu | Station Number | AMS 17 |
| Start Time (MST) | 7:59 | End Time (MST) | 10:38 |
| Analyzer make | Thermo 51i-LT | Analyzer serial # | 1218153352 |

Calibration Data

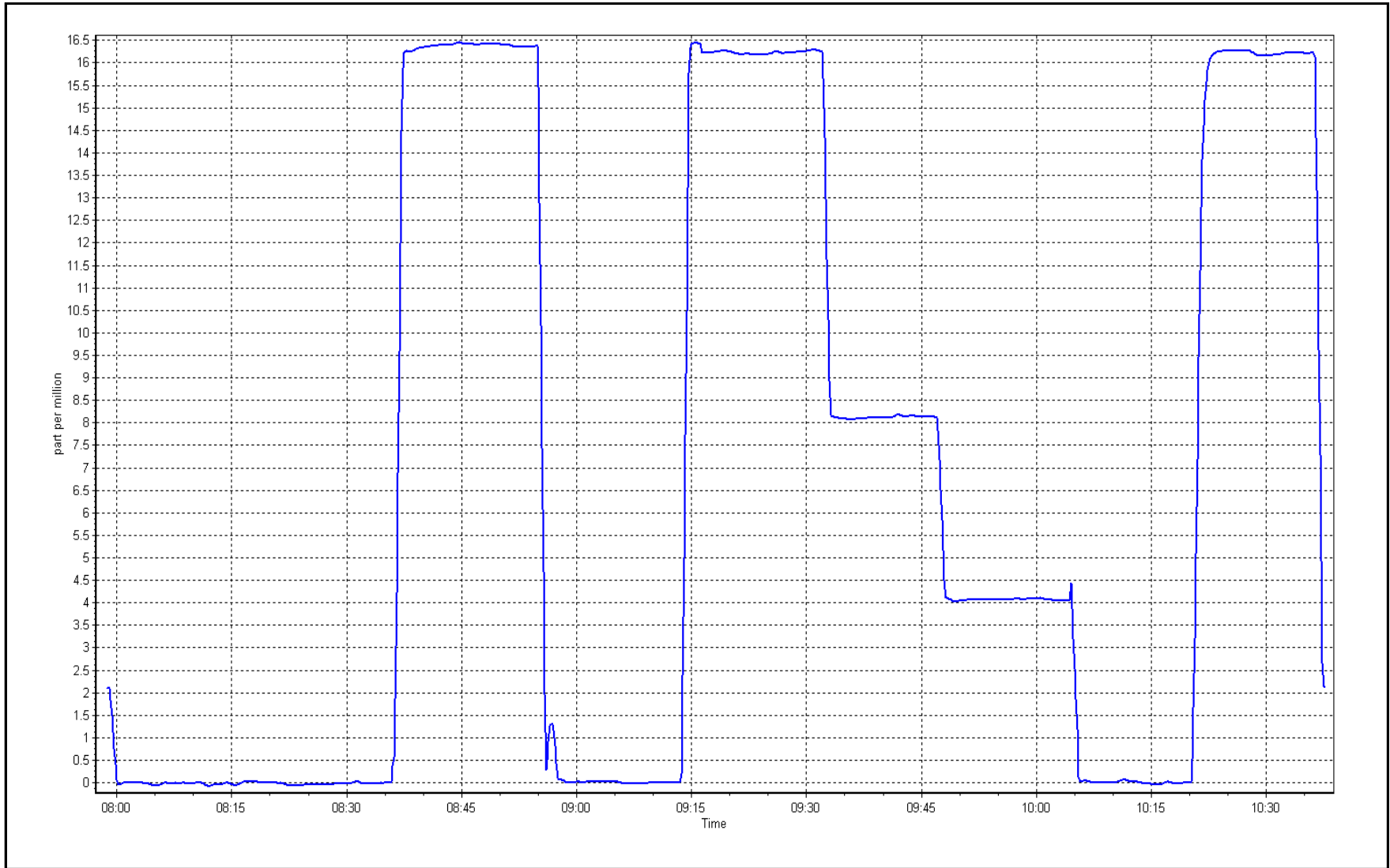
| Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (lc) | Correction factor (Cc/lc) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | 0.999996 | ≥0.995 |
| 16.2 | 16.2 | 0.9980 | | | |
| 8.1 | 8.2 | 0.9945 | Slope | 0.998189 | 0.90 - 1.10 |
| 4.1 | 4.1 | 0.9932 | | | |
| | | | Intercept | -0.013308 | +/-1.5 |



THC Calibration Plot

Date: August 4, 2017

Location: Wapasu





Wood Buffalo Environmental Association

O₃ Calibration Summary

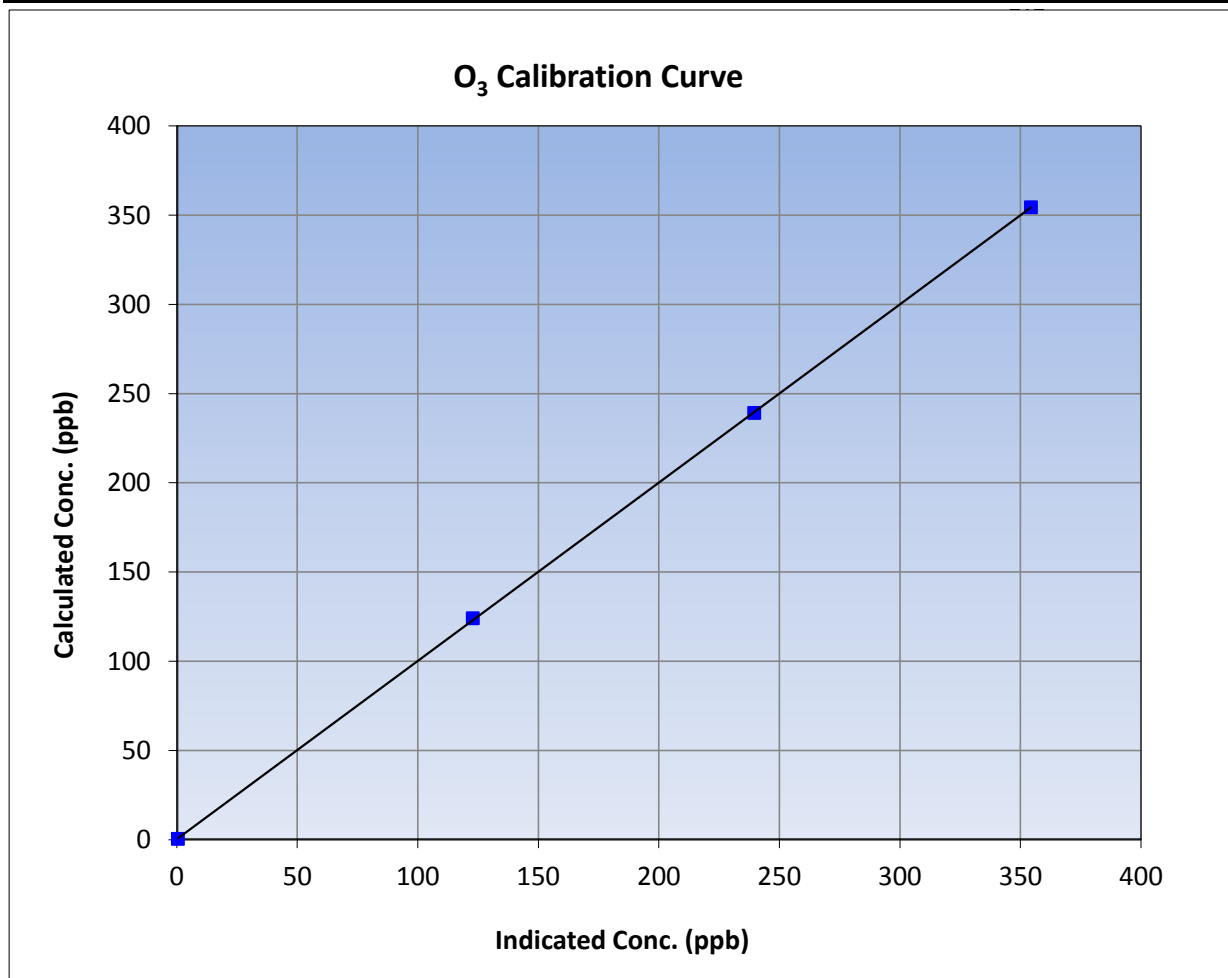
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 24, 2017 | Previous Calibration | July 12, 2017 |
| Station Name | Wapasu | Station Number | AMS 17 |
| Start Time (MST) | 8:30 | End Time (MST) | 11:35 |
| Analyzer make | Teledyne T400 | Analyzer serial # | 824 |

Calibration Data

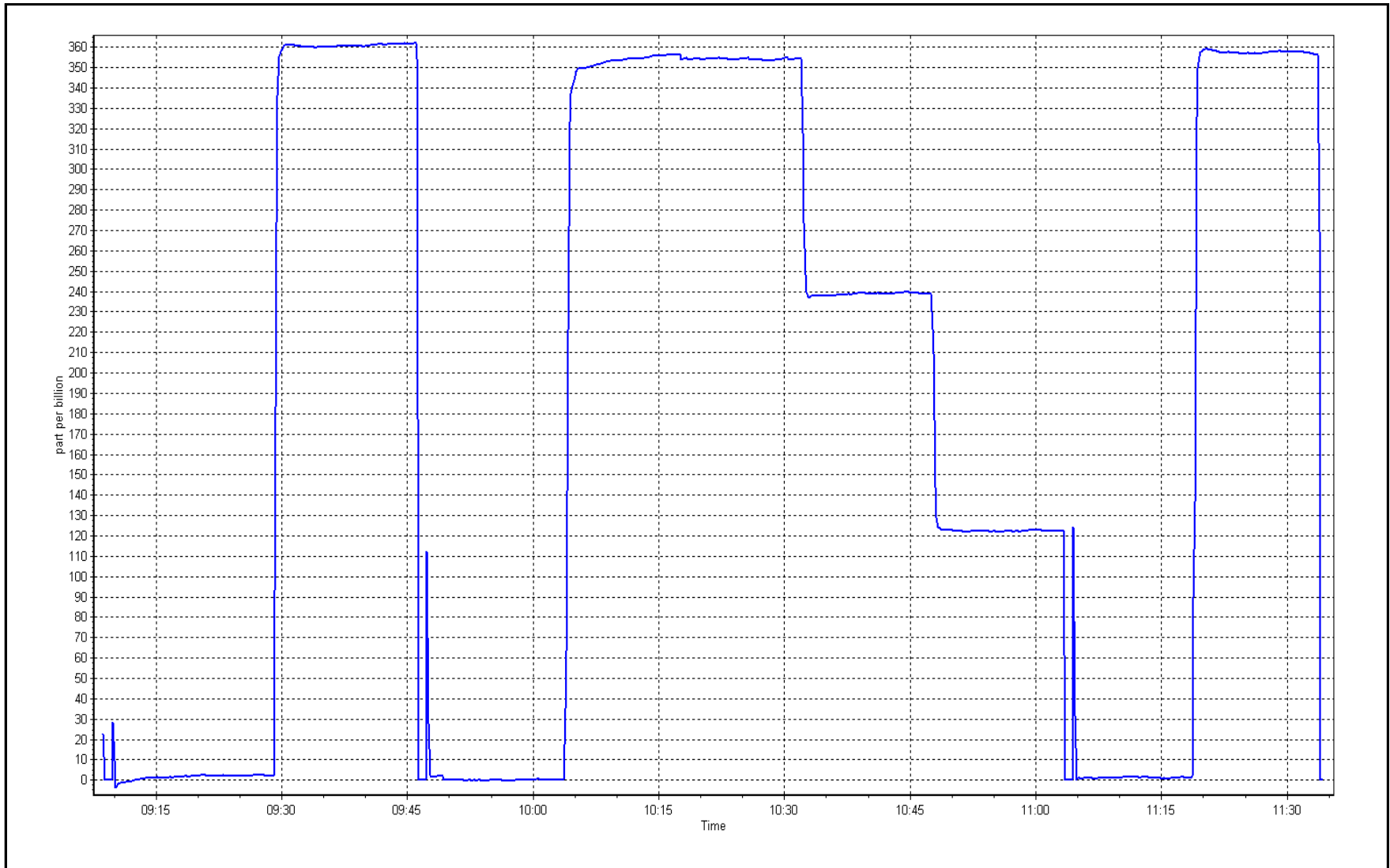
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|--------------------|
| 0.0 | 0.2 | ---- | Correlation Coefficient | 0.999980 | ≥0.995 |
| 354.0 | 354.0 | 1.0000 | Slope | 0.999186 | 0.90 - 1.10 |
| 238.7 | 239.2 | 0.9979 | Intercept | 0.245633 | +/- 10 |
| 123.6 | 122.5 | 1.0090 | | | |



O₃ Calibration Plot

Date: August 24, 2017

Location: Wapasu





Wood Buffalo Environmental Association

NO_x - NO - NO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|---------------|
| Station Name: | Wapasu | Station number: | AMS 17 |
| Calibration Date: | August 23, 2017 | Last Cal Date: | July 12, 2017 |
| Start time (MST): | 6:50 | End time (MST): | 10:40 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|-------------------|-----------------|---------------------|-----------------|
| NO Gas Cylinder # | EY0000753 | Cal Gas Expiry Date | 2/22/2020 |
| NOX Cal Gas Conc. | <u>51.0</u> ppb | NO Cal Gas Conc. | <u>51.0</u> ppb |
| Calibrator Model | API T700 | Serial Number | 997 |
| ZAG make/model | API T701 | Serial Number | 4427 |

Analyzer Information

| | | | |
|-------------------------|--------------|------------------------|------------------------------|
| Analyzer make: API T200 | | Analyzer serial #: 722 | |
| | <u>Start</u> | <u>Finish</u> | |
| NO coefficient | 0.946 | 0.924 | NOX Range (ppb) 0 - 1000 ppb |
| NOX coefficient | 0.946 | 0.926 | PMT Temperature 7.0 7.0 |
| NO2 coefficient | 1.000 | 1.000 | Reaction cell Press 3.2 3.2 |
| NO bkgrnd | 0.0 | 0.8 | Sample Flow 444 444 |
| NOX bkgrnd | 0.1 | 1.6 | HVPS Voltage 781 781 |

Calibration Statistics

| | | |
|----------------------------|--------------|---------------|
| | <u>Start</u> | <u>Finish</u> |
| NO _x Cal Slope | 0.987749 | 0.996743 |
| NO _x Cal Offset | 1.559656 | 1.891006 |
| NO Cal Slope | 0.987983 | 1.000549 |
| NO Cal Offset | 2.219715 | 1.940180 |
| NO ₂ Cal Slope | 1.009537 | 1.002845 |
| NO ₂ Cal Offset | -0.246435 | -0.158491 |



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Version-03-2017

Dilution Calibration Data

| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|----------------------------------|---------------------------|-----------------------------|---|--|---|--|---------------------------------------|--|---|--|
| as found zero | 5097 | 0.0 | 0.0 | 0.0 | 0.0 | 0.8 | -0.2 | 1.0 | ---- | ---- |
| as found span | 5025 | 78.4 | 783.5 | 783.5 | 0.0 | 801.6 | 800.0 | 1.6 | 0.9774 | 0.9793 |
| calibrator zero | 5097 | 0.0 | 0.0 | 0.0 | 0.0 | -0.3 | -0.1 | -0.2 | ---- | ---- |
| high point | 5025 | 78.4 | 783.5 | 783.5 | 0.0 | 785.0 | 782.0 | 3.0 | 0.9981 | 1.0019 |
| second point | 5063 | 39.2 | 391.8 | 391.8 | 0.0 | 390.2 | 388.8 | 1.4 | 1.0042 | 1.0078 |
| third point | 5083 | 19.6 | 195.9 | 195.9 | 0.0 | 193.2 | 192.0 | 1.2 | 1.0140 | 1.0203 |
| as left zero | 5097 | 0.0 | 0.0 | 0.0 | 0.0 | -0.8 | -0.4 | -0.3 | ---- | ---- |
| as left span | 5025 | 78.4 | 783.5 | 423.3 | 360.2 | 775.6 | 424.2 | 351.4 | 1.0102 | 0.9979 |
| Average Correction Factor | | | | | | | | | 1.0054 | 1.0100 |

| | | | | | |
|--|-----------------------------|----------------|--|-----------------|-------------------------|
| Corrected As found | NO _x = 800.8 ppb | NO = 800.2 ppb | | *Percent Change | NO _x = -1.1% |
| Previous Response | NO _x = 791.6 ppb | NO = 790.8 ppb | | *Percent Change | NO = -1.2% |
| <i>* = > +/-5% change initiates investigation</i> | | | | | |

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO drop conc (ppb) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | Converter Efficiency <i>Limit = 96-104%</i> |
|----------------------------------|------------------------------|---|--|---------------------------------------|--|---|--|---|--|
| 1st NO ref point | | 0.0 | 780.2 | 777.3 | 2.9 | 1.0042 | 1.0079 | ---- | ---- |
| 1st NO2 (400 ppb O3) | 423.3 | 354.0 | 776.1 | 423.3 | 352.8 | 1.0095 | ---- | 1.0034 | 99.7% |
| 2nd NO2 (200 ppb O3) | 538.6 | 238.7 | 777.2 | 538.6 | 238.5 | 1.0081 | ---- | 1.0008 | 99.9% |
| 3rd NO2 (100 ppb O3) | 653.7 | 123.6 | 777.4 | 653.7 | 123.8 | 1.0078 | ---- | 0.9984 | 100.2% |
| 2nd NO ref point | ---- | 0.0 | 776.4 | 776.4 | -0.1 | 1.0091 | 1.0091 | ---- | ---- |
| Average Correction Factor | | | | | | 1.0086 | 1.0085 | 1.0009 | 99.9% |

Notes: no maintenance done, zero and span adjusted

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

Version-03-2017

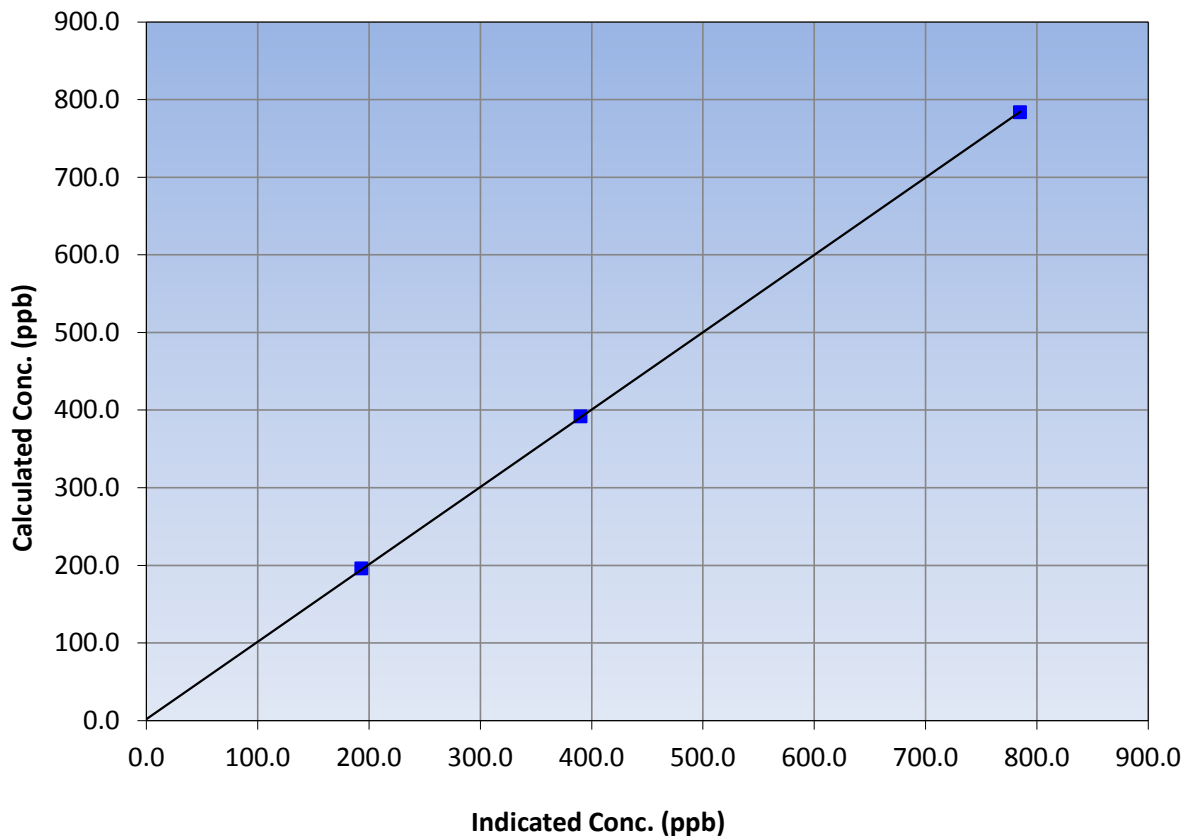
Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 23, 2017 | Previous Calibration | July 12, 2017 |
| Station Name | Wapasu | Station Number | AMS 17 |
| Start Time (MST) | 6:50 | End Time (MST) | 10:40 |
| Analyzer make | API T200 | Analyzer serial # | 722 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | -0.3 | ---- | Correlation Coefficient | ≥0.995 | |
| 783.5 | 785.0 | 0.9981 | | | |
| 391.8 | 390.2 | 1.0042 | | | |
| 195.9 | 193.2 | 1.0140 | | | |
| | | | Slope | 0.996743 | 0.90 - 1.10 |
| | | | Intercept | 1.891006 | +/-20 |

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

Version-03-2017

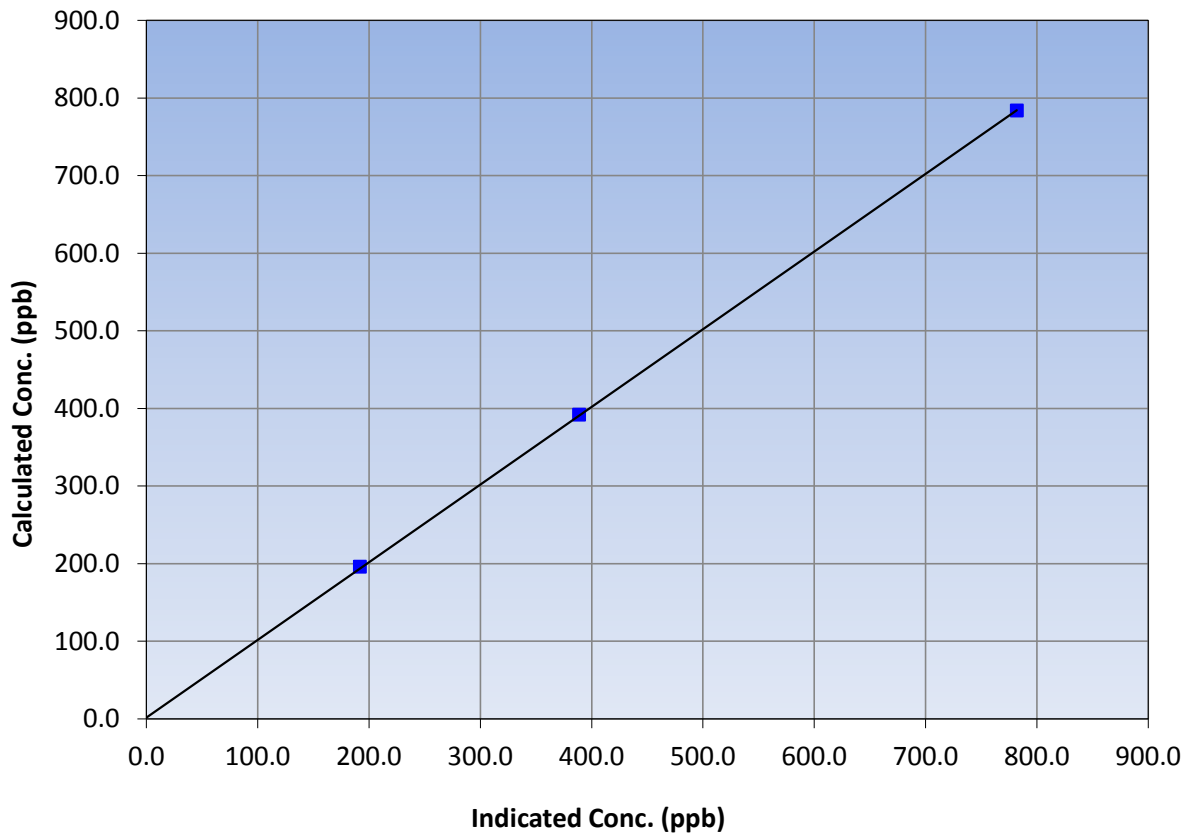
Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 23, 2017 | Previous Calibration | July 12, 2017 |
| Station Name | Wapasu | Station Number | AMS 17 |
| Start Time (MST) | 6:50 | End Time (MST) | 10:40 |
| Analyzer make | API T200 | Analyzer serial # | 722 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | -0.1 | ---- | Correlation Coefficient | ≥0.995 | |
| 783.5 | 782.0 | 1.0019 | | | |
| 391.8 | 388.8 | 1.0078 | | | |
| 195.9 | 192.0 | 1.0203 | | | |
| | | | Slope | 1.000549 | 0.90 - 1.10 |
| | | | Intercept | 1.940180 | +/-20 |

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

Version-03-2017

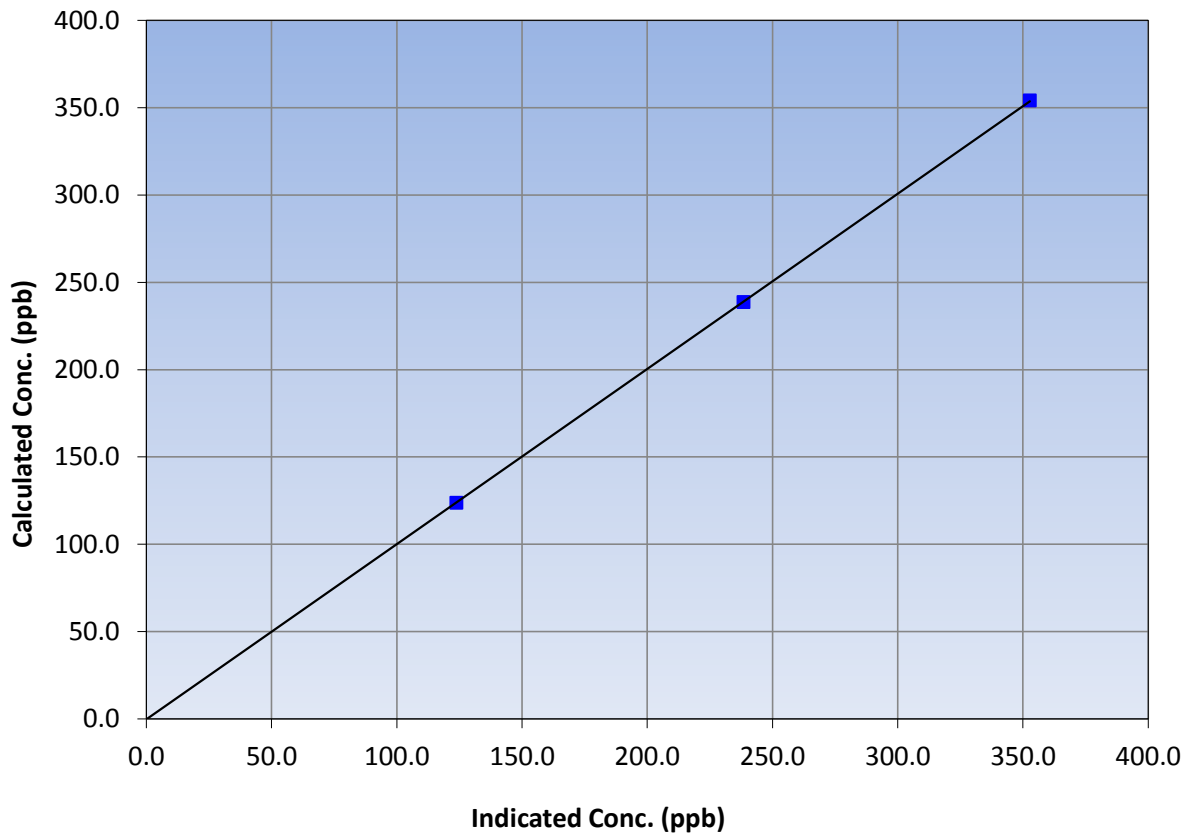
Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 23, 2017 | Previous Calibration | July 12, 2017 |
| Station Name | Wapasu | Station Number | AMS 17 |
| Start Time (MST) | 6:50 | End Time (MST) | 10:40 |
| Analyzer make | API T200 | Analyzer serial # | 722 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | -0.2 | ---- | Correlation Coefficient | ≥0.995 | |
| 354.0 | 352.8 | 1.0034 | | | |
| 238.7 | 238.5 | 1.0008 | | | |
| 123.6 | 123.8 | 0.9984 | | | |
| | | | Slope | 1.002845 | 0.90 - 1.10 |
| | | | Intercept | -0.158491 | +/-20 |

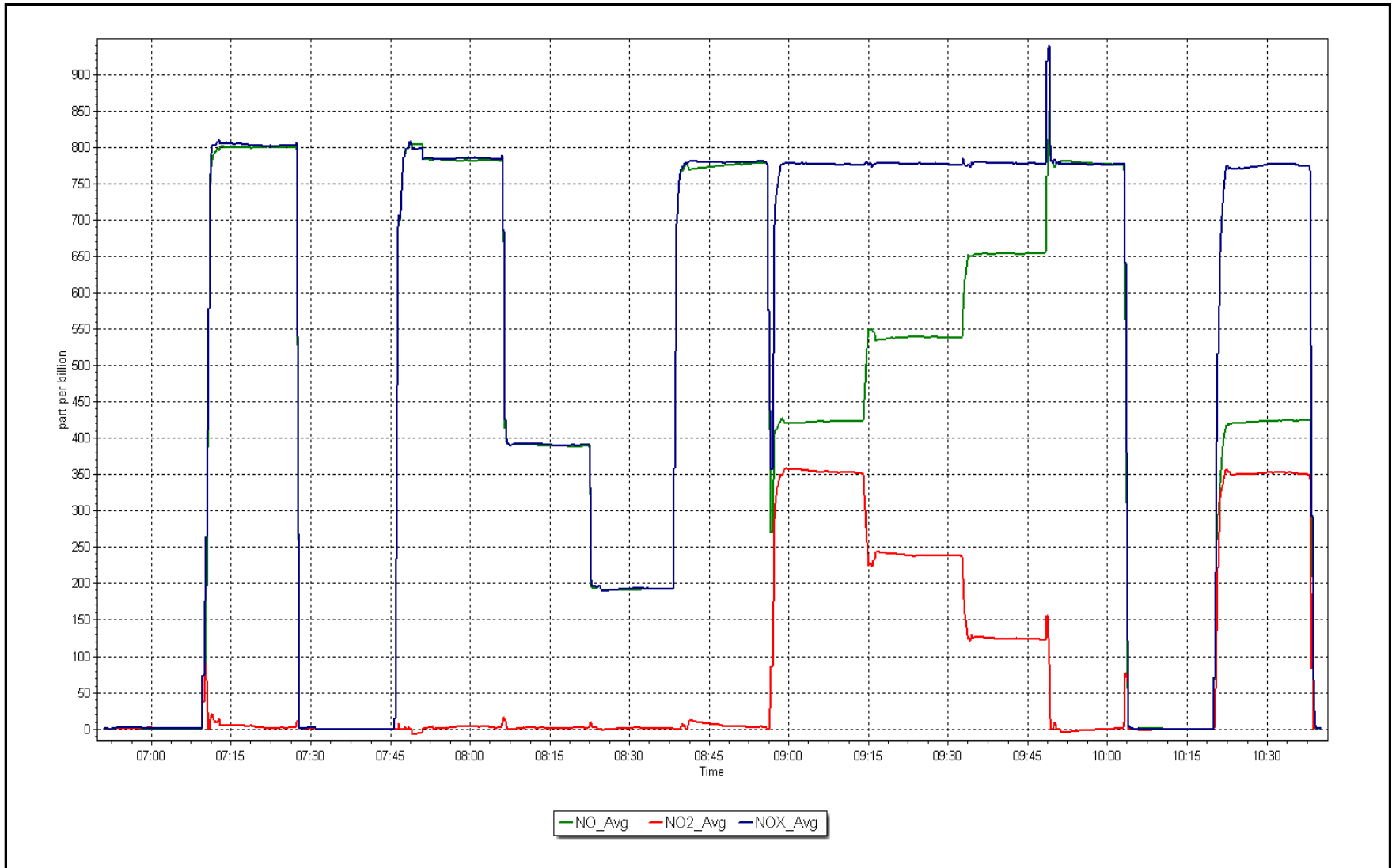
NO₂ Calibration Curve



NO_x Calibration Plot

Date: August 23, 2017

Location: Wapasu





Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-02-2017

Station Information

| | | | |
|------------------------|-----------------|-----------------|---------------|
| Station Name: | Wapasu | Station number: | AMS 17 |
| Calibration Date: | August 24, 2017 | Last Cal Date: | July 12, 2017 |
| Start time (MST): | 7:07 | End time (MST): | 7:55 |
| Sharp Model: | 5030 | S/N: | CM-2390 |
| Particulate Fraction: | PM2.5 | C14 Source S/N: | 10391 |
| Flow Meter Make/Model: | Delta Cal | S/N: | 1451 |
| Temp/RH standard: | Delta Cal | S/N: | 1451 |

Monthly Calibration Test

| <u>Parameter</u> | <u>As found</u> | <u>Measured</u> | <u>As left</u> | <u>Adjusted</u> | (Limits) |
|-----------------------------|-----------------|-------------------------------------|----------------|-------------------------------------|-----------------|
| T1 (°C) | 14 | 14.3 | 14 | <input type="checkbox"/> | +/- 2 °C |
| P3 (hPa) | 947 | 949 | 947 | <input type="checkbox"/> | +/- 13 hPa |
| flow (LPH) | 1000 | 1010 | 1000 | <input type="checkbox"/> | +/- 50 LPH |
| Nephelometer zero | -0.6 | ----- | -0.1 | <input checked="" type="checkbox"/> | +/- 0.5 ug/m3 |
| Instrument Clock: | Verified | <input type="checkbox"/> | | | |
| Cyclone cleaning : | PM10 Cyclone | <input checked="" type="checkbox"/> | PM2.5 Cyclone | <input checked="" type="checkbox"/> | |
| Date Filter Tape Installed: | | | | | |

Quarterly Calibration Test

Leak Test: Date of check: _____ Last Cal Date: July 12, 2017
 Flow w/o adaptor: _____ Flow w/ adaptor: _____

(Limit) 0.4 LPM

| <u>Adjusted</u> | <u>Current Test</u> | <u>Previous Test</u> | <u>% Change</u> |
|-----------------------------------|--------------------------|---------------------------------|-----------------|
| <input type="checkbox"/> | Foil S/N: _____ | Foil S/N: 2519 | |
| Foil Calibration | Foil Mass: _____ | Foil Mass: 1326 | |
| | Calibration Date: _____ | Calibration Date: July 12, 2017 | |
| (Limit) +/- 5% of previous | Correction Factor: _____ | Correction Factor: 7090 | --- |

Annual Calibration Test

| <u>Parameter</u> | <u>As found</u> | <u>Measured</u> | <u>As left</u> | <u>Adjusted</u> | (Limits) |
|-----------------------------|-----------------|-----------------|----------------|--------------------------|-----------------|
| T2 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| T3 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| T4 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| RH (%) | | | | <input type="checkbox"/> | +/- 10% |
| Date Sample Tube Cleaned: | | | | | |
| Date Pump Rebuilt/Replaced: | | | | | |

Notes: Cyclone Head Cleaned; nephelometer adjusted

Calibration by: Melissa Lemay



Wood Buffalo Environmental Association

Wind Speed/Direction Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|--------------|-----------------|-----------------|
| Station Name: | Wapasu | Station Number: | AMS 17 |
| Calibration Date: | August-29-17 | Prev Cal Date: | September-08-16 |
| Start Time (MST): | 8:16 | End Time (MST): | 8:56 |
| Barometric Press: | 732 | Station Temp: | 21 Deg C |
| Reason: | Routine | | |

Wind Speed Information

| | | | |
|--------------------|----------------|----------------|--------|
| Sensor make/model: | Met One 010C-1 | Serial Number: | P10039 |
| WS Calibrator: | MetOne 053 | Serial Number: | J6774 |

| Shaft RPM | Actual Speed (K/hr) (Cv) | Indicated Speed (K/hr) (Iv) | Correction factor (Cv/Iv) <i>Limit = 0.95-1.05</i> |
|----------------------------------|--------------------------|-----------------------------|---|
| 0 | 0.0 | 0.0 | n/a |
| 200 | 20.2 | 20.3 | 0.9952 |
| 400 | 39.4 | 39.4 | 0.9990 |
| 600 | 58.6 | 58.6 | 1.0001 |
| 800 | 77.8 | 77.8 | 0.9989 |
| Average Correction Factor | | | 0.9983 |

| | <u>Start</u> | <u>Finish</u> | <u>Limits</u> |
|--------------------------------|--------------|---------------|---------------|
| Correl Coeff (r ²) | | 0.999999 | ≥0.995 |
| Calculated slope | 0.998867 | 0.999614 | 0.90 - 1.10 |
| Calculated intercept | 0.028978 | -0.029255 | +/- 2 |

Wind Direction Information

| | | | |
|--|----------------|---|-----------|
| Sensor make/model: | Met One 020C-1 | Serial Number: | P19942 |
| As Found Declination (deg west of North) | <u>14</u> | As Left Declination (deg west of North) | <u>14</u> |

| Physical Direction (Degrees) (Cv) | Indicated Direction (Degrees) (Iv) | Correction factor (Cv/Iv) <i>Limit = 0.95-1.05</i> |
|-----------------------------------|------------------------------------|---|
| 0 | 1.8 | n/a |
| 90 | 91.5 | 0.9836 |
| 180 | 179.1 | 1.0050 |
| 270 | 272.1 | 0.9923 |
| 357 | 360.3 | 0.9907 |
| Average Correction Factor | | 0.9929 |

| | <u>Start</u> | <u>Finish</u> | <u>Limits</u> |
|--------------------------------|--------------|---------------|---------------|
| Correl Coeff (r ²) | | 0.999949 | ≥0.995 |
| Calculated slope | 0.991394 | 0.995771 | 0.90 - 1.10 |
| Calculated intercept | -0.940498 | -0.796777 | +/- 7 |

Notes: Torque Test Passed; Declination checked before and after tower take down

Calibration Performed By: Melissa Lemay



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 18
STONY MOUNTAIN
AUGUST 2017**

Operations, Data Collection,
QA/QC, Data Validation and Reporting by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

September 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STONY MOUNTAIN (AMS 18)
AUGUST 2017

MONTHLY SUMMARY for
AMD SECTION III.B.1(c)

| Parameter | Hours of Data | Hours of Calibration | Hours without Data | Operational Time | Maximum 1-Hour Value | 1-Hour Exceedances | Maximum 24-Hour Value | 24-Hour Exceedances |
|---------------------------------------|---------------|----------------------|--------------------|------------------|----------------------|--------------------|-----------------------|---------------------|
| SO2(ppb) Average | 708 | 36 | 36 | 100 | 2 | 0 | 1 | 0 |
| TRS(ppb) Average | 710 | 34 | 34 | 100 | 1 | 0 | 0 | 0 |
| THC(ppm) Average | 708 | 36 | 36 | 100 | 2.3 | - | 2.1 | - |
| NMHC(ppm) Average | 708 | 36 | 36 | 100 | 0.183 | - | 0.127 | - |
| CH4(ppm) Average | 708 | 36 | 36 | 100 | 2.2 | - | 2 | - |
| O3 (ppb) Average | 709 | 35 | 35 | 100 | 61 | 0 | 51 | - |
| NO2 (ppb) Average | 708 | 36 | 36 | 100 | 4 | 0 | 1 | - |
| NO (ppb) Average | 708 | 36 | 36 | 100 | 1 | - | 0 | - |
| NOX (ppb) Average | 708 | 36 | 36 | 100 | 4 | - | 1 | - |
| PM2.5 (ug/m3) Average | 742 | 2 | 2 | 100 | 124.8 | - | 41.4 | 1 |
| Wind Speed 10 m (km/h) Average | 743 | 0 | 1 | 99.87 | 19 | - | 13 | - |
| Wind Direction 10 m (deg) Average | 743 | 0 | 1 | 99.87 | - | 0 | - | - |
| Temperature 2 m (C) Average | 744 | 0 | 0 | 100 | 26.4 | - | 20.2 | - |
| Relative Humidity (%) Average | 744 | 0 | 0 | 100 | 100 | - | 92.0 | - |
| Precipitation (mm) Total | 744 | 0 | 0 | 100 | 3 | - | 8.2 | - |
| Leaf Wetness (% of range) Average | 744 | 0 | 0 | 100 | 33 | - | 15.0 | - |
| Global Solar Radiation (W/m2) Average | 744 | 0 | 0 | 100 | 888 | - | 296.0 | - |

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STONY MOUNTAIN (AMS 18)
AUGUST 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

| Parameter | Number | Mean | StnDev | Total | Percentile | | | | | | |
|---------------------------------------|--------|-------|--------|-------|------------|------|------|--------|------|------|-------|
| | | | | | Min | P10 | Q1 | Median | Q3 | P90 | Max |
| SO2 (ppb) Average | 708 | 0.3 | 0 | - | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| TRS (ppb) Average | 710 | 0.3 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| THC (ppm) Average | 708 | 1.99 | 0.1 | - | 1.9 | 1.9 | 1.9 | 2 | 2 | 2.1 | 2.3 |
| NMHC(ppm) Average | 708 | 0.061 | 0.039 | - | 0 | 0 | 0 | 0.1 | 0.1 | 0.1 | 0.183 |
| CH4(ppm) Average | 708 | 1.93 | 0.1 | - | 1.8 | 1.9 | 1.9 | 1.9 | 2 | 2 | 2.2 |
| O3 (ppb) Average | 709 | 30.9 | 9 | - | 12 | 20 | 25 | 30 | 36 | 44 | 61 |
| NO2 (ppb) Average | 708 | 0.7 | 0 | - | 0 | 0 | 0 | 1 | 1 | 1 | 4 |
| NO (ppb) Average | 708 | 0.1 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| NOX (ppb) Average | 708 | 0.8 | 0 | - | 0 | 0 | 0 | 1 | 1 | 1 | 4 |
| PM2.5 (ug/m3) Average | 742 | 7.43 | 10.7 | - | 0.1 | 1.2 | 2.8 | 5.2 | 7.9 | 12.5 | 124.8 |
| Wind Speed 10 m (km/h) Average | 743 | 6.7 | 3 | - | 0 | 2 | 4 | 7 | 9 | 11 | 19 |
| Wind Direction 10 m (deg) Average | 743 | - | - | - | - | - | - | - | - | - | - |
| Temperature 2 m (C) Average | 744 | 15.77 | 4 | - | 7.5 | 10.7 | 12.9 | 15.2 | 18.7 | 21.5 | 26.4 |
| Relative Humidity (%) Average | 744 | 71.7 | 18 | - | 30 | 46 | 59 | 72 | 86 | 96 | 100 |
| Precipitation (mm) Total | 744 | - | - | 30.18 | - | - | - | - | - | - | - |
| Surface Wetness (% of range) Average | 744 | 4.5 | 7 | - | 0 | 1 | 1 | 2 | 3 | 17 | 33 |
| Global Solar Radiation (W/m2) Average | 744 | 196.2 | 256 | - | 0 | 0 | 0 | 56 | 369 | 638 | 888 |

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STONY MOUNTAIN (AMS 18)
AUGUST 2017

OPERATIONAL NOTES

| Parameter | Period Start | Period End | Duration (Hours) | Notes |
|----------------------------|-------------------|-------------------|------------------|-----------------------------------|
| Wind Speed, Wind Direction | 04 Aug 2017 01:00 | 04 Aug 2017 01:00 | 1 | Flat line in sensor output signal |



Wood Buffalo Environmental Association

Summary of Hour Averages

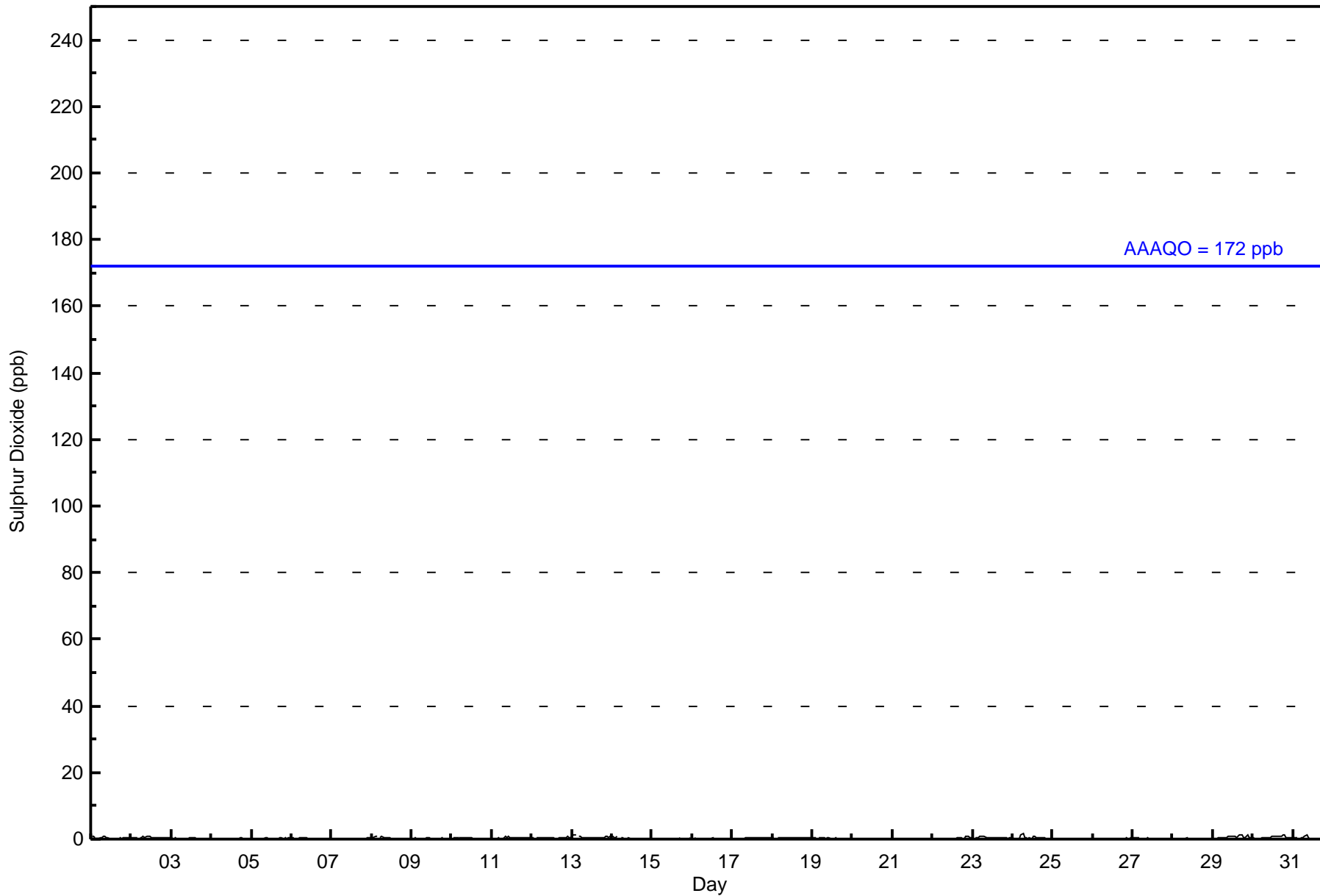
Sulphur Dioxide (SO₂) - ppb
Stony Mountain - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | |
|---|-------------------------------|---|---|---|---|---|---|---|---|--|----|----|----|----|----|----|----|----|----|---------------------------------|----|----|----|-----------------|---------------|---------------|
| Maximum Value: 2 ppb on Aug 24 07:00 | | | | | | | | | | Maximum Daily Average: 0.6 ppb on Aug 13 | | | | | | | | | | Hours of Data: 708 | | | | | | |
| Minimum Value: 0 ppb on Aug 22 02:00 | | | | | | | | | | Minimum Daily Average: 0.1 ppb on Aug 25 | | | | | | | | | | Hours of Missing Data: 36 | | | | | | |
| Maximum Diurnal Average: 0.3 ppb at hour 9 | | | | | | | | | | Minimum Diurnal Average: 0.2 ppb at hour 23 | | | | | | | | | | Hours of Calibration: 36 | | | | | | |
| Monthly Average: 0.3 ppb | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 1 | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 1 | 1 | 0 | Z | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 2-Aug | 0 | 0 | 0 | 0 | Z | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0.5 | 1 |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 4-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 5-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 6-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 7-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.2 | 1 |
| 8-Aug | 1 | 1 | 1 | 1 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 9-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 10-Aug | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 11-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 12-Aug | 0 | 0 | Z | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0.4 | 1 |
| 13-Aug | 1 | 1 | 1 | Z | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0.6 | 1 |
| 14-Aug | 1 | 1 | 1 | 1 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 15-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | C | C | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 16-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 17-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 18-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 19-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 20-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 22-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0.2 | 1 |
| 23-Aug | 0 | Z | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.5 | 1 |
| 24-Aug | 1 | 0 | Z | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 2 |
| 25-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 26-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 28-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 29-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0.6 | 1 |
| 30-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0.6 | 1 |
| 31-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 0.3 0.3 0.3 0.2 0.2 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.2 0.2 0.3 0.3 0.3 0.2 0.3 0.3 0.2 0.3 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| 1 1 1 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| Z - zerospan C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Stony Mountain - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Stony Mountain - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 10 | 708 | 100.00 | 100.00 |
| 11 - 20 | 0 | 0.00 | 100.00 |
| 21 - 60 | 0 | 0.00 | 100.00 |
| 61 - 110 | 0 | 0.00 | 100.00 |
| 111 - 172 | 0 | 0.00 | 100.00 |
| > 172 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Stony Mountain - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|----|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 10 | 12 | 19 | 12 | 15 | 12 | 20 | 56 | 46 | 40 | 73 | 98 | 101 | 120 | 54 | 22 | 8 | 708 |
| 11 - 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21 - 60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 61 - 110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 111 - 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 12 | 19 | 12 | 15 | 12 | 20 | 56 | 46 | 40 | 73 | 98 | 101 | 120 | 54 | 22 | 8 | 708 |

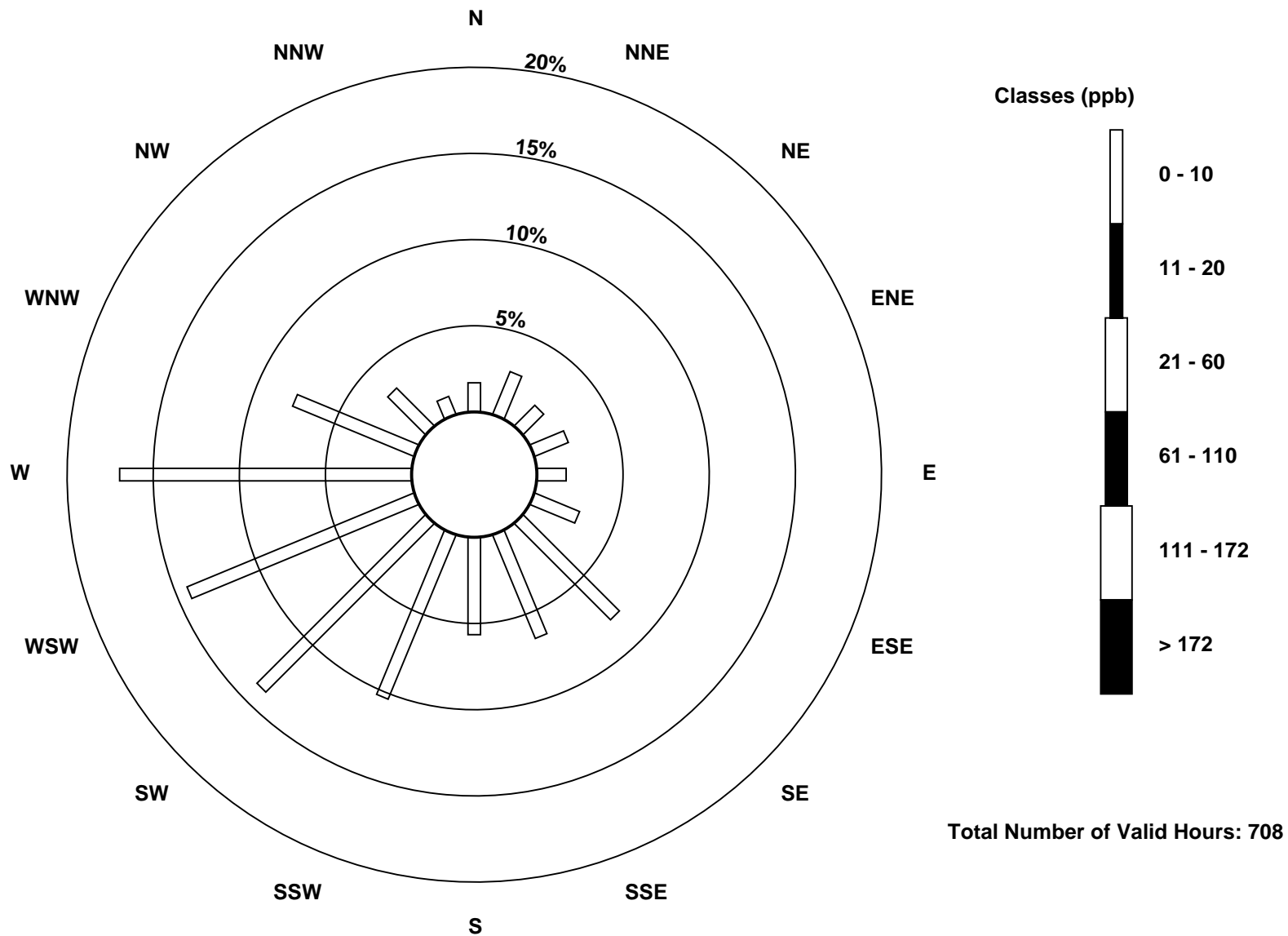
Total Number of Valid Hours: 708

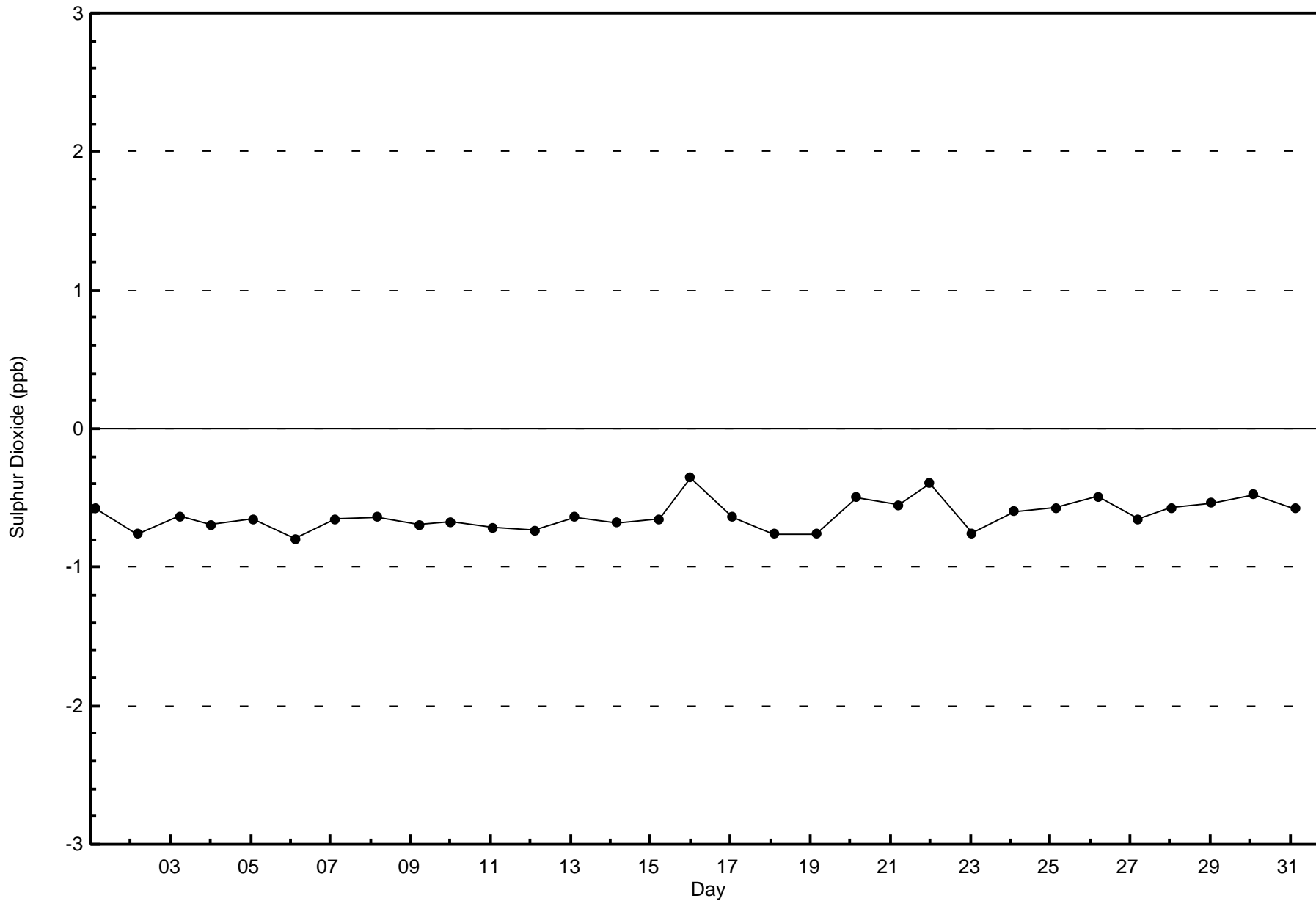
Total Number of Hours: 744

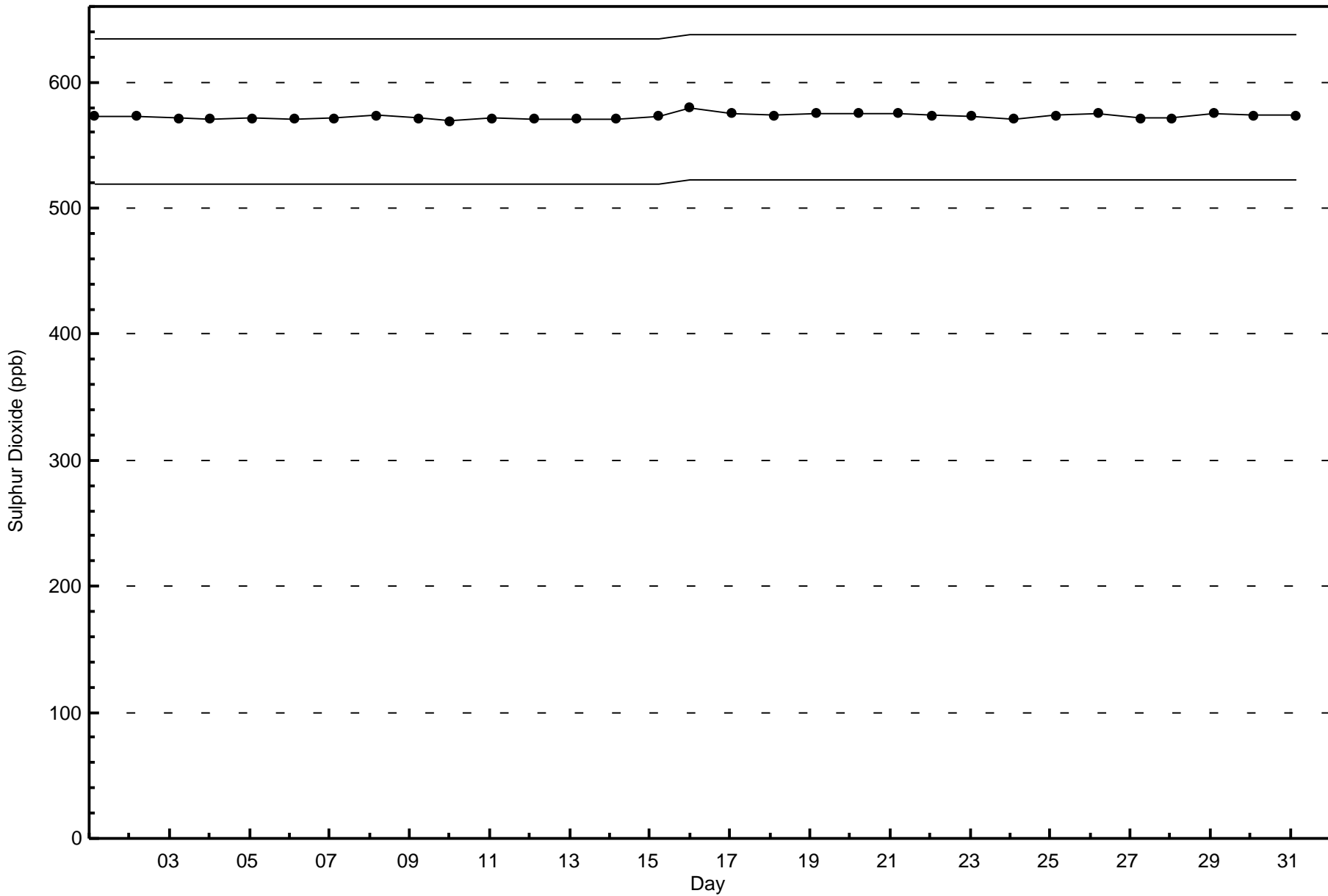


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Sulphur Dioxide (SO₂) - ppb
Stony Mountain (AMS 18)









Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

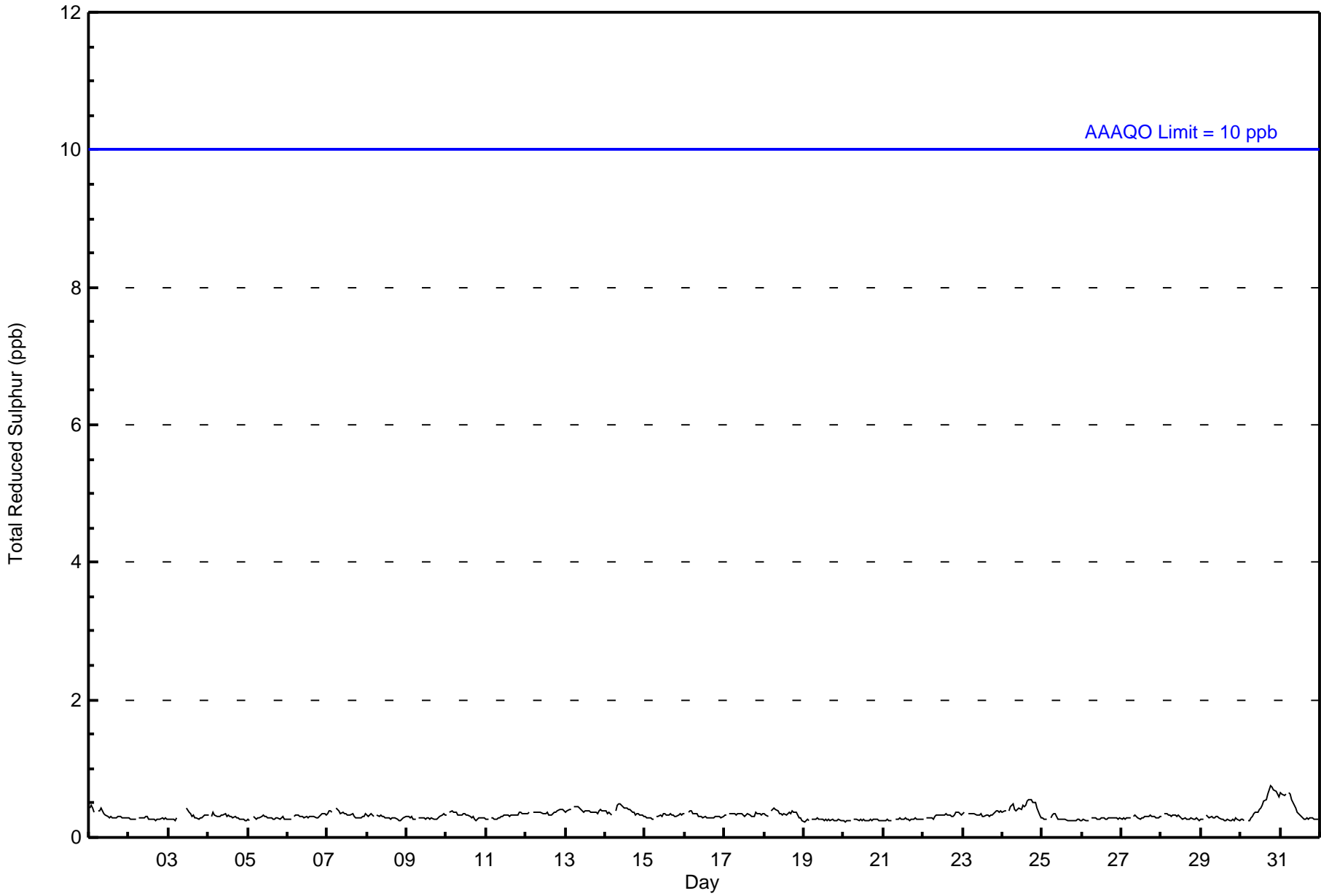
Stony Mountain - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 1 ppb on Aug 30 19:00 Maximum Daily Average: 0.5 ppb on Aug 30 | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 710 Hours of Missing Data: 34 Hours of Calibration: 34 Percent Operational Time: 100.0 | | | | | | | | | |
|--|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|---|----|----|----|----|----|----|-----------------|---------------|---------------|
| Minimum Value: 0 ppb on Aug 20 02:00 Minimum Daily Average: 0.3 ppb on Aug 20 Maximum Diurnal Average: 0.3 ppb at hour 7 Minimum Diurnal Average: 0.3 ppb at hour 5 Monthly Average: 0.3 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 O ₃ = 0 P ₉₀ = 0 P ₉₉ = 1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 2-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 4-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 5-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 6-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 7-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 8-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 9-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 10-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 11-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 12-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 0 |
| 13-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 0 |
| 14-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 0 |
| 15-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 16-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 17-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 18-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 19-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 20-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 22-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 23-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 24-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0.4 | 1 |
| 25-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 26-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 28-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 29-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 30-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.5 | 1 |
| 31-Aug | 1 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| Z - zerospan C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Stony Mountain - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Stony Mountain - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2 | 710 | 100.00 | 100.00 |
| 3 - 4 | 0 | 0.00 | 100.00 |
| 5 - 7 | 0 | 0.00 | 100.00 |
| 8 - 11 | 0 | 0.00 | 100.00 |
| > 11 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 710

Total Number of Hours: 744



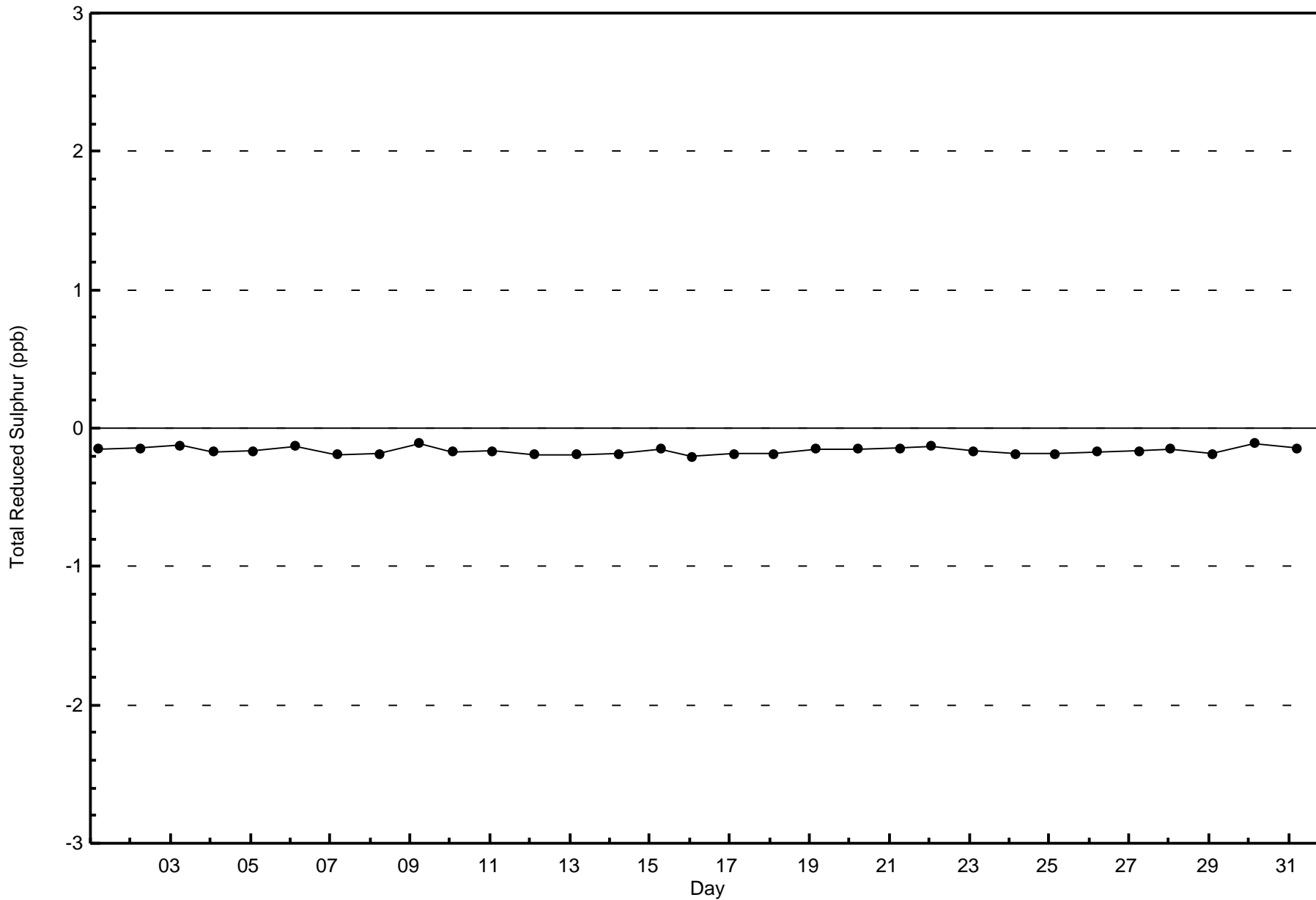
**Wood Buffalo Environmental Association
Frequency Distribution**

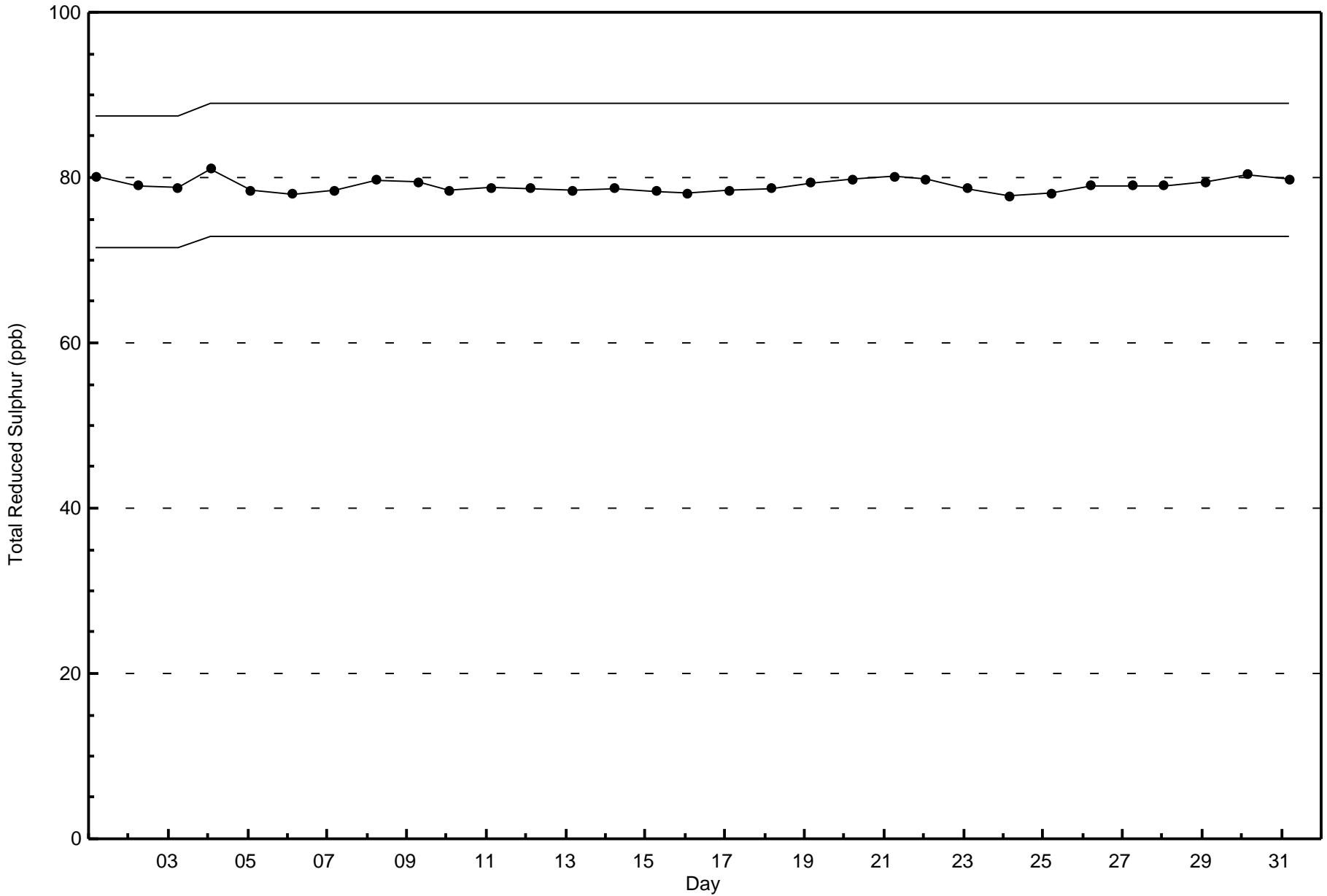
**Total Reduced Sulphur (TRS) - ppb
Stony Mountain - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|----|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2 | 13 | 18 | 11 | 16 | 12 | 20 | 55 | 46 | 37 | 73 | 98 | 102 | 119 | 60 | 21 | 8 | 709 |
| 3 - 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 - 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 - 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 13 | 18 | 11 | 16 | 12 | 20 | 55 | 46 | 37 | 73 | 98 | 102 | 119 | 60 | 21 | 8 | 709 |

Total Number of Valid Hours: 709

Total Number of Hours: 744







Wood Buffalo Environmental Association
Summary of Hour Averages

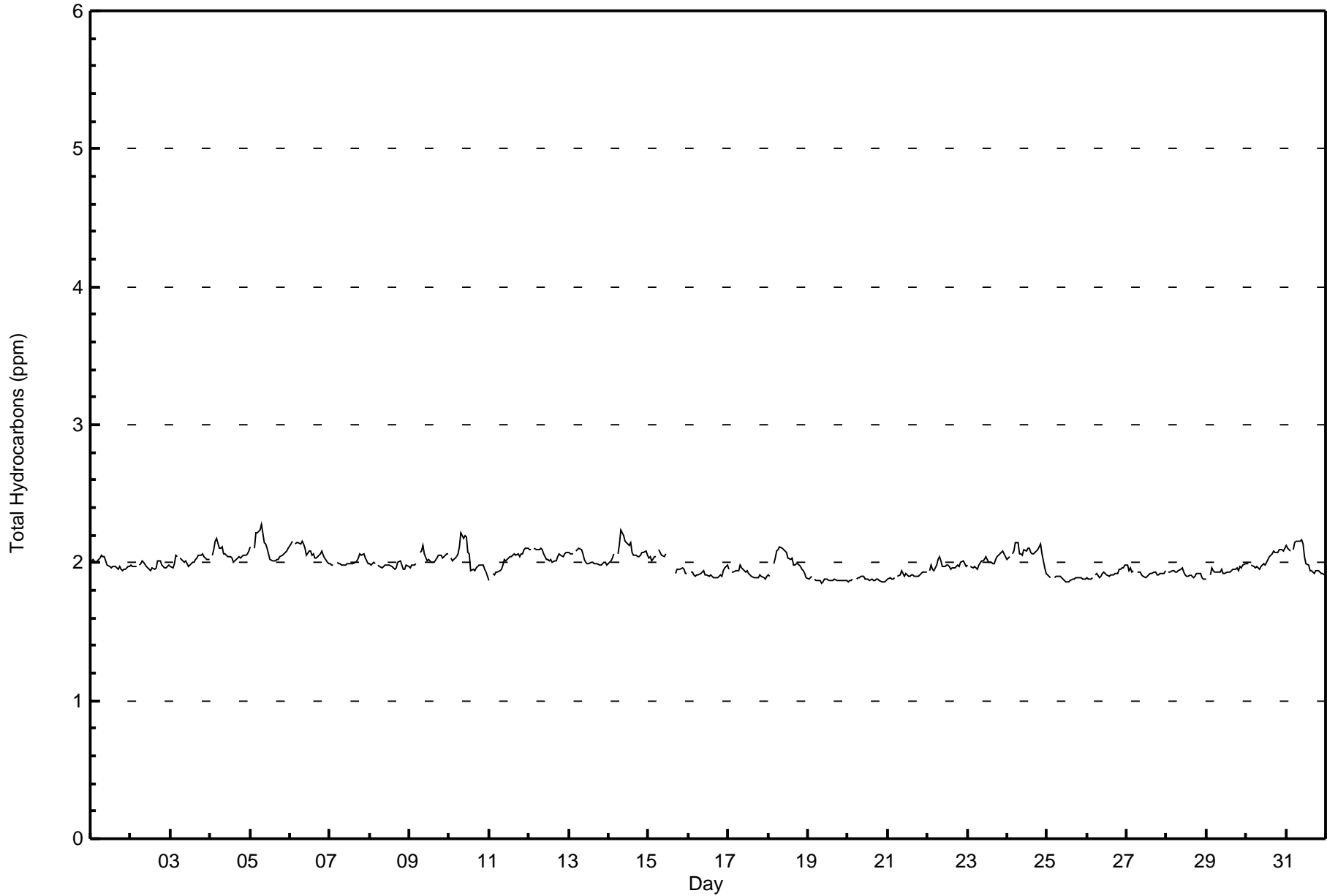
Total Hydrocarbons (THC) - ppm
Stony Mountain - August 2017

| Maximum Value: 2.3 ppm on Aug 5 08:00 Maximum Daily Average: 2.1 ppm on Aug 5 | | Hours in Service: 744 Hours of Data: 708 Hours of Missing Data: 36 Hours of Calibration: 36 Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|---------------|---------------|
| Minimum Value: 1.9 ppm on Aug 19 09:00 Minimum Daily Average: 1.9 ppm on Aug 19 Maximum Diurnal Average: 2.0 ppm at hour 8 Minimum Diurnal Average: 2.0 ppm at hour 16 Monthly Average: 1.99 ppm Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 2.0 Q ₃ = 2.0 P ₉₀ = 2.1 P ₉₉ = 2.2 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 2.0 | 2.0 | 2.0 | Z | 2.0 | 2.0 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 |
| 2-Aug | 2.0 | 2.0 | 2.0 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 2.0 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| 3-Aug | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | |
| 4-Aug | Z | 2.1 | 2.1 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | |
| 5-Aug | 2.1 | Z | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.2 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.3 | |
| 6-Aug | 2.1 | 2.2 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.1 | 2.2 | |
| 7-Aug | 2.0 | 2.0 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.1 | |
| 8-Aug | 2.0 | 2.0 | 2.0 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | |
| 9-Aug | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.0 | 2.1 | 2.1 | 2.0 | 2.1 | |
| 10-Aug | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 1.9 | 2.0 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 2.0 | 2.2 | |
| 11-Aug | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.1 | |
| 12-Aug | 2.1 | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | |
| 13-Aug | 2.1 | 2.1 | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | |
| 14-Aug | 2.0 | 2.0 | 2.0 | 2.1 | Z | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | |
| 15-Aug | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | Z | 2.1 | 2.1 | 2.1 | 2.0 | 2.1 | C | C | C | C | C | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 2.0 | 2.1 | |
| 16-Aug | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 2.0 | |
| 17-Aug | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | |
| 18-Aug | 1.9 | 1.9 | Z | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | 2.1 | |
| 19-Aug | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | |
| 20-Aug | 1.9 | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | |
| 21-Aug | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | |
| 22-Aug | Z | 1.9 | 2.0 | 2.0 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | |
| 23-Aug | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.1 | |
| 24-Aug | 2.0 | 2.0 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 1.9 | 2.1 | 2.1 | |
| 25-Aug | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | |
| 26-Aug | 1.9 | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 1.9 | 2.0 | |
| 27-Aug | 2.0 | 1.9 | 2.0 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | |
| 28-Aug | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | |
| 29-Aug | 1.9 | Z | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 2.0 | 1.9 | 2.0 | 2.0 | 2.0 | 1.9 | 2.0 | |
| 30-Aug | 2.0 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.1 | |
| 31-Aug | 2.1 | 2.1 | 2.1 | Z | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.2 | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| Z - zerospan C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Stony Mountain - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Stony Mountain - August 2017**

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2.0 | 533 | 75.28 | 75.28 |
| 2.1 - 3.0 | 175 | 24.72 | 100.00 |
| 3.1 - 10.0 | 0 | 0.00 | 100.00 |
| > 10.0 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Stony Mountain - August 2017

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---|-----------------------|-----|----|-----|----|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2.0 | 7 | 18 | 7 | 12 | 10 | 9 | 39 | 26 | 24 | 30 | 85 | 94 | 109 | 40 | 15 | 8 | 533 |
| 2.1 - 3.0 | 5 | 1 | 5 | 3 | 2 | 11 | 17 | 20 | 16 | 43 | 13 | 7 | 11 | 14 | 7 | 0 | 175 |
| 3.1 - 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 12 | 19 | 12 | 15 | 12 | 20 | 56 | 46 | 40 | 73 | 98 | 101 | 120 | 54 | 22 | 8 | 708 |

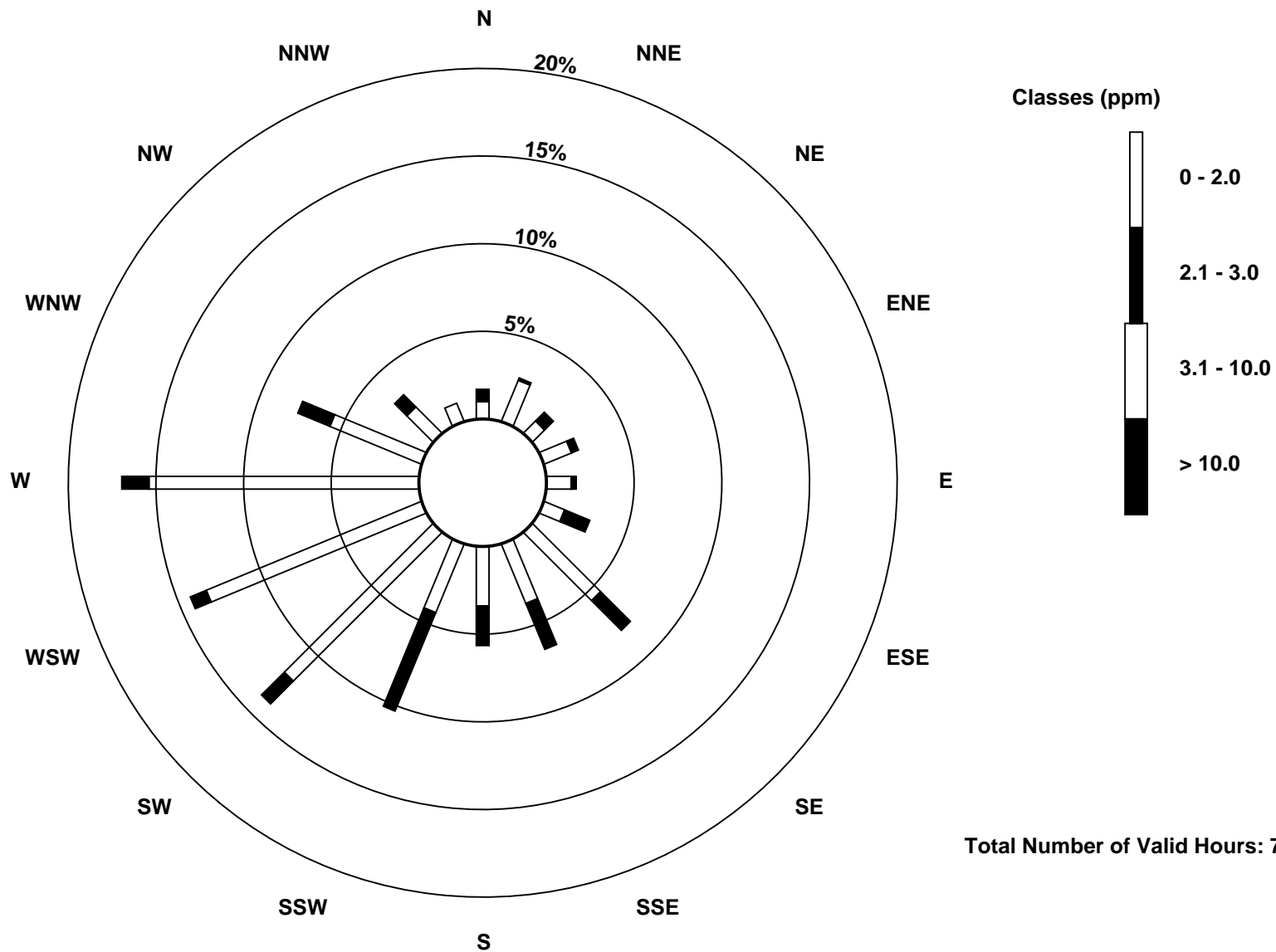
Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

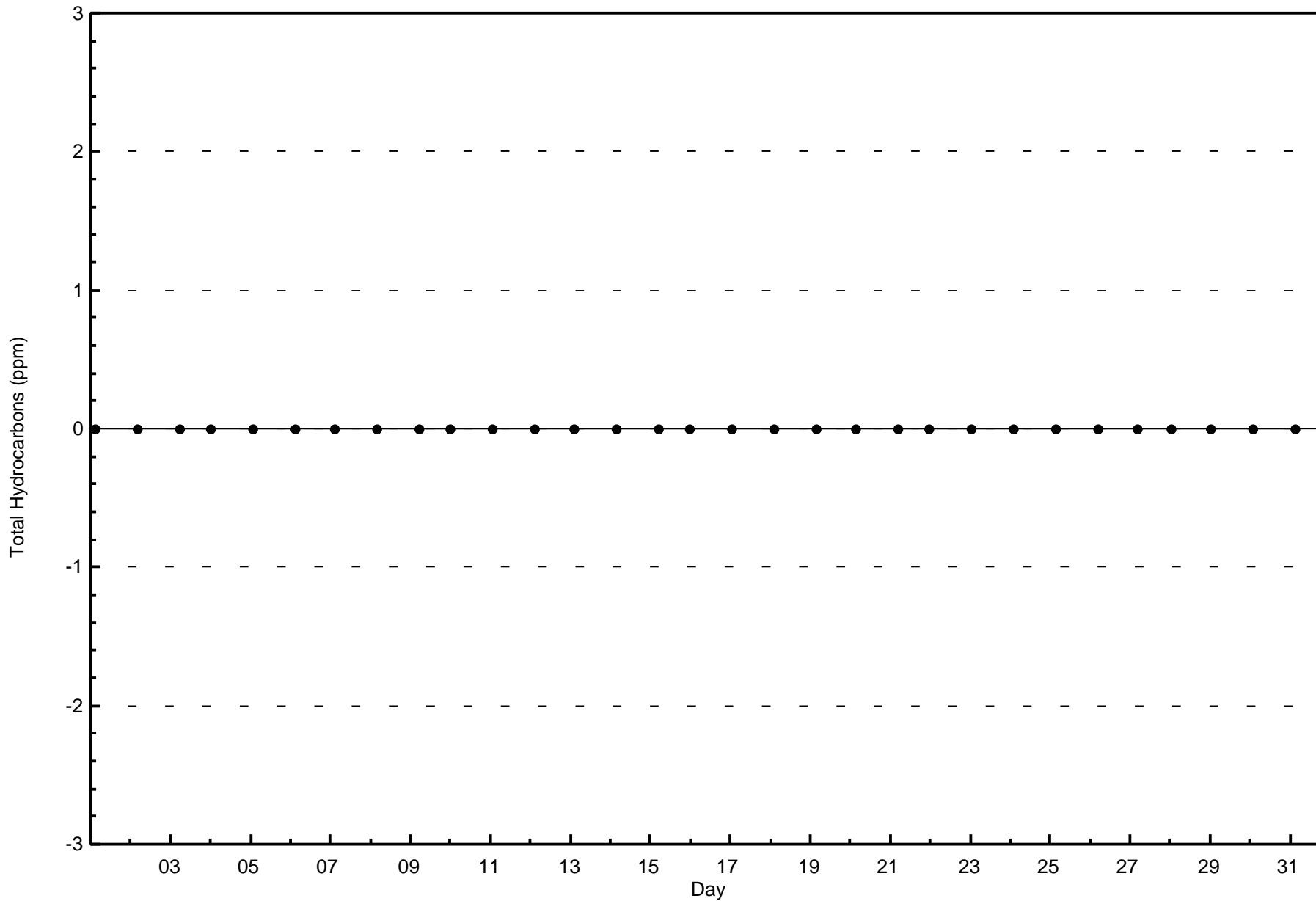
Total Hydrocarbons (THC) - ppm
Stony Mountain (AMS 18)

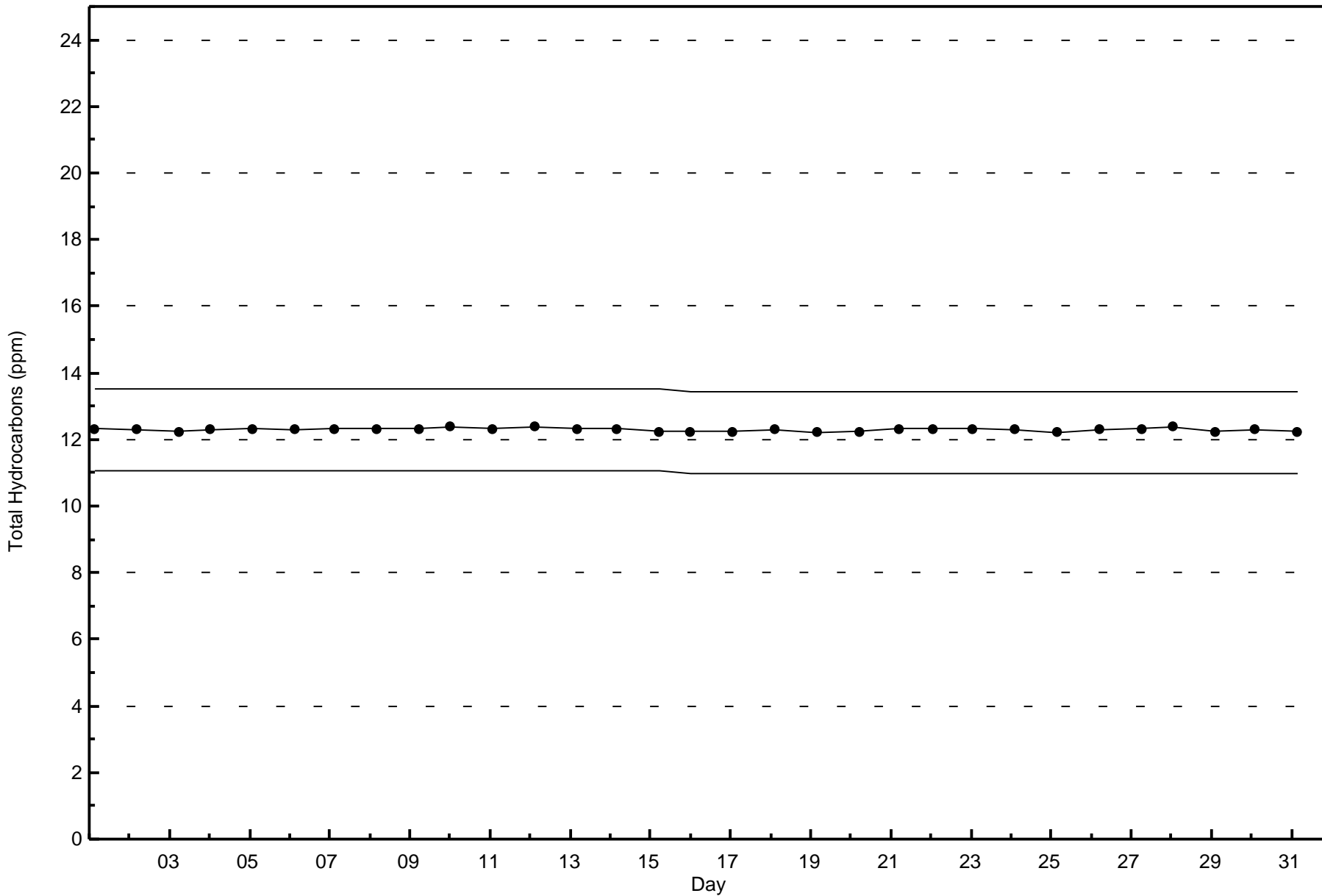




Wood Buffalo Environmental Association
Zero Responses

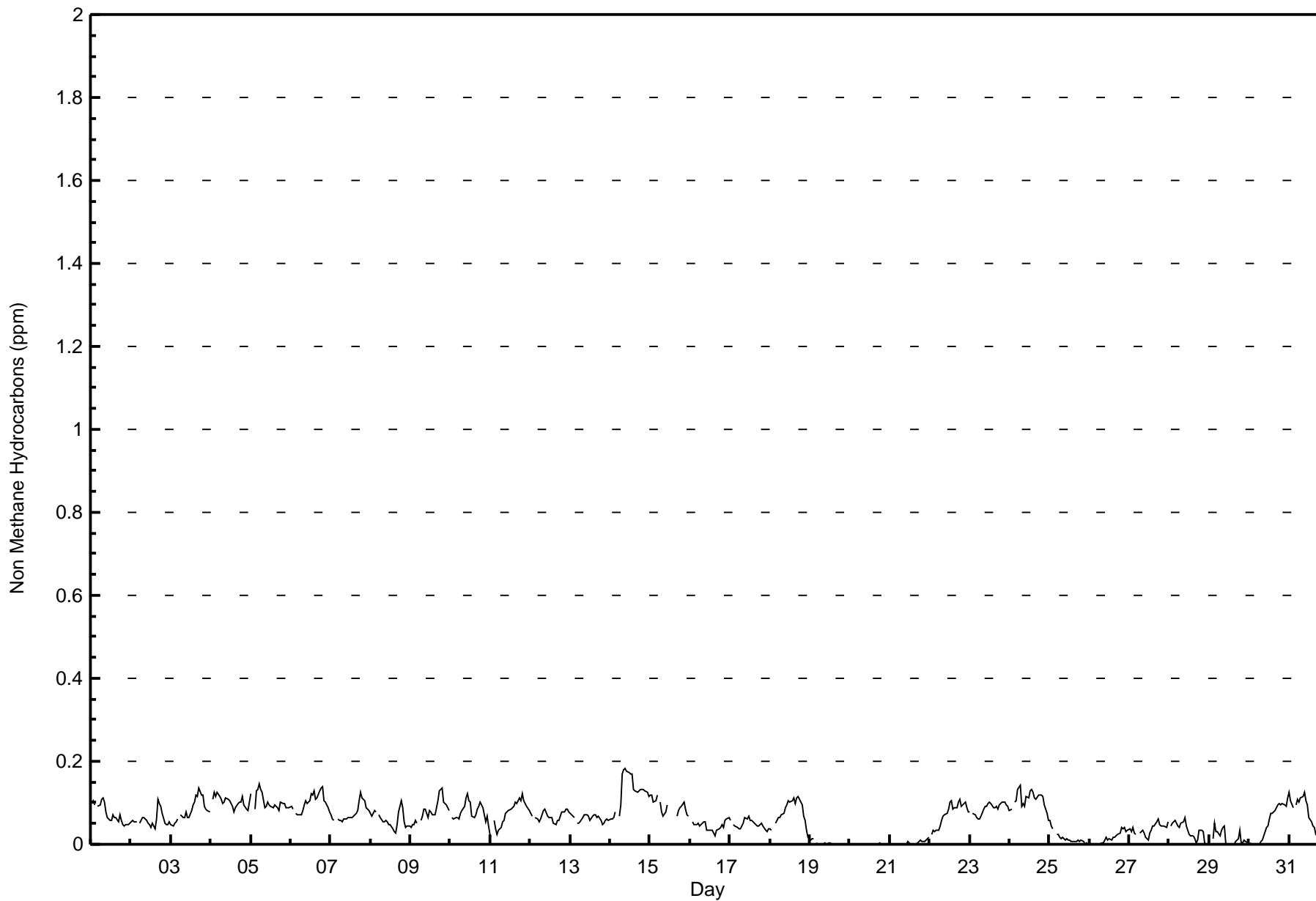
Total Hydrocarbons (THC) - ppm
Stony Mountain - August 2017







| Maximum Value: 0.183 ppm on Aug 14 10:00 | | | | | | | | | | | | | | | | | | | | | | | | Maximum Daily Average: 0.127 ppm on Aug 14 | | | | | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 | |
|---|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--|---------------|---------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|---------------------------|--|
| Minimum Value: 0.000 ppm on Aug 20 01:00 | | | | | | | | | | | | | | | | | | | | | | | | Minimum Daily Average: 0.000 ppm on Aug 20 | | | | | | | | | | | | | | | | | | | | | | | | Hours of Data: 708 | |
| Maximum Diurnal Average: 0.075 ppm at hour 19 | | | | | | | | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 0.054 ppm at hour 3 | | | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: 36 | |
| Monthly Average: 0.061 ppm | | | | | | | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.1 Q ₃ = 0.1 P ₉₀ = 0.1 P ₉₉ = 0.2 | | | | | | | | | | | | | | | | | | | | | | | | Hours of Calibration: 36 | |
| | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 0.098 | 0.106 | 0.096 | Z | 0.092 | 0.094 | 0.108 | 0.111 | 0.103 | 0.078 | 0.065 | 0.059 | 0.058 | 0.071 | 0.064 | 0.065 | 0.053 | 0.072 | 0.056 | 0.046 | 0.045 | 0.047 | 0.048 | 0.050 | 0.073 | 0.111 | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 0.053 | 0.056 | 0.053 | 0.055 | Z | 0.051 | 0.058 | 0.064 | 0.065 | 0.057 | 0.051 | 0.047 | 0.041 | 0.051 | 0.038 | 0.063 | 0.108 | 0.097 | 0.093 | 0.073 | 0.051 | 0.047 | 0.047 | 0.053 | 0.060 | 0.108 | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 0.047 | 0.043 | 0.051 | 0.055 | 0.060 | Z | 0.072 | 0.066 | 0.066 | 0.079 | 0.066 | 0.066 | 0.080 | 0.096 | 0.101 | 0.119 | 0.116 | 0.137 | 0.120 | 0.120 | 0.092 | 0.086 | 0.083 | 0.079 | 0.083 | 0.137 | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | Z | 0.108 | 0.125 | 0.116 | 0.125 | 0.115 | 0.109 | 0.097 | 0.102 | 0.112 | 0.107 | 0.105 | 0.099 | 0.091 | 0.079 | 0.088 | 0.099 | 0.103 | 0.100 | 0.115 | 0.096 | 0.083 | 0.082 | 0.102 | 0.103 | 0.125 | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 0.121 | Z | 0.085 | 0.128 | 0.131 | 0.146 | 0.133 | 0.126 | 0.090 | 0.091 | 0.102 | 0.096 | 0.093 | 0.087 | 0.094 | 0.090 | 0.088 | 0.083 | 0.102 | 0.099 | 0.097 | 0.087 | 0.088 | 0.087 | 0.102 | 0.146 | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 0.091 | 0.084 | Z | 0.076 | 0.072 | 0.070 | 0.072 | 0.081 | 0.097 | 0.104 | 0.097 | 0.106 | 0.122 | 0.118 | 0.128 | 0.108 | 0.112 | 0.130 | 0.134 | 0.139 | 0.104 | 0.100 | 0.087 | 0.079 | 0.100 | 0.139 | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 0.072 | 0.062 | 0.058 | Z | 0.060 | 0.057 | 0.058 | 0.055 | 0.062 | 0.062 | 0.065 | 0.066 | 0.064 | 0.066 | 0.068 | 0.074 | 0.082 | 0.104 | 0.126 | 0.113 | 0.106 | 0.087 | 0.085 | 0.082 | 0.075 | 0.126 | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 0.076 | 0.066 | 0.082 | 0.078 | Z | 0.071 | 0.066 | 0.056 | 0.054 | 0.056 | 0.053 | 0.047 | 0.047 | 0.039 | 0.029 | 0.028 | 0.047 | 0.079 | 0.104 | 0.090 | 0.056 | 0.039 | 0.043 | 0.043 | 0.058 | 0.104 | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 0.042 | 0.048 | 0.048 | 0.056 | 0.050 | Z | 0.057 | 0.068 | 0.086 | 0.083 | 0.064 | 0.080 | 0.077 | 0.071 | 0.072 | 0.072 | 0.105 | 0.130 | 0.132 | 0.135 | 0.103 | 0.096 | 0.088 | 0.081 | 0.080 | 0.135 | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | Z | 0.064 | 0.060 | 0.064 | 0.064 | 0.061 | 0.074 | 0.082 | 0.090 | 0.110 | 0.123 | 0.107 | 0.103 | 0.067 | 0.065 | 0.070 | 0.086 | 0.090 | 0.101 | 0.088 | 0.071 | 0.056 | 0.066 | 0.043 | 0.078 | 0.123 | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 0.025 | Z | 0.058 | 0.038 | 0.024 | 0.035 | 0.042 | 0.053 | 0.059 | 0.076 | 0.079 | 0.082 | 0.085 | 0.088 | 0.092 | 0.103 | 0.098 | 0.113 | 0.104 | 0.122 | 0.104 | 0.099 | 0.091 | 0.082 | 0.076 | 0.122 | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 0.076 | 0.069 | Z | 0.066 | 0.061 | 0.055 | 0.060 | 0.071 | 0.083 | 0.084 | 0.068 | 0.064 | 0.065 | 0.065 | 0.049 | 0.049 | 0.057 | 0.056 | 0.068 | 0.078 | 0.077 | 0.085 | 0.085 | 0.078 | 0.068 | 0.085 | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 0.075 | 0.071 | 0.064 | Z | 0.052 | 0.050 | 0.054 | 0.064 | 0.071 | 0.071 | 0.072 | 0.068 | 0.058 | 0.068 | 0.072 | 0.073 | 0.065 | 0.067 | 0.056 | 0.049 | 0.050 | 0.058 | 0.060 | 0.056 | 0.063 | 0.075 | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 0.061 | 0.062 | 0.063 | 0.077 | Z | 0.067 | 0.096 | 0.169 | 0.178 | 0.183 | 0.176 | 0.174 | 0.170 | 0.169 | 0.133 | 0.127 | 0.124 | 0.128 | 0.131 | 0.132 | 0.133 | 0.128 | 0.127 | 0.116 | 0.127 | 0.183 | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 0.120 | 0.120 | 0.102 | 0.107 | 0.120 | Z | 0.102 | 0.079 | 0.068 | 0.079 | 0.094 | C | C | C | C | C | 0.066 | 0.080 | 0.090 | 0.090 | 0.100 | 0.086 | 0.070 | 0.067 | 0.091 | 0.120 | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | Z | 0.054 | 0.048 | 0.048 | 0.046 | 0.051 | 0.045 | 0.052 | 0.054 | 0.055 | 0.036 | 0.035 | 0.035 | 0.026 | 0.020 | 0.032 | 0.037 | 0.042 | 0.049 | 0.041 | 0.057 | 0.060 | 0.063 | 0.044 | 0.063 | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 0.058 | Z | 0.048 | 0.044 | 0.041 | 0.038 | 0.037 | 0.043 | 0.051 | 0.063 | 0.062 | 0.067 | 0.059 | 0.056 | 0.055 | 0.047 | 0.044 | 0.045 | 0.047 | 0.051 | 0.046 | 0.034 | 0.029 | 0.036 | 0.048 | 0.067 | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 0.038 | 0.036 | Z | 0.052 | 0.058 | 0.064 | 0.063 | 0.071 | 0.075 | 0.090 | 0.095 | 0.104 | 0.101 | 0.106 | 0.112 | 0.098 | 0.110 | 0.114 | 0.108 | 0.094 | 0.066 | 0.057 | 0.033 | 0.016 | 0.077 | 0.114 | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 0.009 | 0.012 | 0.014 | Z | 0.003 | 0.001 | 0.001 | 0.000 | 0.000 | 0.002 | 0.002 | 0.002 | 0.002 | 0.001 | 0.001 | 0.000 | 0.001 | 0.001 | 0.000 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.003 | 0.014 | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.002 | 0.001 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.002 | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.008 | 0.002 | 0.000 | 0.001 | 0.000 | 0.001 | 0.002 | 0.009 | 0.006 | 0.005 | 0.006 | 0.010 | 0.018 | 0.003 | 0.018 | | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | Z | 0.024 | 0.035 | 0.029 | 0.032 | 0.035 | 0.046 | 0.056 | 0.068 | 0.072 | 0.076 | 0.084 | 0.102 | 0.105 | 0.086 | 0.089 | 0.087 | 0.100 | 0.109 | 0.091 | 0.096 | 0.101 | 0.089 | 0.079 | 0.074 | 0.109 | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 0.078 | Z | 0.073 | 0.071 | 0.065 | 0.060 | 0.059 | 0.067 | 0.086 | 0.093 | 0.093 | 0.100 | 0.103 | 0.098 | 0.089 | 0.088 | 0.091 | 0.085 | 0.095 | 0.100 | 0.100 | 0.103 | 0.095 | 0.090 | 0.086 | 0.103 | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 0.081 | 0.085 | Z | 0.102 | 0.105 | 0.131 | 0.142 | 0.093 | 0.099 | 0.091 | 0.114 | 0.114 | 0.129 | 0.133 | 0.125 | 0.110 | 0.109 | 0.120 | 0.119 | 0.117 | 0.116 | 0.096 | 0.073 | 0.058 | 0.107 | 0.142 | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 0.056 | 0.044 | 0.038 | Z | 0.025 | 0.022 | 0.016 | 0.014 | 0.017 | 0.012 | 0.012 | 0.011 | 0.010 | 0.008 | 0.007 | 0.007 | 0.008 | 0.010 | 0.008 | 0.009 | 0.006 | 0.000 | 0.003 | 0.001 | 0.015 | 0.056 | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 0.001 | 0.001 | 0.000 | 0.001 | Z | 0.000 | 0.001 | 0.003 | 0.003 | 0.009 | 0.018 | 0.012 | 0.013 | 0.009 | 0.016 | 0.017 | 0.019 | 0.024 | 0.026 | 0.039 | 0.038 | 0.040 | 0.030 | 0.035 | 0.015 | 0.040 | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 0.039 | 0.030 | 0.042 | 0.029 | 0.022 | Z | 0.028 | 0.032 | 0.035 | 0.027 | 0.018 | 0.011 | 0.026 | 0.035 | 0.044 | 0.046 | 0.055 | 0.063 | 0.047 | 0.045 | 0.045 | 0.046 | 0.042 | 0.053 | 0.037 | 0.063 | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | Z | 0.044 | 0.049 | 0.059 | 0.051 | 0.045 | 0.042 | 0.051 | 0.055 | 0.063 | 0.044 | 0.034 | 0.023 | 0.020 | 0.020 | 0.012 | 0.003 | 0.011 | 0.035 | 0.034 | 0.032 | 0.005 | 0.001 | 0.000 | 0.032 | 0.063 | | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 0.000 | Z | 0.014 | 0.049 | 0.030 | 0.029 | 0.019 | 0.034 | 0.042 | 0.043 | 0.004 | 0.002 | 0.001 | 0.000 | 0.001 | 0.001 | 0.005 | 0.013 | 0.034 | 0.003 | 0.002 | 0.011 | 0.006 | 0.005 | 0.015 | 0.049 | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 0.001 | 0.005 | Z | 0.000 | 0.001 | 0.001 | 0.001 | 0.006 | 0.010 | 0.019 | 0.042 | 0.043 | 0.060 | 0.076 | 0.074 | 0.080 | 0.088 | 0.095 | 0.098 | 0.094 | 0.100 | 0.096 | 0.092 | 0.113 | 0.052 | 0.113 | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 0.125 | 0.105 | 0.088 | Z | 0.096 | 0.110 | 0.103 | 0.111 | 0.115 | 0.125 | 0.105 | 0.096 | 0.063 | 0.053 | 0.043 | 0.042 | 0.025 | 0.021 | 0.033 | 0.030 | 0.017 | 0.005 | 0.001 | 0.000 | 0.066 | 0.125 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |
| Z - zerospan C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Stony Mountain - August 2017**

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 0.005 | 96 | 13.56 | 13.56 |
| 0.006 - 0.05 | 205 | 28.95 | 42.51 |
| 0.06 - 0.1 | 400 | 56.50 | 99.01 |
| > 0.1 | 7 | 0.99 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Stony Mountain - August 2017**

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|----|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 0.005 | 0 | 0 | 0 | 4 | 4 | 1 | 8 | 0 | 1 | 1 | 13 | 26 | 37 | 0 | 1 | 0 | 96 |
| 0.006 - 0.05 | 1 | 2 | 0 | 1 | 2 | 2 | 9 | 1 | 3 | 8 | 51 | 54 | 54 | 12 | 4 | 1 | 205 |
| 0.06 - 0.1 | 11 | 17 | 12 | 10 | 6 | 17 | 39 | 45 | 36 | 64 | 33 | 19 | 26 | 41 | 17 | 7 | 400 |
| > 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 3 | 1 | 0 | 0 | 7 |
| Totals | 12 | 19 | 12 | 15 | 12 | 20 | 56 | 46 | 40 | 73 | 98 | 101 | 120 | 54 | 22 | 8 | 708 |

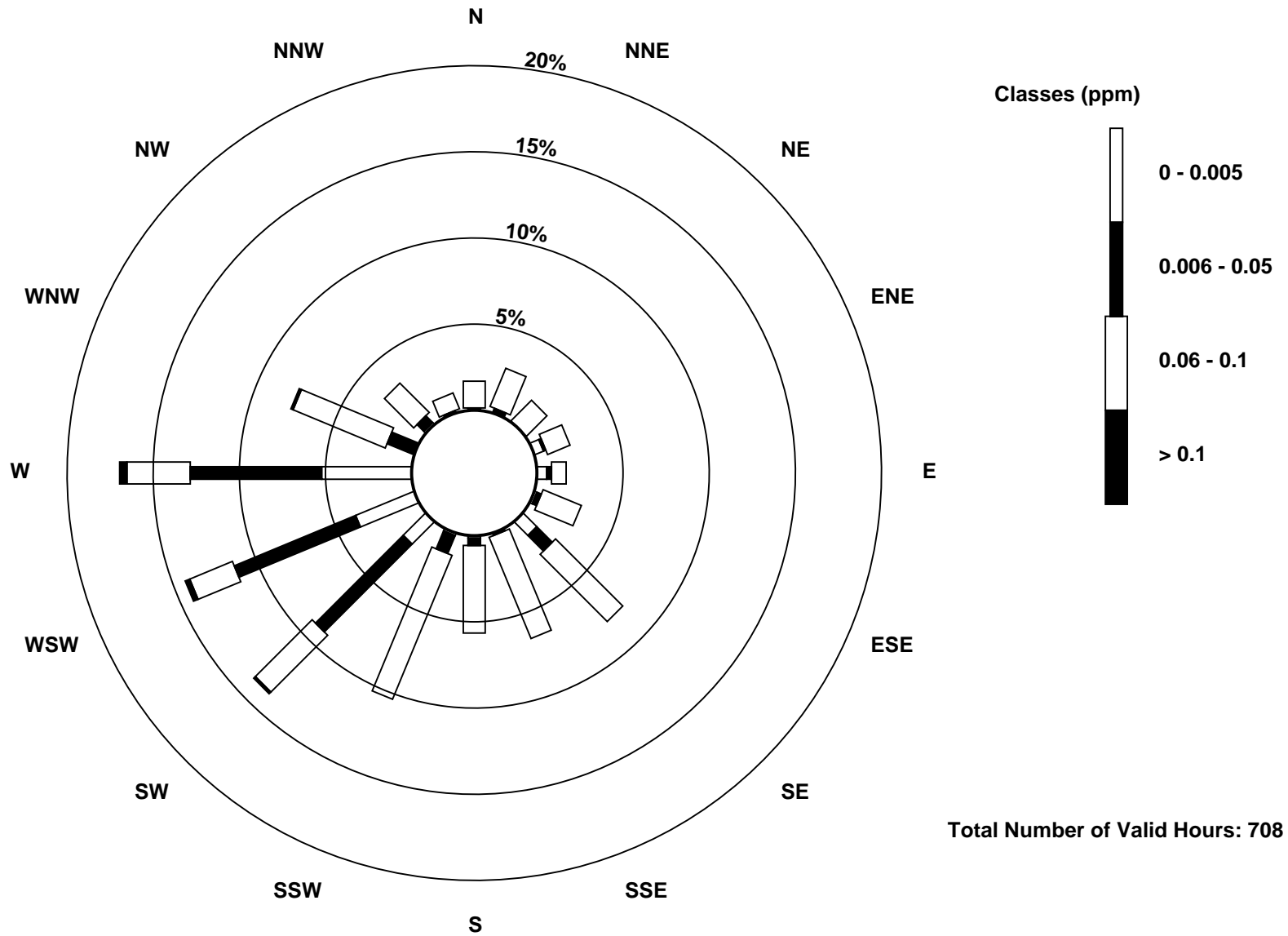
Total Number of Valid Hours: 708

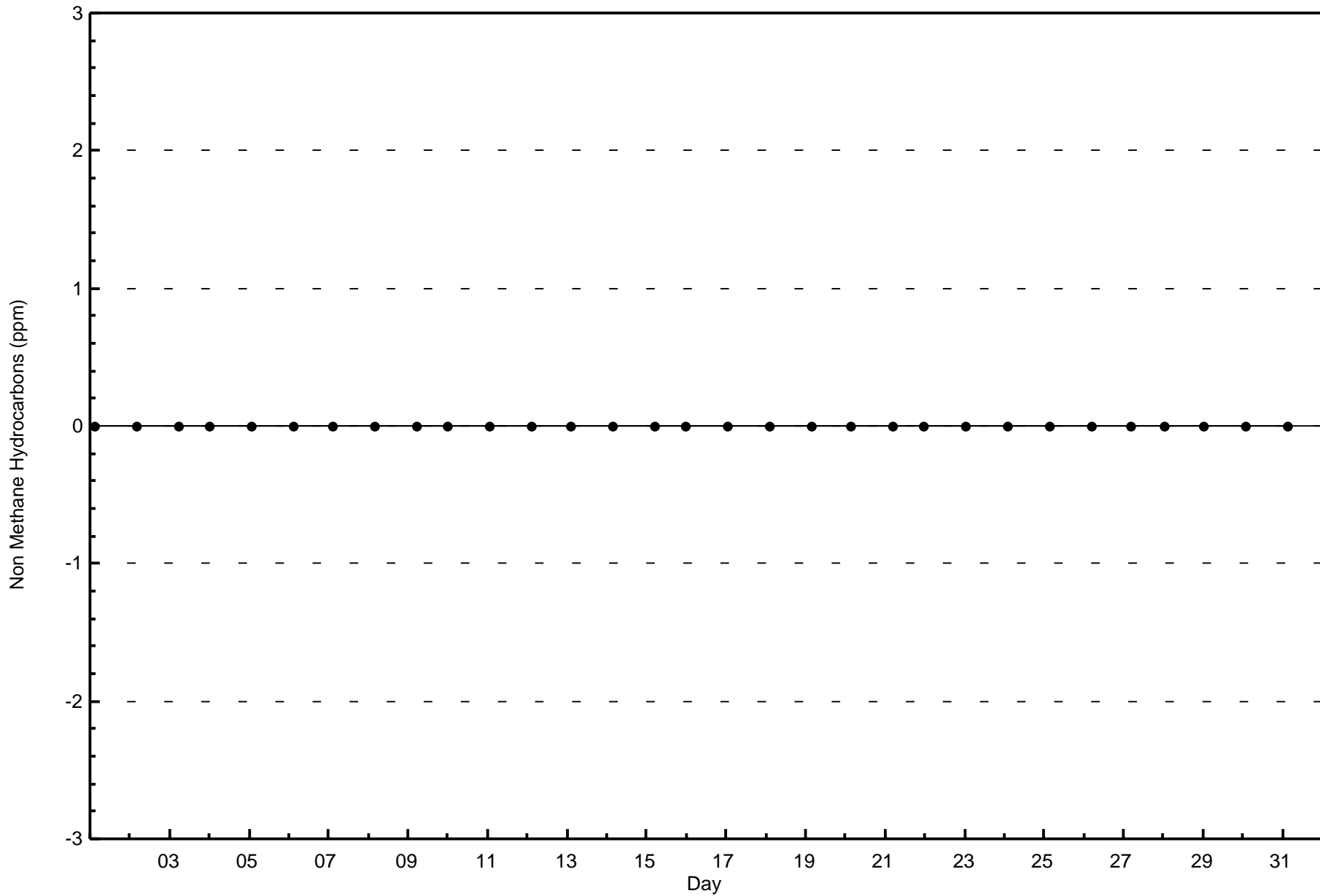
Total Number of Hours: 744

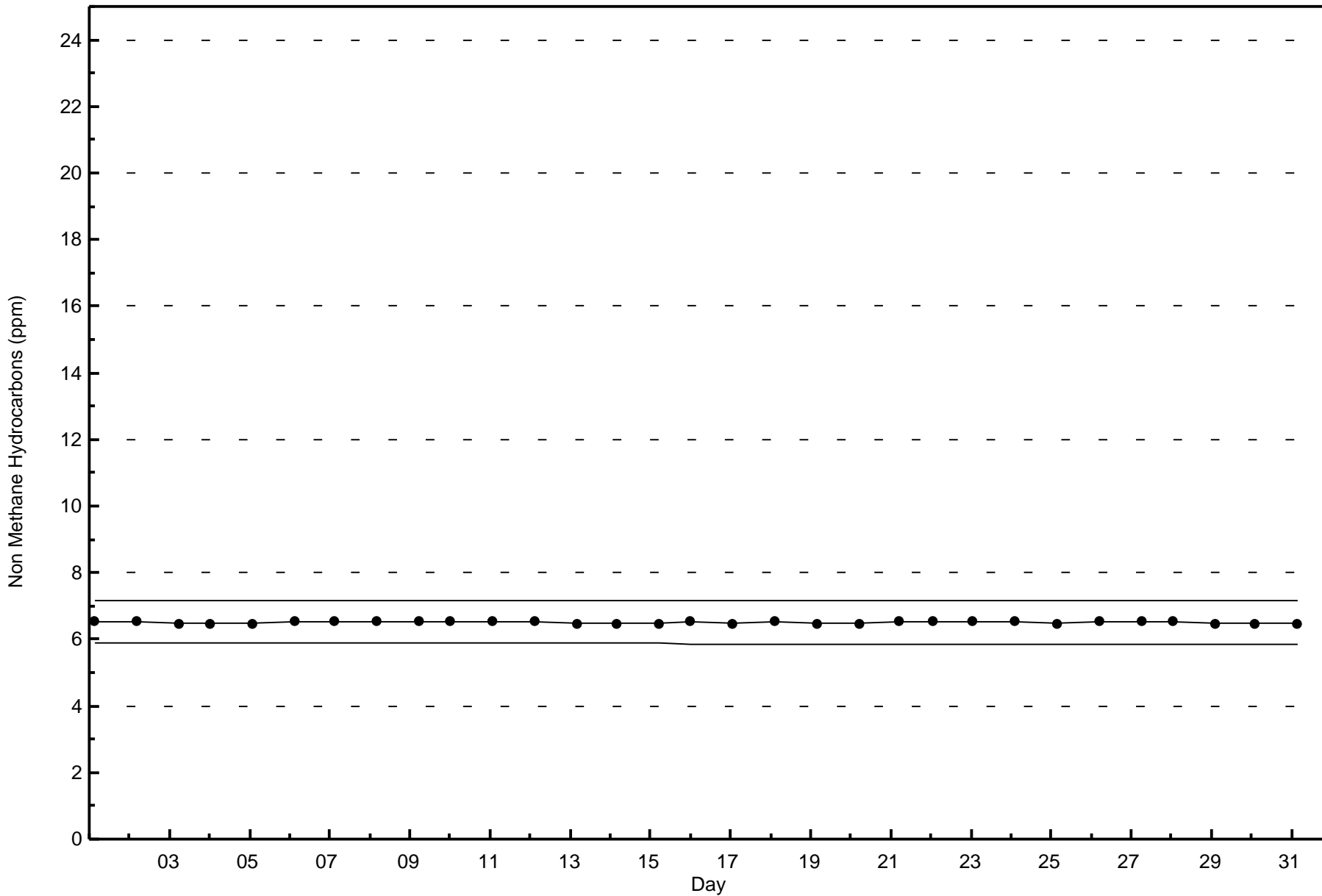


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Non Methane Hydrocarbons (NMHC) - ppm
Stony Mountain (AMS 18)



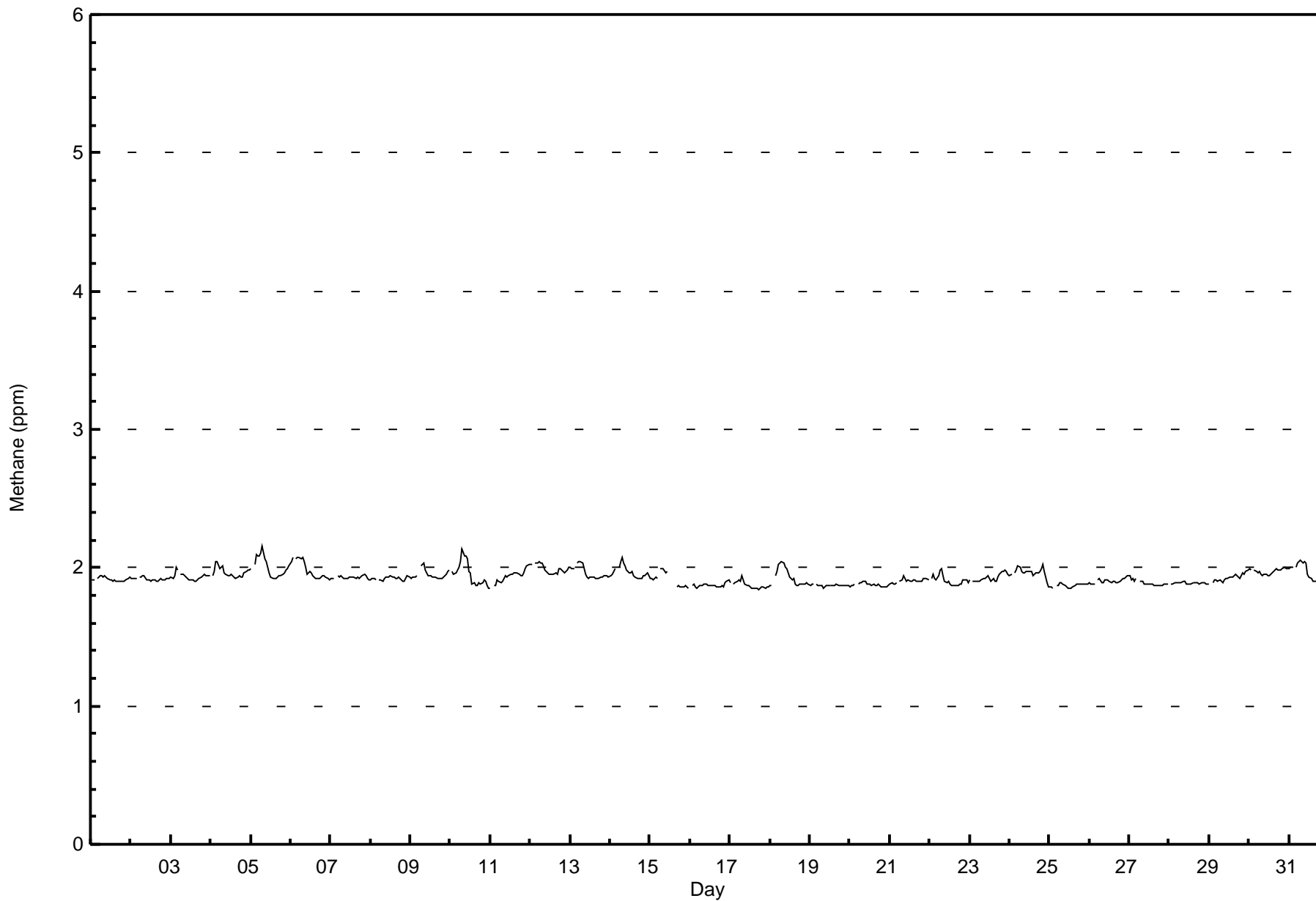






Wood Buffalo Environmental Association
Hourly Averages

Methane (CH₄) - ppm
Stony Mountain - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Stony Mountain - August 2017

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2.0 | 691 | 97.60 | 97.60 |
| 2.1 - 3.0 | 17 | 2.40 | 100.00 |
| 3.1 - 10.0 | 0 | 0.00 | 100.00 |
| > 10.0 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Methane (CH₄) - ppm
Stony Mountain - August 2017**

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|----|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2.0 | 11 | 19 | 11 | 15 | 11 | 18 | 52 | 45 | 40 | 68 | 97 | 101 | 119 | 54 | 22 | 8 | 691 |
| 2.1 - 3.0 | 1 | 0 | 1 | 0 | 1 | 2 | 4 | 1 | 0 | 5 | 1 | 0 | 1 | 0 | 0 | 0 | 17 |
| 3.1 - 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 12 | 19 | 12 | 15 | 12 | 20 | 56 | 46 | 40 | 73 | 98 | 101 | 120 | 54 | 22 | 8 | 708 |

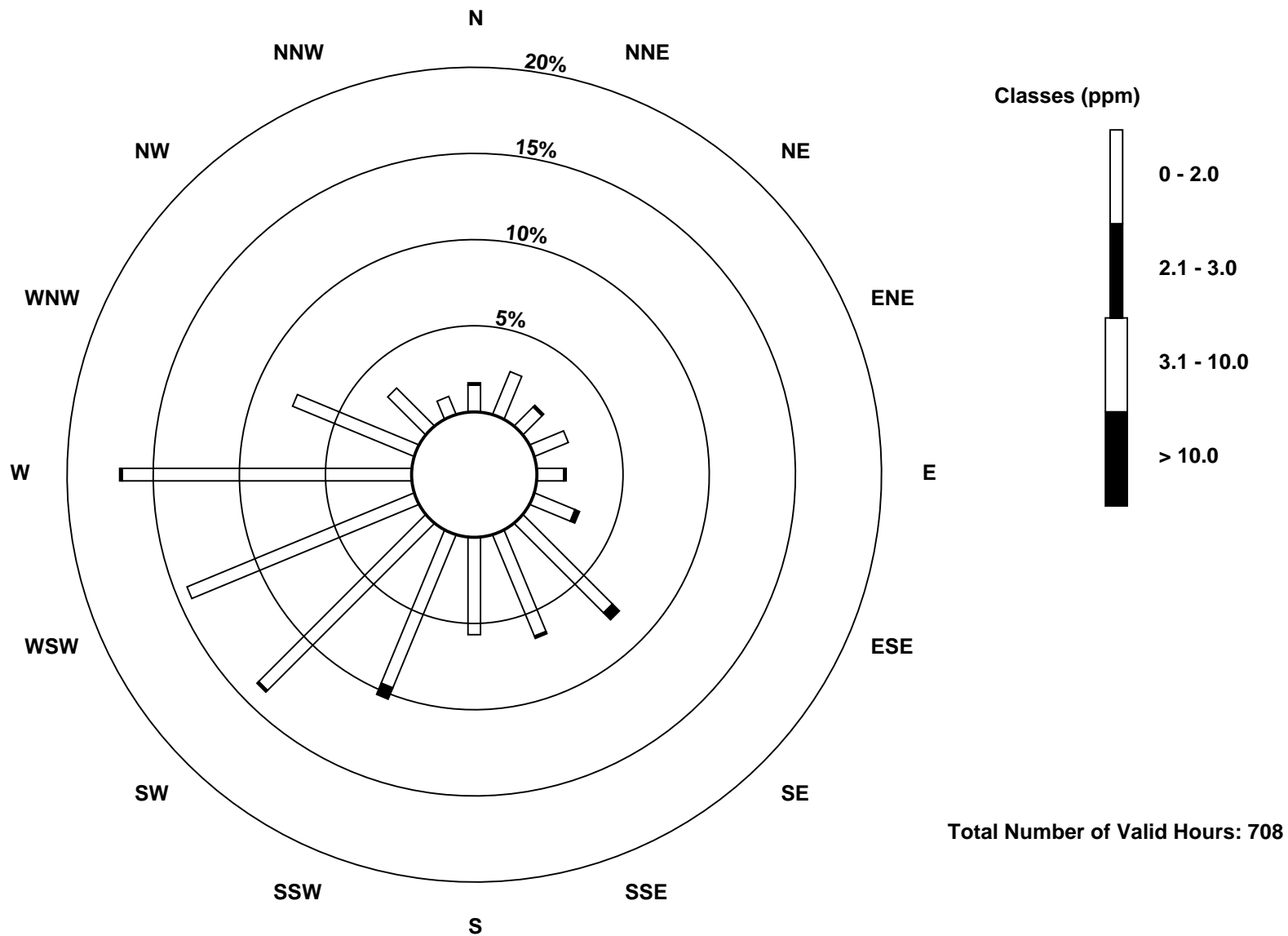
Total Number of Valid Hours: 708

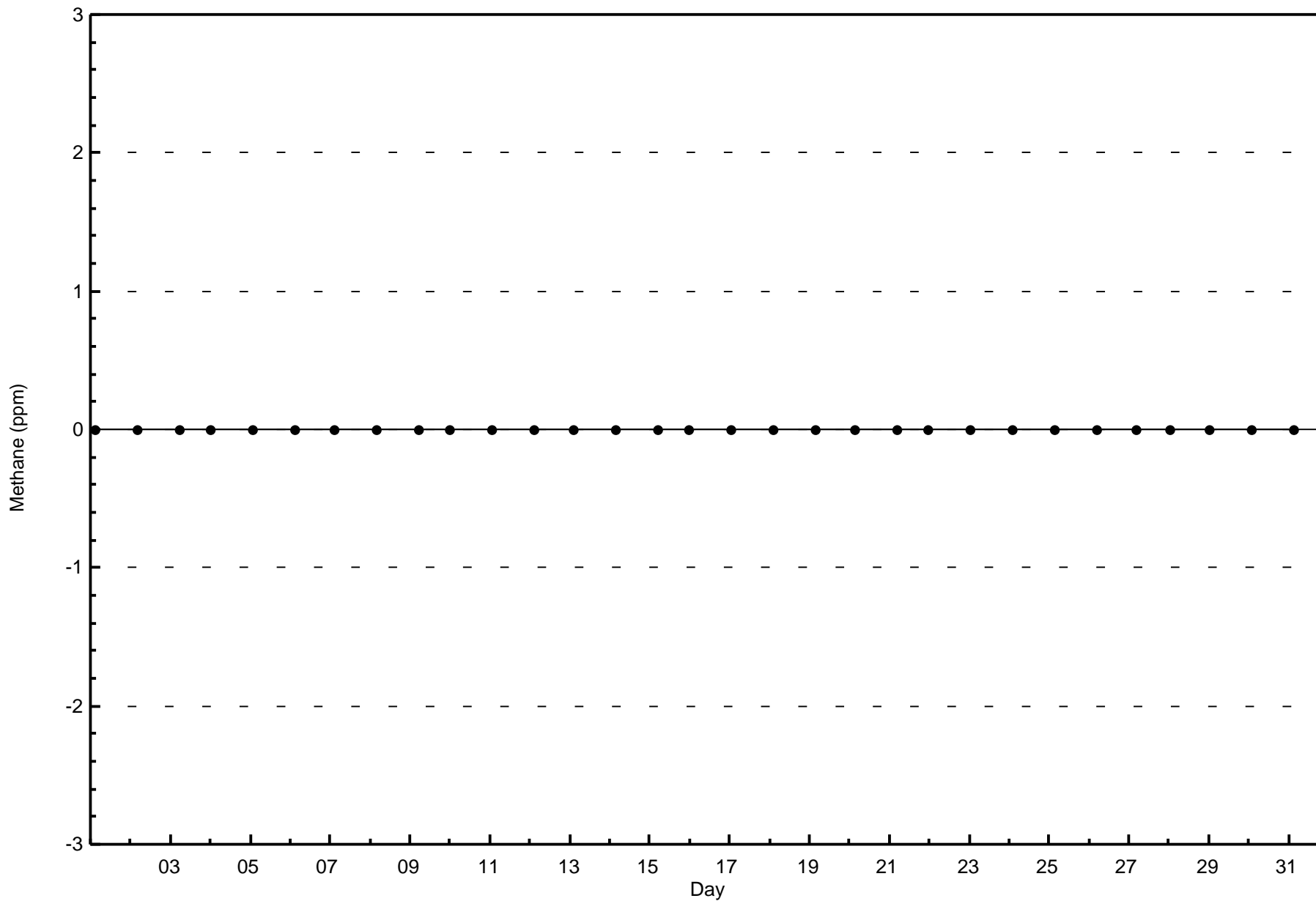
Total Number of Hours: 744

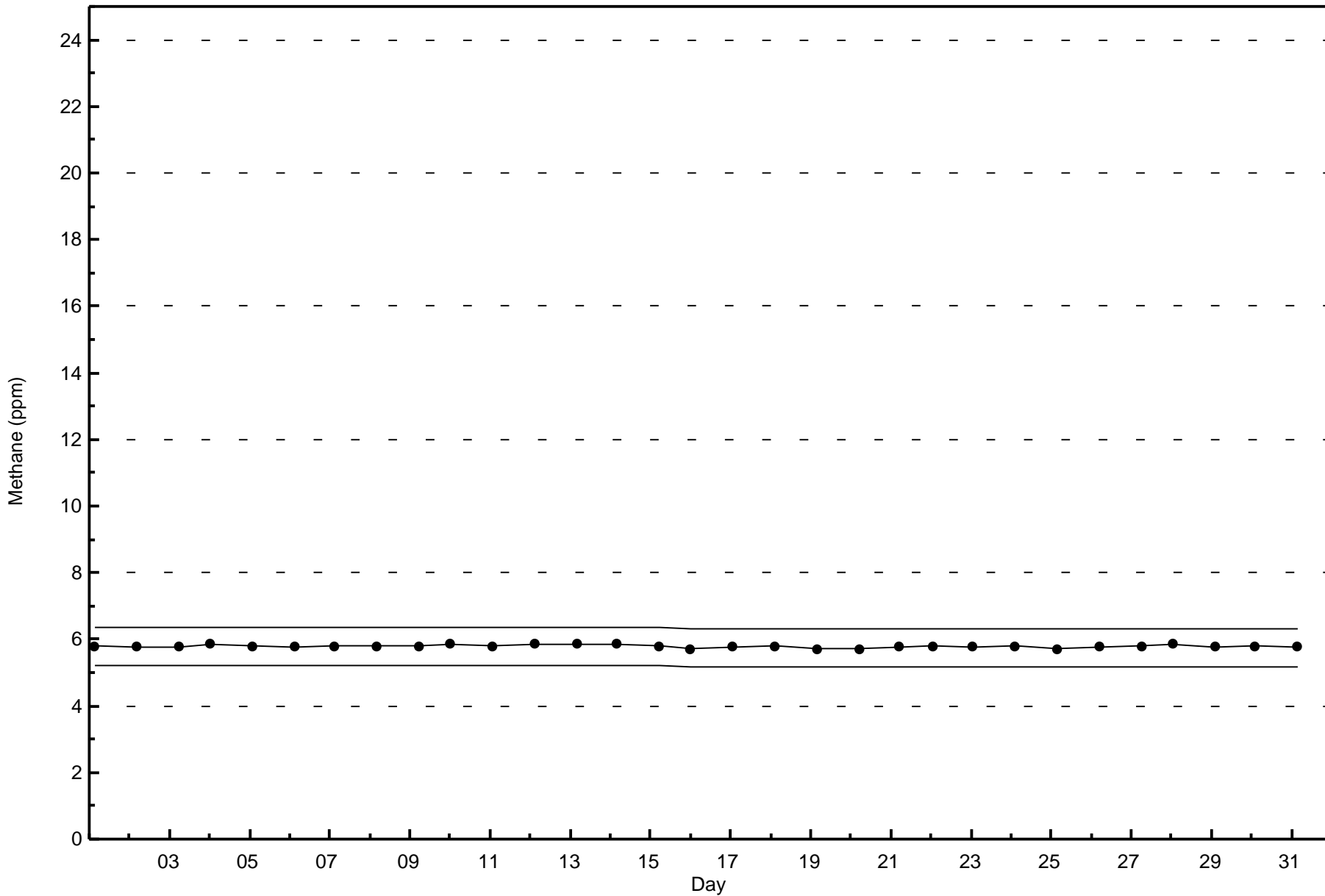


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Methane (CH₄) - ppm
Stony Mountain (AMS 18)







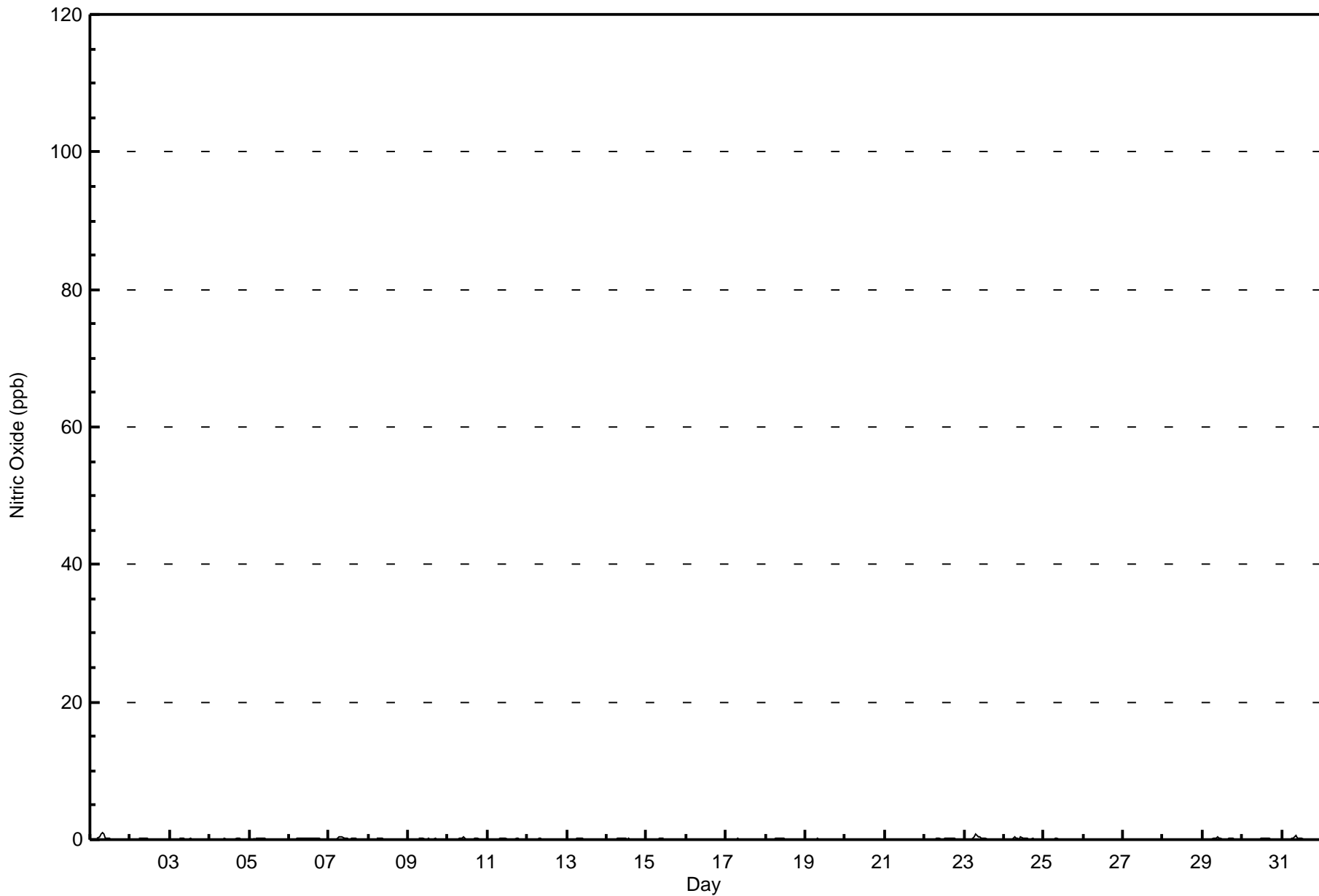


| Maximum Value: 1 ppb on Aug 1 08:00 | | | | | | | | | | | | | | | | | Maximum Daily Average: 0.2 ppb on Aug 1 | | | | | | | | | | | | | | | | | Hours in Service: 744 | |
|--|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|--|----|----|----|----|----|----|-----------------|---------------|---------------|--|--|--|--|--|--|--|---------------------------|--|
| Minimum Value: 0 ppb on Aug 26 01:00 | | | | | | | | | | | | | | | | | Minimum Daily Average: 0.0 ppb on Aug 26 | | | | | | | | | | | | | | | | | Hours of Data: 708 | |
| Maximum Diurnal Average: 0.2 ppb at hour 8 | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 0.0 ppb at hour 24 | | | | | | | | | | | | | | | | | Hours of Missing Data: 36 | |
| Monthly Average: 0.1 ppb | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 O ₃ = 0 P ₉₀ = 0 P ₉₉ = 0 | | | | | | | | | | | | | | | | | Hours of Calibration: 36 | |
| | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | |
| 1-Aug | 0 | 0 | 0 | Z | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | |
| 2-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | |
| 4-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | |
| 5-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | |
| 6-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | |
| 7-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | |
| 8-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | |
| 9-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | |
| 10-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | |
| 11-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | |
| 12-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | |
| 13-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | |
| 14-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | |
| 15-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | C | C | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | |
| 16-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | |
| 17-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | |
| 18-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | |
| 19-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | |
| 20-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | |
| 22-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | |
| 23-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | |
| 24-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | |
| 25-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | |
| 26-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | |
| 28-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | |
| 29-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | |
| 30-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | |
| 31-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 | | | | | | | | | |
| 0.0 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | | | | | | | | |
| 0 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | | | | | | | |
| Z - zerospan C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Stony Mountain - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Stony Mountain - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 708 | 100.00 | 100.00 |
| 21 - 40 | 0 | 0.00 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Stony Mountain - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|----|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 12 | 19 | 12 | 15 | 12 | 20 | 56 | 46 | 40 | 73 | 98 | 101 | 120 | 54 | 22 | 8 | 708 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 41 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 12 | 19 | 12 | 15 | 12 | 20 | 56 | 46 | 40 | 73 | 98 | 101 | 120 | 54 | 22 | 8 | 708 |

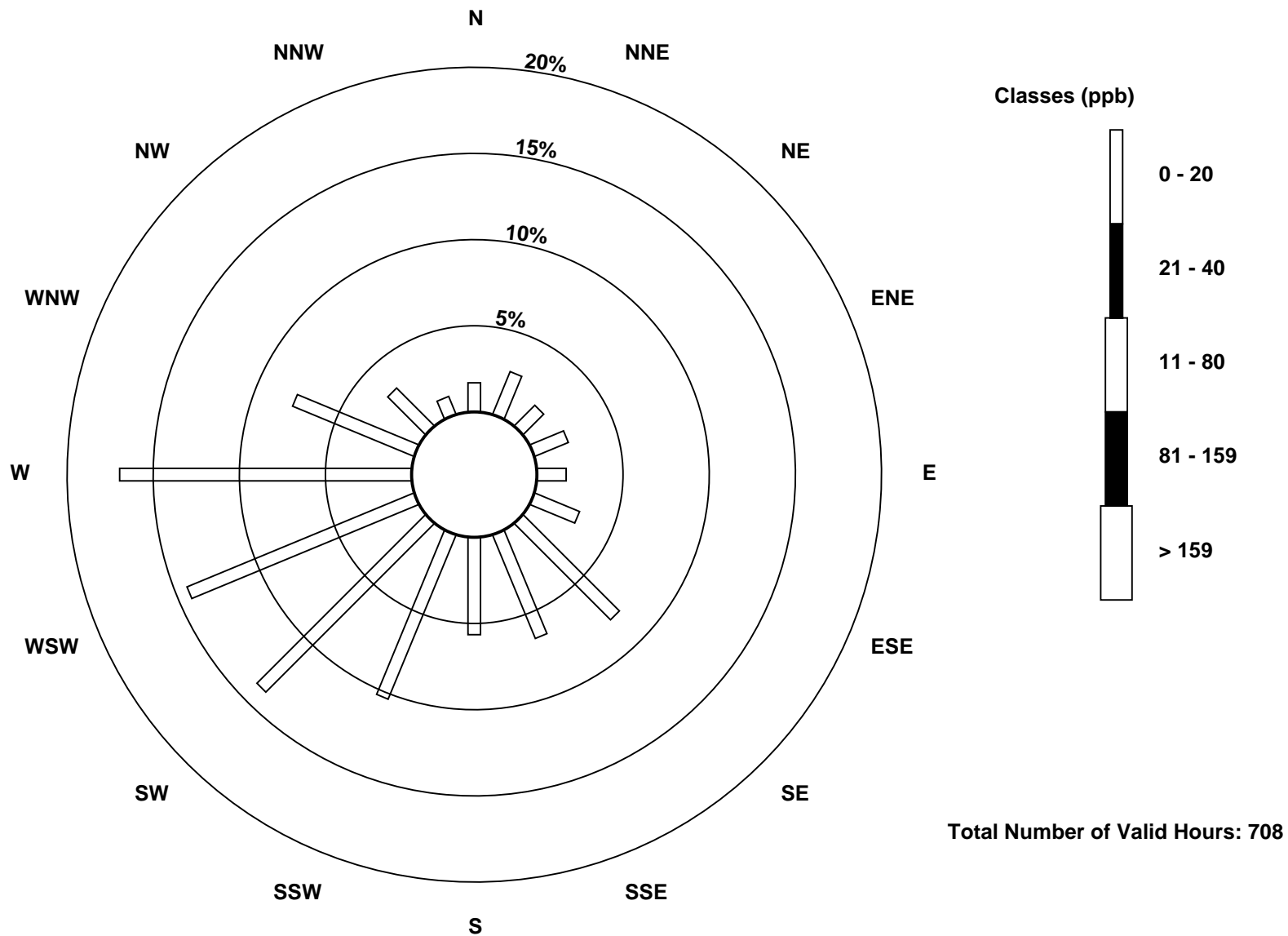
Total Number of Valid Hours: 708

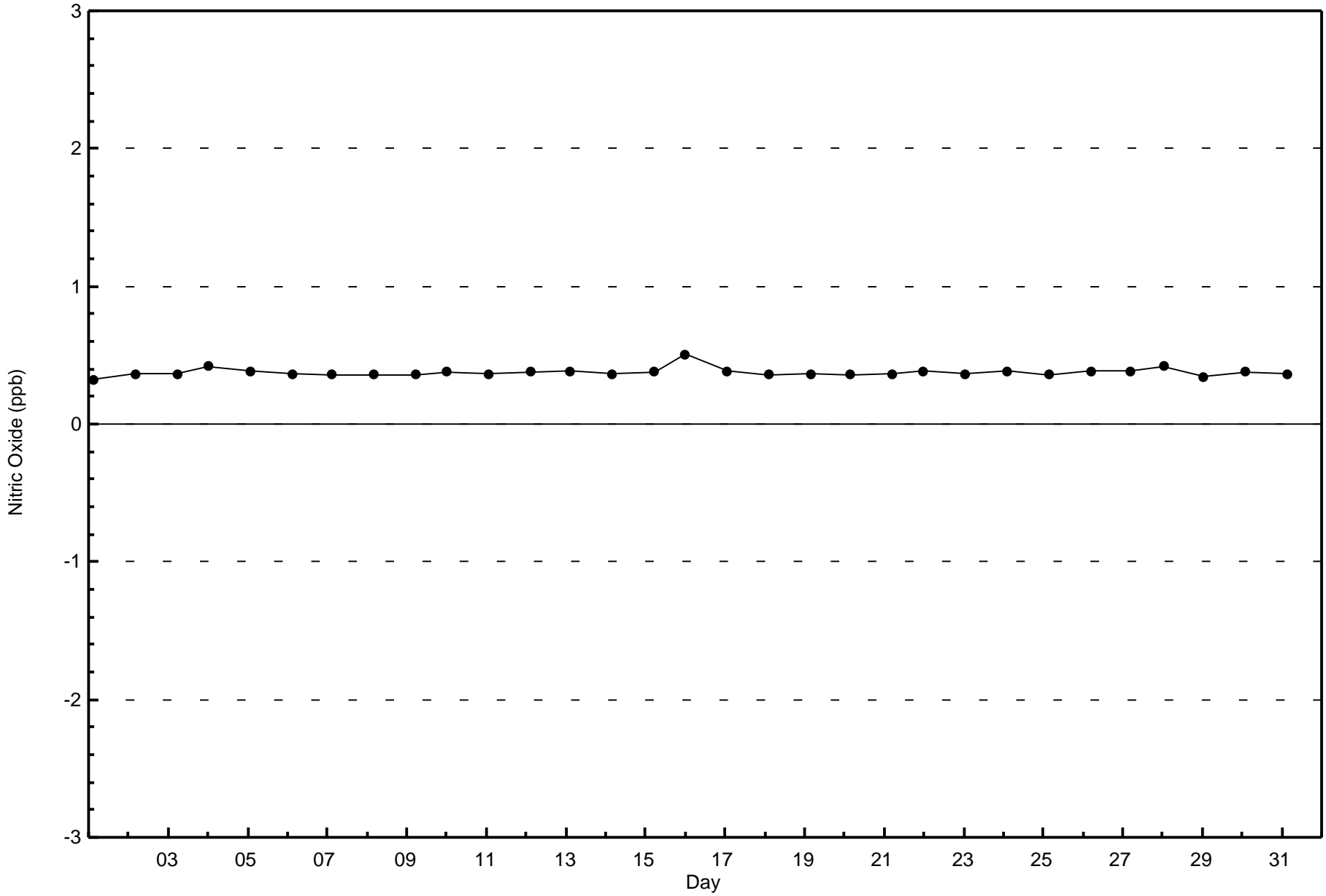
Total Number of Hours: 744

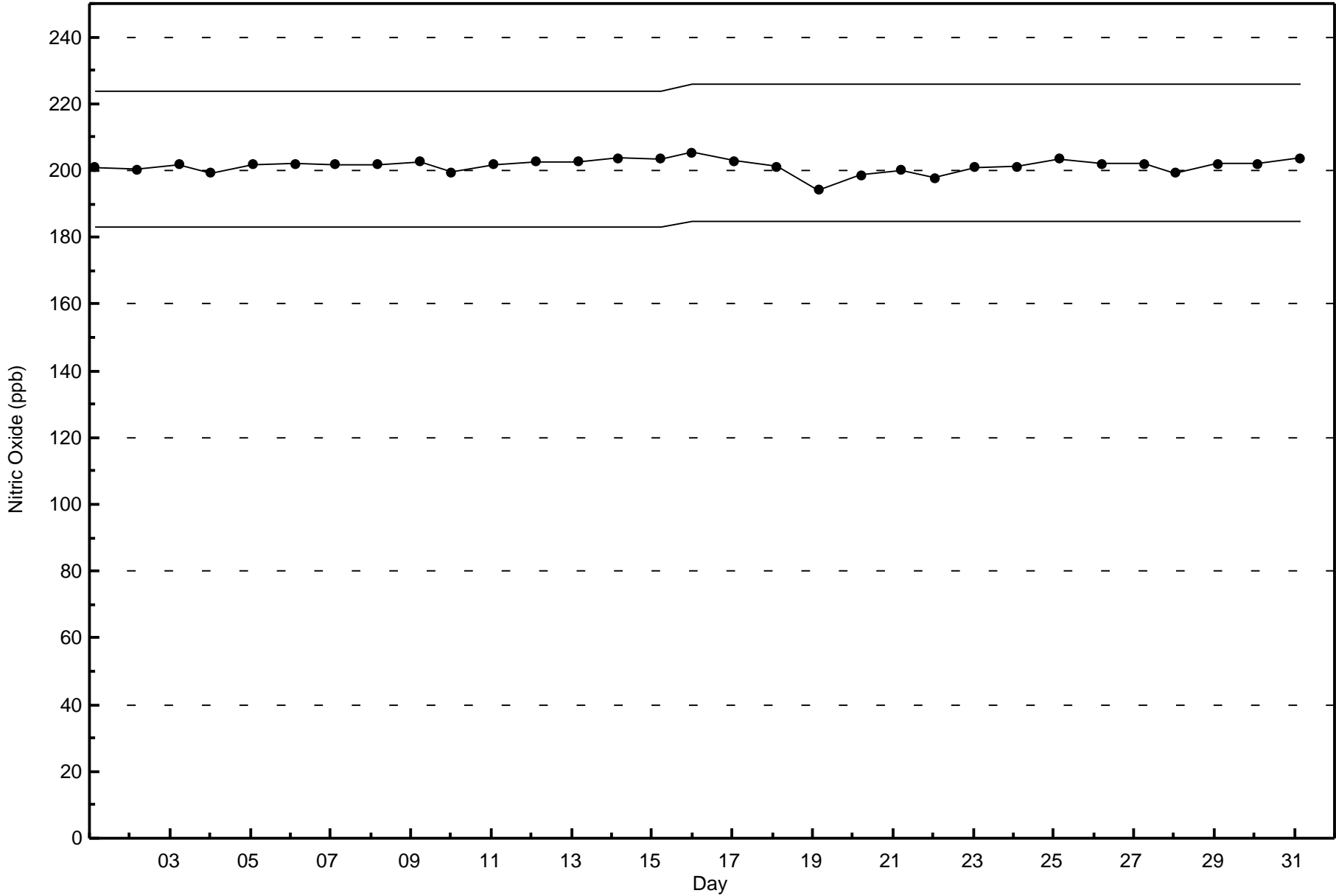


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitric Oxide (NO) - ppb
Stony Mountain (AMS 18)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Stony Mountain - August 2017

| | | | | |
|--|--|----------|---------------------------|-------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 4 ppb on Aug 24 06:00 | Maximum Daily Average: 1.2 ppb on Aug 13 | | Hours of Data: | 708 |
| Minimum Value: 0 ppb on Aug 17 20:00 | Minimum Daily Average: 0.3 ppb on Aug 25 | | Hours of Missing Data: | 36 |
| Maximum Diurnal Average: 1.1 ppb at hour 6 | Minimum Diurnal Average: 0.5 ppb at hour 15 | | Hours of Calibration: | 36 |
| Monthly Average: 0.7 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 2 | | Percent Operational Time: | 100.0 |

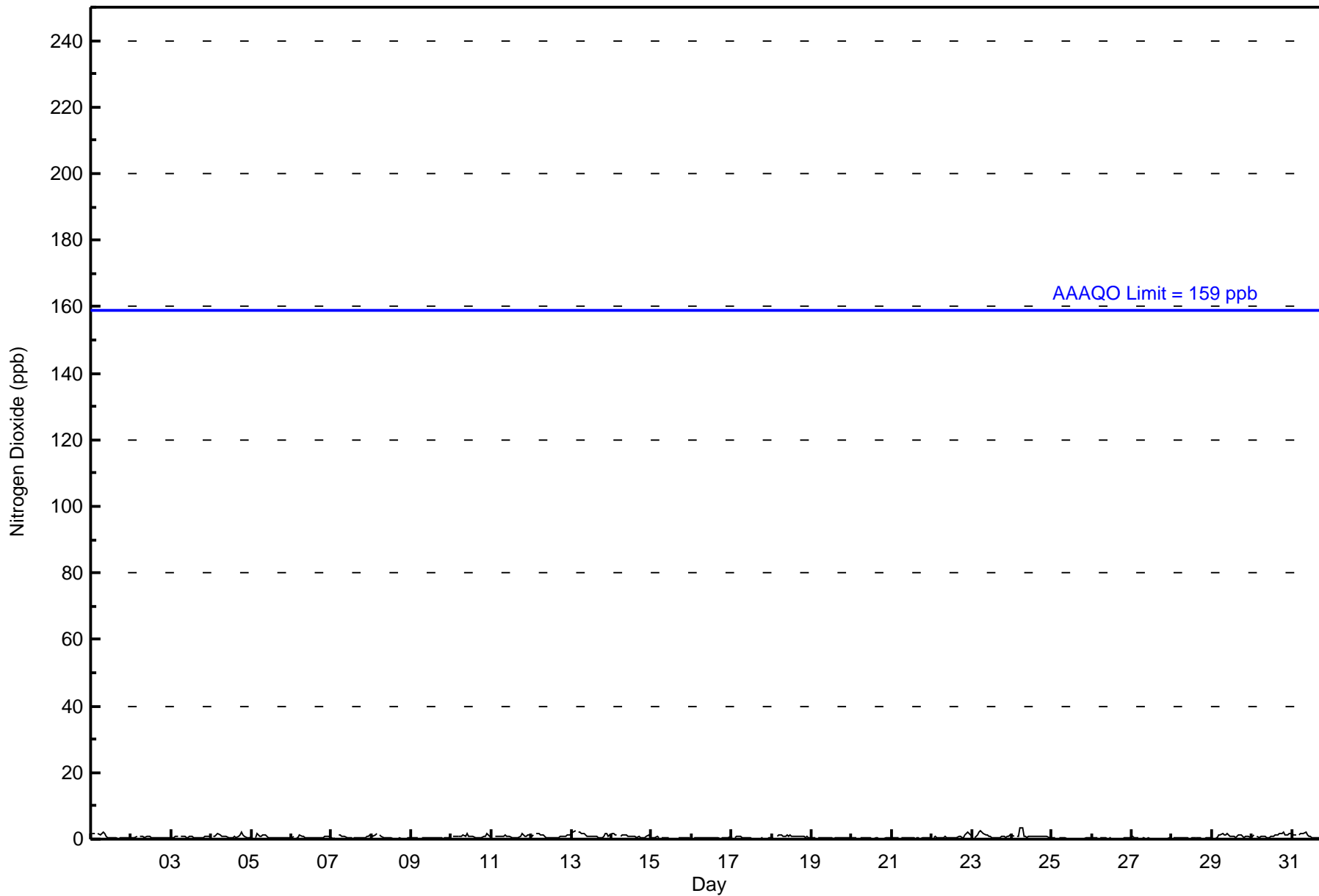
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------|-----------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 2 | 2 | 2 | Z | 2 | 1 | 2 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.8 | 2 |
| 2-Aug | 1 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.6 | 1 |
| 3-Aug | 0 | 1 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.6 | 1 |
| 4-Aug | Z | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 0.9 | 2 |
| 5-Aug | 1 | Z | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0.6 | 2 |
| 6-Aug | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0.6 | 1 |
| 7-Aug | 0 | 0 | 0 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0.6 | 1 |
| 8-Aug | 1 | 1 | 1 | 2 | Z | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 2 |
| 9-Aug | 0 | 0 | 1 | 1 | 0 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.4 | 1 |
| 10-Aug | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | Z | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 2 | 1 | 1 | 0.9 | 2 |
| 11-Aug | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 0.9 | 2 |
| 12-Aug | 1 | 1 | Z | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.9 | 2 |
| 13-Aug | 2 | 2 | 2 | Z | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1.2 | 2 |
| 14-Aug | 2 | 2 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.9 | 2 |
| 15-Aug | 1 | 1 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | C | C | C | C | C | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0.5 | 1 | |
| 16-Aug | Z | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0.4 | 1 |
| 17-Aug | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 18-Aug | 1 | 0 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0.9 | 1 |
| 19-Aug | 0 | 0 | 0 | Z | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 20-Aug | 0 | 0 | 0 | 1 | Z | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 21-Aug | 0 | 0 | 0 | 1 | 1 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.4 | 1 |
| 22-Aug | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 2 | 2 | 1 | 0.7 | 2 |
| 23-Aug | 1 | Z | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.0 | 2 |
| 24-Aug | 1 | 1 | Z | 1 | 1 | 4 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.0 | 4 |
| 25-Aug | 1 | 1 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 26-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.3 | 1 |
| 27-Aug | 1 | 1 | 1 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 28-Aug | Z | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 29-Aug | 0 | Z | 0 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0.9 | 2 |
| 30-Aug | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1.1 | 2 |
| 31-Aug | 2 | 1 | 1 | Z | 1 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.9 | 2 |
| | 0.7 | 0.8 | 0.7 | 0.8 | 0.9 | 1.1 | 1.0 | 0.9 | 0.8 | 0.7 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 0.5 | 0.6 | 0.7 | 0.7 | 0.7 | Diurnal Average |
| | 2 | 2 | 2 | 2 | 2 | 4 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | Diurnal Maximum |

Z - zerospan C - Calibration
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Stony Mountain - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Stony Mountain - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 708 | 100.00 | 100.00 |
| 21 - 40 | 0 | 0.00 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Stony Mountain - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|----|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 12 | 19 | 12 | 15 | 12 | 20 | 56 | 46 | 40 | 73 | 98 | 101 | 120 | 54 | 22 | 8 | 708 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 41 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 12 | 19 | 12 | 15 | 12 | 20 | 56 | 46 | 40 | 73 | 98 | 101 | 120 | 54 | 22 | 8 | 708 |

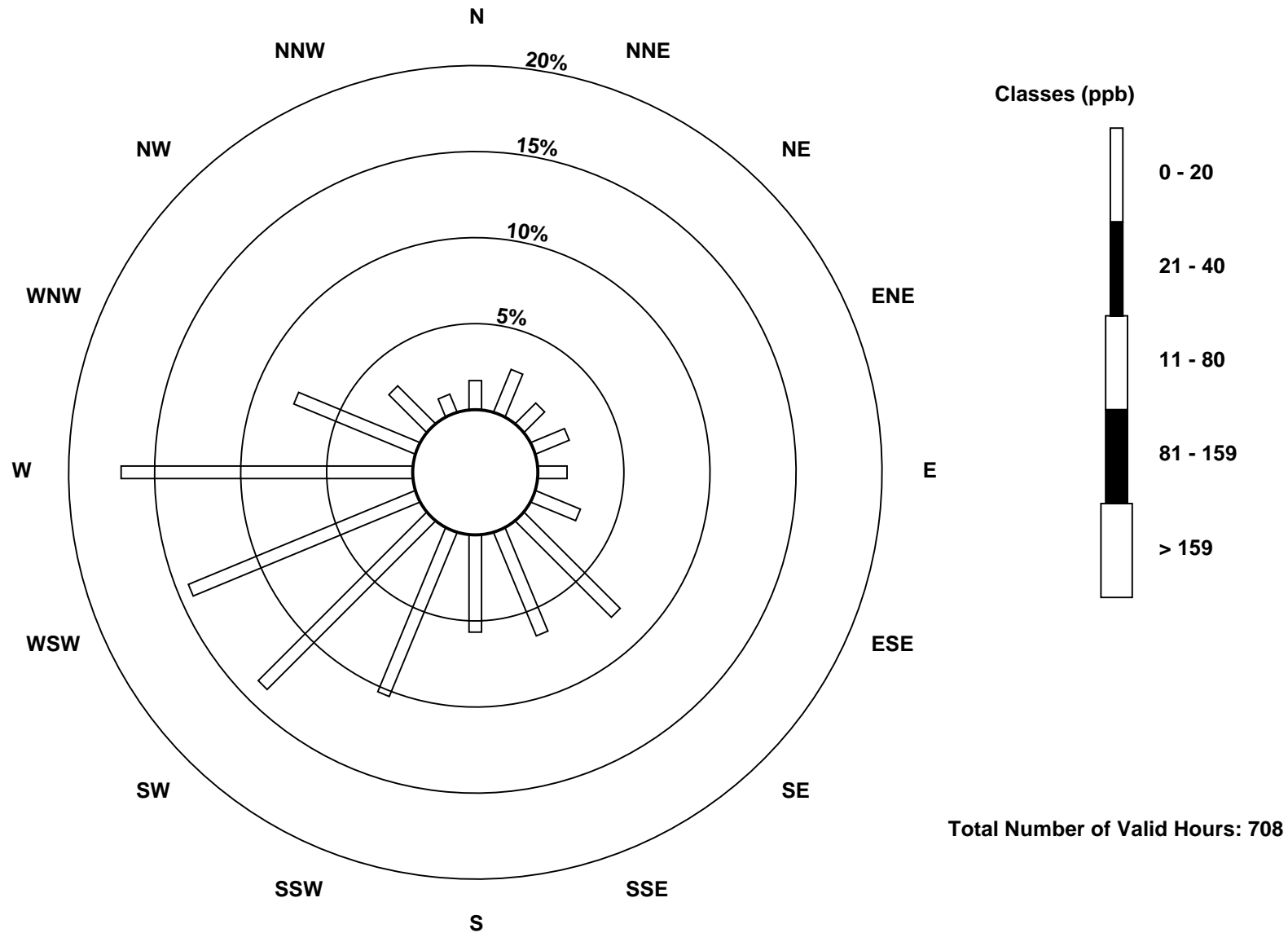
Total Number of Valid Hours: 708

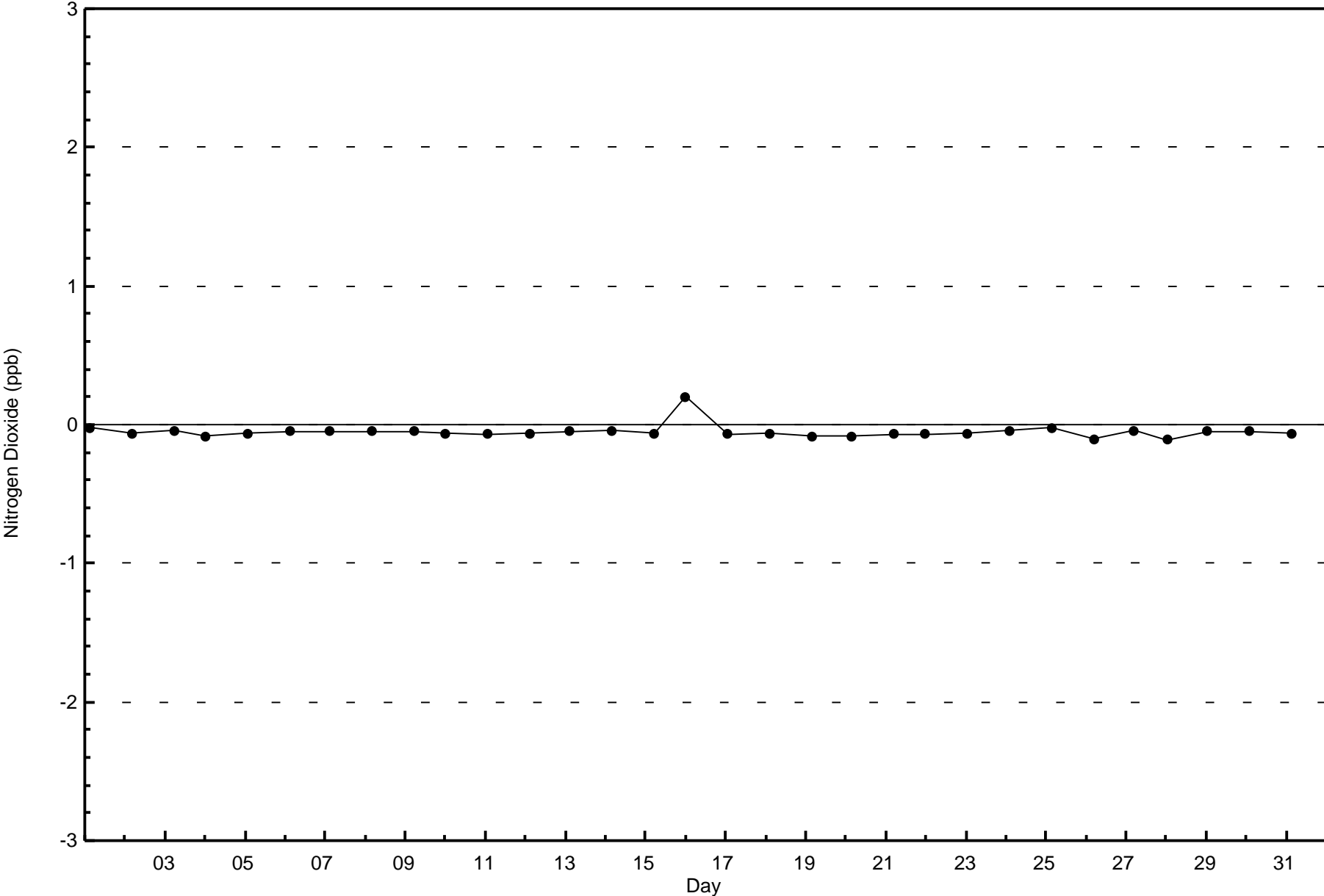
Total Number of Hours: 744

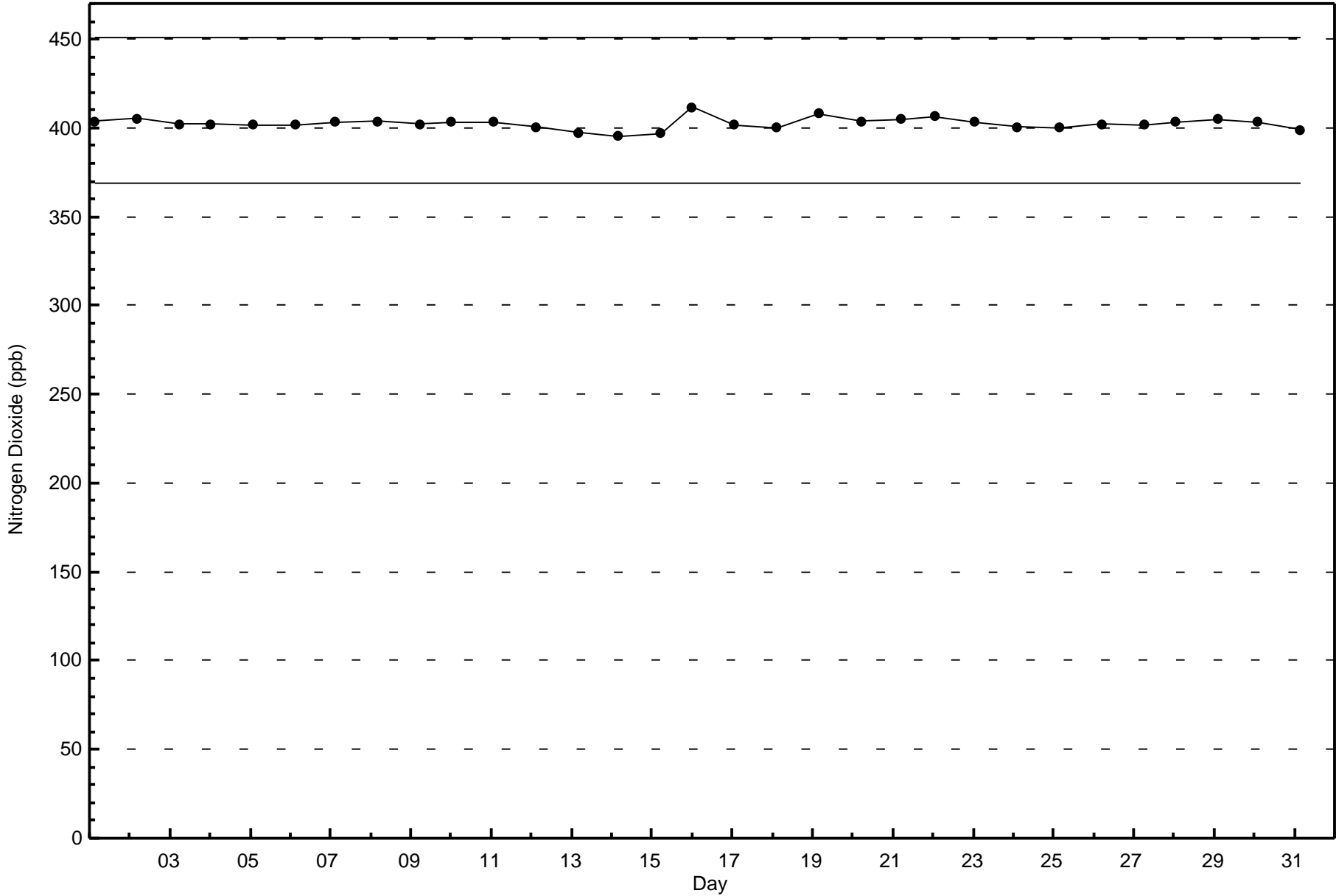


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Dioxide (NO₂) - ppb
Stony Mountain (AMS 18)









Wood Buffalo Environmental Association
Summary of Hour Averages

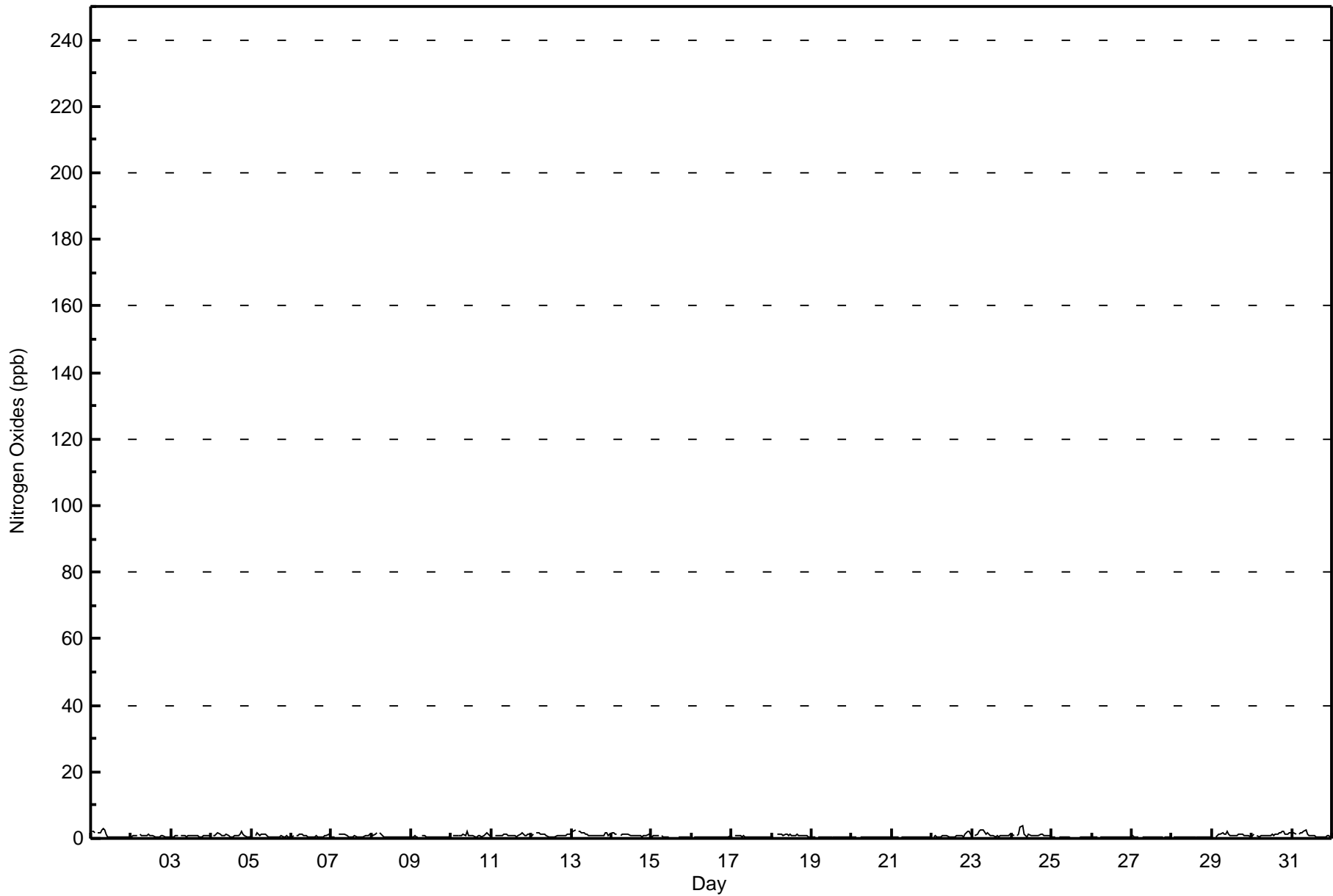
Nitrogen Oxides (NO_x) - ppb
Stony Mountain - August 2017

| Maximum Value: 4 ppb on Aug 24 07:00 | | | | | | | | | | | | | | | | | Maximum Daily Average: 1.3 ppb on Aug 13 | | | | | | | | | | | | | | | | | Hours in Service: 744 | | |
|---|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|--|----|----|----|----|----|----|-----------------|---------------|---------------|---|--|--|--|--|--|--|---------------------------|--|--|
| Minimum Value: 0 ppb on Aug 25 15:00 | | | | | | | | | | | | | | | | | Minimum Daily Average: 0.3 ppb on Aug 25 | | | | | | | | | | | | | | | | | Hours of Data: 708 | | |
| Maximum Diurnal Average: 1.2 ppb at hour 6 | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 0.5 ppb at hour 15 | | | | | | | | | | | | | | | | | Hours of Missing Data: 36 | | |
| Monthly Average: 0.8 ppb | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 3 | | | | | | | | | | | | | | | | | Hours of Calibration: 36 | | |
| | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | |
| 1-Aug | 2 | 2 | 2 | Z | 2 | 2 | 2 | 3 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.0 | 3 | | | | | | | | | | |
| 2-Aug | 0 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.7 | 1 | | | | | | | | | | |
| 3-Aug | 0 | 1 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.7 | 1 | | | | | | | | | | |
| 4-Aug | Z | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 0 | 1 | 1.0 | 2 | | | | | | | | | | |
| 5-Aug | 1 | Z | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0.7 | 2 | | | | | | | | | | |
| 6-Aug | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0.7 | 1 | | | | | | | | | | |
| 7-Aug | 0 | 0 | 0 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.7 | 1 | | | | | | | | | | |
| 8-Aug | 1 | 1 | 1 | 2 | Z | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 2 | | | | | | | | | | |
| 9-Aug | 0 | 0 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.5 | 1 | | | | | | | | | | |
| 10-Aug | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1.0 | 2 | | | | | | | | | | |
| 11-Aug | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1.0 | 2 | | | | | | | | | | |
| 12-Aug | 1 | 1 | Z | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.0 | 2 | | | | | | | | | | |
| 13-Aug | 2 | 2 | 2 | Z | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1.3 | 2 | | | | | | | | | | |
| 14-Aug | 2 | 2 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.0 | 2 | | | | | | | | | | |
| 15-Aug | 1 | 1 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | C | C | C | C | C | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0.6 | 1 | | | | | | | | | | |
| 16-Aug | Z | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0.4 | 1 | | | | | | | | | | |
| 17-Aug | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | |
| 18-Aug | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1.0 | 1 | | | | | | | | | | |
| 19-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | |
| 20-Aug | 0 | 0 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | |
| 21-Aug | 0 | 0 | 0 | 0 | 1 | Z | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.4 | 1 | | | | | | | | | | |
| 22-Aug | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 0.8 | 2 | | | | | | | | | | |
| 23-Aug | 1 | Z | 1 | 1 | 2 | 2 | 3 | 3 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.2 | 3 | | | | | | | | | | |
| 24-Aug | 1 | 1 | Z | 1 | 1 | 4 | 4 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.2 | 4 | | | | | | | | | | |
| 25-Aug | 1 | 1 | 0 | Z | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | |
| 26-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.3 | 1 | | | | | | | | | | |
| 27-Aug | 1 | 1 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | |
| 28-Aug | Z | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | |
| 29-Aug | 0 | Z | 0 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1.0 | 2 | | | | | | | | | | |
| 30-Aug | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1.2 | 2 | | | | | | | | | | |
| 31-Aug | 2 | 1 | 1 | Z | 1 | 2 | 2 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1.0 | 3 | | | | | | | | | |
| 0.8 0.8 0.8 0.8 1.0 1.2 1.1 1.0 0.9 0.8 0.7 0.6 0.6 0.5 0.5 0.5 0.6 0.6 0.7 0.6 0.7 0.7 0.7 0.7 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | | | | | | | | | |
| 2 2 2 2 2 4 4 3 3 2 1 1 1 1 1 1 1 2 2 2 2 2 2 2 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | | | | | | | | |
| Z - zerospan C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Stony Mountain - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Stony Mountain - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 708 | 100.00 | 100.00 |
| 21 - 40 | 0 | 0.00 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Stony Mountain - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|----|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 12 | 19 | 12 | 15 | 12 | 20 | 56 | 46 | 40 | 73 | 98 | 101 | 120 | 54 | 22 | 8 | 708 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 41 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 12 | 19 | 12 | 15 | 12 | 20 | 56 | 46 | 40 | 73 | 98 | 101 | 120 | 54 | 22 | 8 | 708 |

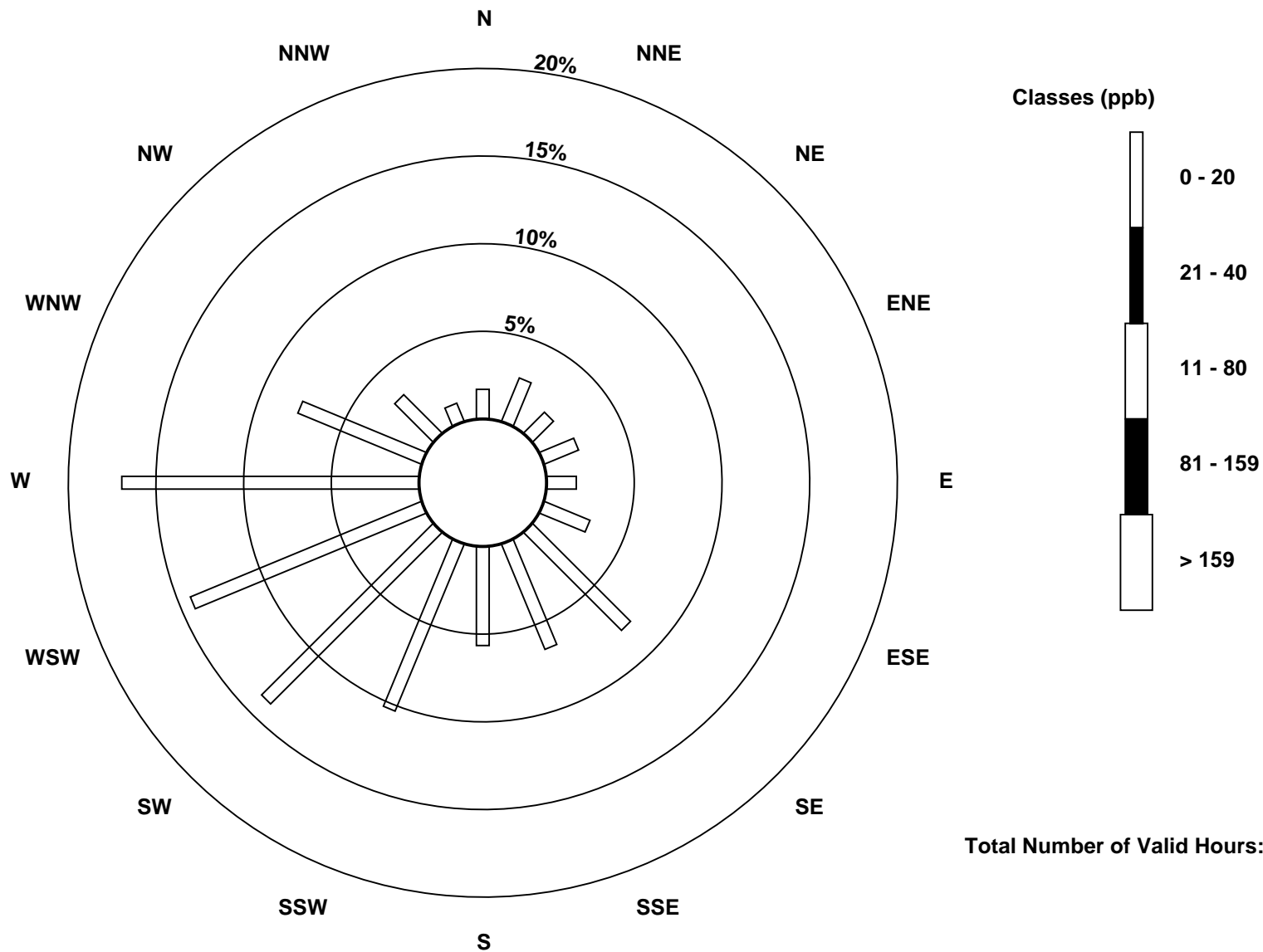
Total Number of Valid Hours: 708

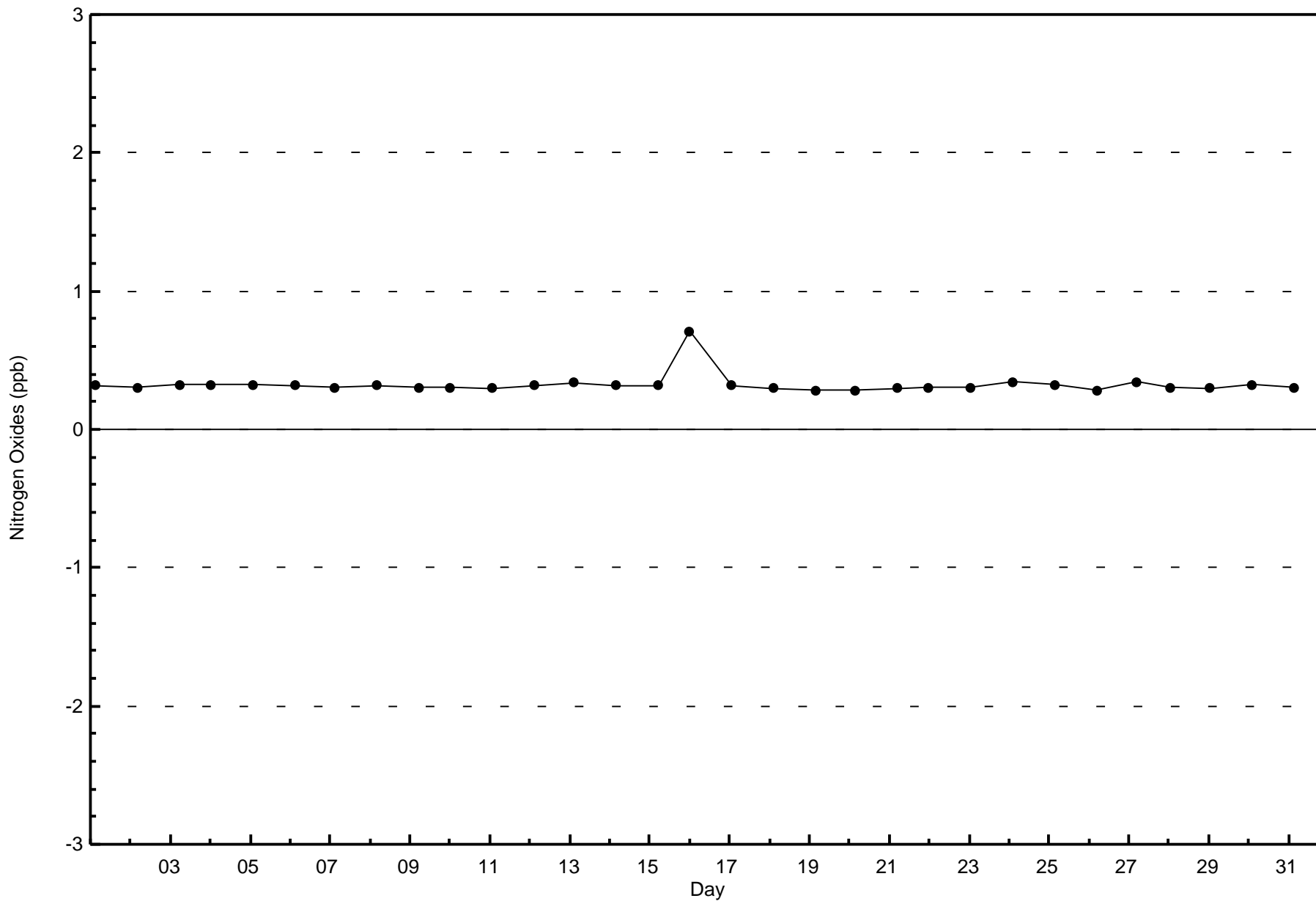
Total Number of Hours: 744

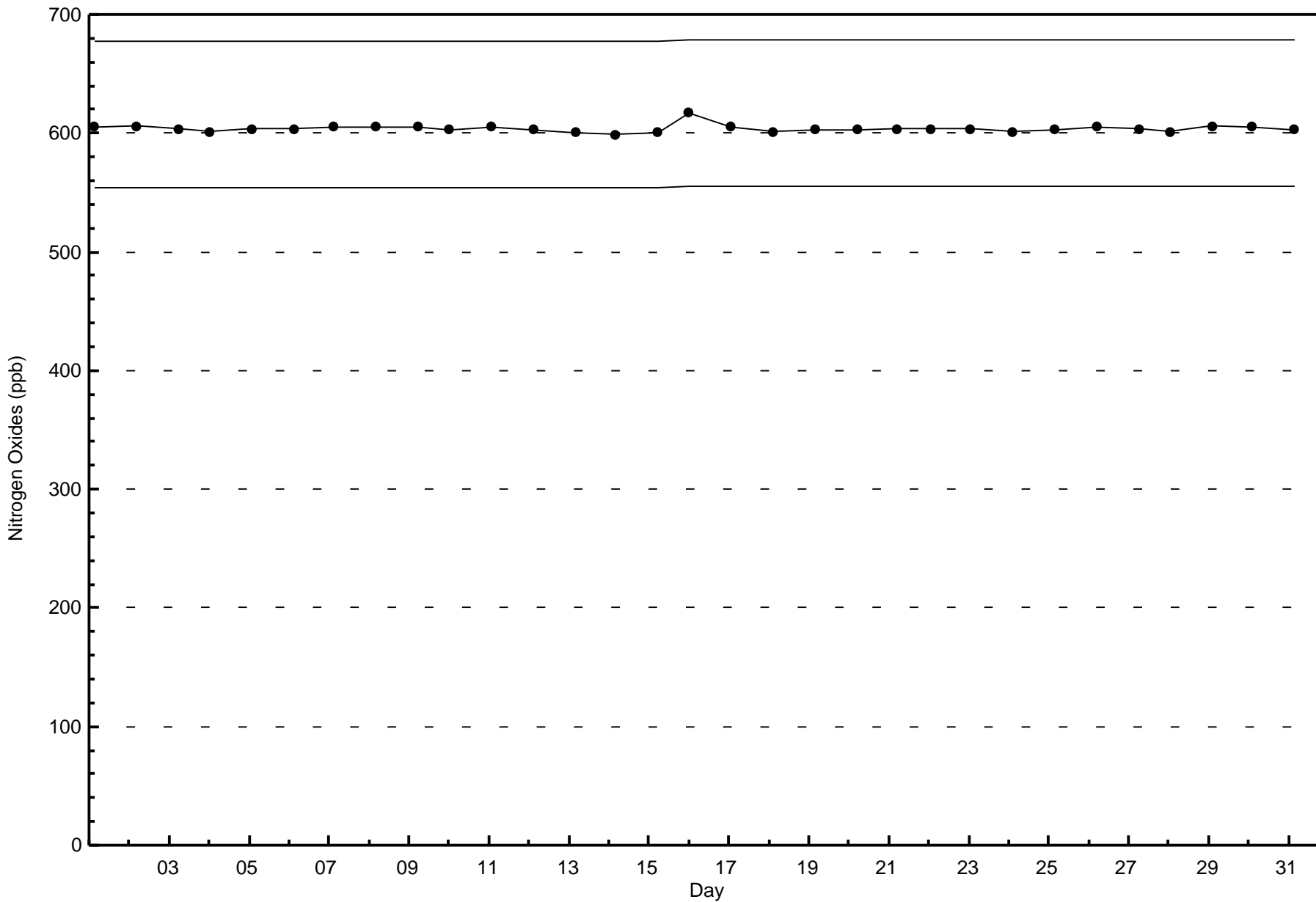


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Oxides (NO_x) - ppb
Stony Mountain (AMS 18)









Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

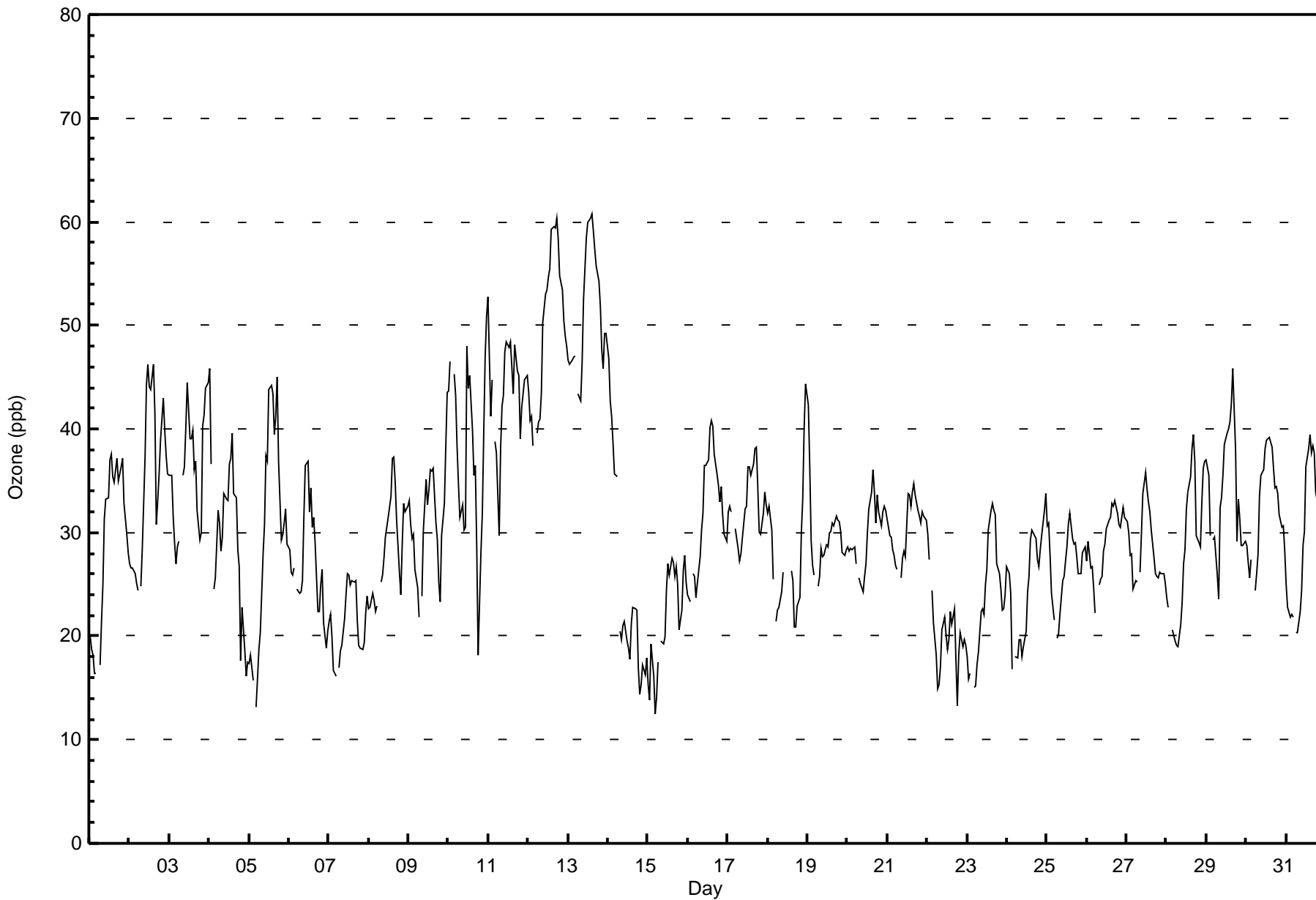
Stony Mountain - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|----|----|---------------------------------|----|----|----|------|---------------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|--|
| Maximum Value: 61 ppb on Aug 13 15:00 | | | | | | | | | | Maximum Daily Average: 51.5 ppb on Aug 13 | | | | | | | | | | Hours of Data: 709 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum Value: 12 ppb on Aug 15 05:00 | | | | | | | | | | Minimum Daily Average: 20.1 ppb on Aug 22 | | | | | | | | | | Hours of Missing Data: 35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 36.2 ppb at hour 15 | | | | | | | | | | Minimum Diurnal Average: 24.6 ppb at hour 7 | | | | | | | | | | Hours of Calibration: 35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 30.9 ppb | | | | | | | | | | Percentiles: P ₁ = 15 P ₁₀ = 20 Q ₁ = 25 Median = 30 Q ₃ = 36 P ₉₀ = 44 P ₉₉ = 59 | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 20 | 19 | 18 | 16 | 16 | Z | 17 | 21 | 25 | 31 | 33 | 33 | 37 | 38 | 35 | 35 | 37 | 35 | 36 | 36 | 37 | 33 | 30 | 28 | 29.0 | 38 | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 27 | 27 | 27 | 26 | 25 | 24 | Z | 25 | 28 | 37 | 44 | 46 | 44 | 44 | 46 | 41 | 31 | 33 | 36 | 39 | 43 | 40 | 37 | 36 | 35.1 | 46 | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 36 | 36 | 32 | 29 | 27 | 29 | Z | 35 | 36 | 40 | 44 | 39 | 39 | 40 | 36 | 37 | 32 | 29 | 30 | 40 | 41 | 44 | 45 | 45 | 35.9 | 45 | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 46 | 37 | Z | 25 | 26 | 32 | 31 | 28 | 30 | 34 | 33 | 33 | 37 | 37 | 40 | 34 | 33 | 28 | 27 | 18 | 23 | 19 | 16 | 17 | 29.6 | 46 | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 17 | 18 | 16 | Z | 13 | 16 | 19 | 20 | 28 | 31 | 37 | 37 | 44 | 44 | 43 | 39 | 41 | 45 | 37 | 29 | 30 | 31 | 32 | 29 | 30.3 | 45 | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 28 | 26 | 26 | 27 | Z | 25 | 24 | 24 | 25 | 31 | 36 | 37 | 32 | 34 | 31 | 31 | 29 | 22 | 22 | 25 | 26 | 21 | 19 | 21 | 27.1 | 37 | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 21 | 22 | 20 | 17 | 16 | Z | 17 | 19 | 19 | 22 | 24 | 26 | 26 | 25 | 25 | 25 | 25 | 22 | 19 | 19 | 19 | 19 | 22 | 24 | 21.4 | 26 | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 23 | 23 | 24 | 23 | 22 | 23 | Z | 25 | 26 | 28 | 30 | 31 | 32 | 33 | 37 | 37 | 35 | 31 | 26 | 24 | 29 | 33 | 32 | 33 | 28.7 | 37 | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 33 | 31 | 29 | 30 | 26 | 25 | 22 | Z | 24 | 30 | 35 | 33 | 34 | 36 | 36 | 36 | 31 | 29 | 25 | 23 | 30 | 33 | 38 | 44 | 31.0 | 44 | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 44 | 47 | Z | 45 | 43 | 38 | 35 | 31 | 33 | 30 | 31 | 48 | 44 | 45 | 40 | 36 | 36 | 29 | 18 | 28 | 32 | 40 | 47 | 51 | 37.8 | 51 | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 53 | 41 | 45 | Z | 39 | 38 | 30 | 38 | 42 | 43 | 47 | 48 | 48 | 48 | 46 | 43 | 48 | 45 | 45 | 39 | 42 | 43 | 45 | 45 | 43.6 | 53 | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 44 | 41 | 41 | 38 | Z | 40 | 41 | 41 | 43 | 50 | 53 | 53 | 55 | 56 | 59 | 60 | 59 | 60 | 58 | 55 | 53 | 50 | 49 | 48 | 49.9 | 60 | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 47 | 46 | 47 | 47 | 47 | Z | 43 | 43 | 46 | 53 | 55 | 58 | 60 | 60 | 61 | 59 | 57 | 56 | 54 | 52 | 48 | 46 | 49 | 49 | 51.5 | 61 | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 47 | 43 | 41 | 39 | 36 | 35 | Z | 20 | 20 | 21 | 21 | 19 | 19 | 18 | 21 | 23 | 23 | 22 | 17 | 14 | 15 | 17 | 16 | 18 | 24.6 | 47 | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 15 | 14 | 19 | 16 | 12 | 14 | 18 | Z | 20 | 19 | 20 | 24 | 27 | 26 | 27 | 27 | 26 | 27 | 25 | 21 | 23 | 26 | 28 | 25 | 21.7 | 28 | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 24 | 23 | Z | 26 | 26 | 24 | 25 | 28 | 30 | 32 | 36 | 36 | 37 | 40 | 41 | 40 | 38 | 36 | 35 | 33 | 34 | 32 | 30 | 29 | 31.9 | 41 | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 32 | 33 | 32 | Z | 30 | 29 | 28 | 27 | 28 | 29 | 32 | 33 | 36 | 36 | 36 | 37 | 38 | 38 | 34 | 30 | 30 | 32 | 34 | 33 | 32.5 | 38 | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 32 | 33 | 30 | 26 | Z | 21 | 23 | 23 | 24 | 26 | C | C | C | C | 26 | 25 | 21 | 21 | 23 | 24 | 30 | 33 | 40 | 44 | 27.6 | 44 | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 42 | 36 | 29 | 27 | 26 | Z | 25 | 26 | 28 | 28 | 28 | 29 | 29 | 30 | 30 | 31 | 31 | 32 | 31 | 31 | 30 | 28 | 28 | 28 | 29.7 | 42 | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 29 | 28 | 29 | 28 | 29 | 27 | Z | 26 | 25 | 24 | 26 | 27 | 30 | 32 | 34 | 36 | 34 | 31 | 34 | 32 | 31 | 32 | 33 | 32 | 29.9 | 36 | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 31 | 30 | 30 | 28 | 28 | 27 | 26 | Z | 26 | 28 | 28 | 28 | 34 | 34 | 32 | 34 | 35 | 34 | 32 | 32 | 31 | 32 | 32 | 31 | 30.5 | 35 | | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 30 | 27 | Z | 24 | 21 | 18 | 15 | 15 | 17 | 21 | 22 | 20 | 19 | 20 | 22 | 21 | 23 | 18 | 13 | 18 | 20 | 19 | 20 | 19 | 20.1 | 30 | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 18 | 16 | 16 | Z | 15 | 15 | 17 | 18 | 22 | 23 | 22 | 25 | 26 | 30 | 32 | 33 | 32 | 32 | 27 | 26 | 24 | 23 | 24 | 24 | 23.5 | 33 | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 27 | 26 | 24 | 17 | Z | 18 | 18 | 20 | 20 | 18 | 19 | 20 | 24 | 26 | 29 | 30 | 30 | 29 | 27 | 27 | 28 | 30 | 32 | 34 | 24.9 | 34 | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 31 | 31 | 28 | 24 | 22 | Z | 20 | 20 | 22 | 25 | 26 | 27 | 29 | 31 | 32 | 29 | 29 | 29 | 28 | 26 | 26 | 28 | 29 | 29 | 26.9 | 32 | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 27 | 29 | 27 | 27 | 25 | 22 | Z | 25 | 26 | 26 | 28 | 29 | 30 | 31 | 31 | 33 | 33 | 33 | 32 | 31 | 31 | 31 | 32 | 31 | 29.1 | 33 | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 31 | 30 | 28 | 28 | 24 | 25 | 25 | Z | 26 | 30 | 34 | 36 | 34 | 33 | 32 | 30 | 28 | 26 | 26 | 26 | 26 | 26 | 25 | 25 | 28.5 | 36 | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 24 | 23 | Z | 21 | 20 | 20 | 19 | 19 | 21 | 23 | 27 | 28 | 32 | 34 | 35 | 38 | 39 | 37 | 30 | 29 | 29 | 33 | 36 | 37 | 28.4 | 39 | | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 37 | 35 | 30 | Z | 29 | 30 | 26 | 24 | 32 | 33 | 36 | 38 | 40 | 40 | 41 | 42 | 46 | 38 | 29 | 33 | 31 | 29 | 29 | 29 | 33.8 | 46 | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 29 | 27 | 26 | 27 | Z | 24 | 26 | 28 | 33 | 35 | 36 | 38 | 39 | 39 | 39 | 38 | 36 | 34 | 34 | 34 | 32 | 31 | 31 | 28 | 32.4 | 39 | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 25 | 23 | 22 | 22 | 22 | Z | 20 | 20 | 22 | 24 | 29 | 30 | 36 | 38 | 39 | 38 | 38 | 38 | 34 | 32 | 35 | 37 | 38 | 38 | 30.5 | 39 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 31.2 | 29.7 | 28.2 | 27.0 | 25.6 | 25.6 | 24.6 | 25.2 | 27.4 | 29.8 | 32.3 | 33.9 | 35.1 | 35.9 | 36.2 | 35.5 | 34.8 | 33.0 | 30.4 | 29.5 | 30.9 | 31.2 | 32.1 | 32.4 | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | | | | | | | 53 | 47 | 47 | 47 | 47 | 40 | 43 | 43 | 46 | 53 | 55 | 58 | 60 | 60 | 61 | 60 | 59 | 60 | 58 | 55 | 53 | 50 | 49 | 51 | Diurnal Maximum | |
| Z - zerospan C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Ozone (O₃) - ppb
Stony Mountain - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ozone (O₃) - ppb
Stony Mountain - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 87 | 12.27 | 12.27 |
| 21 - 50 | 598 | 84.34 | 96.61 |
| 51 - 82 | 24 | 3.39 | 100.00 |
| > 83 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Stony Mountain - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|----|-----|----|-----|----|-----|-----|-----|-----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 3 | 6 | 1 | 2 | 2 | 8 | 7 | 5 | 5 | 10 | 7 | 3 | 10 | 13 | 5 | 0 | 87 |
| 21 - 50 | 9 | 12 | 11 | 13 | 10 | 11 | 41 | 32 | 31 | 57 | 95 | 98 | 104 | 48 | 17 | 8 | 597 |
| 51 - 82 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 8 | 5 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 24 |
| > 83 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 12 | 18 | 12 | 15 | 12 | 19 | 56 | 45 | 41 | 68 | 102 | 101 | 116 | 61 | 22 | 8 | 708 |

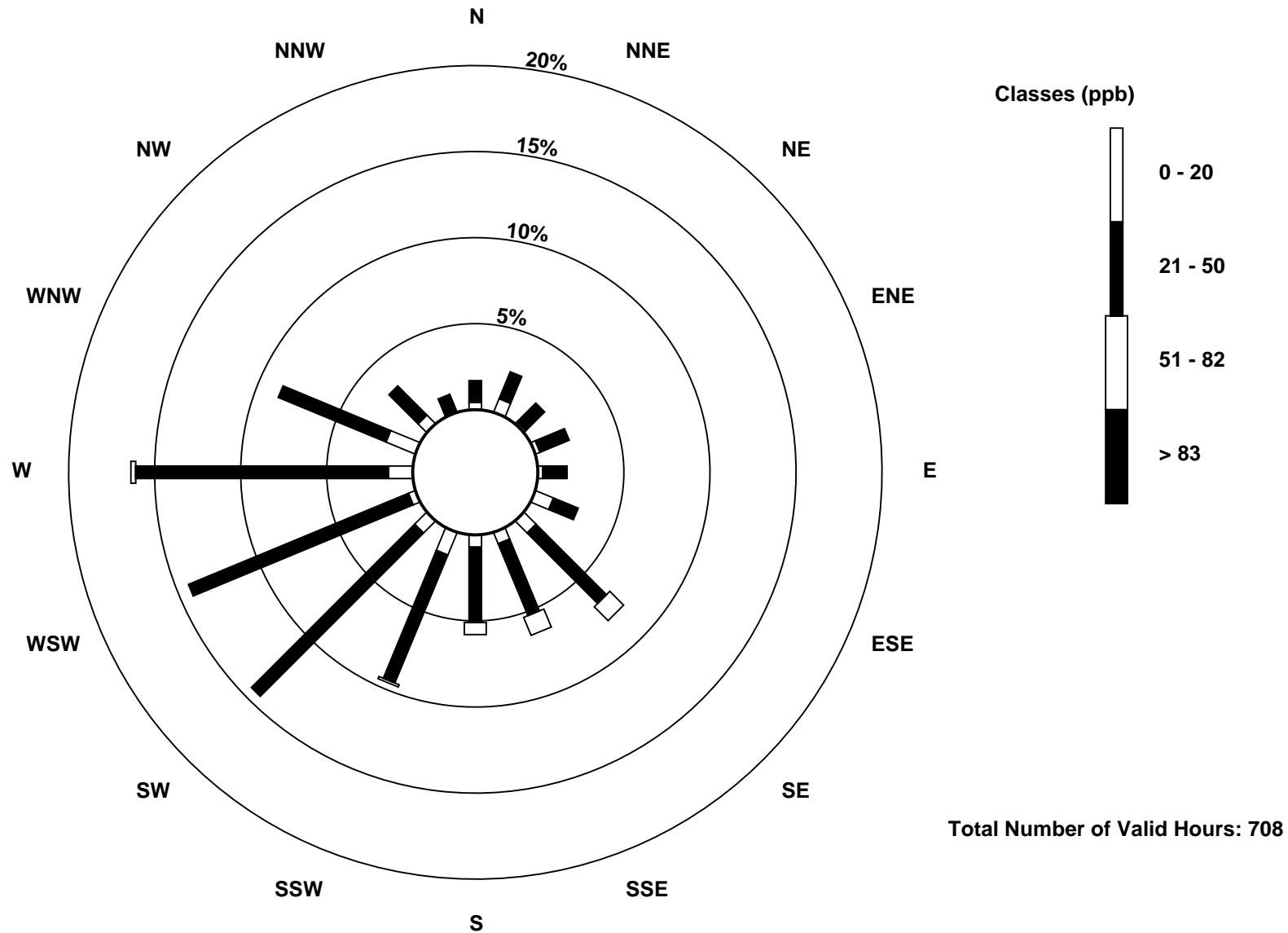
Total Number of Valid Hours: 708

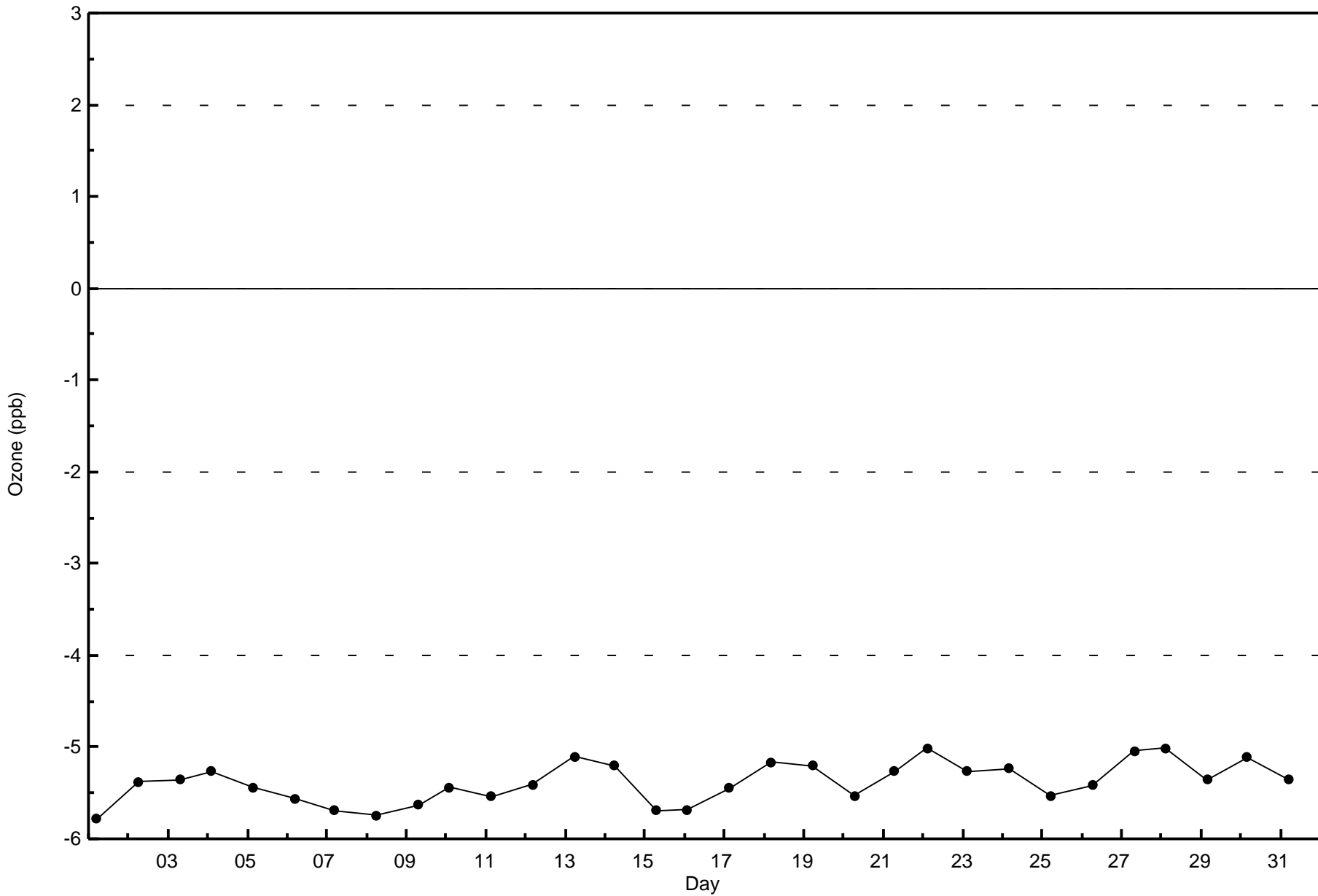
Total Number of Hours: 744

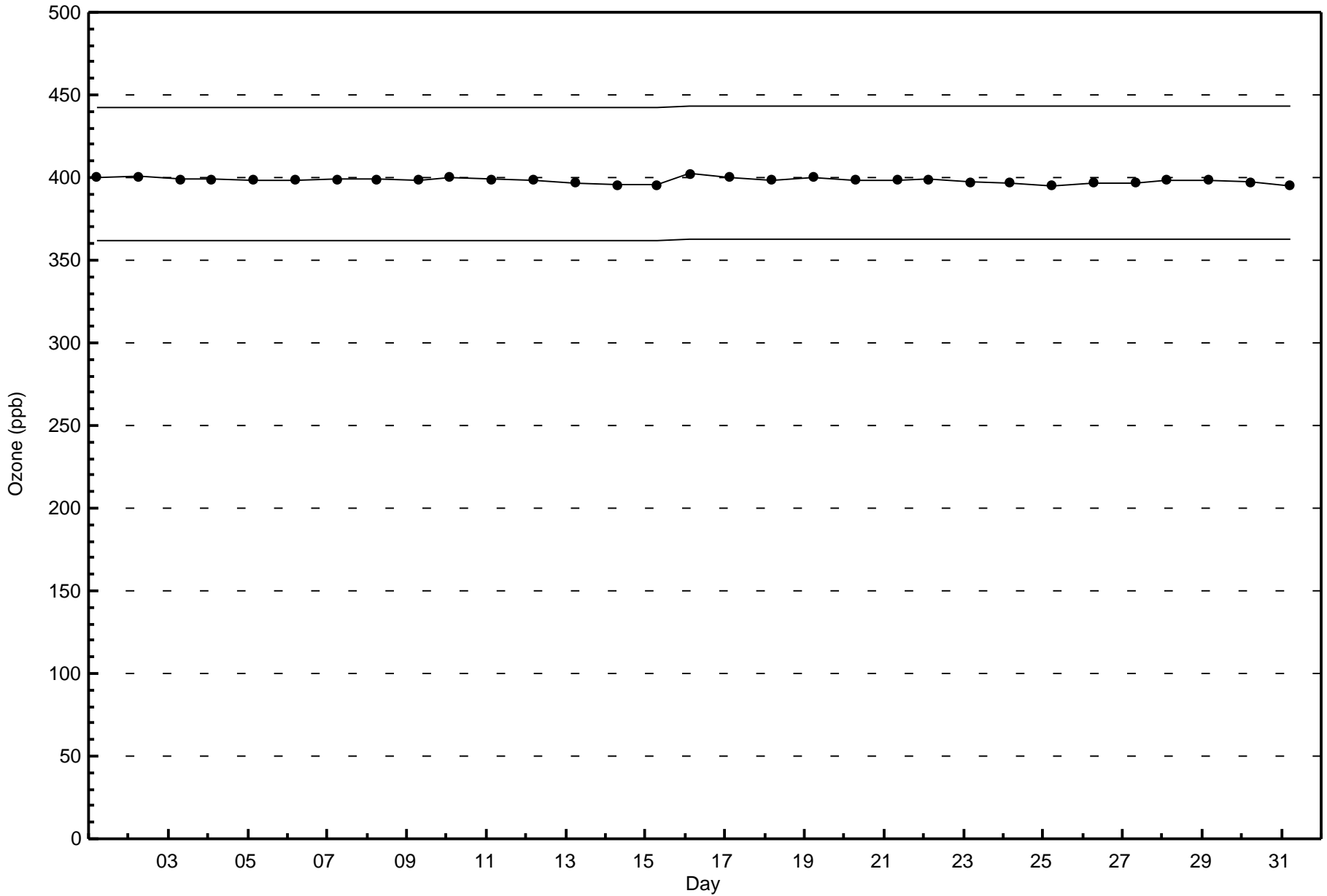


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Ozone (O₃) - ppb
Stony Mountain (AMS 18)









| | | | |
|---|--|---------------------------|-------|
| Number of Exceedences (AAAQO): | 24-hr: 1 | Hours in Service: | 744 |
| Maximum Value: 124.8 µg/m ³ on Aug 14 08:00 | Maximum Daily Average: 41.4 µg/m ³ on Aug 14 | Hours of Data: | 742 |
| Minimum Value: 0.1 µg/m ³ on Aug 19 12:00 | Minimum Daily Average: 0.7 µg/m ³ on Aug 20 | Hours of Missing Data: | 2 |
| Maximum Diurnal Average: 10.2 µg/m ³ at hour 8 | Minimum Diurnal Average: 5.9 µg/m ³ at hour 12 | Hours of Calibration: | 2 |
| Monthly Average: 7.43 µg/m ³ | Percentiles: P ₁ = 0.4 P ₁₀ = 1.2 Q ₁ = 2.8 Median = 5.2 Q ₃ = 7.9 P ₉₀ = 12.5 P ₉₉ = 64.9 | Percent Operational Time: | 100.0 |

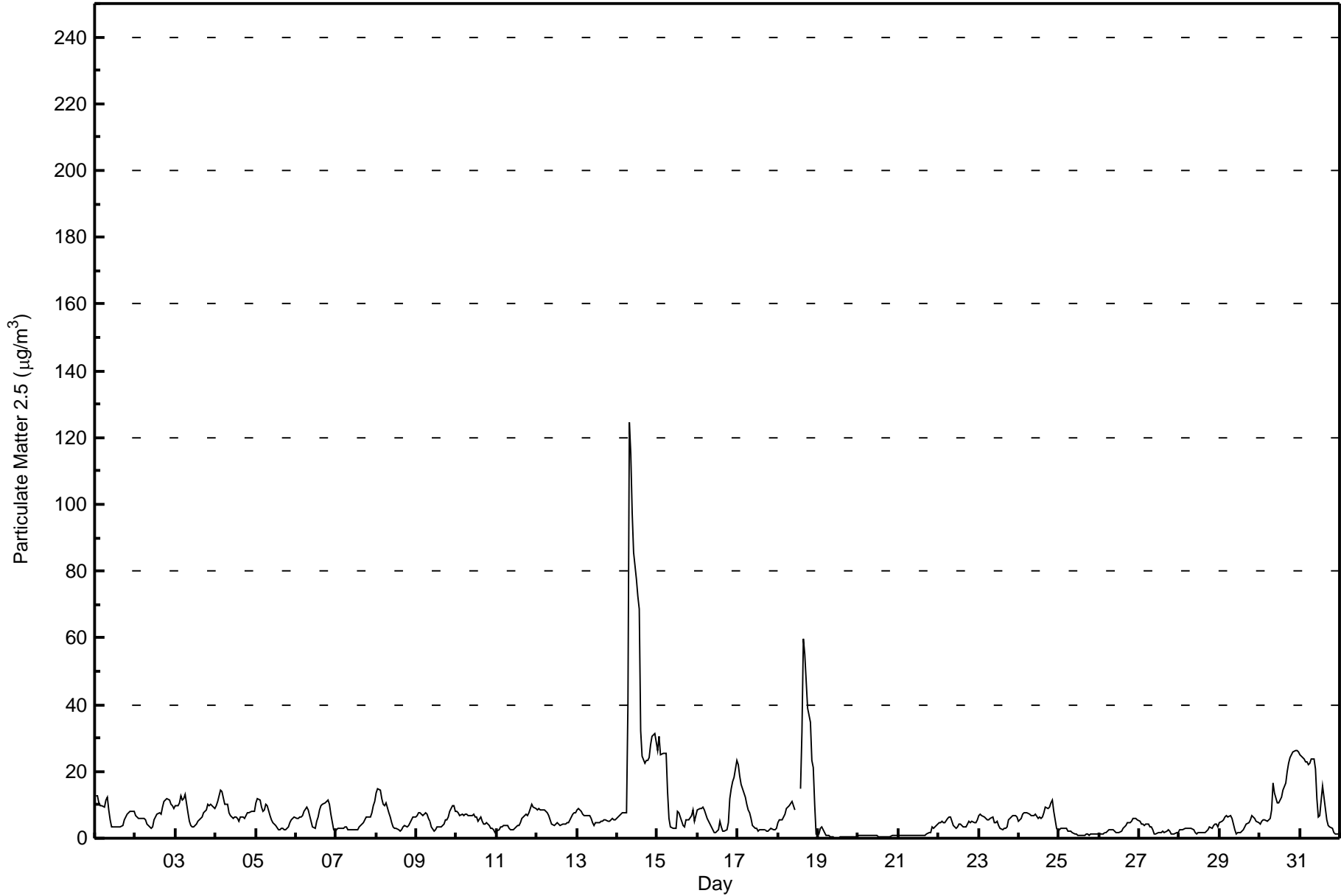
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | |
|--------|-------------------------------|------|------|------|------|------|------|-------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------|---------------|------|------|------|------|-------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 12.5 | 12.6 | 10.5 | 9.9 | 9.9 | 9.5 | 11.4 | 12.3 | 8.4 | 5.4 | 3.2 | 3.3 | 3.5 | 3.2 | 3.3 | 3.2 | 3.7 | 5.5 | 6.3 | 7.4 | 7.7 | 7.9 | 8.0 | 8.2 | 7.4 | 12.6 | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 6.9 | 6.4 | 6.0 | 6.1 | 5.9 | 5.9 | 5.6 | 4.3 | 3.7 | 3.0 | 3.4 | 5.6 | 6.2 | 7.3 | 7.5 | 7.4 | 9.5 | 11.2 | 11.4 | 11.8 | 11.6 | 10.2 | 9.7 | 9.1 | 7.3 | 11.8 | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 9.7 | 9.6 | 10.5 | 12.7 | 11.6 | 11.9 | 13.1 | 7.8 | 5.1 | 4.0 | 3.5 | 3.3 | 4.4 | 5.2 | 5.3 | 5.9 | 6.4 | 7.5 | 8.4 | 10.3 | 9.9 | 10.1 | 9.9 | 9.1 | 8.1 | 13.1 | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 9.8 | 10.9 | 12.8 | 14.4 | 14.0 | 10.4 | 10.0 | 10.0 | 7.7 | 6.8 | 5.8 | 6.2 | 6.3 | 6.1 | 5.1 | 6.6 | 6.2 | 6.1 | 6.8 | 7.5 | 7.7 | 7.9 | 7.9 | 8.0 | 8.4 | 14.4 | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 10.4 | 11.7 | 11.3 | 9.4 | 8.1 | 8.4 | 10.1 | 9.8 | 6.6 | 5.7 | 4.8 | 4.1 | 3.8 | 2.7 | 2.5 | 2.9 | 3.0 | 2.6 | 2.7 | 3.4 | 4.8 | 5.3 | 5.9 | 6.2 | 6.1 | 11.7 | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 6.0 | 5.8 | 6.2 | 6.4 | 6.7 | 8.0 | 9.1 | 8.4 | 6.6 | 5.1 | 3.2 | 2.8 | 5.0 | 6.3 | 8.3 | 9.7 | 10.2 | 10.7 | 11.1 | 11.5 | 10.0 | 7.4 | 2.6 | 2.2 | 7.1 | 11.5 | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 2.7 | 3.1 | 3.1 | 3.1 | 2.9 | 3.2 | 3.2 | 2.7 | 2.7 | 2.4 | 2.6 | 2.5 | 2.6 | 2.7 | 3.3 | 4.1 | 4.7 | 5.5 | 6.3 | 6.4 | 6.5 | 7.5 | 9.7 | 11.1 | 4.4 | 11.1 | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 13.8 | 15.0 | 14.2 | 11.7 | 10.0 | 9.9 | 10.7 | 7.7 | 6.2 | 4.5 | 3.3 | 3.1 | 2.9 | 2.5 | 2.3 | 2.7 | 3.3 | 3.8 | 3.5 | 3.7 | 4.7 | 5.4 | 6.2 | 6.5 | 6.6 | 15.0 | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 6.7 | 7.8 | 7.6 | 7.1 | 6.7 | 7.4 | 7.3 | 5.8 | 4.9 | 3.3 | 2.1 | 2.4 | 3.3 | 3.5 | 3.5 | 3.3 | 4.4 | 5.3 | 5.5 | 6.2 | 7.9 | 9.7 | 9.5 | 8.1 | 5.8 | 9.7 | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 8.3 | 7.5 | 6.9 | 7.1 | 6.7 | 7.0 | 7.2 | 6.9 | 6.9 | 7.0 | 7.1 | 6.2 | 6.1 | 4.9 | 6.3 | 5.0 | 4.2 | 4.2 | 4.7 | 3.7 | 3.1 | 3.0 | 2.3 | 1.8 | 5.6 | 8.3 | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 1.9 | 2.5 | 3.2 | 3.5 | 3.8 | 4.0 | 4.0 | 2.8 | 2.5 | 2.5 | 2.7 | 3.1 | 3.7 | 3.9 | 4.7 | 5.8 | 6.4 | 7.1 | 6.8 | 7.6 | 8.9 | 10.1 | 9.5 | 8.7 | 5.0 | 10.1 | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 8.6 | 8.8 | 8.7 | 8.4 | 8.3 | 7.9 | 7.6 | 6.8 | 5.7 | 4.4 | 3.8 | 4.1 | 4.6 | 4.3 | 4.0 | 4.1 | 4.1 | 4.2 | 4.6 | 4.9 | 6.3 | 7.3 | 7.7 | 7.8 | 6.1 | 8.8 | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 8.5 | 8.8 | 8.0 | 7.3 | 6.7 | 6.8 | 6.9 | 6.6 | 5.9 | 4.5 | 4.0 | 4.7 | 4.6 | 4.7 | 4.9 | 4.9 | 5.3 | 5.7 | 5.2 | 5.0 | 5.6 | 6.0 | 5.7 | 5.6 | 5.9 | 8.8 | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 6.2 | 6.8 | 7.4 | 7.5 | 7.7 | 7.8 | 40.2 | 124.8 | 115.2 | 97.6 | 85.6 | 77.7 | 72.3 | 68.5 | 32.0 | 24.8 | 22.3 | 23.2 | 23.5 | 24.3 | 27.9 | 30.5 | 31.4 | 28.9 | 41.4 | 124.8 | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 26.1 | 30.4 | 24.9 | 25.5 | 25.6 | 25.3 | 14.1 | 5.8 | 3.3 | 2.8 | 2.8 | 2.9 | 8.2 | 7.8 | 5.2 | 3.8 | 3.3 | 5.4 | 5.5 | 5.5 | 6.8 | 8.6 | 5.2 | 6.8 | 10.9 | 30.4 | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 8.5 | 8.8 | 9.0 | 9.4 | 8.4 | 7.2 | 6.1 | 4.3 | 3.3 | 2.5 | 1.8 | 1.8 | 2.5 | 5.1 | 3.2 | 2.1 | 2.3 | 2.6 | 4.8 | 11.9 | 14.8 | 17.0 | 18.3 | 23.2 | 7.5 | 23.2 | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 22.1 | 18.7 | 16.2 | 14.7 | 12.2 | 10.4 | 8.5 | 7.5 | 5.8 | 4.0 | 3.1 | 2.8 | 2.2 | 2.5 | 2.5 | 2.5 | 2.4 | 2.0 | 2.2 | 2.6 | 2.8 | 2.7 | 2.7 | 3.0 | 6.5 | 22.1 | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 4.5 | 5.4 | 5.5 | 6.3 | 7.2 | 8.8 | 9.4 | 9.8 | 11.0 | 9.7 | 8.5 | C | C | 14.7 | 31.8 | 60.0 | 55.2 | 47.2 | 39.0 | 34.6 | 23.2 | 21.1 | 10.3 | 1.4 | 19.3 | 60.0 | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 1.4 | 2.9 | 3.3 | 2.5 | 1.6 | 1.0 | 0.7 | 0.5 | 0.4 | 0.2 | 0.1 | 0.1 | 0.2 | 0.2 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.6 | 0.8 | 3.3 | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 0.6 | 0.7 | 0.8 | 0.8 | 0.8 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.7 | 0.6 | 0.4 | 0.2 | 0.5 | 0.4 | 0.4 | 0.6 | 0.6 | 0.7 | 0.7 | 0.8 | 0.7 | 0.9 | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 0.8 | 0.9 | 0.9 | 0.9 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.8 | 0.7 | 0.7 | 0.7 | 0.9 | 1.0 | 1.0 | 1.0 | 1.4 | 1.7 | 1.9 | 3.4 | 2.8 | 3.3 | 4.2 | 1.4 | 4.2 | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 4.7 | 4.5 | 5.1 | 4.7 | 4.8 | 5.9 | 6.5 | 6.3 | 5.2 | 3.9 | 3.0 | 3.5 | 4.1 | 4.2 | 3.7 | 3.4 | 3.6 | 4.4 | 5.1 | 4.8 | 5.0 | 4.8 | 4.7 | 5.3 | 4.6 | 6.5 | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 6.8 | 7.2 | 6.8 | 6.2 | 5.7 | 5.6 | 5.4 | 5.8 | 6.3 | 4.8 | 4.7 | 5.1 | 4.0 | 2.8 | 2.7 | 3.0 | 3.0 | 3.5 | 5.4 | 6.5 | 6.8 | 6.9 | 6.8 | 6.4 | 5.3 | 7.2 | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 5.2 | 5.8 | 7.1 | 7.7 | 7.6 | 7.5 | 7.3 | 6.9 | 6.7 | 6.9 | 7.1 | 6.0 | 6.2 | 5.9 | 6.5 | 7.8 | 9.4 | 9.0 | 9.2 | 10.7 | 11.5 | 8.1 | 2.9 | 2.2 | 7.1 | 11.5 | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 2.7 | 2.9 | 3.1 | 3.0 | 2.8 | 2.2 | 2.3 | 2.0 | 1.7 | 1.2 | 1.1 | 1.0 | 0.9 | 0.8 | 0.8 | 0.8 | 1.1 | 1.1 | 1.0 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.6 | 3.1 | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 1.2 | 1.2 | 1.3 | 1.6 | 1.8 | 2.3 | 2.5 | 2.8 | 2.5 | 2.1 | 1.7 | 1.6 | 1.7 | 2.0 | 3.0 | 3.5 | 4.0 | 4.5 | 4.5 | 5.2 | 6.0 | 6.1 | 5.8 | 5.6 | 3.1 | 6.1 | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 5.2 | 4.2 | 4.2 | 3.8 | 4.1 | 4.2 | 3.5 | 3.3 | 2.5 | 1.4 | 1.4 | 1.5 | 1.7 | 1.8 | 2.0 | 1.8 | 2.2 | 2.5 | 2.2 | 1.4 | 1.4 | 1.4 | 1.5 | 1.8 | 2.5 | 5.2 | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 2.7 | 2.6 | 2.7 | 2.9 | 2.8 | 2.8 | 2.8 | 2.9 | 2.6 | 1.7 | 1.5 | 1.6 | 1.5 | 1.5 | 1.7 | 1.8 | 2.0 | 2.5 | 3.2 | 3.1 | 3.8 | 4.4 | 4.0 | 3.4 | 2.6 | 4.4 | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 4.5 | 5.1 | 5.5 | 6.4 | 6.9 | 6.5 | 6.9 | 6.1 | 4.3 | 2.5 | 1.3 | 1.7 | 1.9 | 2.1 | 2.7 | 3.3 | 4.3 | 4.7 | 5.5 | 6.8 | 6.5 | 5.9 | 5.0 | 4.5 | 4.6 | 6.9 | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 4.2 | 5.0 | 5.5 | 5.5 | 5.0 | 5.4 | 5.8 | 8.6 | 16.4 | 13.6 | 10.8 | 10.5 | 11.6 | 12.4 | 14.2 | 16.7 | 19.7 | 22.5 | 24.3 | 25.1 | 25.8 | 26.4 | 26.2 | 25.7 | 14.5 | 26.4 | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 25.2 | 24.6 | 23.5 | 23.0 | 22.8 | 22.0 | 22.4 | 23.8 | 23.7 | 20.8 | 11.7 | 6.6 | 6.7 | 15.5 | 12.1 | 8.7 | 5.3 | 3.7 | 3.5 | 3.0 | 1.7 | 1.4 | 1.4 | 1.4 | 13.1 | 25.2 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 7.7 | 8.0 | 7.8 | 7.7 | 7.4 | 7.3 | 8.1 | 10.2 | 9.2 | 7.6 | 6.4 | 5.9 | 6.1 | 6.7 | 6.0 | 6.8 | 6.9 | 7.1 | 7.3 | 7.7 | 7.9 | 8.0 | 7.3 | 7.1 | Diurnal Average |
| | | | | | | | | | | | | | | | | | | | | | | | | 26.1 | 30.4 | 24.9 | 25.5 | 25.6 | 25.3 | 40.2 | 124.8 | 115.2 | 97.6 | 85.6 | 77.7 | 72.3 | 68.5 | 32.0 | 60.0 | 55.2 | 47.2 | 39.0 | 34.6 | 27.9 | 30.5 | 31.4 | 28.9 | Diurnal Maximum |

C - Calibration
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³



Wood Buffalo Environmental Association
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Stony Mountain - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Stony Mountain - August 2017**

| Concentration Ranges ($\mu\text{g}/\text{m}^3$) | Number of Hours | % | Cumulative % |
|---|------------------------|----------|---------------------|
| 1 - 5 | 333 | 44.88 | 44.88 |
| 6 - 15 | 292 | 39.35 | 84.23 |
| 16 - 25 | 31 | 4.18 | 88.41 |
| 26 - 80 | 23 | 3.10 | 91.51 |
| > 81.0 | 4 | 0.54 | 92.05 |

Total Number of Valid Hours: 742

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Stony Mountain - August 2017

| Concentration Ranges (μg/m ³) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|--|----------------|-----|----|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 1 - 5 | 6 | 14 | 6 | 10 | 7 | 2 | 25 | 25 | 22 | 15 | 57 | 57 | 58 | 21 | 4 | 4 | 333 |
| 6 - 15 | 7 | 4 | 6 | 6 | 5 | 18 | 32 | 14 | 17 | 53 | 37 | 11 | 29 | 30 | 18 | 4 | 291 |
| 16 - 25 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 7 | 0 | 1 | 5 | 6 | 1 | 8 | 2 | 0 | 31 |
| 26 - 80 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 7 | 5 | 1 | 4 | 3 | 0 | 0 | 23 |
| > 81.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 4 |
| Totals | 13 | 19 | 12 | 16 | 12 | 20 | 58 | 46 | 41 | 76 | 104 | 76 | 94 | 63 | 24 | 8 | 682 |

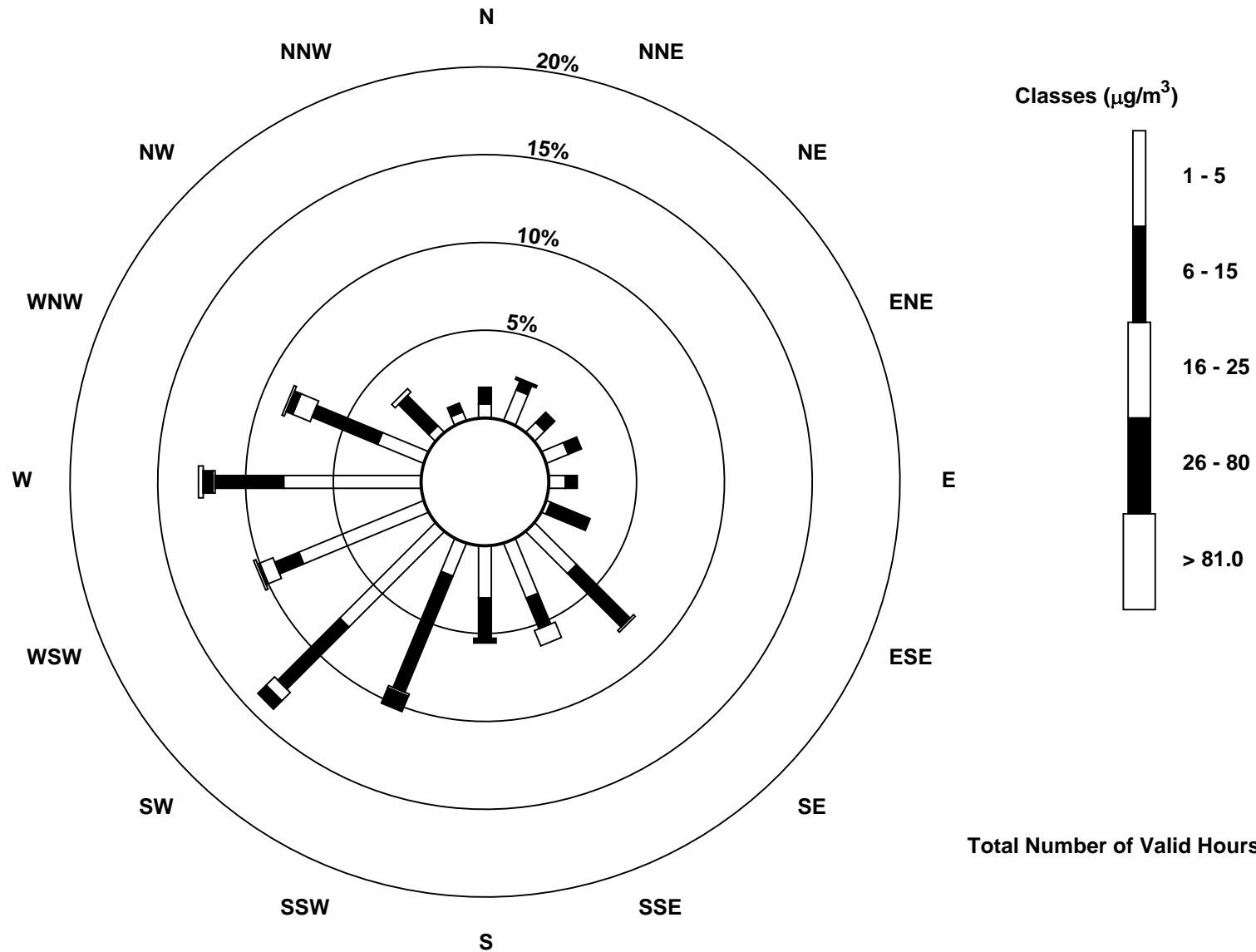
Total Number of Valid Hours: 741

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Stony Mountain (AMS 18)



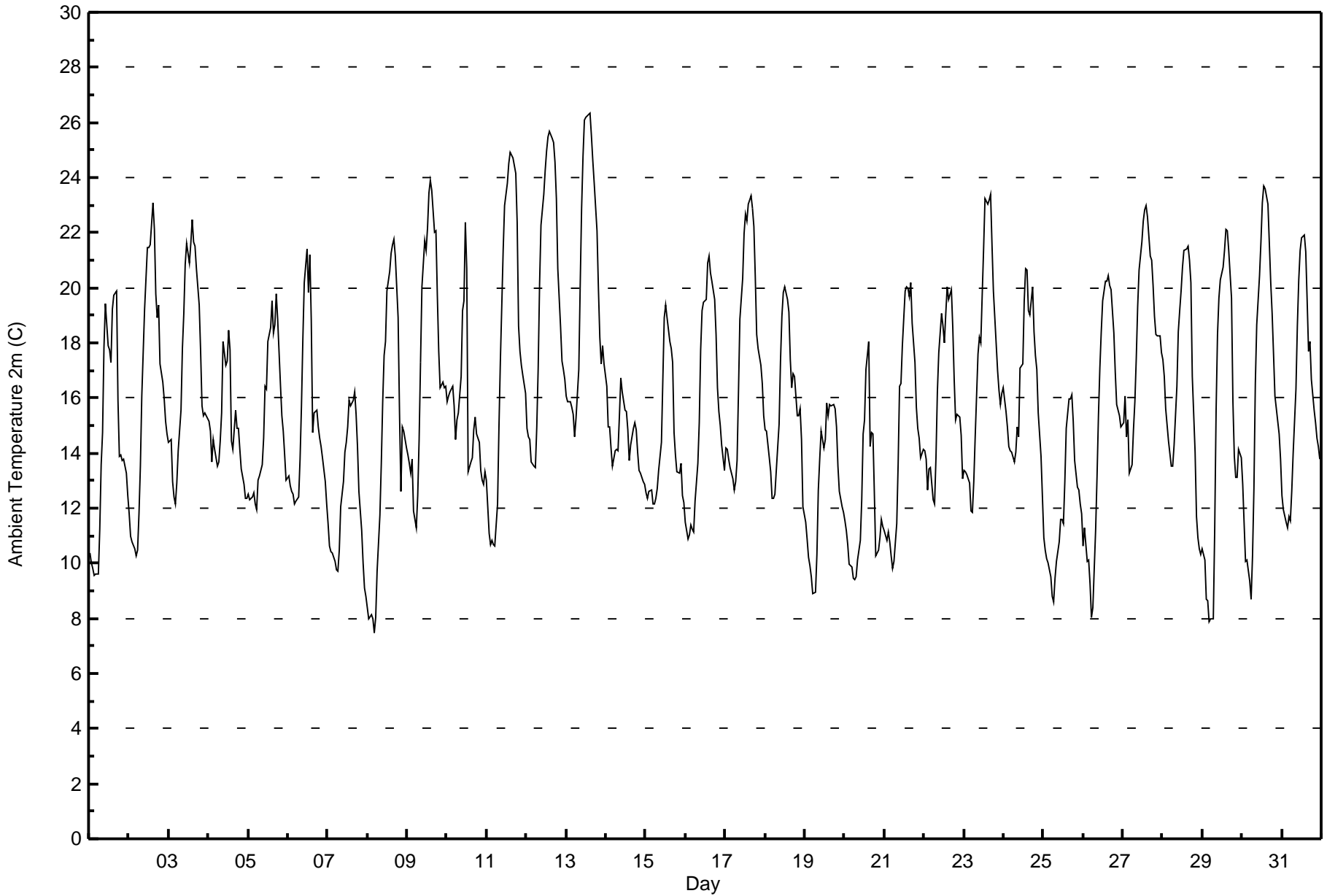


| Maximum Value: 26.4 C on Aug 13 15:00 Maximum Daily Average: 20.2 C on Aug 13 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: | 744 | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------------------|-------|------|---------------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|--|
| Minimum Value: 7.5 C on Aug 8 05:00 Minimum Daily Average: 12.0 C on Aug 25 | | | | | | | | | | | | | | | | | | | | | | Hours of Data: | 744 | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 20.3 C at hour 15 Minimum Diurnal Average: 11.4 C at hour 6 | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 15.77 C Percentiles: P ₁ = 8.0 P ₁₀ = 10.7 Q ₁ = 12.9 Median = 15.2 Q ₃ = 18.7 P ₉₀ = 21.5 P ₉₉ = 25.4 | | | | | | | | | | | | | | | | | | | | | | Hours of Calibration: | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: | 100.0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 10.4 | 10.0 | 9.8 | 9.6 | 9.6 | 9.6 | 11.2 | 13.6 | 14.7 | 17.9 | 19.4 | 17.9 | 17.8 | 17.3 | 19.2 | 19.7 | 19.9 | 15.9 | 13.9 | 13.9 | 13.7 | 13.8 | 13.3 | 12.5 | 14.4 | 19.9 | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 11.8 | 11.0 | 10.8 | 10.5 | 10.3 | 10.5 | 11.8 | 13.5 | 16.1 | 19.2 | 20.3 | 21.5 | 21.5 | 21.6 | 23.1 | 22.1 | 19.8 | 18.9 | 19.4 | 17.2 | 16.6 | 16.0 | 15.2 | 14.7 | 16.4 | 23.1 | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 14.4 | 14.5 | 13.0 | 12.4 | 12.1 | 12.9 | 14.1 | 15.6 | 17.8 | 19.1 | 20.9 | 21.6 | 20.9 | 21.6 | 22.5 | 21.7 | 21.5 | 20.7 | 19.4 | 17.7 | 15.7 | 15.4 | 15.5 | 15.3 | 17.3 | 22.5 | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 15.2 | 14.8 | 13.7 | 14.5 | 14.1 | 13.5 | 13.7 | 14.4 | 15.5 | 18.0 | 17.2 | 17.4 | 18.4 | 17.7 | 14.4 | 14.1 | 15.6 | 14.9 | 14.9 | 14.1 | 13.4 | 12.9 | 12.4 | 12.4 | 14.9 | 18.4 | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 12.5 | 12.3 | 12.4 | 12.5 | 12.2 | 11.9 | 13.0 | 13.2 | 13.6 | 14.5 | 16.4 | 16.3 | 18.0 | 18.6 | 19.5 | 18.3 | 18.6 | 19.8 | 18.9 | 18.9 | 16.5 | 15.3 | 14.8 | 13.9 | 13.0 | 15.3 | 19.8 | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 13.2 | 12.8 | 12.6 | 12.5 | 12.2 | 12.3 | 12.4 | 13.8 | 15.7 | 18.2 | 20.2 | 21.4 | 19.9 | 21.2 | 18.8 | 14.7 | 15.5 | 15.5 | 14.9 | 14.5 | 14.2 | 13.8 | 13.0 | 12.2 | 15.2 | 21.4 | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 11.4 | 10.6 | 10.4 | 10.4 | 10.1 | 9.8 | 9.7 | 10.5 | 12.0 | 13.0 | 14.0 | 14.4 | 14.9 | 15.9 | 15.7 | 15.9 | 16.2 | 15.4 | 14.2 | 12.6 | 11.2 | 10.0 | 9.1 | 8.8 | 12.3 | 16.2 | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 8.4 | 8.0 | 8.1 | 8.0 | 7.5 | 8.0 | 9.7 | 11.8 | 13.6 | 15.9 | 17.6 | 18.1 | 19.9 | 20.6 | 21.3 | 21.5 | 21.8 | 21.2 | 18.9 | 15.4 | 12.6 | 14.9 | 14.8 | 14.2 | 14.7 | 21.8 | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 13.9 | 13.6 | 13.3 | 13.8 | 11.9 | 11.3 | 12.5 | 14.5 | 17.3 | 20.0 | 21.7 | 21.4 | 22.2 | 23.5 | 23.9 | 23.5 | 22.0 | 22.1 | 19.7 | 17.7 | 16.4 | 16.6 | 16.4 | 16.4 | 17.7 | 23.9 | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 15.9 | 16.1 | 16.2 | 16.4 | 15.7 | 14.5 | 15.2 | 15.4 | 16.8 | 19.2 | 19.5 | 22.4 | 20.7 | 13.3 | 13.7 | 13.8 | 14.9 | 15.3 | 14.7 | 14.4 | 13.4 | 13.0 | 12.9 | 13.3 | 15.7 | 22.4 | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 13.0 | 11.1 | 10.7 | 10.8 | 10.7 | 10.6 | 12.1 | 15.0 | 17.3 | 19.3 | 21.4 | 23.0 | 23.8 | 24.5 | 24.9 | 24.8 | 24.7 | 24.1 | 22.4 | 18.6 | 17.7 | 17.2 | 16.9 | 16.2 | 17.9 | 24.9 | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 14.9 | 14.6 | 14.5 | 13.7 | 13.5 | 13.5 | 14.9 | 17.1 | 20.1 | 22.2 | 23.4 | 24.3 | 25.0 | 25.5 | 25.7 | 25.4 | 25.3 | 24.6 | 23.2 | 20.7 | 18.6 | 17.3 | 17.0 | 16.7 | 19.7 | 25.7 | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 16.0 | 15.9 | 15.9 | 15.7 | 15.4 | 14.6 | 15.2 | 17.0 | 20.1 | 22.9 | 24.7 | 26.1 | 26.2 | 26.3 | 26.4 | 25.5 | 24.6 | 23.8 | 22.1 | 20.0 | 18.2 | 17.3 | 17.9 | 17.2 | 20.2 | 26.4 | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 16.4 | 14.9 | 15.0 | 14.2 | 13.5 | 14.1 | 14.1 | 14.1 | 15.3 | 16.7 | 16.2 | 15.6 | 15.5 | 14.9 | 13.7 | 14.3 | 14.9 | 15.1 | 14.9 | 14.0 | 13.4 | 13.3 | 13.0 | 12.8 | 14.6 | 16.7 | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 12.6 | 12.4 | 12.6 | 12.6 | 12.2 | 12.2 | 12.4 | 12.7 | 13.4 | 14.4 | 16.7 | 18.9 | 19.3 | 18.9 | 18.1 | 17.8 | 17.3 | 14.7 | 13.9 | 13.3 | 13.3 | 13.6 | 12.5 | 12.2 | 14.5 | 19.3 | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 11.5 | 10.9 | 11.0 | 11.4 | 11.3 | 11.1 | 12.3 | 13.7 | 15.1 | 17.7 | 19.2 | 19.5 | 19.6 | 20.9 | 21.2 | 20.6 | 20.2 | 19.6 | 18.3 | 16.4 | 15.5 | 15.0 | 14.3 | 13.4 | 15.8 | 21.2 | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 14.2 | 14.1 | 13.8 | 13.5 | 13.1 | 12.6 | 13.0 | 13.7 | 16.2 | 18.9 | 20.3 | 21.9 | 22.7 | 22.4 | 23.0 | 23.3 | 22.9 | 22.2 | 20.4 | 18.3 | 17.8 | 17.2 | 16.5 | 15.3 | 17.8 | 23.3 | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 14.8 | 14.8 | 13.8 | 13.3 | 12.4 | 12.3 | 12.5 | 13.4 | 15.1 | 17.3 | 18.9 | 19.8 | 20.0 | 19.6 | 19.1 | 17.4 | 16.4 | 16.9 | 16.8 | 15.4 | 15.4 | 15.6 | 14.5 | 12.0 | 15.7 | 20.0 | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 11.5 | 10.9 | 10.2 | 9.9 | 9.5 | 8.9 | 8.9 | 10.3 | 12.6 | 13.8 | 14.8 | 14.2 | 14.5 | 15.8 | 15.3 | 15.8 | 15.7 | 15.8 | 15.6 | 14.9 | 13.6 | 12.6 | 12.0 | 11.8 | 12.9 | 15.8 | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 11.6 | 11.2 | 10.7 | 10.0 | 9.9 | 9.4 | 9.4 | 9.5 | 10.1 | 10.8 | 12.3 | 14.7 | 15.2 | 17.0 | 18.1 | 14.3 | 14.8 | 14.7 | 12.6 | 10.3 | 10.5 | 10.9 | 11.6 | 11.4 | 12.1 | 18.1 | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 11.2 | 10.9 | 11.2 | 10.8 | 10.3 | 9.8 | 10.1 | 11.4 | 13.7 | 16.4 | 16.5 | 17.9 | 19.9 | 20.0 | 20.0 | 19.7 | 20.2 | 18.7 | 17.3 | 15.7 | 14.9 | 14.5 | 13.8 | 14.1 | 15.0 | 20.2 | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 14.1 | 13.8 | 12.7 | 13.4 | 13.5 | 12.3 | 12.1 | 13.8 | 16.2 | 17.7 | 19.1 | 18.6 | 18.0 | 19.1 | 20.1 | 19.6 | 19.9 | 18.6 | 16.7 | 15.2 | 15.4 | 15.3 | 14.6 | 13.1 | 16.0 | 20.1 | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 13.4 | 13.3 | 13.2 | 12.9 | 11.9 | 11.9 | 13.0 | 14.6 | 17.6 | 18.2 | 18.0 | 19.8 | 21.4 | 23.2 | 23.0 | 23.2 | 23.4 | 21.5 | 19.9 | 18.0 | 17.0 | 16.3 | 15.8 | 16.2 | 17.4 | 23.4 | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 16.4 | 15.5 | 15.0 | 14.3 | 14.1 | 14.0 | 13.7 | 14.0 | 15.0 | 14.6 | 17.1 | 17.2 | 19.5 | 20.7 | 20.6 | 19.2 | 19.0 | 20.0 | 18.4 | 17.6 | 17.0 | 15.5 | 13.9 | 12.4 | 16.4 | 20.7 | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 10.9 | 10.5 | 10.2 | 10.0 | 9.5 | 8.8 | 8.6 | 9.5 | 10.1 | 10.8 | 11.6 | 11.6 | 11.4 | 13.0 | 14.9 | 16.0 | 15.9 | 16.1 | 15.2 | 13.7 | 12.8 | 12.6 | 12.2 | 11.8 | 12.0 | 16.1 | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 10.6 | 11.3 | 10.1 | 10.1 | 9.3 | 8.0 | 8.4 | 11.2 | 13.2 | 15.3 | 17.1 | 18.4 | 19.5 | 20.3 | 20.2 | 20.4 | 20.1 | 20.0 | 18.3 | 16.9 | 15.8 | 15.6 | 15.3 | 14.9 | 15.0 | 20.4 | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 15.1 | 16.1 | 14.6 | 15.2 | 13.3 | 13.6 | 14.8 | 15.9 | 17.4 | 19.3 | 20.6 | 21.6 | 22.4 | 22.8 | 23.0 | 22.6 | 21.1 | 21.0 | 20.1 | 19.0 | 18.3 | 18.3 | 18.3 | 17.6 | 18.4 | 23.0 | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 17.4 | 16.8 | 15.6 | 14.4 | 14.0 | 13.5 | 13.5 | 14.3 | 16.4 | 18.4 | 19.2 | 19.9 | 20.7 | 21.3 | 21.4 | 21.5 | 21.0 | 20.2 | 16.8 | 14.0 | 11.7 | 10.9 | 10.5 | 10.3 | 16.4 | 21.5 | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 10.5 | 10.1 | 8.7 | 8.6 | 7.9 | 8.0 | 8.0 | 11.2 | 15.6 | 18.3 | 19.6 | 20.3 | 20.8 | 21.4 | 22.1 | 22.1 | 21.4 | 19.6 | 15.8 | 13.9 | 13.1 | 13.1 | 14.2 | 13.8 | 14.9 | 22.1 | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 12.8 | 11.4 | 10.1 | 10.1 | 9.4 | 8.7 | 10.3 | 12.7 | 16.5 | 18.6 | 20.5 | 21.7 | 23.1 | 23.7 | 23.6 | 23.0 | 21.6 | 20.2 | 19.0 | 17.6 | 16.1 | 15.2 | 14.7 | 13.8 | 16.4 | 23.7 | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 12.5 | 11.9 | 11.5 | 11.3 | 11.7 | 11.5 | 12.6 | 14.0 | 16.3 | 18.6 | 20.3 | 21.4 | 21.8 | 21.9 | 21.3 | 19.5 | 17.7 | 18.1 | 16.7 | 15.5 | 15.1 | 14.6 | 14.2 | 13.8 | 16.0 | 21.9 | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | 13.2 | 12.8 | 12.3 | 12.2 | 11.7 | 11.4 | 12.0 | 13.4 | 15.4 | 17.3 | 18.5 | 19.3 | 19.8 | 20.1 | 20.3 | 19.7 | 19.5 | 18.9 | 17.5 | 15.9 | 15.0 | 14.6 | 14.2 | 13.7 | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | | | | | 17.4 | 16.8 | 16.2 | 16.4 | 15.7 | 14.6 | 15.2 | 17.1 | 20.1 | 22.9 | 24.7 | 26.1 | 26.2 | 26.3 | 26.4 | 25.5 | 25.3 | 24.6 | 23.2 | 20.7 | 18.6 | 18.3 | 18.3 | 17.6 | Diurnal Maximum | |



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 2m (AT 2m) - C
Stony Mountain - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C
Stony Mountain - August 2017**

| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 39 | 5.24 | 5.24 |
| 10 - 20 | 575 | 77.28 | 82.53 |
| > 20 | 130 | 17.47 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744

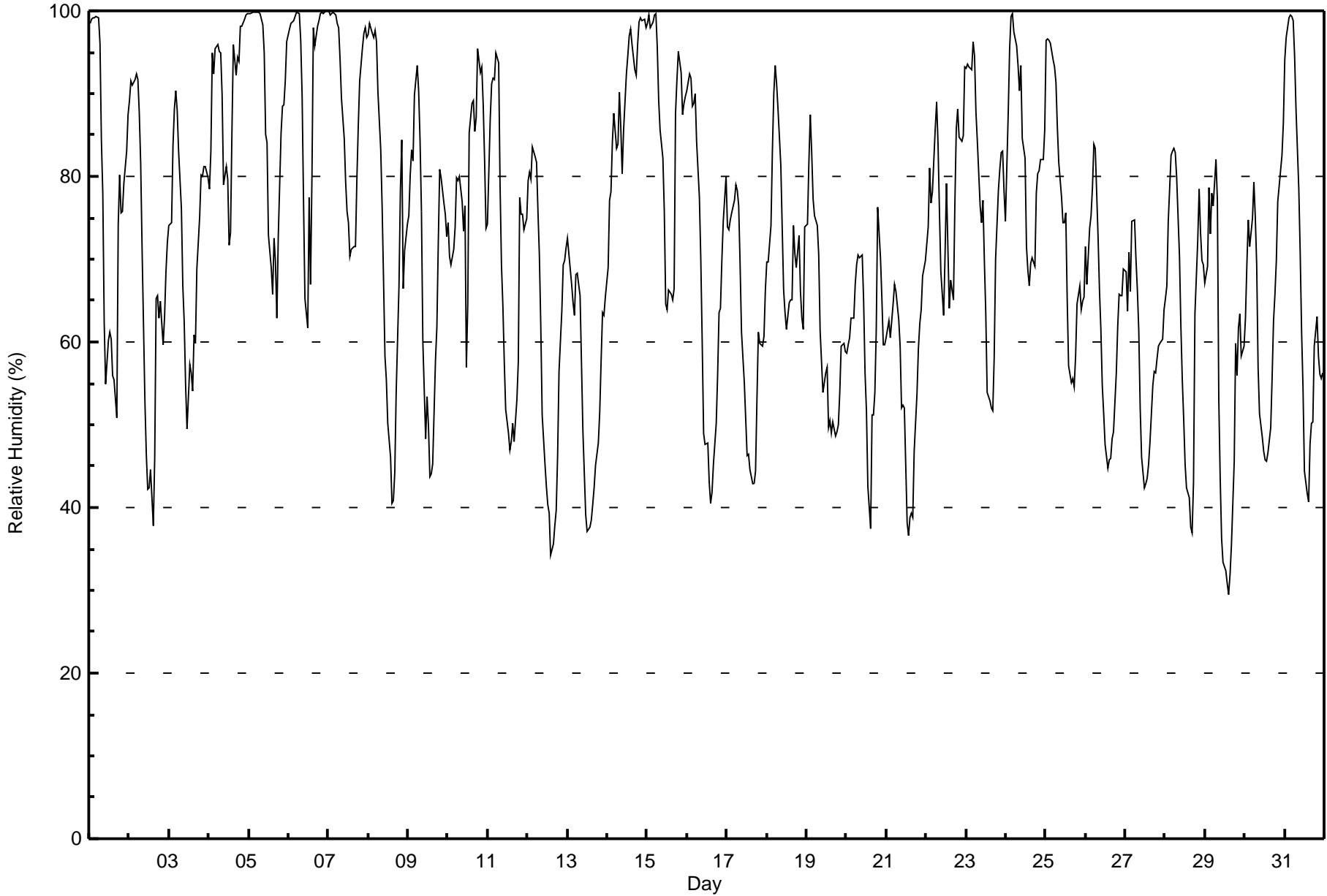


Wood Buffalo Environmental Association

Summary of Hour Averages

**Relative Humidity (RH) - %
Stony Mountain - August 2017**

| Maximum Value: 100 % on Aug 7 00:00 | | | | | | | | | | | | | | Maximum Daily Average: 91.5 % on Aug 6 | | | | | | | | | | | | | | Hours in Service: 744 | |
|---|-------------------------------|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|--|----|----|----|----|----|-----|-----|-----|-----|-----|---------------|---------------|--|---------------------------------|--|
| Minimum Value: 30 % on Aug 29 15:00 | | | | | | | | | | | | | | Minimum Daily Average: 55.0 % on Aug 13 | | | | | | | | | | | | | | Hours of Data: 744 | |
| Maximum Diurnal Average: 87.4 % at hour 6 | | | | | | | | | | | | | | Minimum Diurnal Average: 54.0 % at hour 15 | | | | | | | | | | | | | | Hours of Missing Data: 0 | |
| Monthly Average: 71.7 % | | | | | | | | | | | | | | Percentiles: P ₁ = 35 P ₁₀ = 46 Q ₁ = 59 Median = 72 O ₃ = 86 P ₉₀ = 96 P ₉₉ = 100 | | | | | | | | | | | | | | Hours of Calibration: 0 | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | |
| 1-Aug | 98 | 99 | 99 | 99 | 99 | 99 | 96 | 84 | 78 | 62 | 55 | 60 | 61 | 60 | 56 | 55 | 51 | 74 | 80 | 76 | 76 | 79 | 83 | 88 | 77.9 | 99 | | | |
| 2-Aug | 89 | 92 | 91 | 92 | 92 | 92 | 88 | 82 | 71 | 53 | 46 | 42 | 42 | 45 | 38 | 46 | 65 | 66 | 63 | 65 | 60 | 63 | 68 | 72 | 67.6 | 92 | | | |
| 3-Aug | 74 | 74 | 84 | 88 | 90 | 88 | 83 | 76 | 67 | 62 | 55 | 50 | 57 | 56 | 54 | 61 | 60 | 69 | 75 | 80 | 80 | 81 | 81 | 80 | 71.9 | 90 | | | |
| 4-Aug | 78 | 83 | 95 | 92 | 95 | 96 | 95 | 95 | 90 | 79 | 81 | 80 | 72 | 73 | 85 | 96 | 92 | 94 | 94 | 98 | 98 | 99 | 100 | 100 | 90.0 | 100 | | | |
| 5-Aug | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 98 | 95 | 85 | 84 | 73 | 69 | 66 | 73 | 70 | 63 | 73 | 85 | 88 | 89 | 91 | 96 | 87.3 | 100 | | | |
| 6-Aug | 98 | 99 | 99 | 99 | 99 | 100 | 100 | 96 | 90 | 77 | 65 | 62 | 77 | 67 | 80 | 98 | 96 | 98 | 99 | 100 | 100 | 100 | 100 | 100 | 91.5 | 100 | | | |
| 7-Aug | 100 | 99 | 100 | 100 | 100 | 99 | 98 | 94 | 89 | 85 | 79 | 76 | 74 | 70 | 71 | 72 | 72 | 80 | 86 | 92 | 96 | 97 | 98 | 97 | 88.4 | 100 | | | |
| 8-Aug | 97 | 98 | 97 | 97 | 98 | 96 | 90 | 83 | 76 | 68 | 58 | 55 | 50 | 46 | 41 | 41 | 44 | 54 | 67 | 78 | 84 | 66 | 71 | 74 | 72.1 | 98 | | | |
| 9-Aug | 75 | 80 | 83 | 82 | 90 | 93 | 90 | 84 | 76 | 60 | 48 | 53 | 50 | 44 | 44 | 45 | 58 | 62 | 72 | 81 | 80 | 77 | 75 | 73 | 69.8 | 93 | | | |
| 10-Aug | 74 | 70 | 69 | 71 | 74 | 80 | 79 | 80 | 77 | 73 | 76 | 57 | 65 | 85 | 89 | 89 | 86 | 87 | 95 | 93 | 93 | 89 | 82 | 74 | 79.5 | 95 | | | |
| 11-Aug | 74 | 87 | 91 | 92 | 92 | 95 | 94 | 79 | 69 | 64 | 58 | 52 | 49 | 47 | 48 | 50 | 48 | 53 | 58 | 77 | 75 | 75 | 74 | 75 | 69.9 | 95 | | | |
| 12-Aug | 79 | 81 | 80 | 83 | 82 | 82 | 76 | 70 | 62 | 51 | 45 | 43 | 40 | 39 | 34 | 36 | 38 | 40 | 46 | 56 | 64 | 69 | 70 | 71 | 59.9 | 83 | | | |
| 13-Aug | 73 | 71 | 67 | 65 | 63 | 68 | 68 | 66 | 57 | 49 | 44 | 39 | 37 | 38 | 38 | 40 | 42 | 45 | 48 | 51 | 58 | 64 | 63 | 66 | 55.0 | 73 | | | |
| 14-Aug | 69 | 77 | 78 | 84 | 88 | 83 | 84 | 90 | 86 | 80 | 86 | 92 | 95 | 97 | 98 | 96 | 93 | 92 | 96 | 99 | 99 | 99 | 99 | 98 | 89.9 | 99 | | | |
| 15-Aug | 98 | 99 | 98 | 99 | 100 | 100 | 96 | 89 | 86 | 82 | 76 | 65 | 64 | 66 | 66 | 65 | 67 | 88 | 92 | 95 | 92 | 87 | 89 | 90 | 85.3 | 100 | | | |
| 16-Aug | 90 | 92 | 92 | 88 | 89 | 90 | 84 | 78 | 70 | 60 | 49 | 48 | 48 | 43 | 40 | 42 | 45 | 50 | 56 | 64 | 64 | 70 | 75 | 80 | 67.0 | 92 | | | |
| 17-Aug | 74 | 73 | 75 | 76 | 77 | 79 | 78 | 76 | 69 | 61 | 55 | 51 | 46 | 46 | 45 | 43 | 43 | 44 | 53 | 61 | 60 | 59 | 61 | 66 | 61.4 | 79 | | | |
| 18-Aug | 70 | 70 | 74 | 83 | 90 | 93 | 91 | 88 | 81 | 74 | 66 | 64 | 61 | 65 | 65 | 65 | 74 | 71 | 69 | 73 | 66 | 63 | 62 | 74 | 73.0 | 93 | | | |
| 19-Aug | 74 | 82 | 87 | 83 | 77 | 75 | 74 | 70 | 61 | 58 | 54 | 56 | 57 | 50 | 51 | 49 | 50 | 49 | 49 | 50 | 54 | 59 | 60 | 59 | 62.0 | 87 | | | |
| 20-Aug | 59 | 60 | 61 | 63 | 63 | 67 | 69 | 71 | 70 | 71 | 65 | 56 | 52 | 43 | 37 | 51 | 51 | 54 | 61 | 76 | 70 | 65 | 60 | 60 | 60.6 | 76 | | | |
| 21-Aug | 61 | 63 | 61 | 63 | 65 | 67 | 66 | 63 | 60 | 52 | 52 | 52 | 38 | 37 | 39 | 39 | 39 | 47 | 54 | 59 | 62 | 64 | 68 | 70 | 55.8 | 70 | | | |
| 22-Aug | 72 | 74 | 81 | 77 | 78 | 86 | 89 | 84 | 76 | 68 | 63 | 71 | 79 | 72 | 64 | 67 | 65 | 77 | 86 | 88 | 85 | 84 | 85 | 93 | 77.6 | 93 | | | |
| 23-Aug | 93 | 94 | 93 | 93 | 96 | 95 | 88 | 84 | 76 | 74 | 77 | 70 | 63 | 54 | 53 | 52 | 52 | 58 | 70 | 78 | 81 | 83 | 83 | 78 | 76.6 | 96 | | | |
| 24-Aug | 75 | 88 | 95 | 99 | 100 | 97 | 96 | 93 | 90 | 93 | 85 | 82 | 72 | 69 | 67 | 70 | 69 | 78 | 80 | 81 | 82 | 82 | 86 | 86 | 83.2 | 100 | | | |
| 25-Aug | 96 | 97 | 97 | 96 | 94 | 93 | 91 | 86 | 82 | 77 | 74 | 74 | 76 | 65 | 57 | 55 | 56 | 55 | 58 | 64 | 67 | 64 | 65 | 65 | 75.2 | 97 | | | |
| 26-Aug | 71 | 67 | 74 | 75 | 79 | 84 | 83 | 73 | 66 | 62 | 55 | 51 | 48 | 45 | 46 | 46 | 48 | 49 | 56 | 62 | 66 | 66 | 66 | 69 | 62.7 | 84 | | | |
| 27-Aug | 69 | 64 | 71 | 66 | 75 | 75 | 70 | 66 | 61 | 52 | 46 | 42 | 43 | 44 | 45 | 48 | 55 | 56 | 56 | 58 | 59 | 60 | 60 | 64 | 58.6 | 75 | | | |
| 28-Aug | 65 | 67 | 75 | 83 | 83 | 83 | 83 | 80 | 70 | 62 | 55 | 51 | 45 | 42 | 41 | 38 | 37 | 43 | 63 | 72 | 79 | 73 | 70 | 69 | 63.7 | 83 | | | |
| 29-Aug | 67 | 69 | 79 | 73 | 78 | 77 | 82 | 77 | 53 | 44 | 36 | 33 | 32 | 31 | 30 | 32 | 35 | 46 | 60 | 56 | 62 | 63 | 58 | 59 | 55.5 | 82 | | | |
| 30-Aug | 63 | 69 | 75 | 72 | 75 | 79 | 75 | 69 | 57 | 51 | 48 | 47 | 46 | 46 | 47 | 50 | 56 | 63 | 66 | 70 | 77 | 81 | 82 | 86 | 64.5 | 86 | | | |
| 31-Aug | 94 | 97 | 99 | 100 | 99 | 99 | 95 | 88 | 79 | 71 | 61 | 54 | 44 | 42 | 41 | 48 | 50 | 50 | 59 | 63 | 58 | 56 | 56 | 56 | 69.1 | 100 | | | |
| | | | | | | | | | | | | | | 79.7 81.7 84.4 84.9 86.4 87.4 85.5 81.2 74.0 66.8 61.3 58.4 56.7 54.6 54.0 56.7 58.3 62.7 69.0 74.2 75.3 75.1 75.3 77.0 | | | | | | | | | | | | | | Diurnal Average | |
| | | | | | | | | | | | | | | 100 100 100 100 100 100 100 100 100 98 95 86 92 95 97 98 98 96 98 99 100 100 100 100 100 | | | | | | | | | | | | | | Diurnal Maximum | |





Wood Buffalo Environmental Association

Summary of Hour Averages

Precipitation (PC) - mm

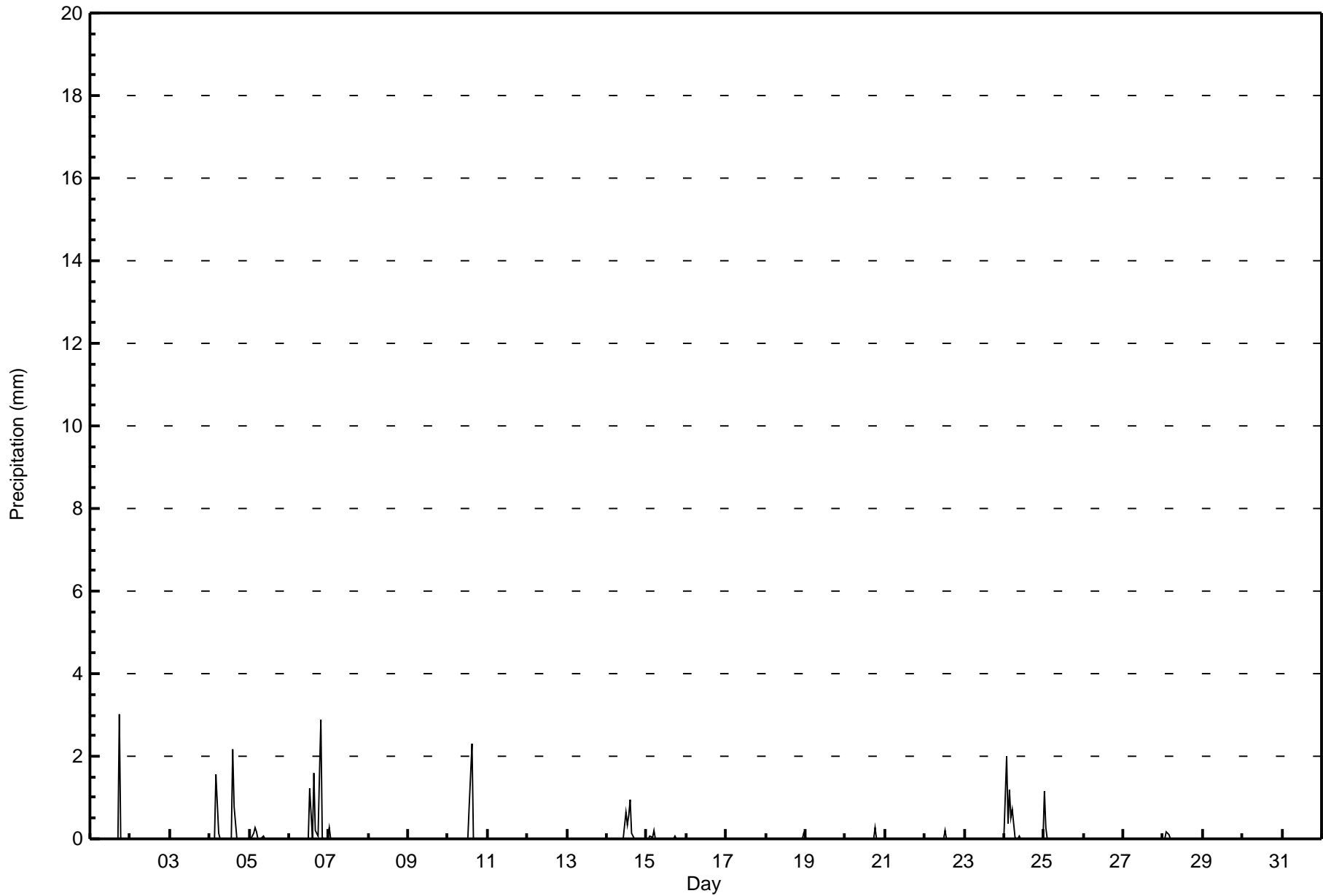
Stony Mountain - August 2017

| Maximum Value: 3.0 mm on Aug 1 18:00 | | | | | | | | | | | | | | | | | | | Maximum Daily Total: 8.2 mm on Aug 6 | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|-----|-----|-----|-----|-----|---------------------------------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|--|
| Minimum Value: 0.0 mm on Aug 1 01:00 | | | | | | | | | | | | | | | | | | | Minimum Daily Total: 0.0 mm on Aug 2 | | | | | | Hours of Data: 744 | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Total: 5.5 mm at hour 15 | | | | | | | | | | | | | | | | | | | Minimum Diurnal Total: 0.0 mm at hour 8 | | | | | | Hours of Missing Data: 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Total: 30.18 mm | | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 1.6 | | | | | | Hours of Calibration: 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 3.0 | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 1.6 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.2 | 0.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.7 | 2.2 | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 0.0 | 0.0 | 0.1 | 0.3 | 0.2 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.7 | 0.3 | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.2 | 0.6 | 0.0 | 1.6 | 0.2 | 0.1 | 1.6 | 2.9 | 0.0 | 0.0 | 0.0 | 0.1 | 8.2 | 2.9 | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.3 | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.8 | 2.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.2 | 2.3 | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.6 | 0.3 | 0.6 | 1.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.6 | 1.0 | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 0.0 | 0.0 | 0.1 | 0.1 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 0.2 | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.3 | 0.3 | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.2 | 0.2 | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 0.0 | 2.0 | 0.4 | 1.2 | 0.5 | 0.7 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.9 | 2.0 | 4.9 | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 1.1 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.4 | 1.1 | 1.4 | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 0.0 | 0.0 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.2 | 0.3 | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 1.4 | 2.3 | 0.7 | 1.6 | 2.5 | 0.9 | 0.1 | 0.0 | 0.1 | 0.1 | 0.0 | 0.6 | 1.8 | 2.0 | 5.5 | 2.5 | 0.2 | 3.1 | 1.8 | 2.9 | 0.0 | 0.0 | 0.0 | 0.2 | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | | | | | | | 1.1 | 2.0 | 0.4 | 1.2 | 1.6 | 0.7 | 0.1 | 0.0 | 0.1 | 0.1 | 0.0 | 0.6 | 1.2 | 0.8 | 2.3 | 1.6 | 0.2 | 3.0 | 1.6 | 2.9 | 0.0 | 0.0 | 0.0 | 0.1 | Diurnal Maximum | |



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Stony Mountain - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Precipitation (PC) - mm
Stony Mountain - August 2017**

| Concentration Ranges (mm) | Number of Hours | % | Cumulative % |
|----------------------------------|------------------------|----------|---------------------|
| 0 - 0.3 | 724 | 97.31 | 97.31 |
| 0.4 - 0.5 | 2 | 0.27 | 97.58 |
| 0.6 - 0.7 | 4 | 0.54 | 98.12 |
| 0.8 - 1.4 | 6 | 0.81 | 98.92 |
| 1.5 - 10 | 8 | 1.08 | 100.00 |
| > 10 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



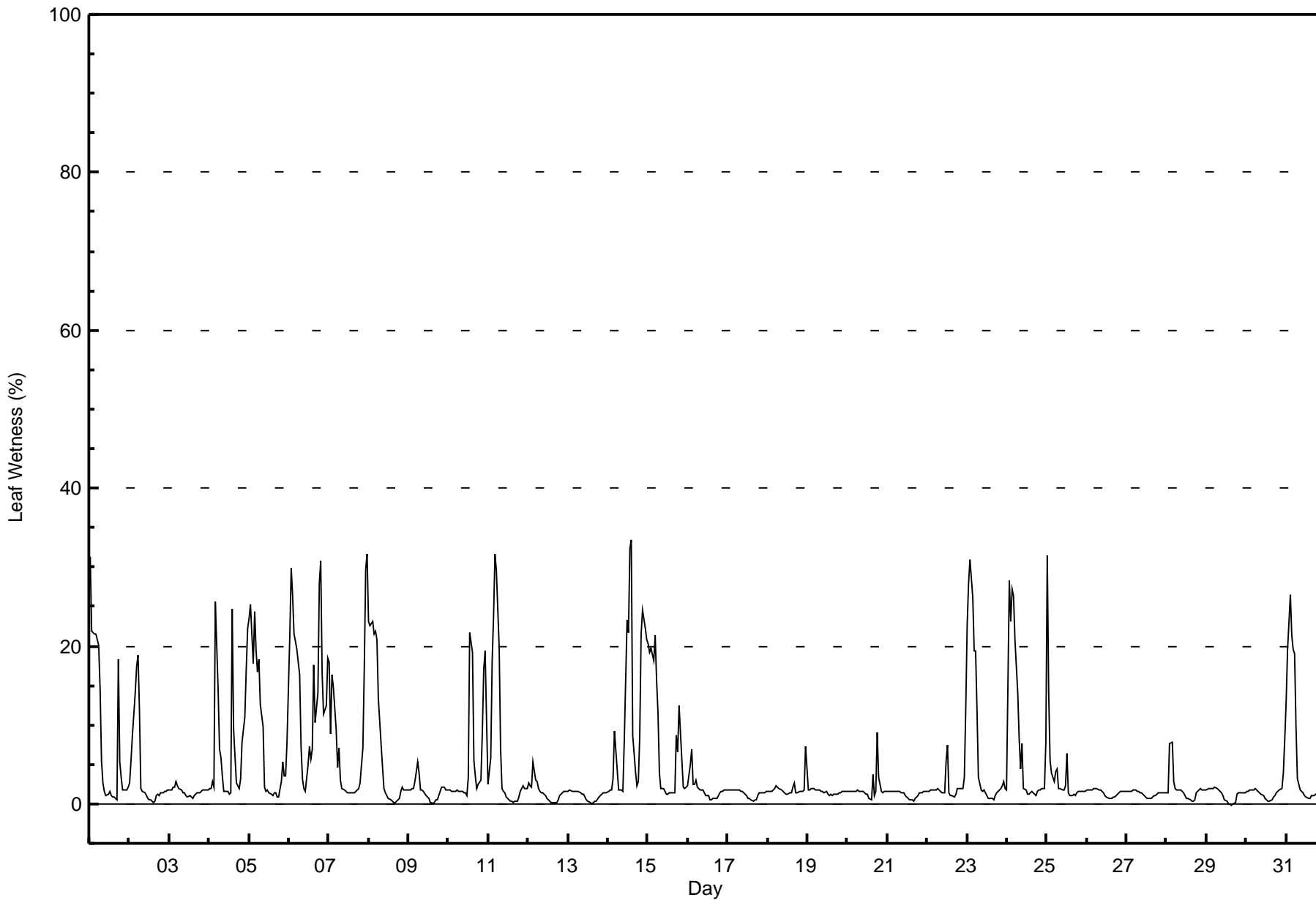
Wood Buffalo Environmental Association

Summary of Hour Averages

Leaf Wetness (LW) - %

Stony Mountain - August 2017

| Maximum Value: 33 % on Aug 14 15:00 | | | | | | | | | | | | | | | | | Maximum Daily Average: 14.7 % on Aug 6 | | | | | | | | | | Hours in Service: 744 | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|----|----|----|----|----|----|-----------------|---------------|---------------|---------------------------------|--|
| Minimum Value: 0 % on Aug 29 16:00 | | | | | | | | | | | | | | | | | Minimum Daily Average: 1.1 % on Aug 13 | | | | | | | | | | Hours of Data: 744 | |
| Maximum Diurnal Average: 9.7 % at hour 5 | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 1.4 % at hour 17 | | | | | | | | | | Hours of Missing Data: 0 | |
| Monthly Average: 4.5 % | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 17 P ₉₉ = 31 | | | | | | | | | | Hours of Calibration: 0 | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | |
| 1-Aug | 31 | 22 | 22 | 22 | 21 | 20 | 15 | 6 | 3 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 18 | 5 | 3 | 2 | 2 | 2 | 2 | 8.5 | 31 | | |
| 2-Aug | 3 | 5 | 9 | 14 | 17 | 19 | 12 | 2 | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 4.1 | 19 | | |
| 3-Aug | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 1.6 | 3 | | |
| 4-Aug | 2 | 2 | 3 | 2 | 26 | 14 | 7 | 6 | 4 | 2 | 2 | 2 | 1 | 1 | 25 | 9 | 3 | 2 | 2 | 3 | 8 | 11 | 17 | 22 | 7.3 | 26 | | |
| 5-Aug | 24 | 25 | 18 | 24 | 19 | 17 | 18 | 13 | 10 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 5 | 3 | 3 | 8 | 8.5 | 25 | | |
| 6-Aug | 21 | 30 | 26 | 22 | 21 | 20 | 16 | 7 | 3 | 2 | 2 | 5 | 7 | 6 | 7 | 18 | 10 | 14 | 28 | 31 | 17 | 11 | 12 | 19 | 14.7 | 31 | | |
| 7-Aug | 18 | 9 | 16 | 15 | 9 | 5 | 7 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 7 | 17 | 30 | 32 | 7.8 | 32 | | | |
| 8-Aug | 23 | 23 | 23 | 22 | 22 | 21 | 13 | 7 | 5 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 2 | 2 | 2 | 2 | 7.3 | 23 | | |
| 9-Aug | 2 | 2 | 2 | 2 | 3 | 5 | 4 | 2 | 2 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 1.6 | 5 | | |
| 10-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 3 | 22 | 19 | 6 | 3 | 2 | 2 | 3 | 9 | 17 | 19 | 11 | 5.6 | 22 | | |
| 11-Aug | 3 | 6 | 18 | 24 | 32 | 30 | 20 | 7 | 2 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 2 | 2 | 2 | 2 | 6.5 | 32 | | |
| 12-Aug | 3 | 2 | 2 | 5 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 1.5 | 5 | | |
| 13-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1.1 | 2 | | |
| 14-Aug | 2 | 2 | 2 | 3 | 9 | 4 | 2 | 2 | 2 | 2 | 8 | 23 | 22 | 32 | 33 | 9 | 4 | 2 | 3 | 8 | 21 | 25 | 22 | 21 | 11.0 | 33 | | |
| 15-Aug | 20 | 19 | 20 | 18 | 21 | 16 | 12 | 4 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 9 | 7 | 12 | 5 | 2 | 2 | 2 | 7.6 | 21 | | |
| 16-Aug | 2 | 5 | 7 | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 1.9 | 7 | | |
| 17-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 1.3 | 2 | | |
| 18-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 1 | 1 | 2 | 2 | 2 | 2 | 7 | 1.9 | 7 | | |
| 19-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 1.5 | 2 | | |
| 20-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 4 | 1 | 2 | 9 | 3 | 2 | 1 | 2 | 2 | 1.9 | 9 | | |
| 21-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1.2 | 2 | | |
| 22-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 5 | 8 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 12 | 2.5 | 12 | | |
| 23-Aug | 23 | 28 | 31 | 26 | 19 | 19 | 12 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 2 | 7.7 | 31 | | |
| 24-Aug | 2 | 28 | 23 | 27 | 26 | 21 | 14 | 8 | 4 | 8 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 8 | 7.9 | 28 | | | |
| 25-Aug | 31 | 14 | 6 | 4 | 3 | 4 | 4 | 2 | 2 | 2 | 2 | 2 | 6 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 4.1 | 31 | | |
| 26-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 1.4 | 2 | | |
| 27-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.3 | 2 | | |
| 28-Aug | 1 | 1 | 8 | 8 | 3 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 2 | 2 | 2 | 2 | 2 | 1.9 | 8 | | |
| 29-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1.2 | 2 | | |
| 30-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 4 | 8 | 1.7 | 8 | | |
| 31-Aug | 13 | 20 | 26 | 21 | 19 | 19 | 10 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 6.3 | 26 | | |
| 7.9 8.5 9.2 9.1 9.7 8.6 6.3 3.3 2.2 1.8 1.6 2.1 2.3 2.6 3.3 2.1 1.4 2.3 2.8 3.3 3.6 4.1 4.9 5.9 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | |
| 31 30 31 27 32 30 20 13 10 8 8 23 22 32 33 18 10 18 28 31 21 25 30 32 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | |





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Leaf Wetness (LW) - %
Stony Mountain - August 2017

| Concentration Ranges (%) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 0.3 | 27 | 3.64 | 3.64 |
| 0.4 - 0.5 | 24 | 3.24 | 6.88 |
| 0.6 - 0.7 | 31 | 4.18 | 11.07 |
| 0.8 - 1.4 | 163 | 22.00 | 33.06 |
| 1.5 - 10 | 366 | 49.39 | 82.46 |
| > 10 | 103 | 13.90 | 96.36 |

Total Number of Valid Hours: 741

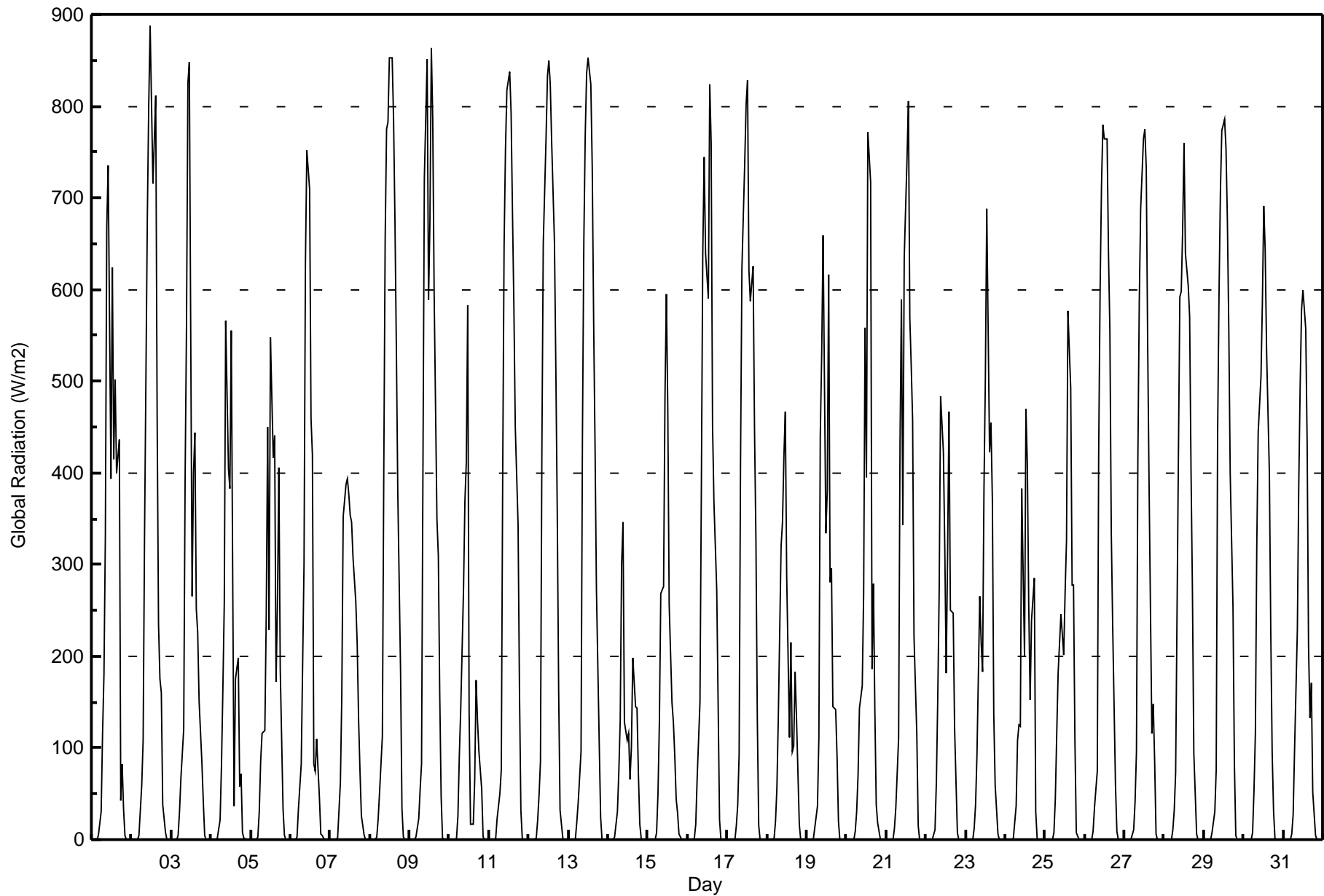
Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

Global Radiation (GR) - W/m2
Stony Mountain - August 2017

| Maximum Value: 888 W/m2 on Aug 2 12:00 | | | | | | | | | | | | | | Maximum Daily Average: 296.1 W/m2 on Aug 8 | | | | | | | | | | | | | | Hours in Service: 744 | |
|--|-------------------------------|---|---|---|---|----|-----|-----|-----|-----|-----|-----|-----|---|-----|-----|-----|-----|-----|----|----|----|----|----|---------------|---------------|--|---------------------------------|--|
| Minimum Value: 0 W/m2 on Aug 2 23:00 | | | | | | | | | | | | | | Minimum Daily Average: 82.3 W/m2 on Aug 14 | | | | | | | | | | | | | | Hours of Data: 744 | |
| Maximum Diurnal Average: 569.3 W/m2 at hour 12 | | | | | | | | | | | | | | Minimum Diurnal Average: 0.0 W/m2 at hour 23 | | | | | | | | | | | | | | Hours of Missing Data: 0 | |
| Monthly Average: 196.2 W/m2 | | | | | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 56 Q ₃ = 369 P ₉₀ = 638 P ₉₉ = 849 | | | | | | | | | | | | | | Hours of Calibration: 0 | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | |
| 1-Aug | 0 | 0 | 0 | 0 | 5 | 30 | 116 | 180 | 330 | 668 | 735 | 393 | 624 | 415 | 502 | 399 | 436 | 42 | 83 | 34 | 5 | 0 | 0 | 0 | 208.3 | 735 | | | |
| 2-Aug | 0 | 0 | 0 | 0 | 5 | 31 | 60 | 108 | 330 | 679 | 801 | 888 | 802 | 715 | 811 | 463 | 235 | 176 | 161 | 39 | 8 | 0 | 0 | 0 | 263.1 | 888 | | | |
| 3-Aug | 0 | 0 | 0 | 0 | 4 | 31 | 67 | 120 | 393 | 562 | 825 | 848 | 266 | 399 | 444 | 251 | 225 | 150 | 84 | 42 | 4 | 0 | 0 | 0 | 196.5 | 848 | | | |
| 4-Aug | 0 | 0 | 0 | 0 | 2 | 22 | 82 | 164 | 257 | 566 | 404 | 383 | 556 | 291 | 36 | 175 | 198 | 58 | 72 | 8 | 1 | 0 | 0 | 0 | 136.5 | 566 | | | |
| 5-Aug | 0 | 0 | 0 | 0 | 3 | 30 | 86 | 115 | 119 | 246 | 450 | 228 | 547 | 417 | 440 | 173 | 256 | 406 | 186 | 33 | 4 | 0 | 0 | 0 | 155.8 | 547 | | | |
| 6-Aug | 0 | 0 | 0 | 0 | 3 | 34 | 82 | 191 | 301 | 629 | 752 | 709 | 459 | 419 | 82 | 75 | 110 | 45 | 7 | 5 | 1 | 0 | 0 | 0 | 162.7 | 752 | | | |
| 7-Aug | 0 | 0 | 0 | 0 | 2 | 32 | 63 | 157 | 352 | 387 | 394 | 377 | 354 | 347 | 309 | 259 | 214 | 131 | 75 | 26 | 4 | 0 | 0 | 0 | 145.1 | 394 | | | |
| 8-Aug | 0 | 0 | 0 | 0 | 3 | 23 | 52 | 113 | 399 | 656 | 775 | 782 | 853 | 853 | 785 | 675 | 535 | 382 | 183 | 34 | 3 | 0 | 0 | 0 | 296.1 | 853 | | | |
| 9-Aug | 0 | 0 | 0 | 0 | 3 | 22 | 55 | 83 | 404 | 722 | 851 | 588 | 674 | 864 | 786 | 597 | 350 | 310 | 159 | 48 | 2 | 0 | 0 | 0 | 271.6 | 864 | | | |
| 10-Aug | 0 | 0 | 0 | 0 | 2 | 25 | 91 | 142 | 273 | 370 | 412 | 583 | 139 | 17 | 17 | 66 | 175 | 130 | 96 | 56 | 2 | 0 | 0 | 0 | 108.2 | 583 | | | |
| 11-Aug | 0 | 0 | 0 | 0 | 2 | 22 | 50 | 77 | 396 | 648 | 753 | 818 | 837 | 793 | 683 | 581 | 450 | 343 | 161 | 33 | 2 | 0 | 0 | 0 | 277.1 | 837 | | | |
| 12-Aug | 0 | 0 | 0 | 0 | 2 | 22 | 49 | 86 | 422 | 650 | 766 | 833 | 850 | 824 | 761 | 652 | 513 | 357 | 163 | 32 | 2 | 0 | 0 | 0 | 291.0 | 850 | | | |
| 13-Aug | 0 | 0 | 0 | 0 | 1 | 19 | 42 | 97 | 439 | 653 | 769 | 835 | 852 | 824 | 734 | 568 | 430 | 273 | 105 | 24 | 1 | 0 | 0 | 0 | 277.7 | 852 | | | |
| 14-Aug | 0 | 0 | 0 | 0 | 2 | 30 | 73 | 130 | 300 | 346 | 128 | 109 | 117 | 65 | 100 | 198 | 145 | 143 | 72 | 17 | 1 | 0 | 0 | 0 | 82.3 | 346 | | | |
| 15-Aug | 0 | 0 | 0 | 0 | 0 | 7 | 50 | 128 | 269 | 277 | 483 | 596 | 470 | 256 | 149 | 128 | 91 | 44 | 29 | 6 | 0 | 0 | 0 | 0 | 124.3 | 596 | | | |
| 16-Aug | 0 | 0 | 0 | 0 | 1 | 17 | 68 | 149 | 384 | 638 | 745 | 638 | 591 | 823 | 760 | 452 | 368 | 272 | 146 | 21 | 1 | 0 | 0 | 0 | 253.0 | 823 | | | |
| 17-Aug | 0 | 0 | 0 | 0 | 1 | 16 | 37 | 93 | 411 | 624 | 738 | 802 | 828 | 621 | 587 | 625 | 447 | 327 | 131 | 16 | 0 | 0 | 0 | 0 | 262.7 | 828 | | | |
| 18-Aug | 0 | 0 | 0 | 0 | 1 | 20 | 57 | 132 | 320 | 347 | 418 | 466 | 287 | 112 | 215 | 97 | 103 | 183 | 132 | 16 | 0 | 0 | 0 | 0 | 121.1 | 466 | | | |
| 19-Aug | 0 | 0 | 0 | 0 | 0 | 13 | 36 | 111 | 441 | 527 | 660 | 334 | 381 | 617 | 280 | 296 | 146 | 142 | 91 | 19 | 0 | 0 | 0 | 0 | 170.6 | 660 | | | |
| 20-Aug | 0 | 0 | 0 | 0 | 0 | 9 | 31 | 71 | 144 | 168 | 268 | 558 | 395 | 771 | 716 | 186 | 279 | 141 | 39 | 19 | 0 | 0 | 0 | 0 | 158.2 | 771 | | | |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | 13 | 35 | 112 | 433 | 589 | 344 | 634 | 743 | 805 | 569 | 517 | 458 | 222 | 115 | 16 | 0 | 0 | 0 | 0 | 233.6 | 805 | | | |
| 22-Aug | 0 | 0 | 0 | 0 | 0 | 10 | 65 | 157 | 272 | 484 | 422 | 317 | 182 | 313 | 467 | 250 | 248 | 121 | 64 | 7 | 0 | 0 | 0 | 0 | 140.8 | 484 | | | |
| 23-Aug | 0 | 0 | 0 | 0 | 0 | 12 | 38 | 93 | 266 | 215 | 183 | 381 | 504 | 689 | 422 | 455 | 371 | 137 | 59 | 5 | 0 | 0 | 0 | 0 | 159.7 | 689 | | | |
| 24-Aug | 0 | 0 | 0 | 0 | 0 | 2 | 37 | 108 | 125 | 123 | 382 | 199 | 470 | 409 | 257 | 153 | 240 | 286 | 31 | 1 | 0 | 0 | 0 | 0 | 117.6 | 470 | | | |
| 25-Aug | 0 | 0 | 0 | 0 | 0 | 7 | 44 | 115 | 181 | 245 | 224 | 202 | 269 | 327 | 577 | 493 | 278 | 278 | 109 | 8 | 0 | 0 | 0 | 0 | 139.8 | 577 | | | |
| 26-Aug | 0 | 0 | 0 | 0 | 0 | 9 | 34 | 74 | 422 | 598 | 713 | 780 | 764 | 765 | 639 | 556 | 335 | 233 | 60 | 9 | 0 | 0 | 0 | 0 | 249.7 | 780 | | | |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | 11 | 41 | 96 | 415 | 585 | 688 | 765 | 775 | 732 | 543 | 389 | 115 | 148 | 85 | 6 | 0 | 0 | 0 | 0 | 224.8 | 775 | | | |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | 11 | 32 | 74 | 421 | 592 | 598 | 663 | 760 | 640 | 604 | 571 | 403 | 272 | 95 | 6 | 0 | 0 | 0 | 0 | 239.3 | 760 | | | |
| 29-Aug | 0 | 0 | 0 | 0 | 0 | 7 | 31 | 77 | 441 | 593 | 706 | 773 | 786 | 754 | 674 | 557 | 400 | 254 | 83 | 4 | 0 | 0 | 0 | 0 | 255.9 | 786 | | | |
| 30-Aug | 0 | 0 | 0 | 0 | 0 | 7 | 53 | 115 | 321 | 444 | 506 | 586 | 691 | 643 | 534 | 400 | 227 | 94 | 31 | 2 | 0 | 0 | 0 | 0 | 193.9 | 691 | | | |
| 31-Aug | 0 | 0 | 0 | 0 | 0 | 6 | 28 | 98 | 229 | 386 | 494 | 578 | 599 | 557 | 432 | 211 | 133 | 170 | 51 | 5 | 0 | 0 | 0 | 0 | 165.7 | 599 | | | |
| | | | | | | | | | | | | | | 0.0 0.0 0.1 0.0 1.4 17.8 54.3 115.0 329.4 490.8 560.8 569.3 562.1 550.8 481.1 369.9 287.6 202.4 95.3 19.3 1.4 0.0 0.0 0.0 | | | | | | | | | | | | | | Diurnal Average | |
| | | | | | | | | | | | | | | 0 0 0 0 5 34 116 191 441 722 851 888 853 864 811 675 535 406 186 56 8 0 0 0 | | | | | | | | | | | | | | Diurnal Maximum | |





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Global Radiation (GR) - W/m2
Stony Mountain - August 2017

| Concentration Ranges (W/m2) | Number of Hours | % | Cumulative % |
|------------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 319 | 42.88 | 42.88 |
| 21 - 100 | 98 | 13.17 | 56.05 |
| 101 - 300 | 118 | 15.86 | 71.91 |
| 301 - 600 | 125 | 16.80 | 88.71 |
| 601 - 900 | 84 | 11.29 | 100.00 |
| > 900 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744

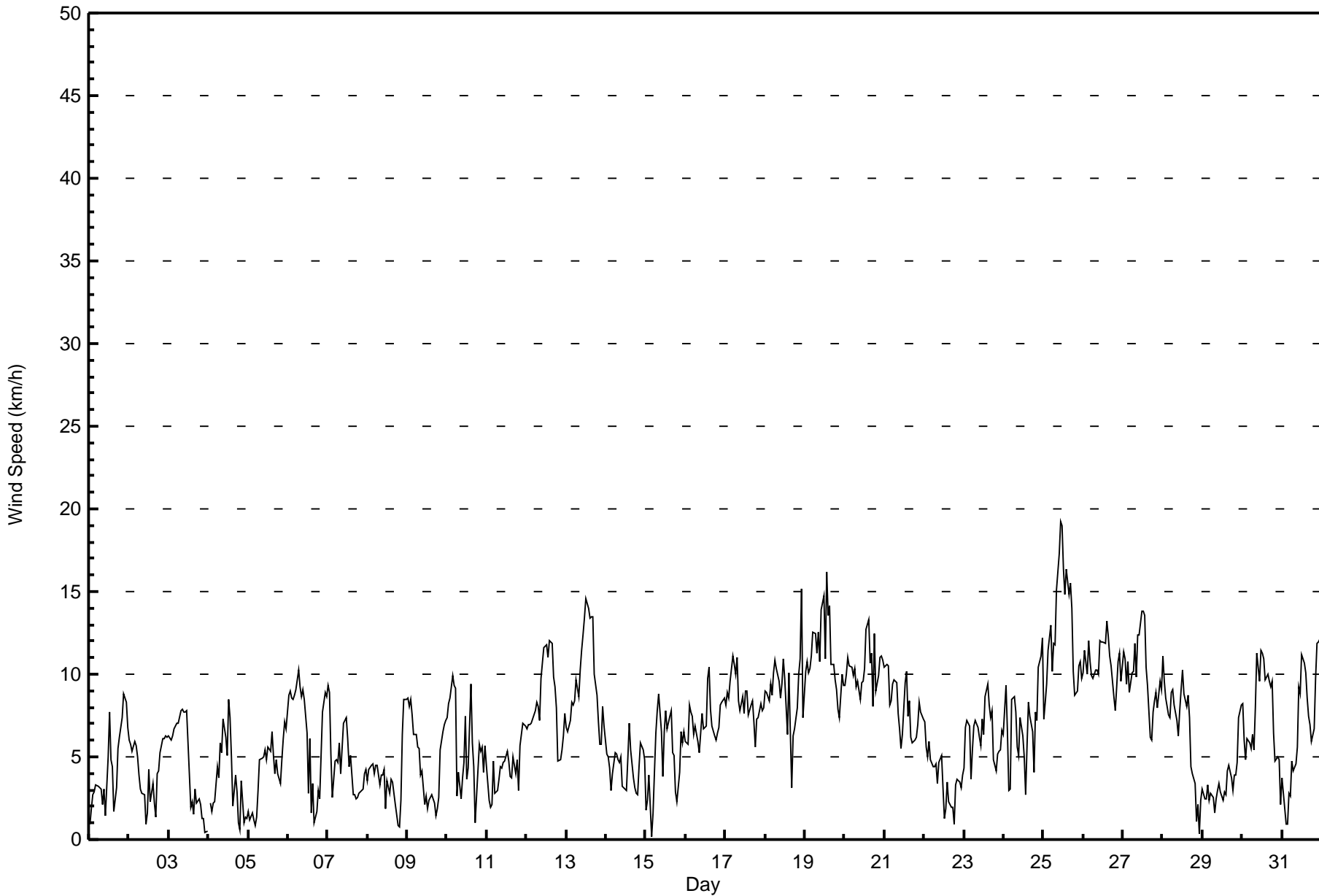


| | | |
|--|--|--------------------------------|
| Maximum Speed: 19 km/h on Aug 25 11:00 | Maximum Daily Speed Average: 12.3 km/h on Aug 25 | Hours in Service: 744 |
| Minimum Speed Value: 0 km/h on Aug 15 04:00 | Minimum Daily Speed Average: 2.1 km/h on Aug 29 | Hours of Data: 743 |
| Maximum Diurnal Speed Average: 5.0 km/h at hour 23 | Minimum Diurnal Speed Average: 3.3 km/h at hour 19 | Hours of Missing Data: 1 |
| Monthly Average Velocity: 4.0 km/h 231.6 deg | Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 4 Median = 7 Q ₃ = 9 P ₉₀ = 11 P ₉₉ = 15 | Percent Operational Time: 99.9 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
|--------|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|---------------|---------------|------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | NW1 | NW2 | WNW3 | WNW3 | NW3 | NW3 | NW3 | NW3 | NNW2 | N3 | NE1 | WNW5 | N8 | NNE5 | WNW4 | WSW2 | SSW3 | WSW6 | SW6 | WSW7 | W7 | W9 | W8 | W7 | WNW3.2 | W9 | |
| 2-Aug | WNW6 | WNW6 | WNW5 | WNW6 | WNW6 | NW5 | NW4 | W3 | WNW3 | NNW3 | WNW1 | WNW2 | W4 | SSW2 | WSW3 | W2 | WSW1 | SW4 | WSW4 | WSW5 | SW6 | SW6 | SW6 | SW6 | W3.5 | SW6 | |
| 3-Aug | SW6 | SW6 | SW6 | SW7 | SSW7 | SSW7 | SSW7 | SSW8 | SSW8 | S8 | S8 | SSW8 | WSW4 | SE2 | SE2 | SSW2 | SW3 | WSW2 | WSW2 | W2 | W1 | N1 | SE0 | SSE1 | SSW4.0 | SSW8 | |
| 4-Aug | AF | NE2 | ENE2 | ESE2 | NW2 | WNW4 | N4 | ENE6 | ENE5 | NE7 | NNW6 | NNW5 | NNE8 | NNE7 | SE5 | E2 | ENE4 | ESE3 | ESE1 | W1 | NE4 | ESE1 | SSW1 | SW1 | NE2.2 | NNE8 | |
| 5-Aug | N2 | ENE1 | SE2 | SE1 | N1 | E1 | ESE3 | SE5 | SSE5 | S5 | S5 | S5 | S6 | SSE5 | SSE7 | SSE5 | SSE7 | SSE5 | S4 | SW5 | SE4 | SSW3 | SSW5 | SSW6 | SSW7 | S3.4 | SSW7 |
| 6-Aug | SSW9 | SSW9 | SSW9 | SW9 | SW9 | SW9 | SSW10 | SSW9 | SSW9 | SW9 | SW8 | SW6 | WSW3 | SW6 | N2 | E3 | SSW1 | NW2 | NW3 | N2 | NNE5 | NE8 | NE9 | NNE9 | SW3.3 | SSW10 | |
| 7-Aug | NNE9 | NNE9 | NNE5 | N3 | NNE5 | NNE5 | NNE5 | NNE6 | NNE4 | NE7 | NE7 | NE7 | ENE6 | ENE4 | NE5 | N3 | WNW3 | WNW2 | WNW3 | WNW3 | WNW3 | WNW3 | WNW4 | WNW4 | NNE3.8 | NNE9 | |
| 8-Aug | NW4 | WNW4 | NW4 | NW5 | NW4 | WNW4 | WNW5 | NW3 | NW4 | NW4 | W4 | WSW2 | WNW4 | WNW3 | W4 | W3 | WSW3 | N2 | NNE1 | WNW1 | SSW2 | SW6 | SW8 | SW9 | W3.1 | SW9 | |
| 9-Aug | SW9 | SW8 | SW8 | SW8 | SW6 | SW6 | SSW6 | SSW5 | SSW4 | SSE4 | ENE2 | NNE3 | NNW2 | NNW2 | NNE3 | N3 | SSE2 | S1 | SSE2 | S3 | SSW5 | SSW7 | SW7 | SW7 | SW3.4 | SW9 | |
| 10-Aug | SW7 | SW8 | SW9 | SW10 | SW9 | SW9 | SSW3 | NE4 | SE2 | ESE4 | SE5 | SW7 | NE4 | S4 | SSW9 | S6 | WNW4 | SW1 | SSE3 | S6 | SSW5 | SSW6 | WSW4 | W6 | SSW4.2 | SW10 | |
| 11-Aug | W5 | W2 | WNW2 | WSW2 | SW5 | SSW3 | SSW3 | S4 | SSE4 | S4 | S5 | SSE5 | SSE5 | SSE5 | SE4 | ESE4 | S5 | SSE4 | SSW5 | SSW3 | SSW6 | SSW6 | SSW7 | SSW7 | S3.5 | SSW7 | |
| 12-Aug | SSW7 | SSW7 | SSW7 | SSW7 | SSW8 | SSW8 | SSW8 | SSW8 | S7 | SSE10 | SSE12 | S12 | S12 | SSE11 | S12 | SSW12 | SSE10 | S9 | SSE8 | S5 | SSE5 | SE5 | SSE6 | SSE8 | S8.1 | S12 | |
| 13-Aug | SSE7 | SSE7 | S7 | S8 | S8 | SSE8 | SE10 | SE9 | SE10 | SE11 | SE12 | SSE13 | SSE15 | SSE14 | SE13 | SE13 | SE13 | SE10 | SE9 | SE7 | SE6 | ESE6 | SE8 | SE7 | SE9.4 | SSE15 | |
| 14-Aug | SE5 | ESE5 | ESE4 | SSE3 | SE4 | S5 | W5 | W5 | W5 | W5 | WNW5 | WSW3 | SW3 | WSW3 | W5 | W7 | W5 | WSW4 | SSW3 | SSE3 | SSE3 | SSW4 | SSW6 | SSW5 | SSW5 | SW2.6 | W7 |
| 15-Aug | SSW2 | WNW2 | SW4 | NNE0 | W2 | WNW4 | W6 | W8 | WNW9 | WNW7 | NW4 | WNW7 | WNW8 | NW7 | WNW7 | W8 | W5 | NNE5 | NNW3 | W2 | WNW4 | W7 | WNW6 | WNW6 | WNW4.6 | WNW9 | |
| 16-Aug | WNW6 | W6 | W8 | W8 | W7 | W6 | W7 | W6 | WSW5 | W6 | WSW8 | WSW7 | WSW7 | SW10 | WSW10 | W8 | W7 | W6 | WSW6 | WSW6 | WSW7 | SW8 | SW8 | SW9 | WSW6.9 | WSW10 | |
| 17-Aug | WSW8 | WSW9 | WSW9 | W10 | W11 | W11 | W10 | W11 | W8 | W8 | W9 | WNW8 | W9 | W9 | WNW8 | W8 | W8 | W7 | WSW6 | SW7 | WSW7 | WSW8 | WSW8 | SW8 | W8.2 | W11 | |
| 18-Aug | SW9 | SW9 | SW8 | SW9 | SSW9 | SSW10 | SSW11 | SSW10 | SSW10 | SSW9 | SSW9 | SSW11 | SSW10 | SSW6 | WNW10 | WNW6 | SW3 | SSW6 | SW7 | SW8 | SW10 | WSW11 | W15 | W7 | SW8.0 | W15 | |
| 19-Aug | WSW10 | SW11 | SW10 | SW10 | WSW11 | W13 | W12 | W11 | W13 | W11 | W14 | W15 | W11 | W16 | W14 | W14 | W11 | W11 | WSW10 | WSW9 | WSW8 | W7 | WSW10 | W9 | WSW10.9 | W16 | |
| 20-Aug | WSW9 | W10 | WSW11 | WSW11 | WSW10 | SW10 | WSW10 | WSW9 | WSW10 | WSW8 | WSW10 | WSW10 | W10 | W13 | W13 | W11 | W11 | W8 | W12 | WSW9 | WSW10 | WSW11 | W11 | W11 | WSW10.1 | W13 | |
| 21-Aug | W10 | W11 | W10 | W8 | WSW8 | WSW9 | W10 | W9 | W8 | WSW7 | WSW6 | WSW6 | W9 | WSW10 | W7 | SW8 | WSW6 | SW6 | SW6 | SW6 | SW7 | SW8 | SW8 | SW7 | WSW7.7 | W11 | |
| 22-Aug | SW7 | SW6 | SW5 | SW6 | WSW5 | SW4 | SSW4 | SW5 | WSW3 | SW5 | W5 | SW3 | W1 | WNW2 | ENE3 | E2 | ENE2 | E2 | ENE1 | ESE3 | SE4 | SSE3 | SSE3 | SE4 | SSW2.2 | SW7 | |
| 23-Aug | S4 | SSW7 | SSW7 | SSW7 | S4 | S5 | S7 | S7 | S7 | S6 | SE6 | SE7 | SE6 | SE9 | SSE9 | SSE8 | SSE7 | SSE8 | SSE5 | SE4 | SE5 | SE5 | SSE5 | S7 | SSE5.9 | SSE9 | |
| 24-Aug | S6 | WSW9 | SSW7 | SE3 | ESE3 | ESE9 | ESE9 | ESE8 | SE6 | SE5 | ESE7 | ESE6 | SE5 | E3 | SSE6 | S8 | S7 | SSW4 | W8 | W7 | WNW10 | W11 | W12 | W12 | S3.2 | W12 | |
| 25-Aug | W7 | W8 | SW9 | SW11 | SW13 | SW10 | SW12 | SSW12 | SW15 | SW17 | SW19 | WSW19 | WSW16 | WSW15 | W16 | WSW15 | WSW16 | WSW14 | SW10 | SW9 | SW9 | SW11 | SW11 | SW10 | SW12.3 | SW19 | |
| 26-Aug | SW10 | WSW11 | SW10 | SW12 | SW11 | SW10 | SW10 | WSW10 | WSW10 | WSW10 | SW12 | WSW12 | WSW12 | WSW12 | WSW13 | WSW12 | WSW11 | WSW11 | SW9 | SW8 | SW9 | SW11 | SW11 | SSW10 | SW10.4 | WSW13 | |
| 27-Aug | SW11 | WSW11 | SW9 | WSW11 | SW9 | SW10 | SW10 | WSW12 | WSW10 | W12 | WSW12 | WSW14 | W14 | W14 | W10 | W9 | WSW6 | WSW6 | WSW8 | WSW8 | WSW9 | WSW8 | WSW10 | WSW9 | WSW9.9 | WSW14 | |
| 28-Aug | W11 | W10 | W9 | WSW8 | WSW7 | W9 | W9 | W8 | W7 | W6 | W8 | W9 | W10 | WNW9 | W8 | W9 | W7 | W4 | W4 | W3 | WNW1 | NW2 | S0 | SSW2 | W6.6 | W11 | |
| 29-Aug | SW3 | WNW2 | NW2 | N3 | NNE2 | NNW3 | NW3 | SE2 | ESE2 | E3 | ENE3 | E3 | ENE2 | E3 | ENE3 | ENE4 | E5 | E4 | ENE3 | E4 | ESE4 | ESE5 | SE7 | SE8 | E2.1 | SE8 | |
| 30-Aug | SE8 | SE6 | SE5 | SE6 | SE6 | SE6 | SE6 | SE5 | SE8 | SE11 | SE10 | SE11 | SE11 | SE11 | SSE10 | SSE10 | SSE10 | SSE9 | SSE10 | SSE6 | S5 | S5 | SSW5 | SW2 | SSE7.2 | SE11 | |
| 31-Aug | NW4 | NW3 | WSW1 | WNW1 | WNW3 | WNW3 | WNW5 | WNW4 | WNW5 | WNW6 | WNW9 | WNW9 | WNW11 | WNW11 | W10 | W9 | WSW7 | WSW7 | WSW6 | WSW7 | W10 | W12 | W12 | W12 | W6.5 | W12 | |

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----------------|--|
| SW4.6 | WSW4.6 | SW4.7 | SW4.8 | SW4.5 | SW4.5 | SW4.3 | SW3.8 | SW3.8 | SW3.5 | SW3.6 | SW4.2 | WSW3.4 | WSW3.6 | WSW4.1 | SW3.8 | SW3.6 | SW3.3 | SW3.3 | SW3.7 | SW3.9 | SW4.5 | SW5.0 | SW4.7 | Diurnal Average | |
| WSW11 | WSW11 | WSW11 | SW12 | SW13 | W13 | W12 | WSW12 | SW15 | SW17 | SW19 | WSW19 | WSW16 | W16 | WSW16 | WSW15 | WSW16 | WSW14 | W12 | WSW9 | SW10 | W12 | W15 | W12 | Diurnal Maximum | |

AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Stony Mountain - August 2017**

| Wind Speed Ranges (km/h) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 5 | 291 | 39.17 | 39.17 |
| 6 - 11 | 398 | 53.57 | 92.73 |
| 12 - 19 | 54 | 7.27 | 100.00 |
| 20 - 28 | 0 | 0.00 | 100.00 |
| 29 - 38 | 0 | 0.00 | 100.00 |
| > 38 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 743

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Stony Mountain - August 2017**

| Wind Speed Ranges (km/h) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------------|-----------------------|-----|----|-----|----|-----|----|-----|----|-----|-----|-----|-----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 5 | 12 | 13 | 6 | 14 | 12 | 14 | 25 | 21 | 19 | 26 | 16 | 20 | 24 | 39 | 23 | 7 | 291 |
| 6 - 11 | 1 | 6 | 6 | 2 | 0 | 6 | 29 | 21 | 19 | 50 | 83 | 69 | 80 | 24 | 1 | 1 | 398 |
| 12 - 19 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 4 | 3 | 2 | 7 | 15 | 19 | 0 | 0 | 0 | 54 |
| 20 - 28 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29 - 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 13 | 19 | 12 | 16 | 12 | 20 | 58 | 46 | 41 | 78 | 106 | 104 | 123 | 63 | 24 | 8 | 743 |

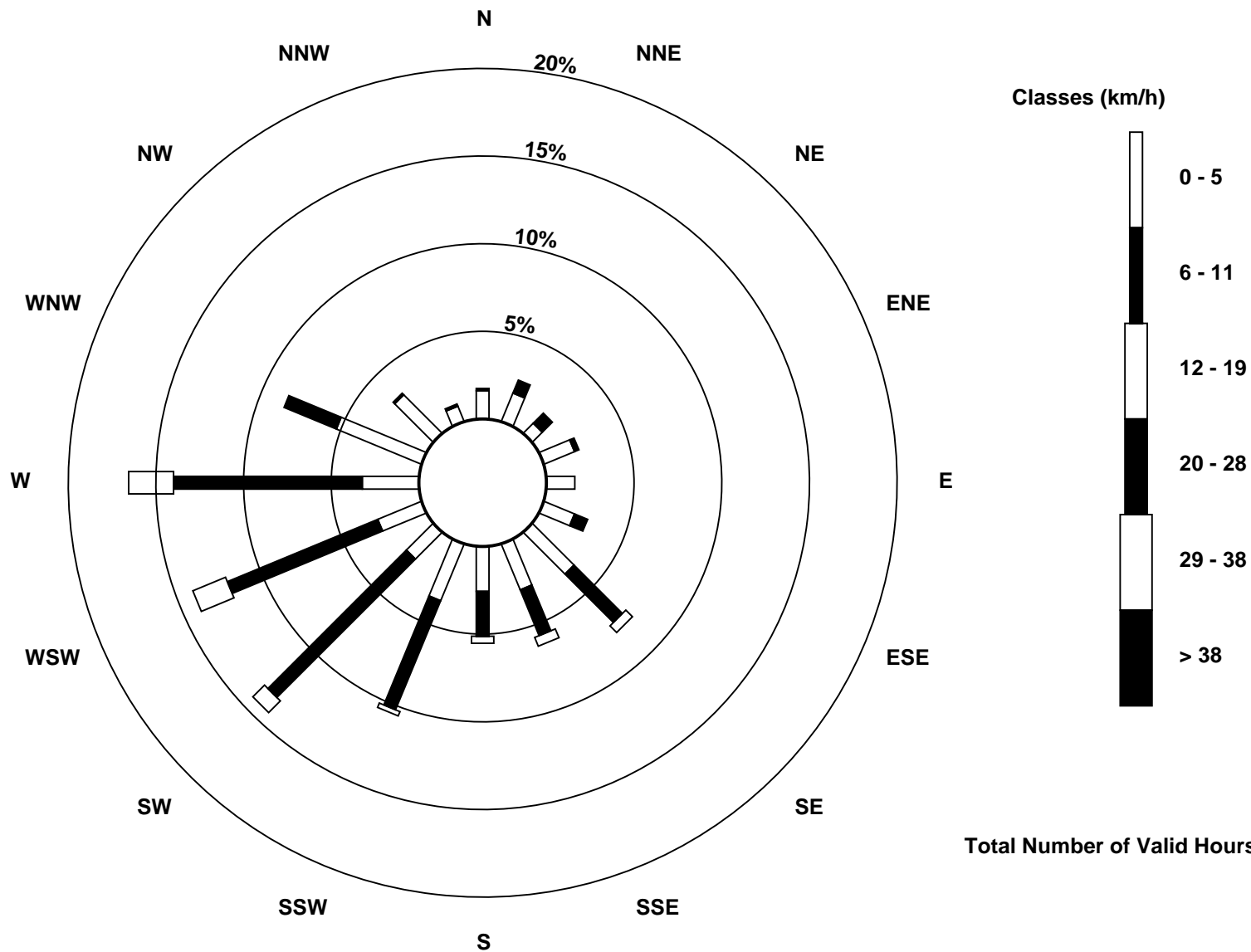
Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Wind Speed (WS) - km/h
Stony Mountain (AMS 18)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Stony Mountain - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Aug 20 19:00 | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9 | | | | | | | | | | | |
|--|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|--|----|----|----|----|----|----|----|----|----|----|---------------|
| Minimum Value: 0 km/h on Aug 28 22:00 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 4 | 3 | 2 | 1 | 1 | 3 | 2 | 2 | 2 | 3 | 3 | 2 | 4 |
| 2-Aug | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| 3-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 |
| 4-Aug | AF | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 5 | 4 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 5 |
| 5-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 3 |
| 6-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 1 | 1 | 2 | 1 | 2 | 3 | 3 | 3 | 3 |
| 7-Aug | 3 | 3 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 |
| 8-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 |
| 9-Aug | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 |
| 10-Aug | 1 | 2 | 2 | 3 | 3 | 2 | 4 | 1 | 1 | 1 | 2 | 3 | 6 | 3 | 4 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 2 | 6 |
| 11-Aug | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 4 |
| 12-Aug | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 4 | 5 | 4 | 5 | 5 | 5 | 5 | 4 | 4 | 3 | 2 | 2 | 2 | 2 | 3 | 5 |
| 13-Aug | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 5 | 5 | 5 | 6 | 6 | 5 | 5 | 5 | 4 | 3 | 2 | 2 | 3 | 2 | 6 | 6 |
| 14-Aug | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| 15-Aug | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 2 | 2 | 2 | 3 |
| 16-Aug | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 4 |
| 17-Aug | 2 | 3 | 3 | 3 | 4 | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 2 | 4 |
| 18-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 3 | 2 | 5 | 3 | 1 | 2 | 2 | 3 | 3 | 5 | 6 | 3 | 6 |
| 19-Aug | 4 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 5 | 4 | 5 | 5 | 5 | 6 | 6 | 6 | 4 | 4 | 4 | 3 | 4 | 3 | 3 | 3 | 6 |
| 20-Aug | 3 | 4 | 4 | 4 | 4 | 3 | 4 | 3 | 4 | 3 | 3 | 4 | 4 | 5 | 5 | 6 | 5 | 4 | 7 | 3 | 4 | 4 | 4 | 4 | 7 |
| 21-Aug | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 4 | 4 | 3 | 3 | 3 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 4 |
| 22-Aug | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| 23-Aug | 2 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 3 | 2 | 2 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 2 | 1 | 1 | 2 | 2 | 2 | 4 |
| 24-Aug | 2 | 4 | 3 | 2 | 3 | 4 | 4 | 3 | 3 | 2 | 3 | 2 | 2 | 1 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 4 | 4 | 5 | 5 |
| 25-Aug | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 5 | 6 | 7 | 7 | 6 | 6 | 6 | 6 | 6 | 5 | 4 | 3 | 3 | 4 | 3 | 3 | 7 |
| 26-Aug | 3 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 4 | 5 | 4 | 3 | 2 | 3 | 3 | 3 | 3 | 5 |
| 27-Aug | 4 | 4 | 3 | 4 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 5 |
| 28-Aug | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 4 | 4 | 4 | 4 | 3 | 2 | 1 | 1 | 1 | 0 | 1 | 1 | 4 |
| 29-Aug | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 3 | 3 | 3 |
| 30-Aug | 3 | 2 | 1 | 2 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 4 | 5 | 4 | 4 | 4 | 3 | 4 | 3 | 2 | 2 | 1 | 1 | 5 |
| 31-Aug | 1 | 1 | 1 | 1 | 2 | 1 | 3 | 2 | 2 | 2 | 3 | 4 | 5 | 4 | 4 | 3 | 3 | 2 | 2 | 3 | 3 | 4 | 5 | 4 | 5 |
| | | | | | | | | | | | | | | Diurnal Maximum | | | | | | | | | | | |
| AF - Analyzer Failure | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Summary of Hour Averages

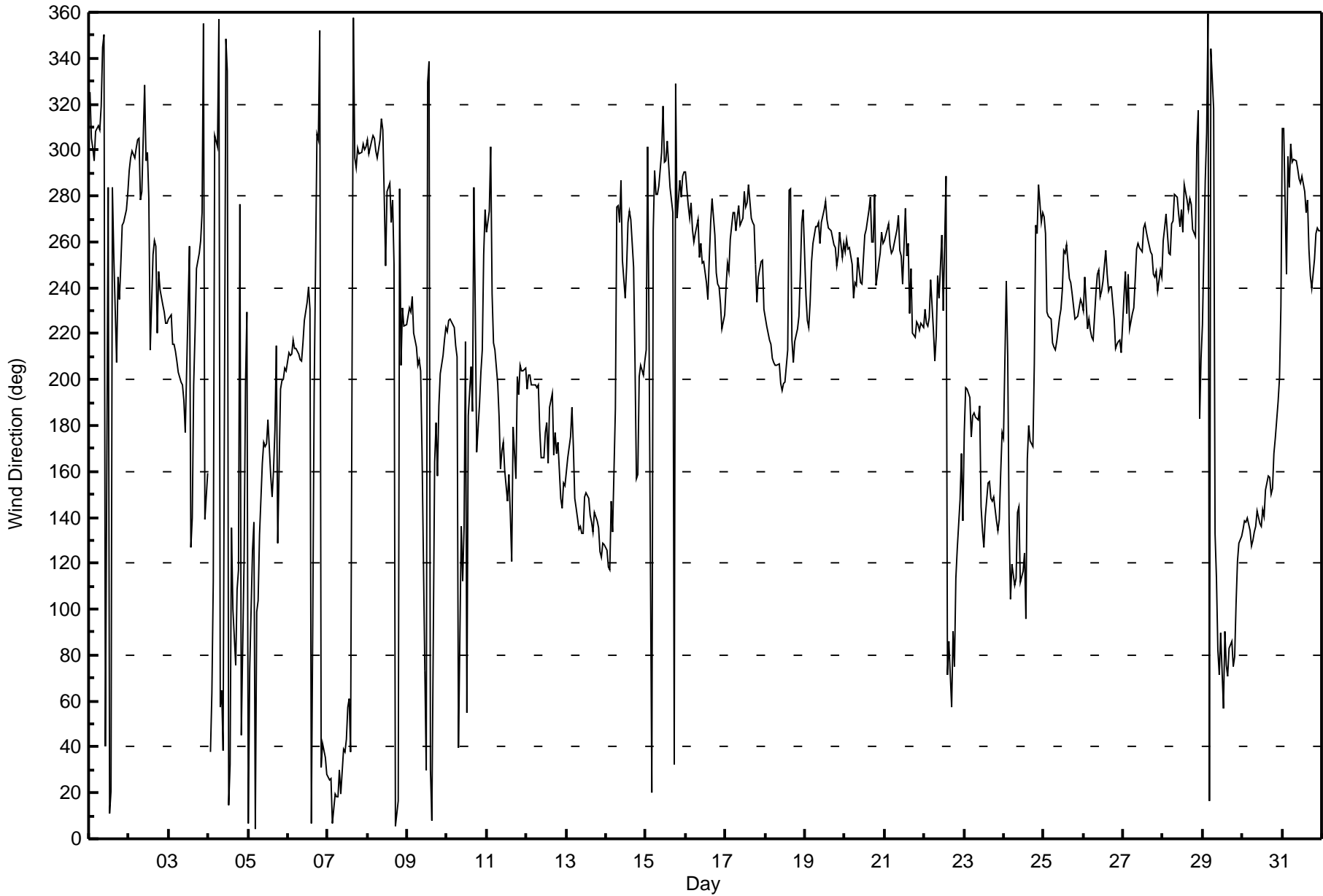
Wind Direction (WD) - deg
Stony Mountain - August 2017

| | | | |
|---|--|---------------------------|------|
| Direction of Maximum Speed: 230 deg on Aug 25 11:00 | | Hours in Service: | 744 |
| Direction of Maximum Daily Speed Average: 235.6 deg on Aug 25 | | Hours of Data: | 743 |
| Direction of Minimum Speed: 20 deg on Aug 15 04:00 | | Hours of Missing Data: | 1 |
| Direction of Minimum Daily Speed Average: 2.1 deg on Aug 29 | | Percent Operational Time: | 99.9 |
| Monthly Average Direction: 244.2 deg | | | |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average |
|--------|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 325 | 305 | 301 | 295 | 308 | 310 | 309 | 319 | 345 | 350 | 41 | 284 | 11 | 21 | 284 | 254 | 207 | 245 | 235 | 250 | 267 | 269 | 274 | 281 | 287.6 |
| 2-Aug | 291 | 296 | 299 | 297 | 301 | 304 | 305 | 279 | 282 | 328 | 295 | 299 | 279 | 213 | 254 | 260 | 258 | 220 | 247 | 239 | 233 | 229 | 225 | 224 | 267.1 |
| 3-Aug | 226 | 228 | 215 | 215 | 212 | 208 | 203 | 199 | 198 | 191 | 177 | 204 | 258 | 127 | 140 | 198 | 221 | 249 | 255 | 260 | 273 | 355 | 139 | 159 | 209.0 |
| 4-Aug | AF | 38 | 63 | 112 | 306 | 301 | 357 | 57 | 65 | 39 | 348 | 334 | 15 | 32 | 135 | 100 | 76 | 109 | 117 | 276 | 45 | 122 | 199 | 229 | 36.6 |
| 5-Aug | 7 | 74 | 126 | 138 | 4 | 99 | 104 | 132 | 164 | 173 | 171 | 172 | 183 | 158 | 149 | 161 | 178 | 215 | 129 | 196 | 199 | 200 | 205 | 204 | 171.7 |
| 6-Aug | 212 | 210 | 211 | 218 | 214 | 214 | 211 | 209 | 208 | 216 | 226 | 234 | 241 | 231 | 6 | 94 | 195 | 307 | 305 | 352 | 31 | 42 | 35 | 28 | 219.6 |
| 7-Aug | 27 | 26 | 26 | 7 | 19 | 18 | 18 | 30 | 20 | 39 | 38 | 44 | 57 | 61 | 38 | 358 | 297 | 292 | 301 | 299 | 299 | 303 | 300 | 301 | 15.4 |
| 8-Aug | 305 | 299 | 304 | 306 | 305 | 300 | 296 | 304 | 314 | 309 | 280 | 249 | 282 | 285 | 268 | 278 | 250 | 5 | 17 | 283 | 206 | 231 | 224 | 224 | 276.5 |
| 9-Aug | 228 | 231 | 230 | 236 | 220 | 214 | 206 | 208 | 204 | 168 | 73 | 30 | 330 | 339 | 30 | 8 | 164 | 181 | 158 | 189 | 203 | 210 | 218 | 223 | 216.8 |
| 10-Aug | 221 | 226 | 227 | 224 | 223 | 214 | 210 | 40 | 136 | 112 | 135 | 216 | 55 | 184 | 205 | 186 | 284 | 229 | 168 | 189 | 203 | 213 | 254 | 274 | 211.5 |
| 11-Aug | 264 | 273 | 301 | 238 | 216 | 213 | 198 | 184 | 161 | 169 | 173 | 160 | 147 | 159 | 141 | 121 | 180 | 157 | 202 | 193 | 206 | 204 | 204 | 205 | 188.7 |
| 12-Aug | 196 | 202 | 202 | 198 | 198 | 198 | 197 | 198 | 178 | 166 | 166 | 177 | 181 | 164 | 188 | 194 | 167 | 177 | 168 | 173 | 148 | 144 | 155 | 154 | 179.3 |
| 13-Aug | 160 | 166 | 175 | 188 | 171 | 148 | 144 | 135 | 136 | 133 | 133 | 149 | 151 | 148 | 141 | 138 | 134 | 142 | 139 | 136 | 125 | 123 | 129 | 128 | 144.0 |
| 14-Aug | 126 | 118 | 117 | 147 | 133 | 187 | 275 | 276 | 269 | 287 | 252 | 236 | 249 | 268 | 273 | 270 | 249 | 207 | 157 | 159 | 201 | 206 | 202 | 208 | 220.6 |
| 15-Aug | 213 | 302 | 222 | 20 | 265 | 291 | 281 | 281 | 284 | 299 | 319 | 294 | 295 | 304 | 284 | 278 | 273 | 33 | 329 | 270 | 287 | 279 | 289 | 291 | 288.9 |
| 16-Aug | 291 | 276 | 270 | 277 | 265 | 260 | 264 | 270 | 253 | 260 | 251 | 252 | 243 | 235 | 252 | 268 | 279 | 263 | 247 | 242 | 241 | 233 | 222 | 228 | 254.7 |
| 17-Aug | 240 | 251 | 247 | 261 | 272 | 273 | 265 | 271 | 276 | 268 | 270 | 282 | 275 | 277 | 285 | 270 | 268 | 267 | 250 | 234 | 245 | 252 | 252 | 231 | 262.6 |
| 18-Aug | 227 | 223 | 217 | 215 | 209 | 207 | 206 | 206 | 207 | 198 | 195 | 199 | 199 | 213 | 283 | 283 | 217 | 208 | 217 | 222 | 227 | 246 | 269 | 274 | 223.2 |
| 19-Aug | 237 | 226 | 223 | 234 | 251 | 259 | 266 | 267 | 268 | 260 | 268 | 274 | 278 | 270 | 266 | 265 | 265 | 259 | 258 | 250 | 254 | 264 | 253 | 259 | 258.5 |
| 20-Aug | 256 | 261 | 257 | 257 | 250 | 236 | 243 | 241 | 253 | 242 | 242 | 253 | 263 | 266 | 274 | 279 | 260 | 260 | 281 | 241 | 251 | 255 | 264 | 259 | 256.9 |
| 21-Aug | 261 | 265 | 268 | 259 | 255 | 256 | 260 | 265 | 271 | 256 | 254 | 241 | 274 | 254 | 260 | 229 | 248 | 220 | 218 | 225 | 224 | 222 | 225 | 223 | 249.5 |
| 22-Aug | 231 | 224 | 224 | 227 | 243 | 221 | 208 | 219 | 245 | 236 | 263 | 230 | 260 | 289 | 72 | 86 | 57 | 90 | 75 | 114 | 126 | 148 | 167 | 139 | 209.5 |
| 23-Aug | 177 | 196 | 196 | 192 | 175 | 184 | 185 | 184 | 183 | 188 | 145 | 134 | 127 | 141 | 155 | 156 | 148 | 147 | 149 | 139 | 134 | 139 | 159 | 177 | 162.9 |
| 24-Aug | 174 | 243 | 210 | 138 | 104 | 120 | 110 | 113 | 142 | 144 | 112 | 117 | 124 | 96 | 165 | 180 | 173 | 171 | 207 | 267 | 264 | 285 | 269 | 273 | 183.5 |
| 25-Aug | 271 | 263 | 230 | 228 | 226 | 216 | 214 | 213 | 216 | 227 | 230 | 239 | 257 | 255 | 259 | 244 | 242 | 237 | 232 | 226 | 228 | 231 | 235 | 233 | 235.6 |
| 26-Aug | 230 | 245 | 222 | 227 | 221 | 219 | 217 | 238 | 246 | 248 | 236 | 239 | 243 | 256 | 246 | 238 | 241 | 240 | 226 | 214 | 216 | 217 | 217 | 212 | 232.2 |
| 27-Aug | 236 | 247 | 229 | 246 | 222 | 229 | 231 | 244 | 257 | 259 | 258 | 256 | 266 | 268 | 264 | 261 | 256 | 255 | 246 | 245 | 247 | 238 | 248 | 245 | 248.8 |
| 28-Aug | 260 | 266 | 272 | 255 | 254 | 268 | 269 | 281 | 279 | 272 | 267 | 274 | 264 | 285 | 278 | 274 | 279 | 277 | 266 | 263 | 302 | 317 | 183 | 209 | 270.1 |
| 29-Aug | 224 | 287 | 308 | 359 | 17 | 344 | 318 | 133 | 114 | 82 | 72 | 90 | 57 | 91 | 76 | 71 | 83 | 86 | 75 | 79 | 103 | 121 | 129 | 132 | 88.0 |
| 30-Aug | 135 | 138 | 138 | 140 | 134 | 127 | 130 | 134 | 136 | 143 | 137 | 136 | 143 | 140 | 152 | 158 | 158 | 150 | 153 | 168 | 175 | 190 | 201 | 232 | 147.5 |
| 31-Aug | 310 | 309 | 246 | 297 | 284 | 303 | 295 | 296 | 295 | 292 | 288 | 286 | 289 | 282 | 272 | 278 | 257 | 245 | 240 | 253 | 264 | 266 | 265 | 265 | 274.8 |

234.9 242.4 232.6 233.0 233.4 230.4 231.6 231.1 228.6 224.4 223.8 229.8 245.9 240.3 239.7 233.8 225.9 218.8 221.3 223.5 227.1 232.4 233.6 233.3
 Diurnal Average

AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Stony Mountain - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | | | | | | | | | | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|-----|-----|----|----|----|----|----|----|--------------------------------|-----|----|----|----|----|---------------|----|----|----|-----|-----|----|----|----|----|----|----|----|-----|----|----|----|----|--|
| Maximum Value: 104 deg on Aug 8 12:00 | | | | | | | | | | | | | | | | | | | Hours of Data: 743 | | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum Value: 8 deg on Aug 3 22:00 | | | | | | | | | | | | | | | | | | | Hours of Missing Data: 1 | | | | | | | | | | | | | | | | | | | | | | | | |
| Percentiles: P ₁ = 14 P ₁₀ = 19 Q ₁ = 25 Median = 34 Q ₃ = 41 P ₉₀ = 56 P ₉₉ = 91 | | | | | | | | | | | | | | | | | | | Hours of Calibration: 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | Percent Operational Time: 99.9 | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 56 | 25 | 24 | 16 | 23 | 15 | 28 | 37 | 59 | 71 | 93 | 62 | 51 | 53 | 44 | 82 | 43 | 46 | 23 | 28 | 27 | 32 | 31 | 24 | 93 | | | | | | | | | | | | | | | | | | |
| 2-Aug | 22 | 18 | 19 | 18 | 18 | 17 | 21 | 42 | 59 | 58 | 100 | 96 | 55 | 77 | 71 | 56 | 60 | 18 | 22 | 21 | 20 | 18 | 17 | 16 | 100 | | | | | | | | | | | | | | | | | | |
| 3-Aug | 18 | 20 | 15 | 14 | 15 | 16 | 18 | 22 | 27 | 31 | 41 | 38 | 36 | 82 | 63 | 70 | 22 | 18 | 15 | 21 | 44 | 8 | 87 | 63 | 87 | | | | | | | | | | | | | | | | | | |
| 4-Aug | AF | 54 | 43 | 57 | 48 | 20 | 45 | 27 | 29 | 40 | 54 | 53 | 48 | 42 | 34 | 69 | 34 | 28 | 78 | 100 | 34 | 46 | 57 | 61 | 100 | | | | | | | | | | | | | | | | | | |
| 5-Aug | 34 | 33 | 18 | 51 | 58 | 28 | 25 | 31 | 38 | 39 | 41 | 39 | 43 | 45 | 41 | 40 | 41 | 41 | 35 | 21 | 15 | 16 | 19 | 18 | 58 | | | | | | | | | | | | | | | | | | |
| 6-Aug | 21 | 22 | 22 | 21 | 23 | 24 | 23 | 22 | 23 | 26 | 35 | 43 | 91 | 43 | 86 | 67 | 83 | 65 | 39 | 46 | 23 | 27 | 24 | 25 | 91 | | | | | | | | | | | | | | | | | | |
| 7-Aug | 25 | 23 | 32 | 35 | 30 | 29 | 30 | 30 | 45 | 29 | 37 | 30 | 38 | 39 | 36 | 46 | 46 | 32 | 18 | 20 | 19 | 15 | 15 | 16 | 46 | | | | | | | | | | | | | | | | | | |
| 8-Aug | 15 | 14 | 16 | 17 | 15 | 16 | 20 | 39 | 43 | 57 | 58 | 104 | 70 | 89 | 71 | 65 | 60 | 55 | 59 | 51 | 18 | 19 | 22 | 22 | 104 | | | | | | | | | | | | | | | | | | |
| 9-Aug | 22 | 25 | 25 | 26 | 17 | 14 | 14 | 19 | 44 | 58 | 84 | 54 | 92 | 80 | 79 | 77 | 50 | 58 | 27 | 23 | 14 | 14 | 17 | 18 | 92 | | | | | | | | | | | | | | | | | | |
| 10-Aug | 18 | 21 | 22 | 24 | 23 | 19 | 95 | 25 | 55 | 38 | 34 | 33 | 98 | 70 | 38 | 23 | 38 | 90 | 64 | 22 | 20 | 21 | 36 | 27 | 98 | | | | | | | | | | | | | | | | | | |
| 11-Aug | 28 | 52 | 28 | 74 | 16 | 17 | 23 | 25 | 36 | 44 | 49 | 56 | 50 | 50 | 63 | 61 | 46 | 47 | 19 | 15 | 13 | 13 | 16 | 16 | 74 | | | | | | | | | | | | | | | | | | |
| 12-Aug | 15 | 16 | 16 | 16 | 17 | 16 | 20 | 21 | 36 | 41 | 41 | 38 | 42 | 44 | 38 | 36 | 41 | 40 | 43 | 47 | 39 | 38 | 43 | 47 | 47 | | | | | | | | | | | | | | | | | | |
| 13-Aug | 46 | 48 | 43 | 30 | 43 | 36 | 35 | 34 | 33 | 37 | 36 | 42 | 39 | 40 | 39 | 35 | 33 | 36 | 32 | 24 | 21 | 23 | 26 | 22 | 48 | | | | | | | | | | | | | | | | | | |
| 14-Aug | 19 | 18 | 16 | 34 | 22 | 30 | 41 | 38 | 46 | 44 | 52 | 33 | 41 | 35 | 32 | 41 | 42 | 38 | 34 | 28 | 17 | 17 | 15 | 13 | 52 | | | | | | | | | | | | | | | | | | |
| 15-Aug | 60 | 19 | 20 | 86 | 67 | 24 | 29 | 27 | 28 | 38 | 65 | 50 | 44 | 50 | 36 | 35 | 55 | 43 | 56 | 41 | 32 | 34 | 30 | 31 | 86 | | | | | | | | | | | | | | | | | | |
| 16-Aug | 31 | 31 | 31 | 31 | 31 | 32 | 35 | 30 | 43 | 39 | 40 | 39 | 40 | 41 | 39 | 37 | 41 | 43 | 30 | 27 | 28 | 27 | 26 | 27 | 43 | | | | | | | | | | | | | | | | | | |
| 17-Aug | 32 | 35 | 33 | 34 | 32 | 32 | 37 | 33 | 34 | 38 | 38 | 46 | 40 | 35 | 41 | 41 | 35 | 34 | 27 | 24 | 31 | 36 | 33 | 25 | 46 | | | | | | | | | | | | | | | | | | |
| 18-Aug | 23 | 22 | 19 | 20 | 18 | 18 | 19 | 19 | 22 | 23 | 25 | 25 | 24 | 31 | 31 | 33 | 37 | 20 | 23 | 25 | 29 | 32 | 36 | 33 | 37 | | | | | | | | | | | | | | | | | | |
| 19-Aug | 31 | 28 | 26 | 30 | 36 | 35 | 33 | 38 | 35 | 39 | 35 | 33 | 37 | 37 | 35 | 35 | 36 | 35 | 35 | 36 | 54 | 37 | 34 | 33 | 54 | | | | | | | | | | | | | | | | | | |
| 20-Aug | 37 | 36 | 36 | 35 | 35 | 31 | 35 | 33 | 38 | 33 | 31 | 39 | 35 | 36 | 38 | 51 | 34 | 38 | 42 | 31 | 34 | 37 | 33 | 33 | 51 | | | | | | | | | | | | | | | | | | |
| 21-Aug | 33 | 37 | 33 | 33 | 34 | 36 | 34 | 36 | 30 | 37 | 34 | 37 | 40 | 37 | 43 | 33 | 39 | 29 | 21 | 20 | 20 | 22 | 21 | 22 | 43 | | | | | | | | | | | | | | | | | | |
| 22-Aug | 25 | 25 | 20 | 22 | 31 | 29 | 18 | 24 | 43 | 47 | 44 | 55 | 73 | 69 | 55 | 57 | 69 | 40 | 32 | 17 | 19 | 32 | 31 | 25 | 73 | | | | | | | | | | | | | | | | | | |
| 23-Aug | 31 | 17 | 18 | 20 | 33 | 27 | 27 | 28 | 32 | 32 | 35 | 39 | 31 | 42 | 43 | 41 | 40 | 36 | 35 | 28 | 24 | 26 | 44 | 41 | 44 | | | | | | | | | | | | | | | | | | |
| 24-Aug | 39 | 32 | 28 | 46 | 75 | 35 | 26 | 26 | 43 | 33 | 29 | 35 | 35 | 56 | 43 | 39 | 41 | 45 | 49 | 31 | 35 | 28 | 34 | 33 | 75 | | | | | | | | | | | | | | | | | | |
| 25-Aug | 38 | 35 | 31 | 29 | 28 | 29 | 26 | 26 | 26 | 31 | 31 | 33 | 36 | 37 | 36 | 35 | 36 | 34 | 31 | 26 | 25 | 29 | 30 | 31 | 38 | | | | | | | | | | | | | | | | | | |
| 26-Aug | 28 | 34 | 25 | 25 | 26 | 23 | 24 | 33 | 36 | 40 | 34 | 35 | 36 | 39 | 36 | 34 | 36 | 34 | 26 | 21 | 22 | 23 | 24 | 21 | 40 | | | | | | | | | | | | | | | | | | |
| 27-Aug | 35 | 36 | 29 | 38 | 28 | 29 | 29 | 34 | 41 | 36 | 36 | 37 | 35 | 36 | 35 | 37 | 33 | 32 | 32 | 32 | 35 | 32 | 33 | 33 | 41 | | | | | | | | | | | | | | | | | | |
| 28-Aug | 34 | 37 | 33 | 38 | 34 | 30 | 32 | 29 | 32 | 39 | 40 | 35 | 38 | 38 | 43 | 39 | 38 | 37 | 25 | 41 | 52 | 12 | 84 | 45 | 84 | | | | | | | | | | | | | | | | | | |
| 29-Aug | 17 | 38 | 24 | 28 | 47 | 39 | 15 | 66 | 31 | 46 | 65 | 70 | 82 | 67 | 77 | 40 | 33 | 30 | 21 | 25 | 21 | 19 | 27 | 29 | 82 | | | | | | | | | | | | | | | | | | |
| 30-Aug | 27 | 24 | 28 | 27 | 22 | 18 | 19 | 26 | 35 | 33 | 37 | 36 | 34 | 37 | 42 | 40 | 41 | 38 | 39 | 43 | 38 | 30 | 18 | 62 | 62 | | | | | | | | | | | | | | | | | | |
| 31-Aug | 18 | 16 | 66 | 69 | 39 | 25 | 36 | 27 | 27 | 32 | 32 | 32 | 35 | 34 | 33 | 30 | 36 | 34 | 24 | 32 | 32 | 32 | 34 | 35 | 69 | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | 60 | 54 | 66 | 86 | 75 | 39 | 95 | 66 | 59 | 71 | 100 | 104 | 98 | 89 | 86 | 82 | 83 | 90 | 78 | 100 | 54 | 46 | 87 | 63 | |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AF - Analyzer Failure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association

SO₂ Calibration Summary

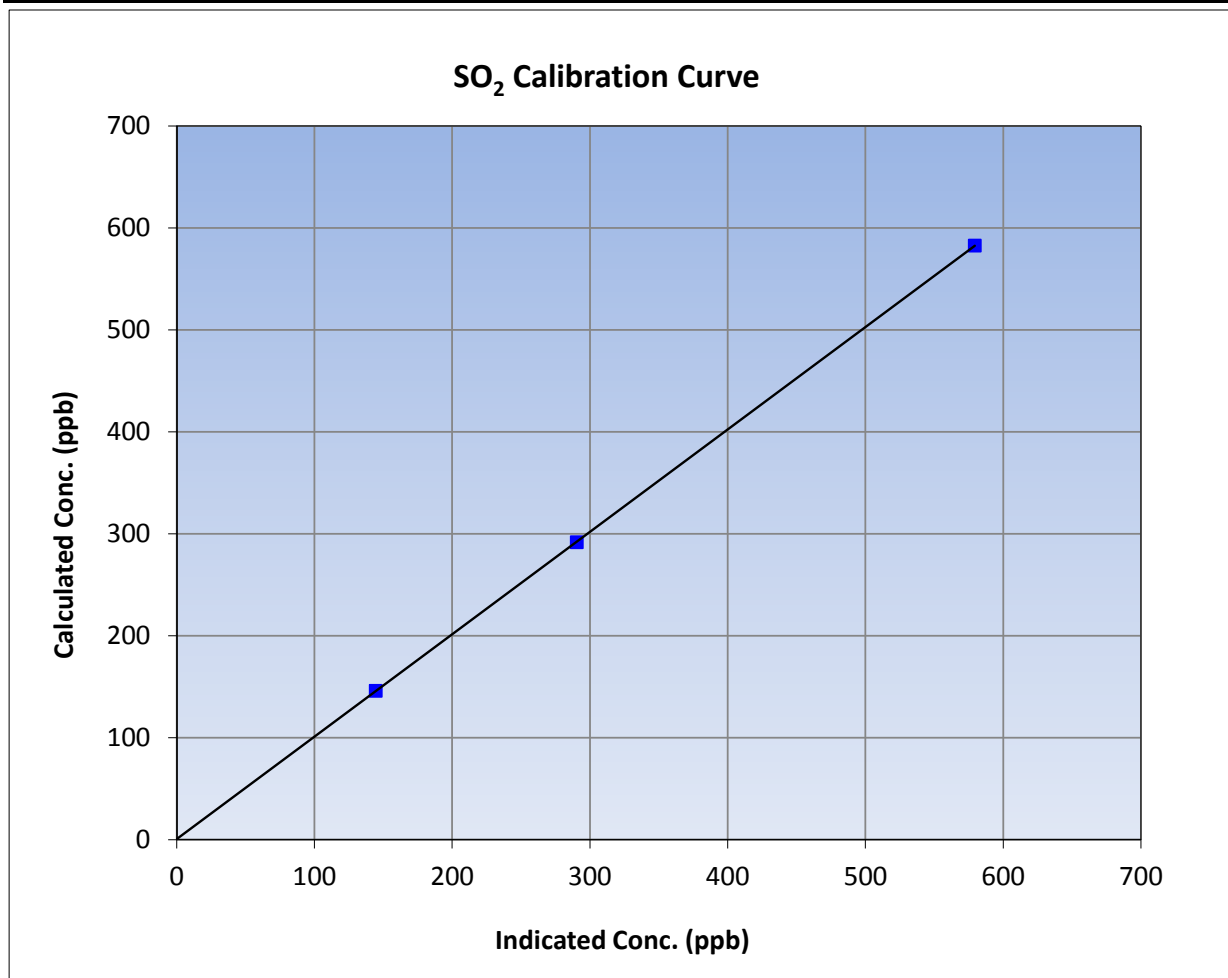
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 15, 2017 | Previous Calibration | July 12, 2017 |
| Station Name | Stony Mountain | Station Number | AMS 18 |
| Start Time (MST) | 10:55 | End Time (MST) | 15:36 |
| Analyzer make | Thermo 43i | Analyzer serial # | JC1501301453 |

Calibration Data

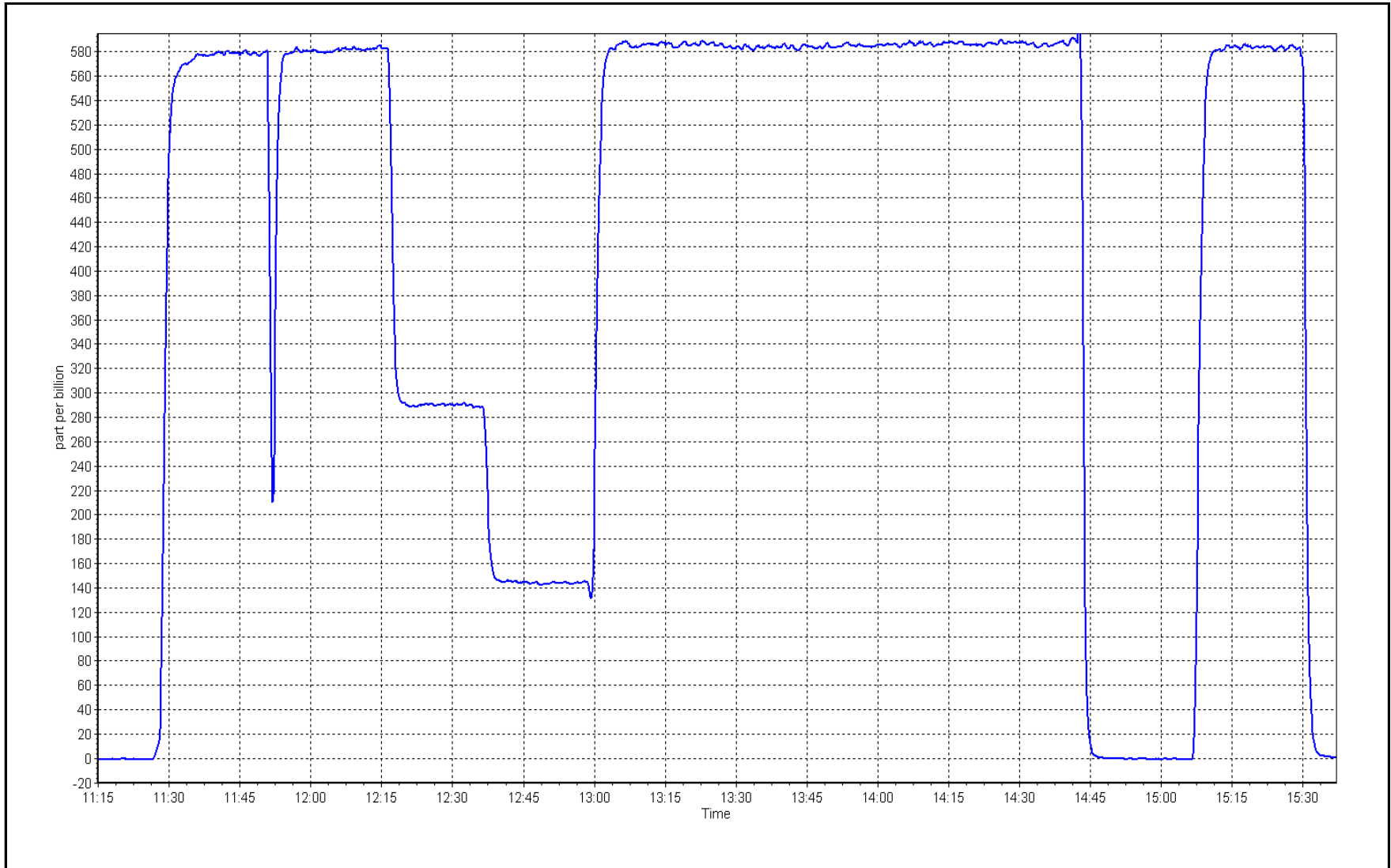
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-------------|
| 0.0 | -0.6 | ---- | Correlation Coefficient | ≥0.995 |
| 582.3 | 579.0 | 1.0056 | | |
| 291.4 | 290.0 | 1.0049 | Slope | 0.90 - 1.10 |
| 145.8 | 144.1 | 1.0117 | | |
| | | | Intercept | +/-30 |



SO2 Calibration Plot

Date: August 15, 2017

Location: Stony Mountain





Wood Buffalo Environmental Association

TRS Calibration Summary

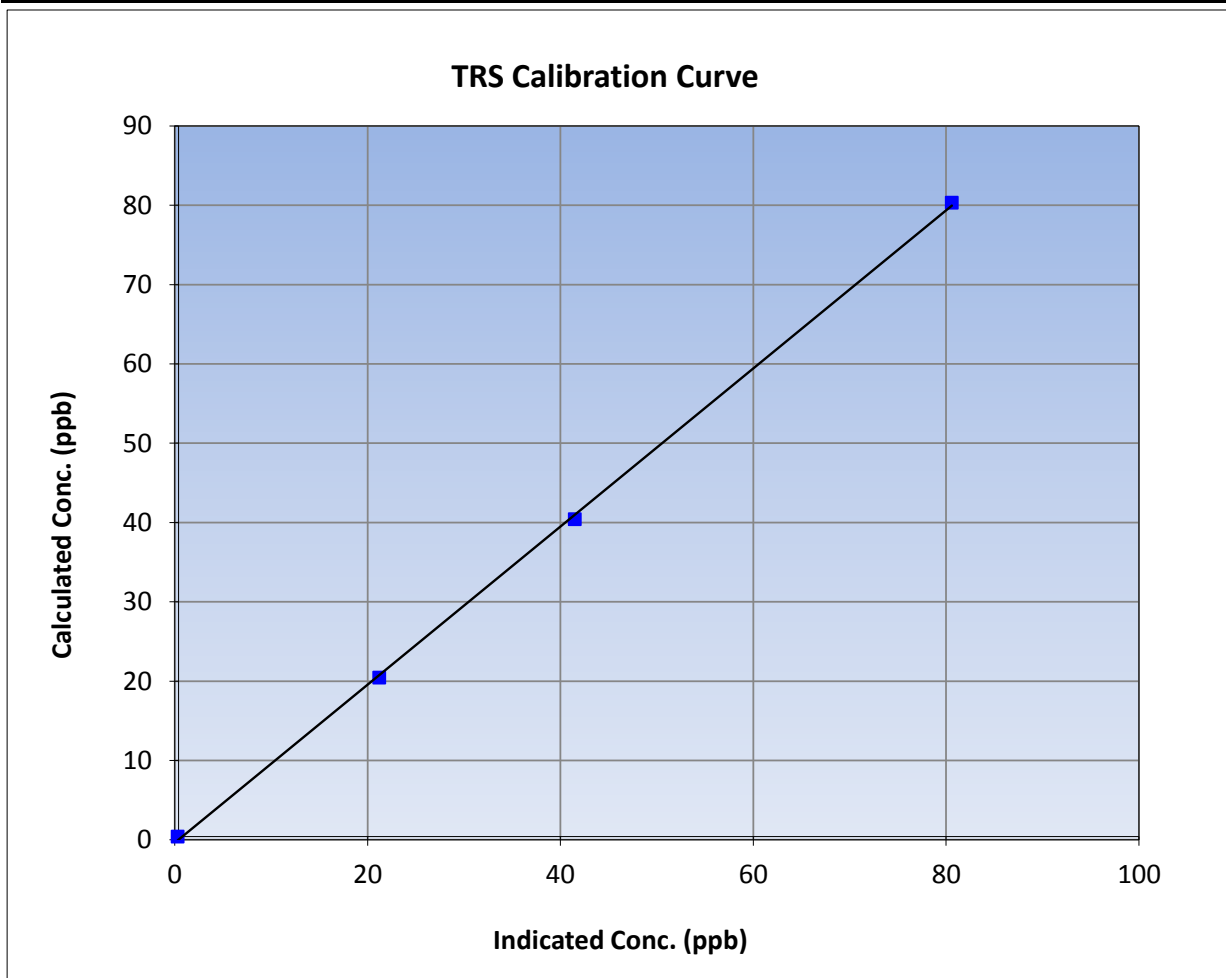
Version-03-2017

Station Information

| | | | |
|------------------|----------------|----------------------|---------------|
| Calibration Date | August 3, 2017 | Previous Calibration | July 13, 2017 |
| Station Name | Stony Mountain | Station Number | AMS 18 |
| Start Time (MST) | 8:09 | End Time (MST) | 10:30 |
| Analyzer make | Thermo 43i-TLE | Analyzer serial # | 1336160090 |

Calibration Data

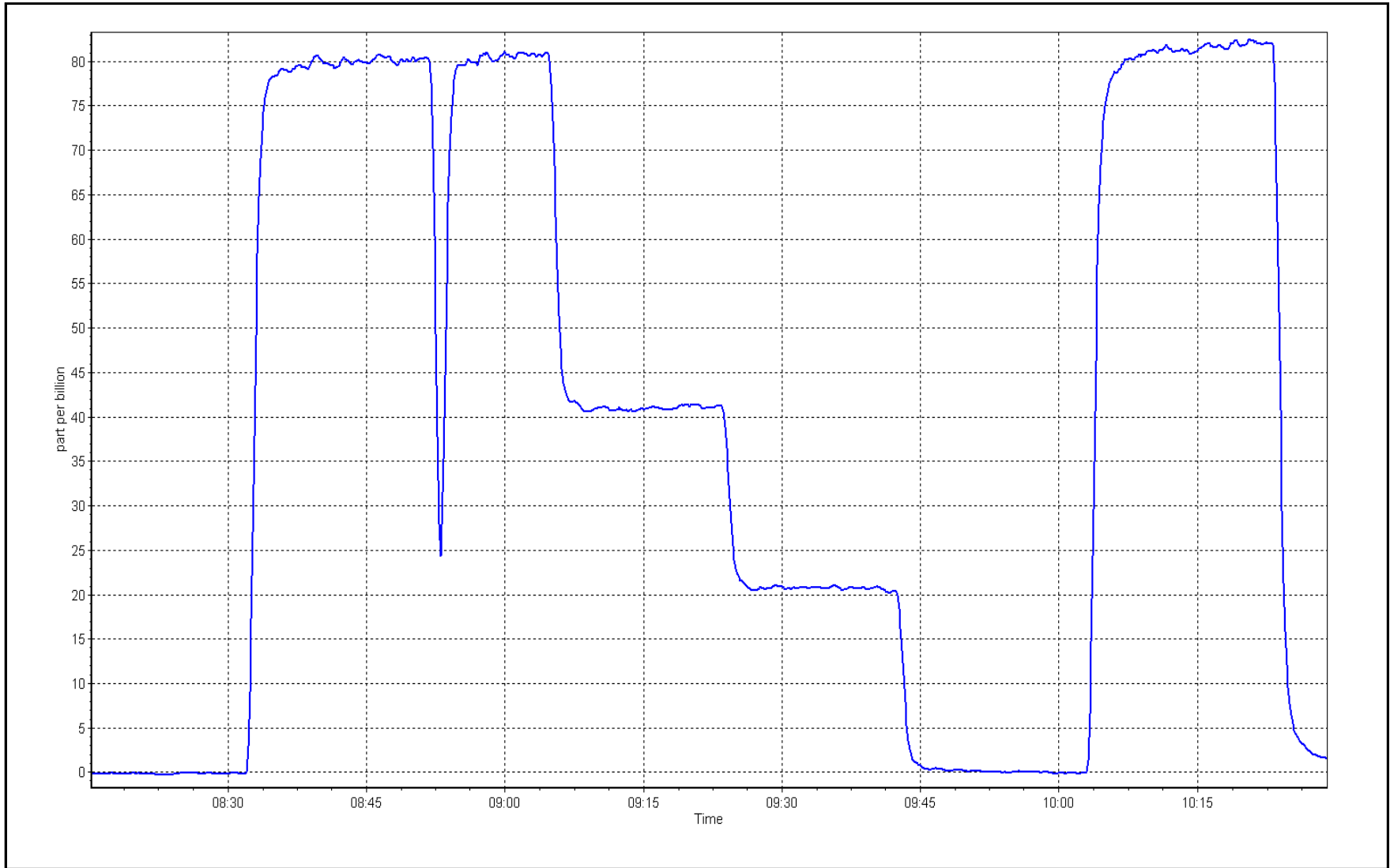
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|-------------|
| 0.0 | -0.1 | ---- | Correlation Coefficient | 0.999780 | ≥0.995 |
| 79.9 | 80.2 | 0.9966 | | | |
| 40.0 | 41.1 | 0.9738 | Slope | 0.996869 | 0.90 - 1.10 |
| 20.1 | 20.8 | 0.9643 | | | |
| | | | Intercept | -0.387468 | +/-3 |



TRS Calibration Plot

Date: August 3, 2017

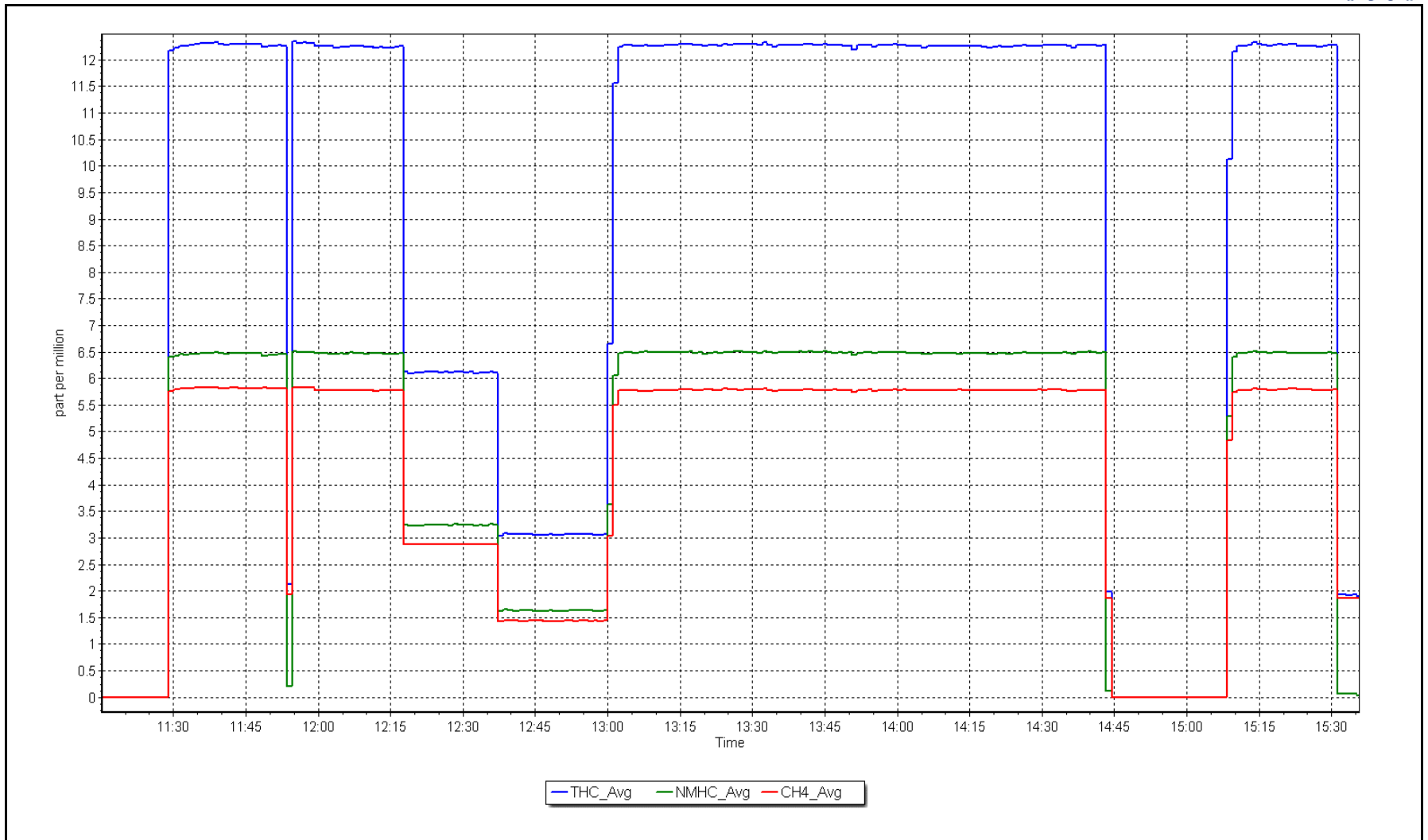
Location: Stony Mountain



NMHC Calibration Plot

Date: August 15, 2017

Location: Stony Mountain





Wood Buffalo Environmental Association

O₃ Calibration Summary

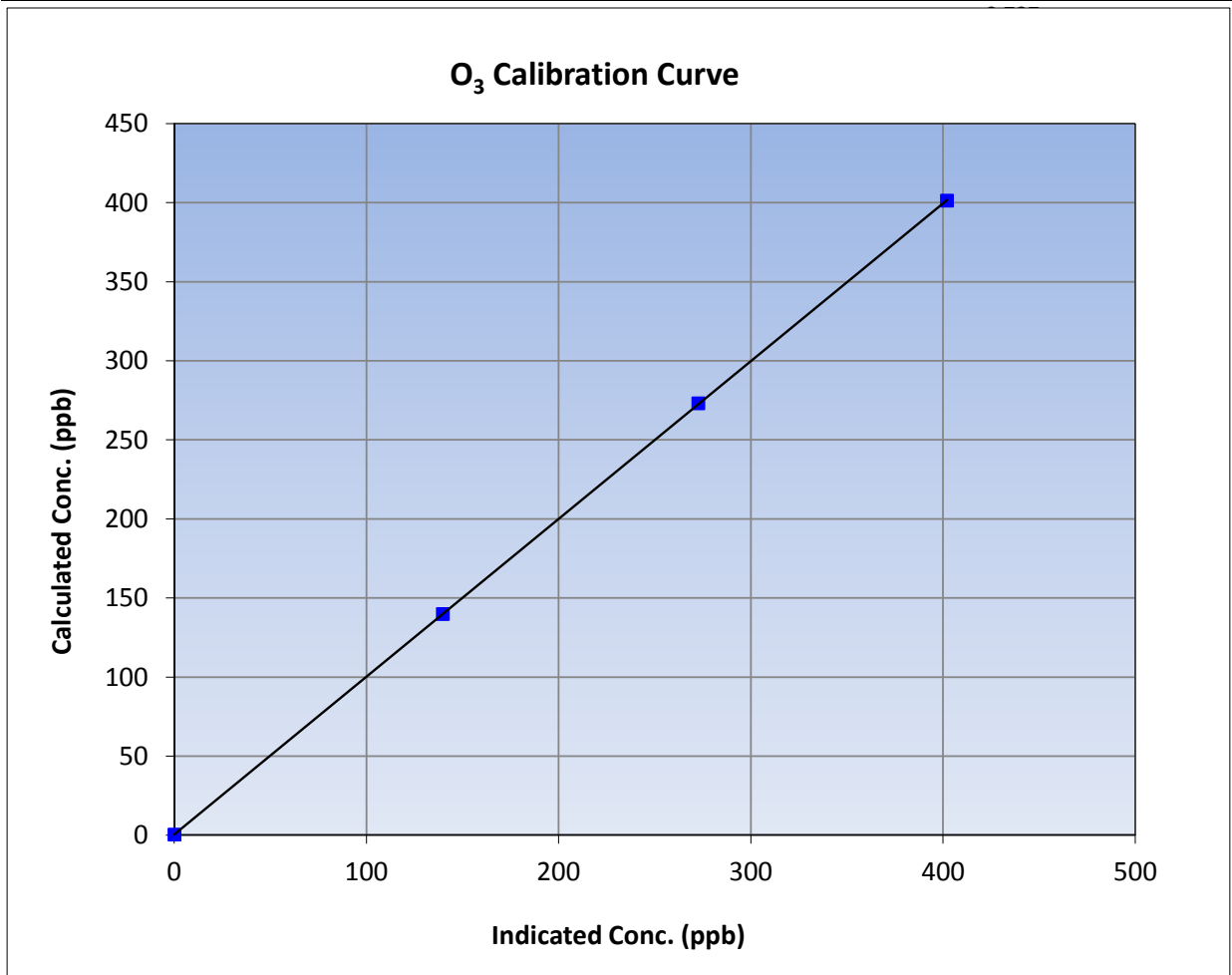
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 18, 2017 | Previous Calibration | July 13, 2017 |
| Station Name | Stony Mountain | Station Number | AMS 18 |
| Start Time (MST) | 10:13 | End Time (MST) | 13:35 |
| Analyzer make | Thermo 49i | Analyzer serial # | 1501663733 |

Calibration Data

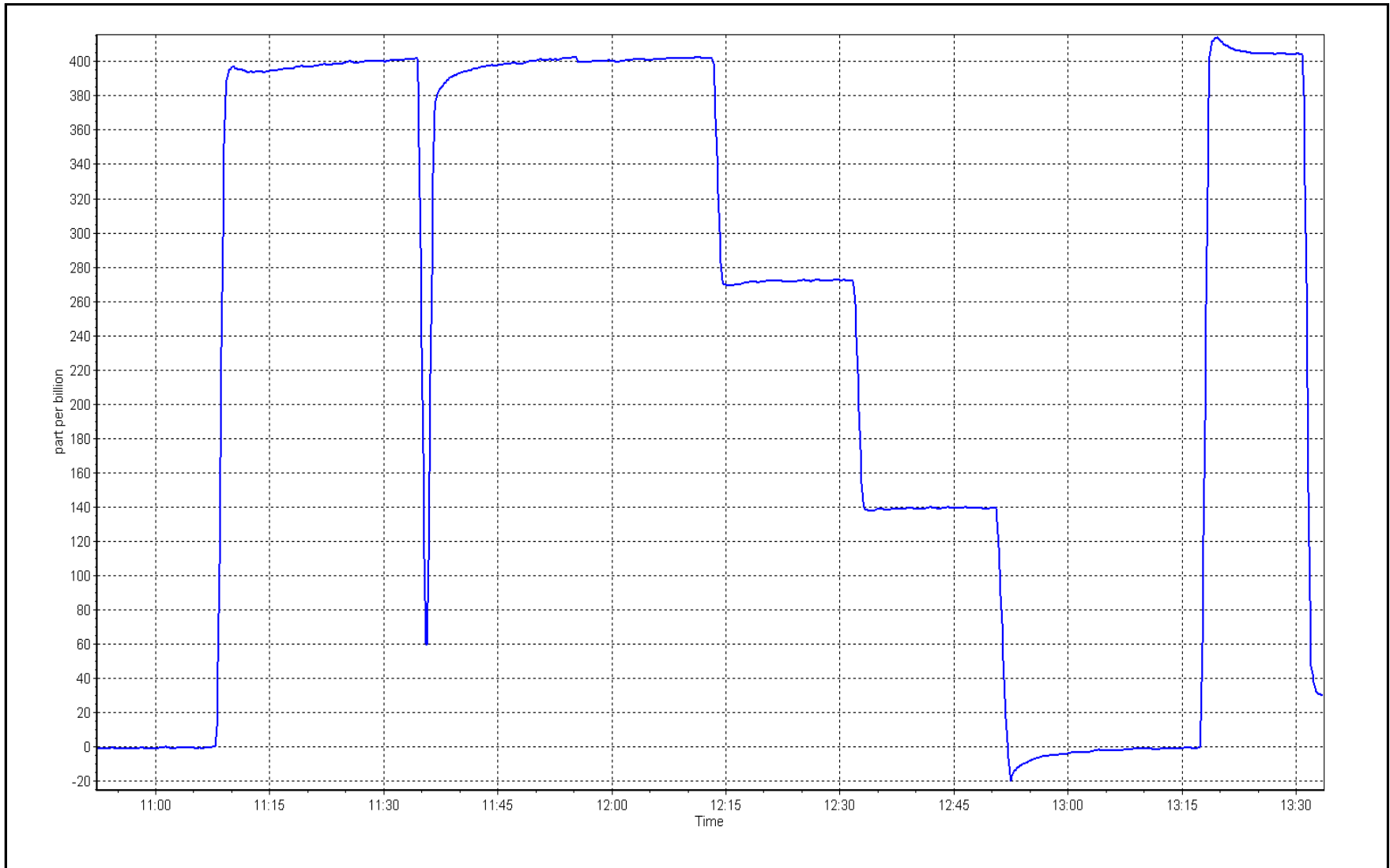
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|-------------|
| 0.0 | -0.3 | ---- | Correlation Coefficient | 0.999995 | ≥0.995 |
| 400.9 | 401.7 | 0.9980 | | | |
| 272.7 | 272.3 | 1.0015 | Slope | 0.997856 | 0.90 - 1.10 |
| 139.4 | 139.4 | 1.0000 | | | |
| | | | Intercept | 0.410758 | +/- 10 |



O₃ Calibration Plot

Date: August 18, 2017

Location: Stony Mountain





Wood Buffalo Environmental Association

NO_x - NO - NO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|---------------|
| Station Name: | Stony Mountain | Station number: | AMS 18 |
| Calibration Date: | August 15, 2017 | Last Cal Date: | July 12, 2017 |
| Start time (MST): | 10:57 | End time (MST): | 15:36 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|-------------------|-------------------|---------------------|-------------------|
| NO Gas Cylinder # | LL110090 | Cal Gas Expiry Date | February 16, 2019 |
| NOX Cal Gas Conc. | <u>50.9</u> ppb | NO Cal Gas Conc. | <u>50.9</u> ppb |
| Calibrator Model | API T700 | Serial Number | 1222 |
| ZAG make/model | Teledyne API T701 | Serial Number | 5610 |

Analyzer Information

| | | | | | |
|-----------------------------|--------------|---------------|-------------------------------|--------------|---------------|
| Analyzer make: Thermo 42i | | | Analyzer serial #: 1336160088 | | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| NO coefficient | 0.973 | 0.973 | NOX Range (ppb) | 0 - 1000 ppb | |
| NOX coefficient | 0.998 | 0.998 | PMT Temperature | -2.7 | -3.1 |
| NO ₂ coefficient | 0.999 | 0.999 | Reaction cell Press | 196.6 | 195.8 |
| NO bkgrnd | 1.7 | 1.7 | Sample Flow | 0.713 | 0.711 |
| NOX bkgrnd | 1.8 | 1.8 | PMT Voltage | -850.6 | -850.6 |

Calibration Statistics

| | | |
|----------------------------|--------------|---------------|
| | <u>Start</u> | <u>Finish</u> |
| NO _x Cal Slope | 0.998939 | 1.005444 |
| NO _x Cal Offset | -1.065914 | -0.973316 |
| NO Cal Slope | 0.999538 | 1.004499 |
| NO Cal Offset | -1.223978 | -1.152606 |
| NO ₂ Cal Slope | 1.000772 | 0.999799 |
| NO ₂ Cal Offset | 0.392350 | -0.209032 |



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Version-03-2017

Dilution Calibration Data

| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|----------------------------------|---------------------------|-----------------------------|---|--|---|--|---------------------------------------|--|---|--|
| as found zero | 5010 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.4 | 0.0 | ---- | ---- |
| as found span | 4955 | 59.1 | 599.9 | 599.9 | 0.0 | 597.0 | 597.7 | -0.7 | 1.0049 | 1.0038 |
| calibrator zero | 5009 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.4 | 0.0 | ---- | ---- |
| high point | 4955 | 59.1 | 599.9 | 599.9 | 0.0 | 597.0 | 597.7 | -0.7 | 1.0049 | 1.0038 |
| second point | 4985 | 29.6 | 300.5 | 300.5 | 0.0 | 301.1 | 301.6 | -0.5 | 0.9978 | 0.9962 |
| third point | 5000 | 14.8 | 150.2 | 150.2 | 0.0 | 150.4 | 150.8 | -0.1 | 0.9988 | 0.9961 |
| as left zero | 5010 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 0.4 | 0.0 | ---- | ---- |
| as left span | 4846 | 59.1 | 613.3 | 205.8 | 407.5 | 607.0 | 199.7 | 407.4 | 1.0103 | 1.0305 |
| Average Correction Factor | | | | | | | | | 1.0005 | 0.9987 |

| | | | | | |
|--|-----------------------------|----------------|--|-----------------|------------------------|
| Corrected As found | NO _x = 596.7 ppb | NO = 597.3 ppb | | *Percent Change | NO _x = 0.8% |
| Previous Response | NO _x = 601.6 ppb | NO = 601.4 ppb | | *Percent Change | NO = 0.7% |
| <i>* = > +/-5% change initiates investigation</i> | | | | | |

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO drop conc (ppb) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | Converter Efficiency <i>Limit = 96-104%</i> |
|----------------------------------|------------------------------|---|--|---------------------------------------|--|---|--|---|--|
| 1st NO ref point | | 0.0 | 606.1 | 606.7 | -0.6 | 0.9898 | 0.9889 | ---- | ---- |
| 1st NO2 (400 ppb O3) | 205.8 | 400.9 | 606.5 | 205.8 | 400.7 | 0.9892 | ---- | 1.0005 | 100.0% |
| 2nd NO2 (200 ppb O3) | 334.0 | 272.7 | 607.7 | 334.0 | 273.7 | 0.9872 | ---- | 0.9963 | 100.4% |
| 3rd NO2 (100 ppb O3) | 467.3 | 139.4 | 607.0 | 467.3 | 139.6 | 0.9884 | ---- | 0.9986 | 100.1% |
| 2nd NO ref point | ---- | 0.0 | 608.0 | 607.9 | 0.0 | 0.9868 | 0.9869 | ---- | ---- |
| Average Correction Factor | | | | | | 0.9879 | 0.9879 | 0.9985 | 100.2% |

Notes:

No adjustments made.

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association

NO_x Calibration Summary

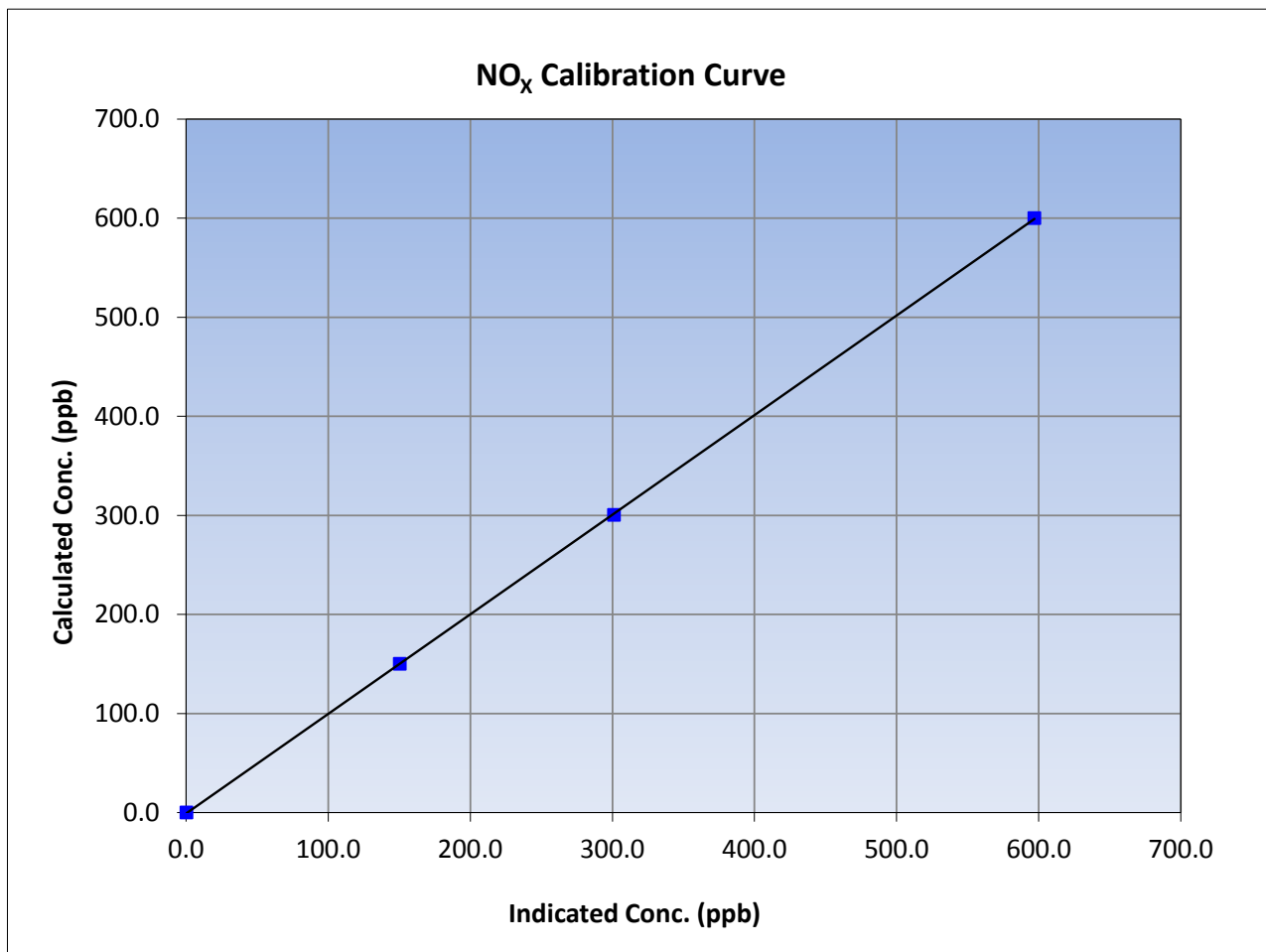
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 15, 2017 | Previous Calibration | July 12, 2017 |
| Station Name | Stony Mountain | Station Number | AMS 18 |
| Start Time (MST) | 10:57 | End Time (MST) | 15:36 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1336160088 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.3 | ---- | Correlation Coefficient | ≥0.995 | |
| 599.9 | 597.0 | 1.0049 | | | |
| 300.5 | 301.1 | 0.9978 | | | |
| 150.2 | 150.4 | 0.9988 | | | |
| | | | Slope | 1.005444 | 0.90 - 1.10 |
| | | | Intercept | -0.973316 | +/-20 |





Wood Buffalo Environmental Association

NO Calibration Summary

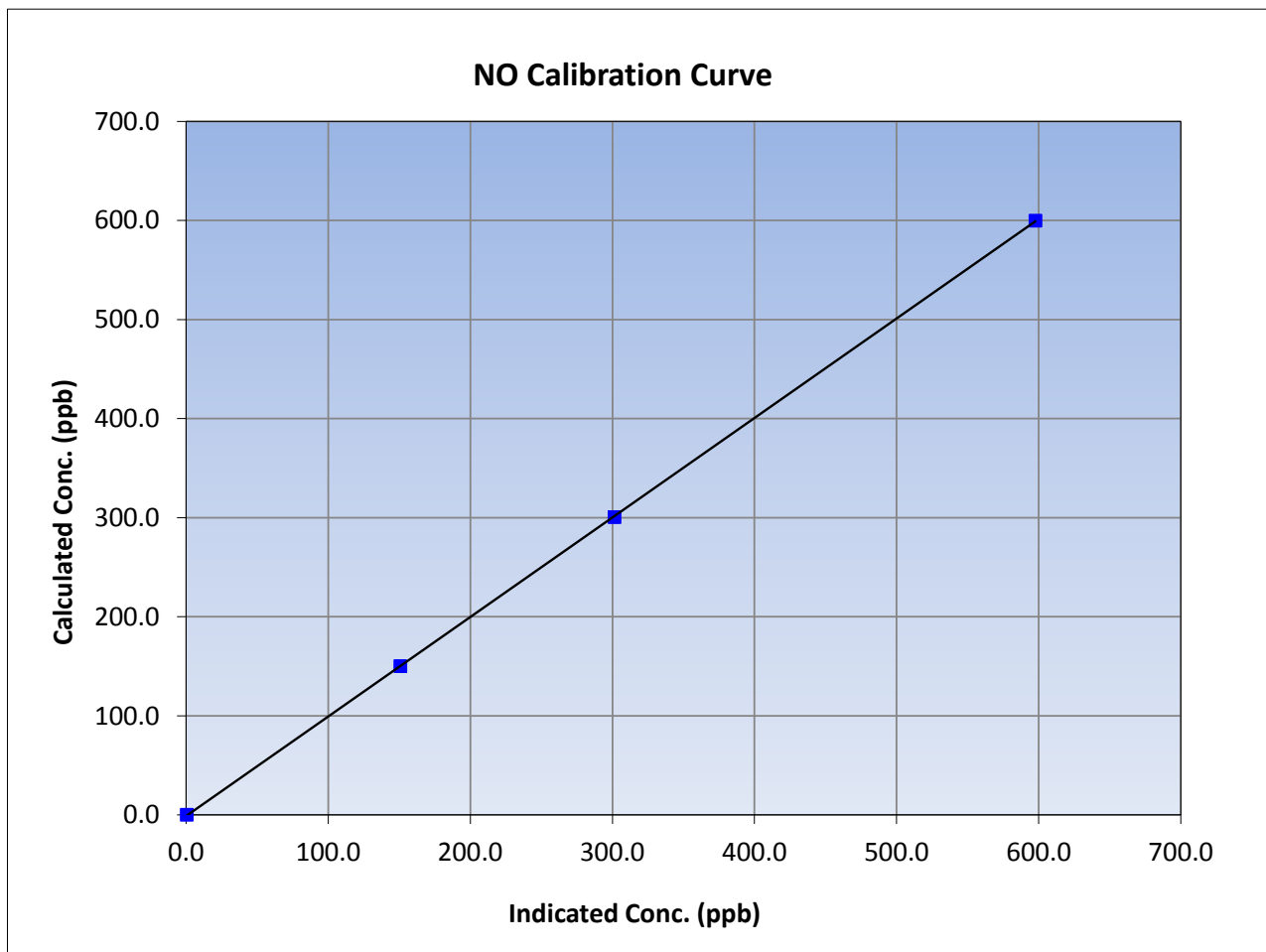
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 15, 2017 | Previous Calibration | July 12, 2017 |
| Station Name | Stony Mountain | Station Number | AMS 18 |
| Start Time (MST) | 10:57 | End Time (MST) | 15:36 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1336160088 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> |
|-------------------------------------|------------------------------------|---------------------------|---|--------------------------------|
| 0.0 | 0.4 | ---- | Correlation Coefficient Slope Intercept | ≥0.995 0.90 - 1.10 +/-20 |
| 599.9 | 597.7 | 1.0038 | | |
| 300.5 | 301.6 | 0.9962 | | |
| 150.2 | 150.8 | 0.9961 | | |





Wood Buffalo Environmental Association

NO₂ Calibration Summary

Version-03-2017

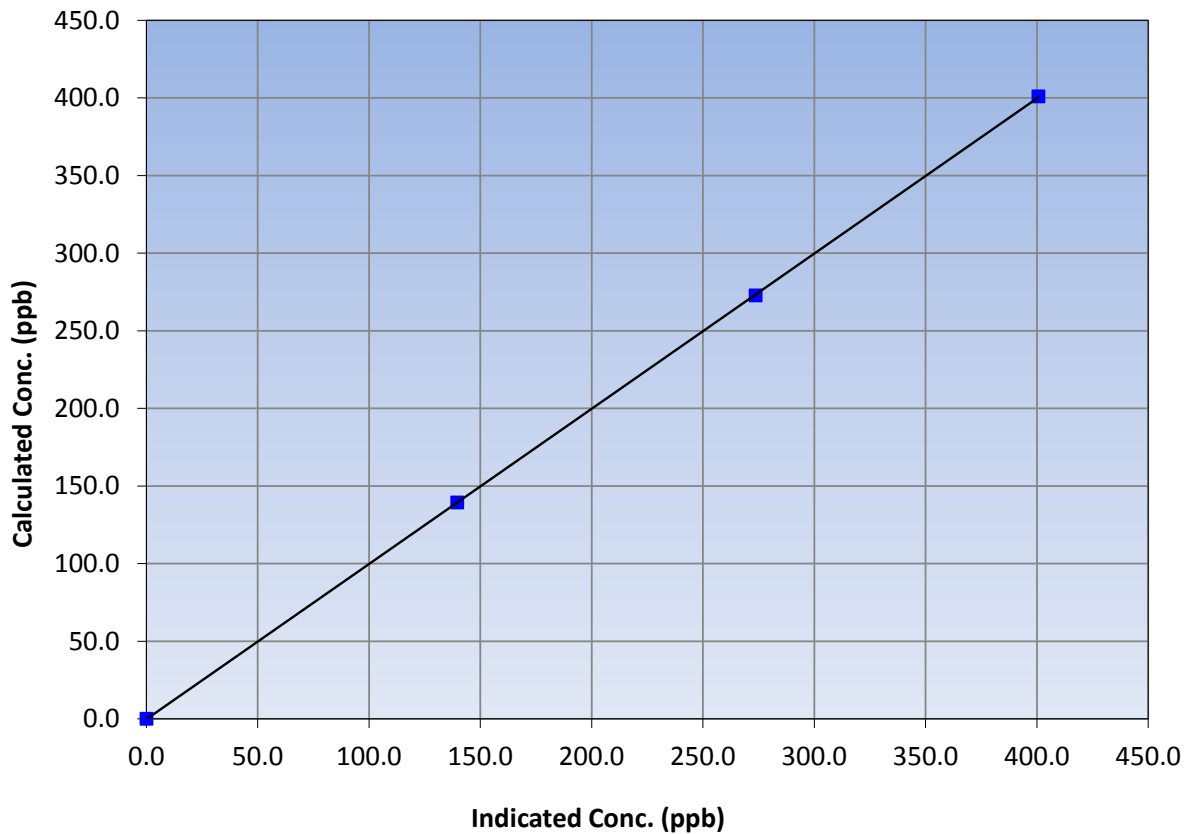
Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 15, 2017 | Previous Calibration | July 12, 2017 |
| Station Name | Stony Mountain | Station Number | AMS 18 |
| Start Time (MST) | 10:57 | End Time (MST) | 15:36 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1336160088 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | ≥0.995 | |
| 400.9 | 400.7 | 1.0005 | | | |
| 272.7 | 273.7 | 0.9963 | | | |
| 139.4 | 139.6 | 0.9986 | | | |
| | | | Slope | 0.999799 | 0.90 - 1.10 |
| | | | Intercept | -0.209032 | +/-20 |

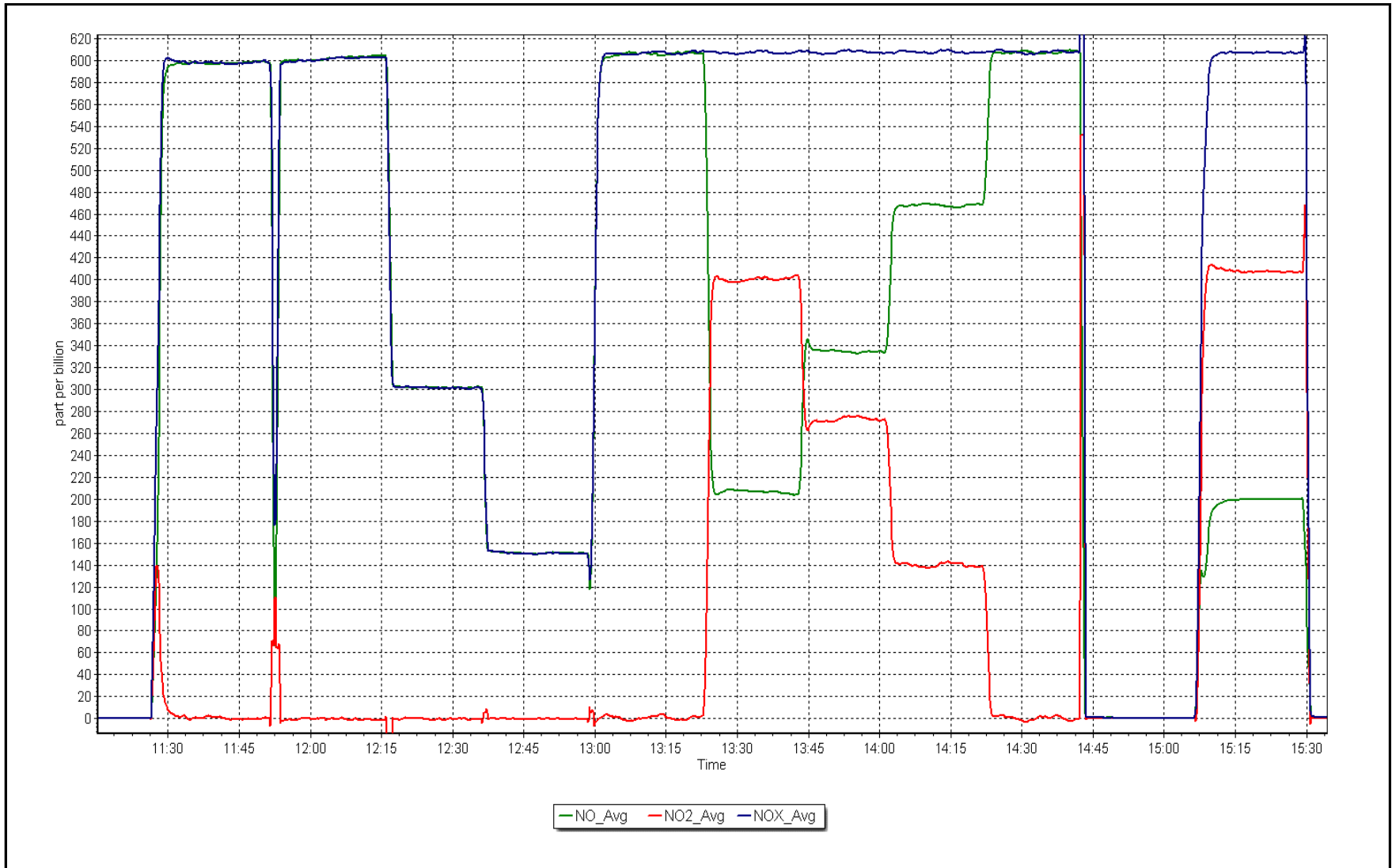
NO₂ Calibration Curve



NO_x Calibration Plot

Date: August 15, 2017

Location: Stony Mountain





Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-02-2017

Station Information

| | | | |
|------------------------|-------------------|-----------------|---------------|
| Station Name: | Stony Mountain | Station number: | AMS 18 |
| Calibration Date: | August 18, 2017 | Last Cal Date: | July 25, 2017 |
| Start time (MST): | 11:20 | End time (MST): | 12:54 |
| Sharp Model: | Thermo 5030 SHARP | S/N: | E-1107 |
| Particulate Fraction: | PM2.5 | C14 Source S/N: | 4965 |
| Flow Meter Make/Model: | Delta-Cal | S/N: | 954 |
| Temp/RH standard: | Delta-Cal | S/N: | 954 |

Monthly Calibration Test

| <u>Parameter</u> | <u>As found</u> | <u>Measured</u> | <u>As left</u> | <u>Adjusted</u> | (Limits) |
|-----------------------------|--|-----------------|---|-------------------------------------|-----------------|
| T1 (°C) | 19 | 20.6 | 19 | <input type="checkbox"/> | +/- 2 °C |
| P3 (hPa) | 927 | 927 | 927 | <input type="checkbox"/> | +/- 13 hPa |
| flow (LPH) | 1000 | 998 | 1000 | <input type="checkbox"/> | +/- 50 LPH |
| Nephelometer zero | 2 | 0 | 0 | <input checked="" type="checkbox"/> | +/- 0.5 ug/m3 |
| Instrument Clock: | Verified <input checked="" type="checkbox"/> | | | | |
| Cyclone cleaning : | PM10 Cyclone <input checked="" type="checkbox"/> | | PM2.5 Cyclone <input checked="" type="checkbox"/> | | |
| Date Filter Tape Installed: | | | | | |

Quarterly Calibration Test

Leak Test: Date of check: June 27, 2017 Last Cal Date: January 10, 2017
 Flow w/o adaptor: 16.63 Flow w/ adaptor: 16.58

(Limit) 0.4 LPM

| <u>Adjusted</u> | <u>Current Test</u> | <u>Previous Test</u> | <u>% Change</u> |
|-----------------------------------|--------------------------|--------------------------|-----------------|
| <input type="checkbox"/> | Foil S/N: _____ | Foil S/N: _____ | |
| Foil Calibration | Foil Mass: _____ | Foil Mass: _____ | |
| | Calibration Date: _____ | Calibration Date: _____ | |
| (Limit) +/- 5% of previous | Correction Factor: _____ | Correction Factor: _____ | --- |

Annual Calibration Test

| <u>Parameter</u> | <u>As found</u> | <u>Measured</u> | <u>As left</u> | <u>Adjusted</u> | (Limits) |
|-----------------------------|-----------------|-----------------|----------------|--------------------------|-----------------|
| T2 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| T3 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| T4 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| RH (%) | | | | <input type="checkbox"/> | +/- 10% |
| Date Sample Tube Cleaned: | | | | | |
| Date Pump Rebuilt/Replaced: | | | | | |

Notes: Nephelometer zero adjusted.

Calibration by: Aswin Sasi Kumar



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 19
FIREBAG
AUGUST 2017**

Operations, Data Collection,
QA/QC, Data Validation and Reporting by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

September 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
AUGUST 2017

MONTHLY SUMMARY for
AMD SECTION III.B.1(c)

| Parameter | Hours of Data | Hours of Calibration | Hours without Data | Operational Time | Maximum 1-Hour Value | 1-Hour Exceedances | Maximum 24-Hour Value | 24-Hour Exceedances |
|-----------------------------------|---------------|----------------------|--------------------|------------------|----------------------|--------------------|-----------------------|---------------------|
| SO2 (ppb) Average | 707 | 36 | 37 | 99.87 | 19 | 0 | 5 | 0 |
| H2S (ppb) Average | 709 | 34 | 35 | 99.87 | 1 | 0 | 0 | 0 |
| THC (ppm) Average | 707 | 36 | 37 | 99.87 | 3 | - | 2.4 | - |
| NO2 (ppb) Average | 707 | 36 | 37 | 99.87 | 19 | 0 | 5 | - |
| NO (ppb) Average | 707 | 36 | 37 | 99.87 | 16 | - | 1 | - |
| NOX (ppb) Average | 707 | 36 | 37 | 99.87 | 29 | - | 6 | - |
| Temperature 2 m (C) Average | 744 | 0 | 0 | 100 | 27.8 | - | 22.2 | - |
| Relative Humidity (%) Average | 744 | 0 | 0 | 100 | 99 | - | 95 | - |
| Wind Speed 10 m (km/h) Average | 744 | 0 | 0 | 100 | 35 | - | 24 | - |
| Wind Direction 10 m (deg) Average | 744 | 0 | 0 | 100 | - | - | - | - |

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
AUGUST 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

| Parameter | Number | Mean | StnDev | Total | Percentile | | | | | | |
|--------------------------------|--------|-------|--------|-------|------------|------|------|--------|------|------|------|
| | | | | | Min | P10 | Q1 | Median | Q3 | P90 | Max |
| SO2 (ppb) Average | 707 | 1.1 | 2 | - | 0 | 0 | 0 | 0 | 1 | 3 | 19 |
| H2S (ppb) Average | 709 | 0.2 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| THC (ppm) Average | 707 | 2.22 | 0.1 | - | 2 | 2.1 | 2.2 | 2.2 | 2.3 | 2.3 | 3 |
| NO2 (ppb) Average | 707 | 2.2 | 2 | - | 0 | 0 | 1 | 1 | 3 | 5 | 19 |
| NO (ppb) Average | 707 | 0.4 | 1 | - | 0 | 0 | 0 | 0 | 0 | 1 | 16 |
| NOX (ppb) Average | 707 | 2.7 | 3 | - | 0 | 0 | 1 | 2 | 3 | 6 | 29 |
| Temperature 2 m (C) Average | 744 | 16.35 | 4.6 | - | 4.6 | 10.2 | 12.8 | 16.4 | 19.7 | 22.5 | 27.8 |
| Relative Humidity (%) Average | 744 | 62.7 | 20 | - | 27 | 36 | 45 | 62 | 80 | 93 | 99 |
| Wind Speed 10 m (km/h) Average | 744 | 13.3 | 7 | - | 0 | 6 | 8 | 12 | 18 | 23 | 35 |
| | 6 | 744 | - | - | - | - | - | - | - | - | - |

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
AUGUST 2017

OPERATIONAL NOTES

| Parameter | Period Start | Period End | Duration (Hours) | Notes |
|---------------------------|-------------------|-------------------|------------------|--|
| ALL AIR QUALITY ANALYZERS | 29 Aug 2017 08:00 | 29 Aug 2017 08:00 | 1 | DAS collection error - data not recorded |



Summary of Hour Averages

Firebag - August 2017

| | | | | |
|--|--|----------|---------------------------|------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 19 ppb on Aug 8 07:00 | Maximum Daily Average: 5.3 ppb on Aug 8 | | Hours of Data: | 707 |
| Minimum Value: 0 ppb on Aug 2 04:00 | Minimum Daily Average: 0.1 ppb on Aug 6 | | Hours of Missing Data: | 37 |
| Maximum Diurnal Average: 2.0 ppb at hour 8 | Minimum Diurnal Average: 0.7 ppb at hour 21 | | Hours of Calibration: | 36 |
| Monthly Average: 1.1 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 9 | | Percent Operational Time: | 99.9 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 2-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 3 | 1 | 1 | 3 | 3 | 5 | 5 | 4 | 3 | 1 | 0 | 0 | 1.4 | 5 |
| 3-Aug | 0 | 0 | 1 | 1 | 0 | Z | 4 | 12 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 2 | 4 | 1.8 | 13 |
| 4-Aug | Z | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 5-Aug | 0 | Z | 0 | 1 | 5 | 4 | 4 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.9 | 5 |
| 6-Aug | 0 | 0 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 |
| 7-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 11 | 9 | 1.2 | 11 |
| 8-Aug | 6 | 3 | 3 | 5 | Z | 8 | 19 | 13 | 2 | 2 | 2 | 4 | 4 | 7 | 11 | 6 | 3 | 4 | 5 | 5 | 5 | 3 | 1 | 0 | 5.3 | 19 |
| 9-Aug | 0 | 0 | 0 | 0 | 1 | Z | 6 | 6 | 5 | 3 | 1 | 0 | 1 | 2 | 3 | 1 | 1 | 2 | 3 | 3 | 2 | 1 | 1 | 0 | 1.9 | 6 |
| 10-Aug | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 1 |
| 11-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 12-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0.5 | 1 |
| 13-Aug | 0 | 0 | 0 | Z | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 14-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 10 | 2 | 0 | 0 | 0 | 0 | 0.9 | 10 |
| 15-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 |
| 16-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | C | C | C | C | C | 1 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 1 | 1 | 0.6 | 2 |
| 17-Aug | 1 | Z | 2 | 3 | 4 | 3 | 3 | 3 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1.3 | 4 |
| 18-Aug | 3 | 3 | Z | 1 | 1 | 5 | 2 | 6 | 9 | 8 | 3 | 5 | 4 | 4 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 6 | 3.0 | 9 |
| 19-Aug | 5 | 5 | 2 | Z | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.9 | 5 |
| 20-Aug | 0 | 1 | 2 | 1 | Z | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0.5 | 2 |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | Z | 4 | 2 | 2 | 1 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 4 |
| 22-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 23-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 24-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0.6 | 5 | |
| 25-Aug | 5 | 3 | 2 | Z | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1.0 | 5 |
| 26-Aug | 1 | 1 | 0 | 1 | Z | 2 | 5 | 4 | 6 | 6 | 6 | 3 | 2 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 2.5 | 6 |
| 27-Aug | 1 | 1 | 2 | 2 | 3 | Z | 4 | 4 | 2 | 2 | 5 | 2 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1.5 | 5 |
| 28-Aug | Z | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 6 | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1.0 | 6 |
| 29-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | DF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0.3 | 1 |
| 30-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.3 | 1 |
| 31-Aug | 1 | 1 | 1 | Z | 1 | 1 | 1 | 3 | 8 | 7 | 8 | 9 | 8 | 9 | 4 | 0 | 0 | 1 | 1 | 0 | 1 | 2 | 0 | 1 | 2.9 | 9 |

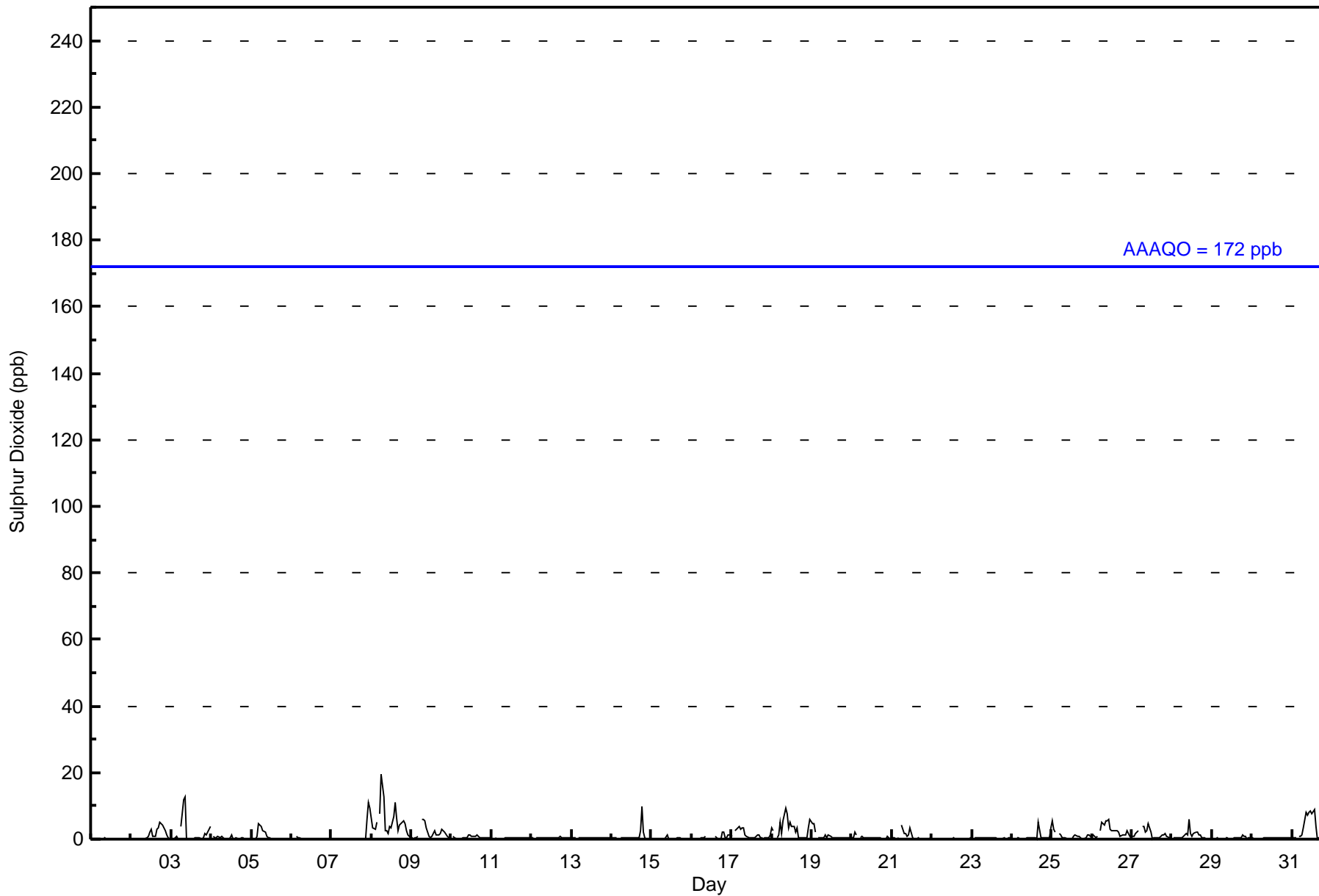
| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|--|
| 1.0 | 0.8 | 0.7 | 0.8 | 0.8 | 1.1 | 1.9 | 2.0 | 1.9 | 1.3 | 1.3 | 1.3 | 1.0 | 1.1 | 1.1 | 0.9 | 0.8 | 0.7 | 1.1 | 0.8 | 0.7 | 0.8 | 0.9 | 1.1 | Diurnal Average | |
| 6 | 5 | 3 | 5 | 5 | 8 | 19 | 13 | 13 | 8 | 8 | 9 | 8 | 9 | 11 | 6 | 5 | 5 | 10 | 5 | 5 | 6 | 11 | 9 | Diurnal Maximum | |

Z - zerospan C - Calibration DF - DAS Failure
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Firebag - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Firebag - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 10 | 701 | 99.15 | 99.15 |
| 11 - 20 | 6 | 0.85 | 100.00 |
| 21 - 60 | 0 | 0.00 | 100.00 |
| 61 - 110 | 0 | 0.00 | 100.00 |
| 111 - 172 | 0 | 0.00 | 100.00 |
| > 172 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Firebag - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|---|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 10 | 37 | 22 | 13 | 14 | 7 | 12 | 32 | 57 | 80 | 94 | 111 | 83 | 51 | 44 | 30 | 14 | 701 |
| 11 - 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 1 | 0 | 0 | 0 | 0 | 6 |
| 21 - 60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 61 - 110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 111 - 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 37 | 22 | 13 | 14 | 7 | 12 | 32 | 57 | 80 | 95 | 115 | 84 | 51 | 44 | 30 | 14 | 707 |

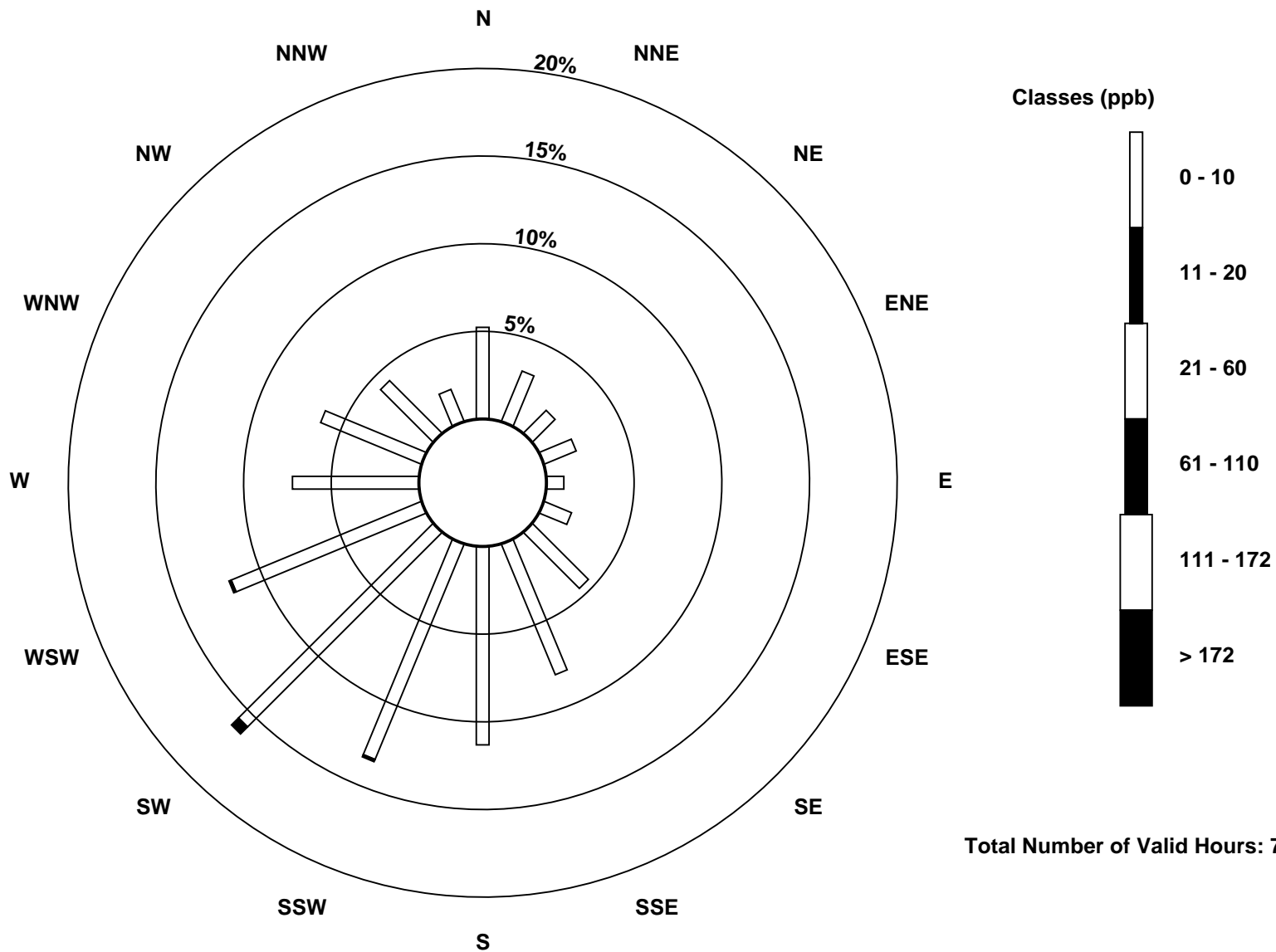
Total Number of Valid Hours: 707

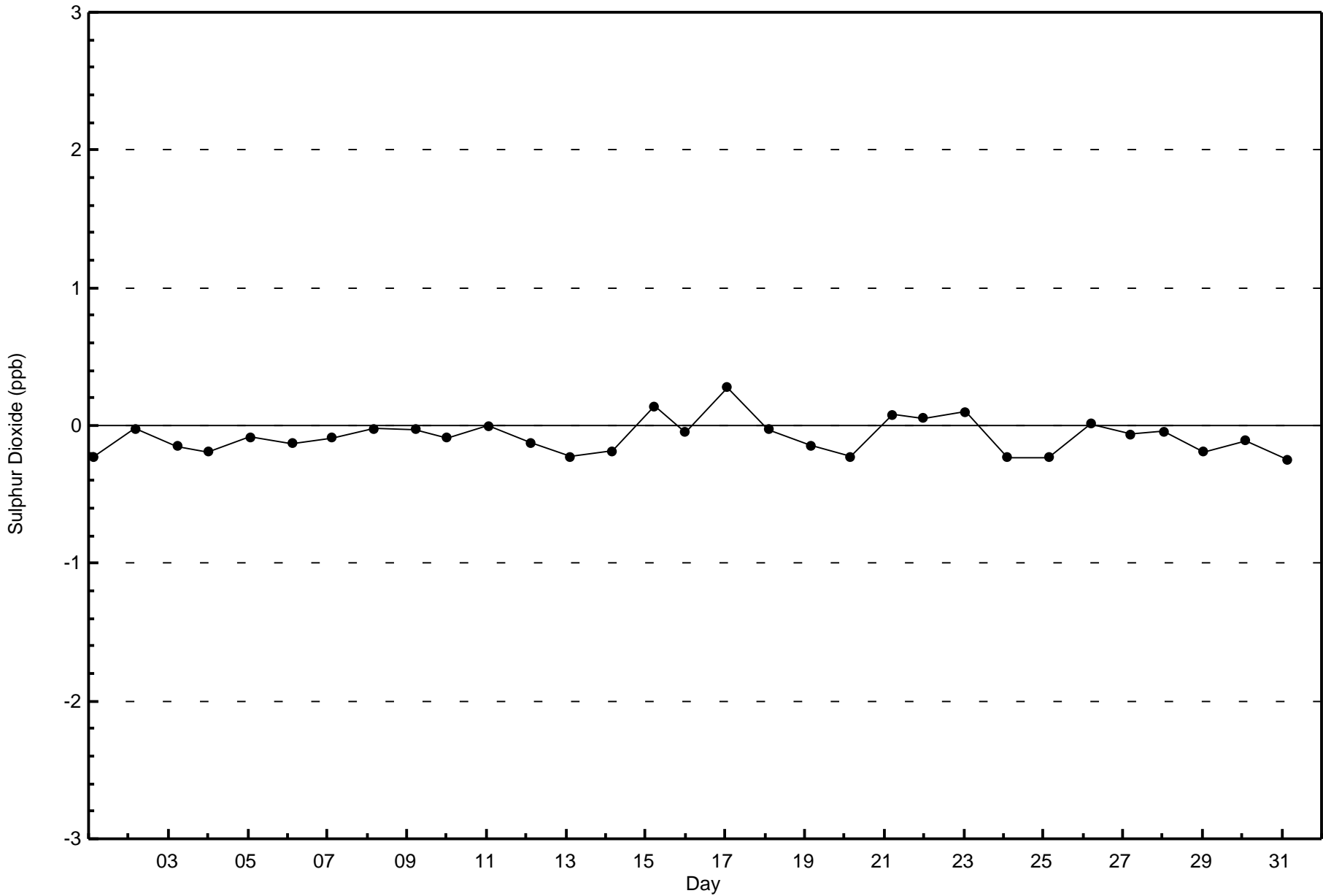
Total Number of Hours: 744

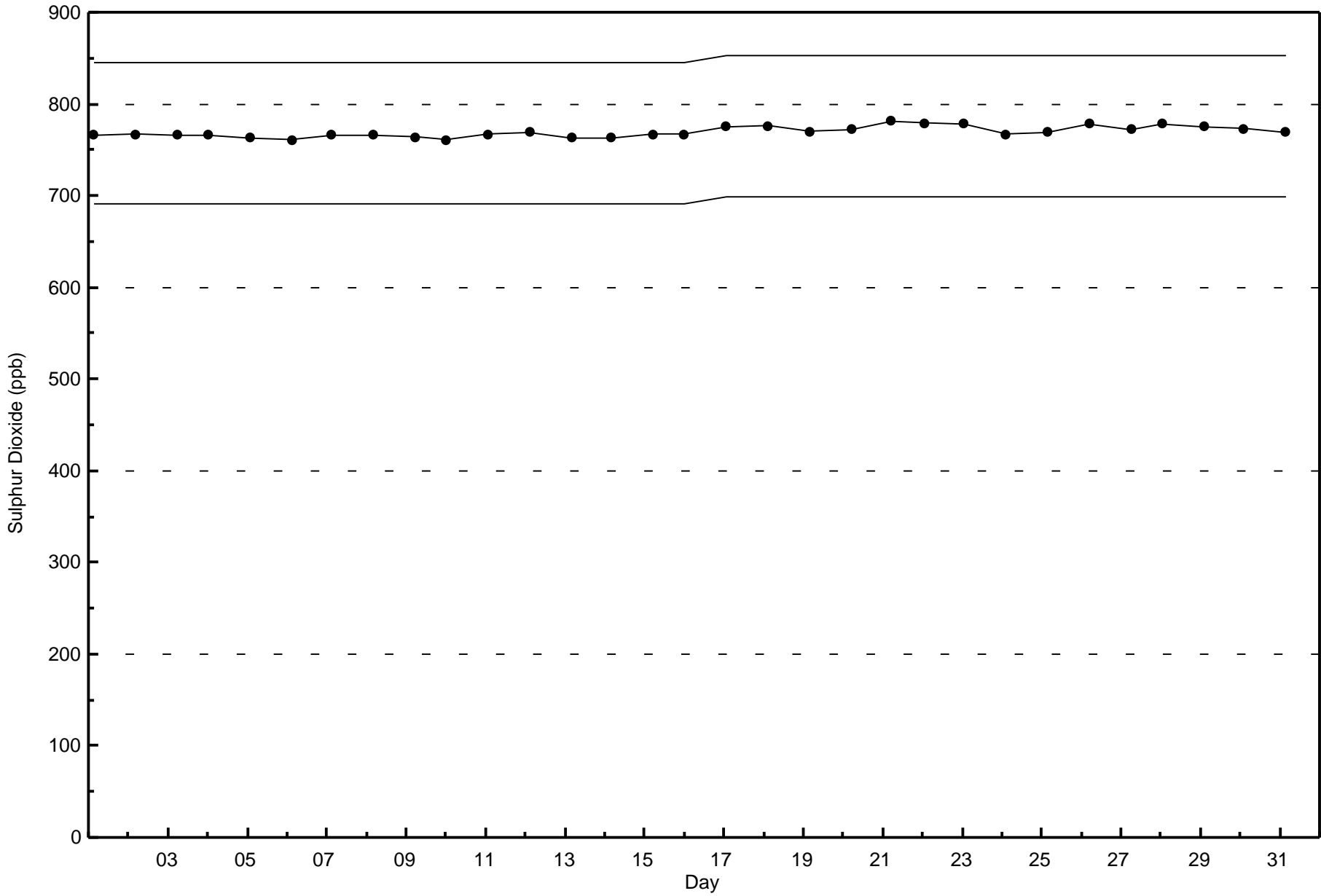


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Sulphur Dioxide (SO₂) - ppb
Firebag (AMS 19)







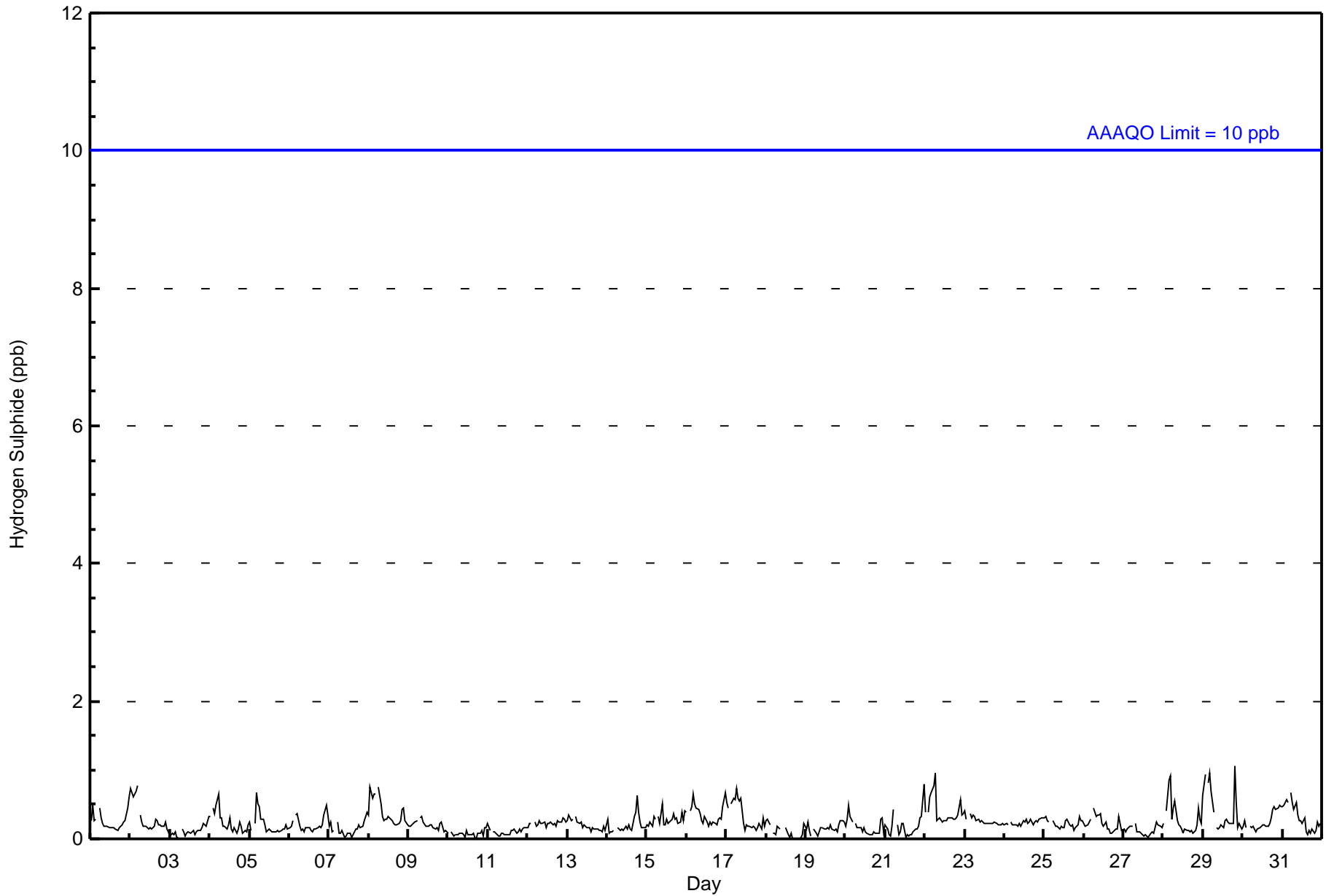


| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | |
|---|-------------------------------|---|---|---|---|---|---|----|---|--|----|----|----|----|----|----|----|----|----|--------------------------------|----|----|----|-----------------|---------------|---------------|
| Maximum Value: 1 ppb on Aug 29 20:00 | | | | | | | | | | Maximum Daily Average: 0.4 ppb on Aug 29 | | | | | | | | | | Hours of Data: 709 | | | | | | |
| Minimum Value: 0 ppb on Aug 18 17:00 | | | | | | | | | | Minimum Daily Average: 0.1 ppb on Aug 10 | | | | | | | | | | Hours of Missing Data: 35 | | | | | | |
| Maximum Diurnal Average: 0.4 ppb at hour 5 | | | | | | | | | | Minimum Diurnal Average: 0.2 ppb at hour 15 | | | | | | | | | | Hours of Calibration: 34 | | | | | | |
| Monthly Average: 0.2 ppb | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1 | | | | | | | | | | Percent Operational Time: 99.9 | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.3 | 1 |
| 2-Aug | 1 | 1 | 1 | 1 | 1 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 4-Aug | 0 | Z | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 5-Aug | 0 | 0 | Z | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 6-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 7-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 8-Aug | 0 | 1 | 1 | 1 | 1 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 9-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 10-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 11-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 12-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 13-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 14-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 15-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 16-Aug | 0 | Z | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.4 | 1 |
| 17-Aug | 1 | 0 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 18-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 19-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 20-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.2 | 1 |
| 22-Aug | 0 | Z | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0.4 | 1 |
| 23-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 24-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 25-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 26-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 28-Aug | 0 | Z | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 29-Aug | 1 | 1 | Z | 1 | 1 | 1 | 0 | DF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0.4 | 1 |
| 30-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 31-Aug | 0 | 0 | 1 | 1 | Z | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 0.3 0.3 0.3 0.3 0.4 0.3 0.3 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.3 0.3 0.3 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 1 1 1 0 1 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| Z - zerospan C - Calibration DF - DAS Failure | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Firebag - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Firebag - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2 | 709 | 100.00 | 100.00 |
| 3 - 4 | 0 | 0.00 | 100.00 |
| 5 - 7 | 0 | 0.00 | 100.00 |
| 8 - 11 | 0 | 0.00 | 100.00 |
| > 11 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Firebag - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|------------|-----------|------------|----------|------------|-----------|------------|-----------|------------|------------|------------|-----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2 | 37 | 23 | 12 | 14 | 6 | 12 | 34 | 56 | 80 | 93 | 114 | 84 | 55 | 44 | 30 | 15 | 709 |
| 3 - 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 - 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 - 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 37 | 23 | 12 | 14 | 6 | 12 | 34 | 56 | 80 | 93 | 114 | 84 | 55 | 44 | 30 | 15 | 709 |

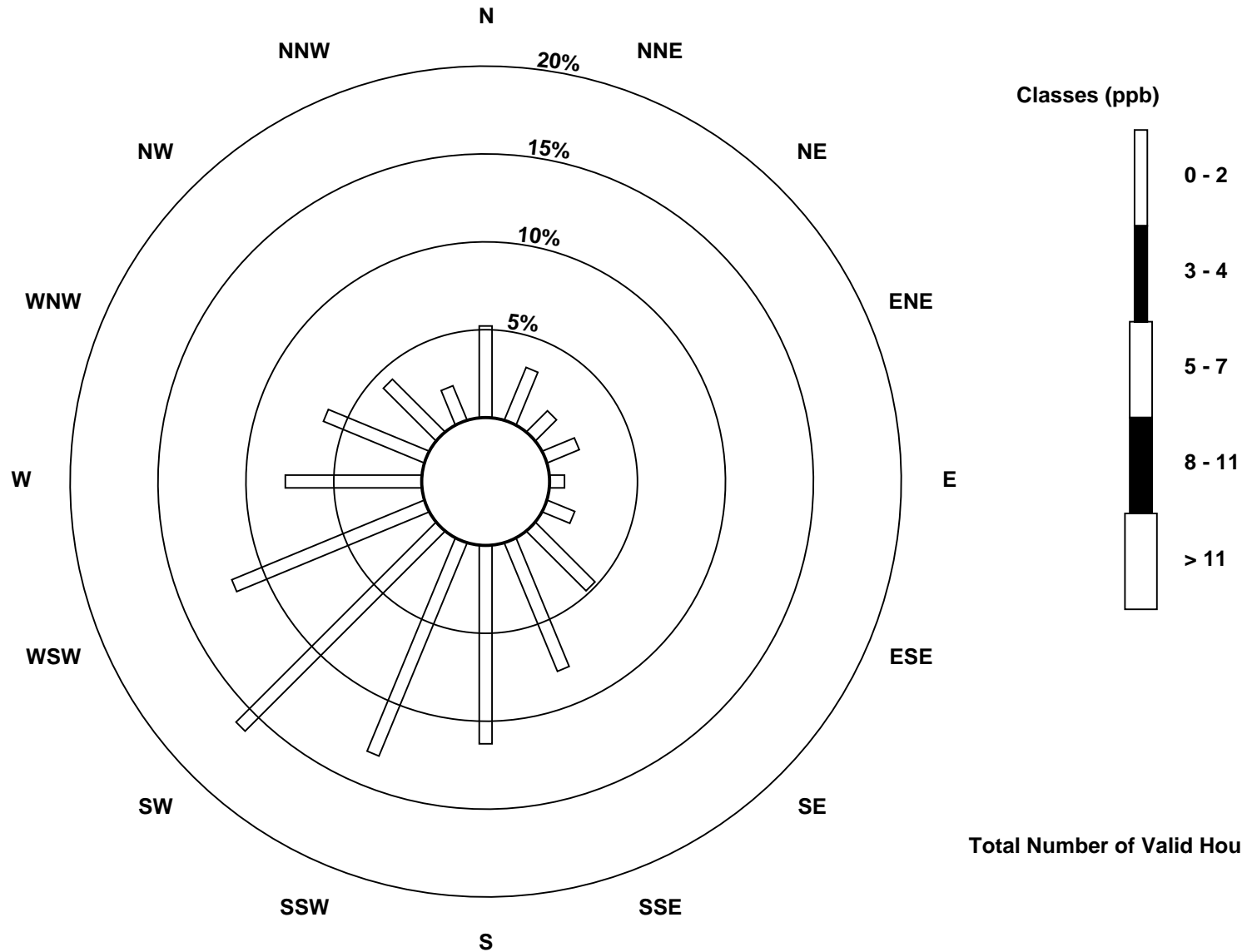
Total Number of Valid Hours: 709

Total Number of Hours: 744

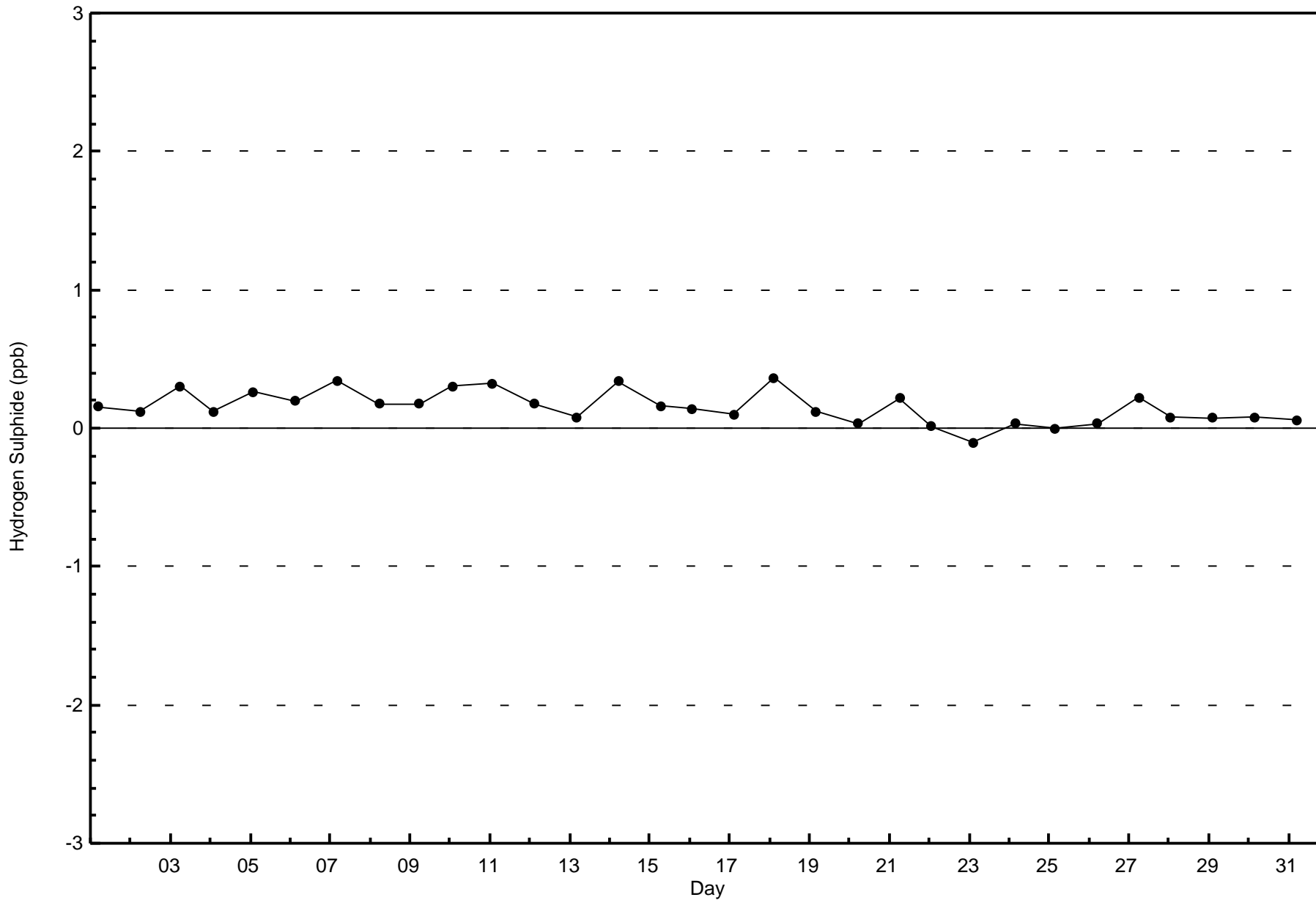


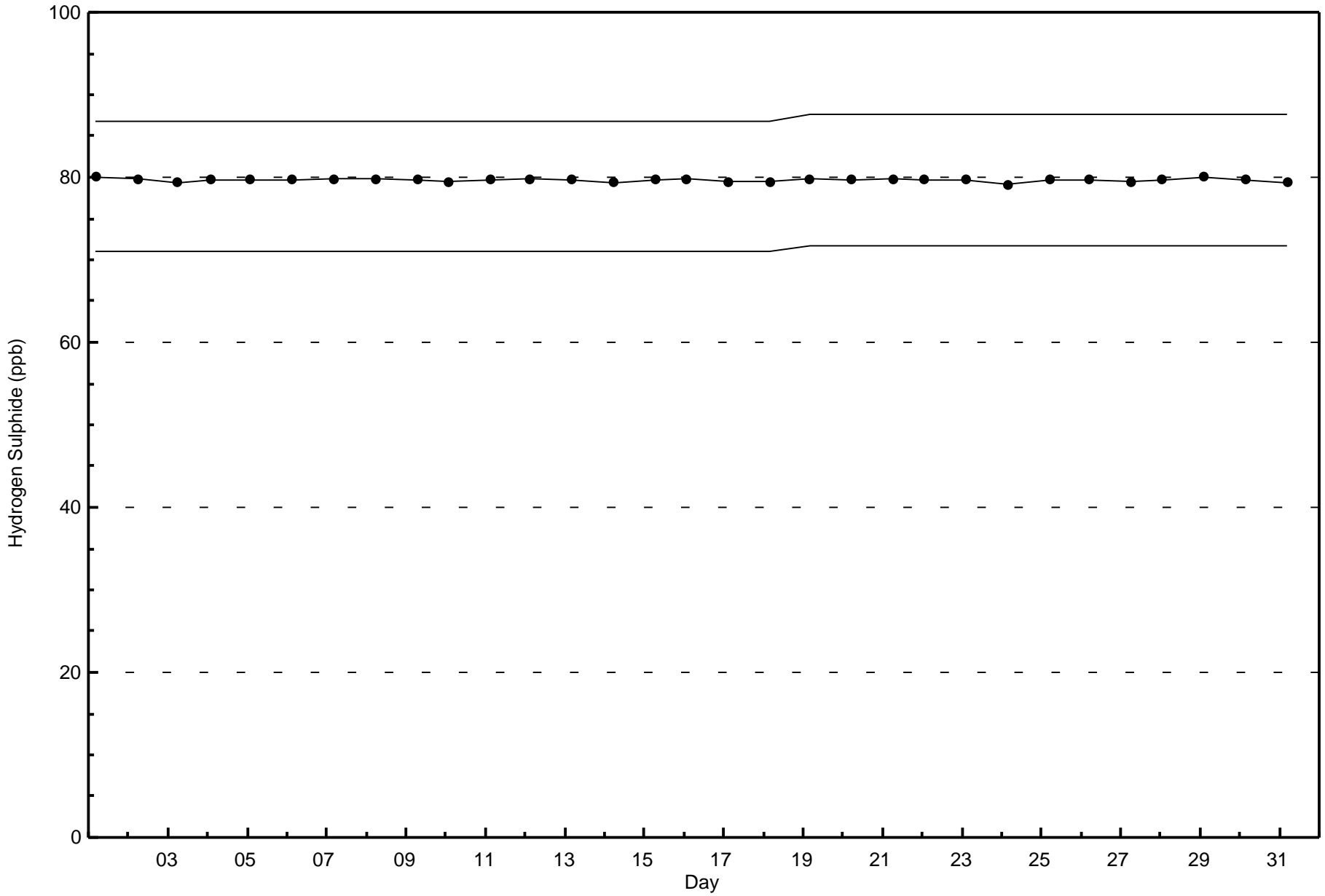
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Hydrogen Sulphide (H₂S) - ppb
Firebag (AMS 19)



Total Number of Valid Hours: 709







Wood Buffalo Environmental Association
Summary of Hour Averages

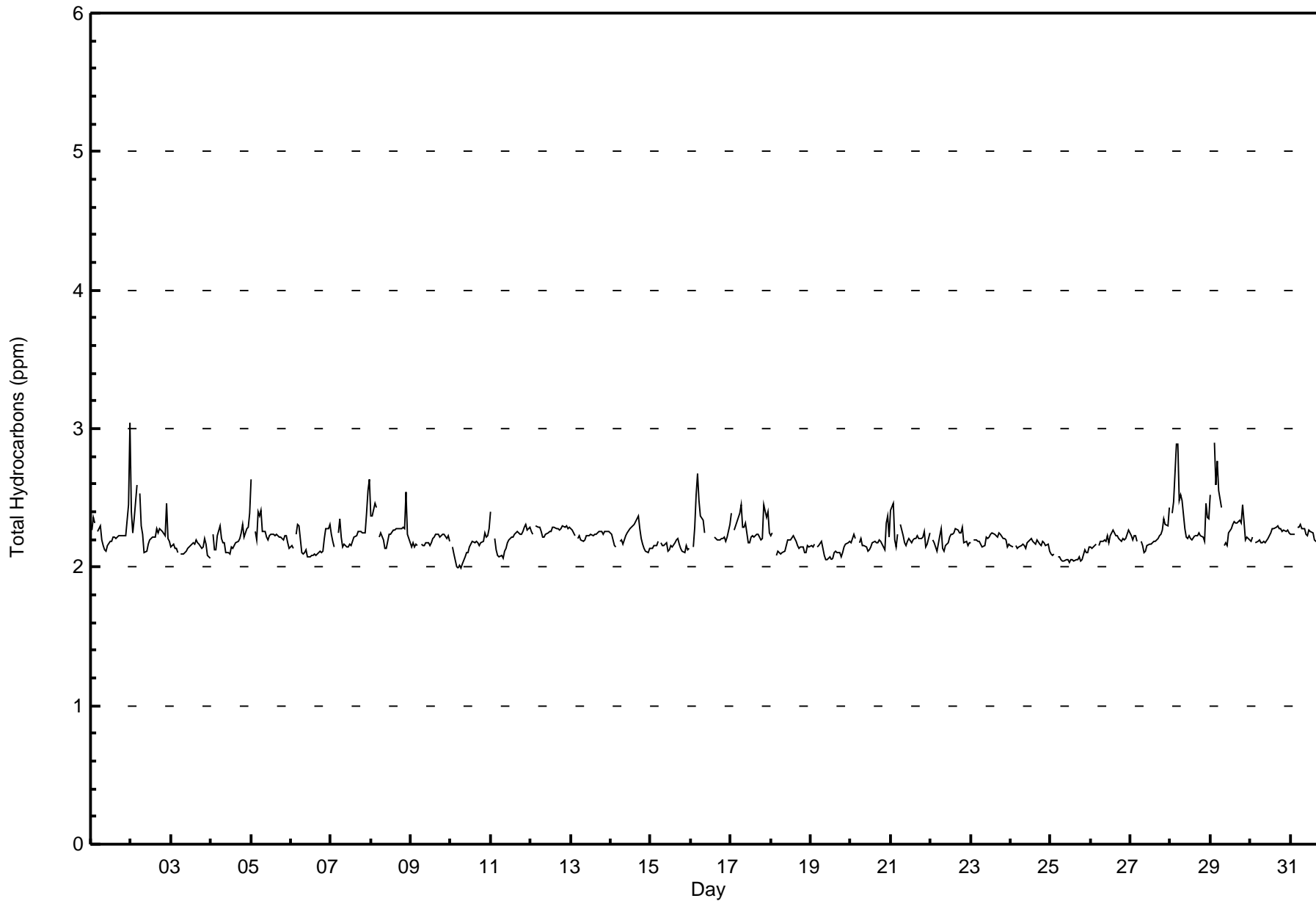
Total Hydrocarbons (THC) - ppm
Firebag - August 2017

| Maximum Value: 3.0 ppm on Aug 2 00:00 | | Maximum Daily Average: 2.4 ppm on Aug 29 | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|--|-----|--------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|---------------|---------------|-----|
| Minimum Value: 2.0 ppm on Aug 10 05:00 | | Minimum Daily Average: 2.1 ppm on Aug 25 | | Hours of Data: 707 | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 2.3 ppm at hour 24 | | Minimum Diurnal Average: 2.2 ppm at hour 10 | | Hours of Missing Data: 37 | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 2.22 ppm | | Percentiles: P ₁ = 2.0 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.2 Q ₃ = 2.3 P ₉₀ = 2.3 P ₉₉ = 2.6 | | Hours of Calibration: 36 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Percent Operational Time: 99.9 | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 2.3 | 2.4 | 2.3 | Z | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.5 | 3.0 | 2.3 | 3.0 | |
| 2-Aug | 2.4 | 2.2 | 2.4 | 2.6 | Z | 2.5 | 2.3 | 2.2 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.5 | 2.2 | 2.2 | 2.3 | 2.6 | |
| 3-Aug | 2.1 | 2.2 | 2.1 | 2.1 | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.2 | |
| 4-Aug | Z | 2.2 | 2.1 | 2.1 | 2.2 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.2 | 2.3 | 2.3 | 2.4 | 2.2 | 2.4 | |
| 5-Aug | 2.6 | Z | 2.3 | 2.2 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.3 | 2.6 | |
| 6-Aug | 2.2 | 2.1 | Z | 2.2 | 2.3 | 2.3 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.3 | 2.3 | 2.3 | 2.2 | 2.3 | |
| 7-Aug | 2.2 | 2.2 | 2.1 | Z | 2.2 | 2.3 | 2.2 | 2.1 | 2.2 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.4 | 2.6 | 2.6 | 2.3 | 2.6 | |
| 8-Aug | 2.4 | 2.4 | 2.5 | 2.4 | Z | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.5 | 2.2 | 2.2 | 2.3 | 2.5 | |
| 9-Aug | 2.1 | 2.2 | 2.1 | 2.2 | 2.2 | Z | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | |
| 10-Aug | Z | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.2 | 2.2 | 2.3 | 2.1 | 2.3 | |
| 11-Aug | 2.4 | Z | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.2 | 2.2 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.4 | |
| 12-Aug | 2.3 | 2.2 | Z | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | |
| 13-Aug | 2.3 | 2.3 | 2.2 | Z | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.3 | 2.2 | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.3 | |
| 14-Aug | 2.2 | 2.2 | 2.2 | 2.1 | Z | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.4 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.4 | |
| 15-Aug | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | Z | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.2 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.1 | 2.2 | 2.2 | |
| 16-Aug | Z | 2.1 | 2.3 | 2.5 | 2.7 | 2.5 | 2.4 | 2.3 | 2.2 | C | C | C | C | C | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.7 | |
| 17-Aug | 2.4 | Z | 2.3 | 2.3 | 2.4 | 2.4 | 2.5 | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.5 | |
| 18-Aug | 2.2 | 2.2 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.2 | 2.2 | |
| 19-Aug | 2.2 | 2.1 | 2.2 | Z | 2.1 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.1 | 2.2 | |
| 20-Aug | 2.2 | 2.2 | 2.2 | 2.2 | Z | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.3 | 2.4 | 2.2 | 2.2 | 2.4 | |
| 21-Aug | 2.4 | 2.5 | 2.2 | 2.1 | 2.2 | Z | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.1 | 2.2 | 2.2 | 2.2 | 2.5 | |
| 22-Aug | Z | 2.2 | 2.2 | 2.1 | 2.1 | 2.2 | 2.3 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | |
| 23-Aug | 2.2 | Z | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.2 | 2.2 | 2.3 | |
| 24-Aug | 2.2 | 2.1 | Z | 2.2 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.2 | 2.2 | |
| 25-Aug | 2.1 | 2.1 | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.1 | 2.1 | 2.0 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | |
| 26-Aug | 2.1 | 2.1 | 2.2 | 2.2 | Z | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | |
| 27-Aug | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | Z | 2.2 | 2.2 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.4 | 2.3 | 2.3 | 2.4 | 2.2 | 2.4 |
| 28-Aug | Z | 2.4 | 2.5 | 2.9 | 2.9 | 2.5 | 2.5 | 2.5 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.5 | 2.4 | 2.4 | 2.4 | 2.4 | 2.9 |
| 29-Aug | 2.5 | Z | 2.9 | 2.6 | 2.8 | 2.6 | 2.4 | DF | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.4 | 2.3 | 2.2 | 2.2 | 2.2 | 2.4 | 2.9 | |
| 30-Aug | 2.2 | 2.2 | Z | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.3 | |
| 31-Aug | 2.2 | 2.2 | 2.2 | Z | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.3 | 2.2 | 2.3 | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 2.3 2.3 | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 2.6 3.0 | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Z - zerospan C - Calibration DF - DAS Failure | | | |



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Firebag - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Firebag - August 2017

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2.0 | 12 | 1.70 | 1.70 |
| 2.1 - 3.0 | 695 | 98.30 | 100.00 |
| 3.1 - 10.0 | 0 | 0.00 | 100.00 |
| > 10.0 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Firebag - August 2017

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|---|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 5 | 2 | 1 | 0 | 0 | 0 | 12 |
| 2.1 - 3.0 | 37 | 22 | 13 | 14 | 7 | 12 | 32 | 57 | 77 | 94 | 110 | 82 | 50 | 44 | 30 | 14 | 695 |
| 3.1 - 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 37 | 22 | 13 | 14 | 7 | 12 | 32 | 57 | 80 | 95 | 115 | 84 | 51 | 44 | 30 | 14 | 707 |

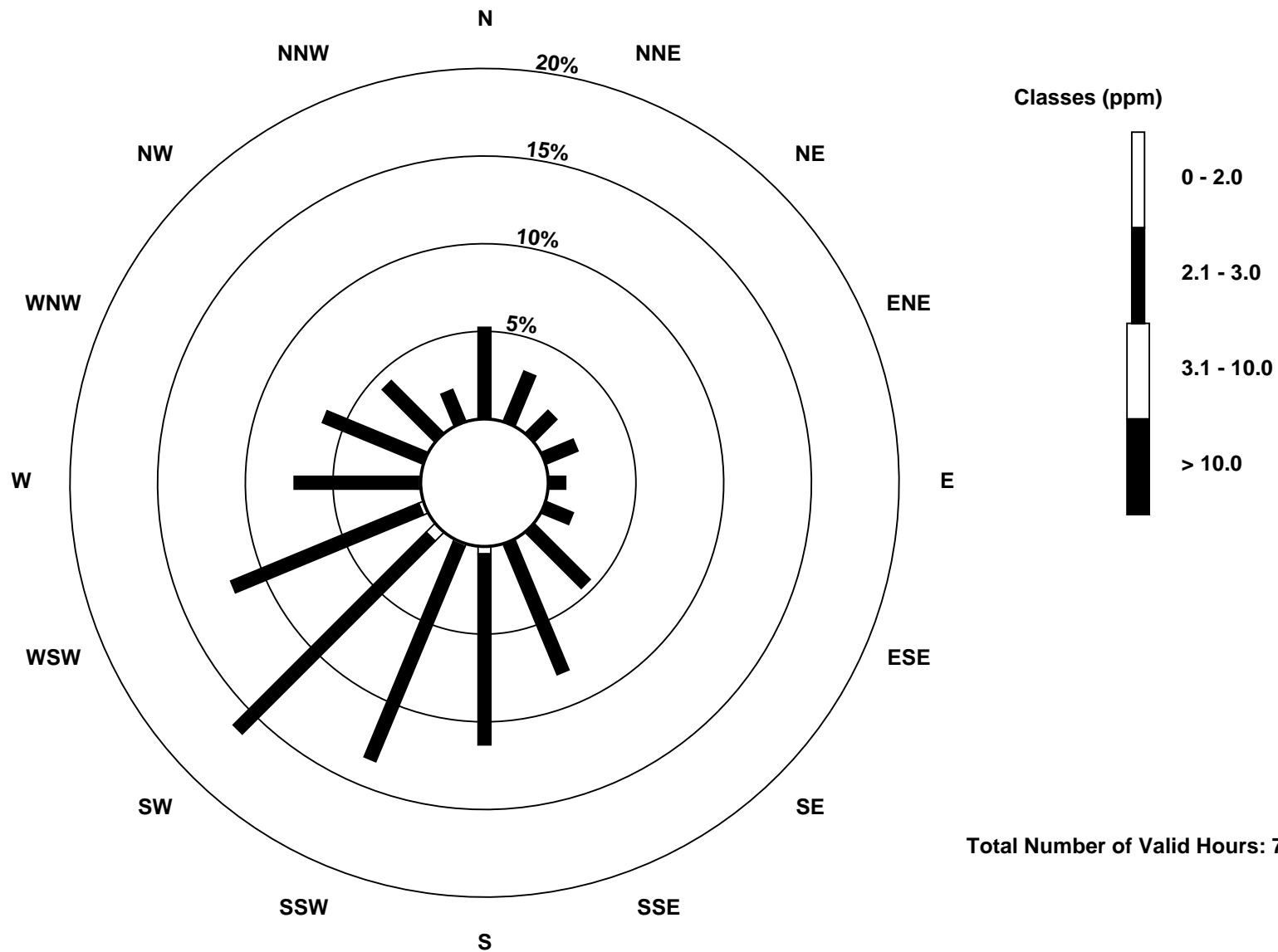
Total Number of Valid Hours: 707

Total Number of Hours: 744

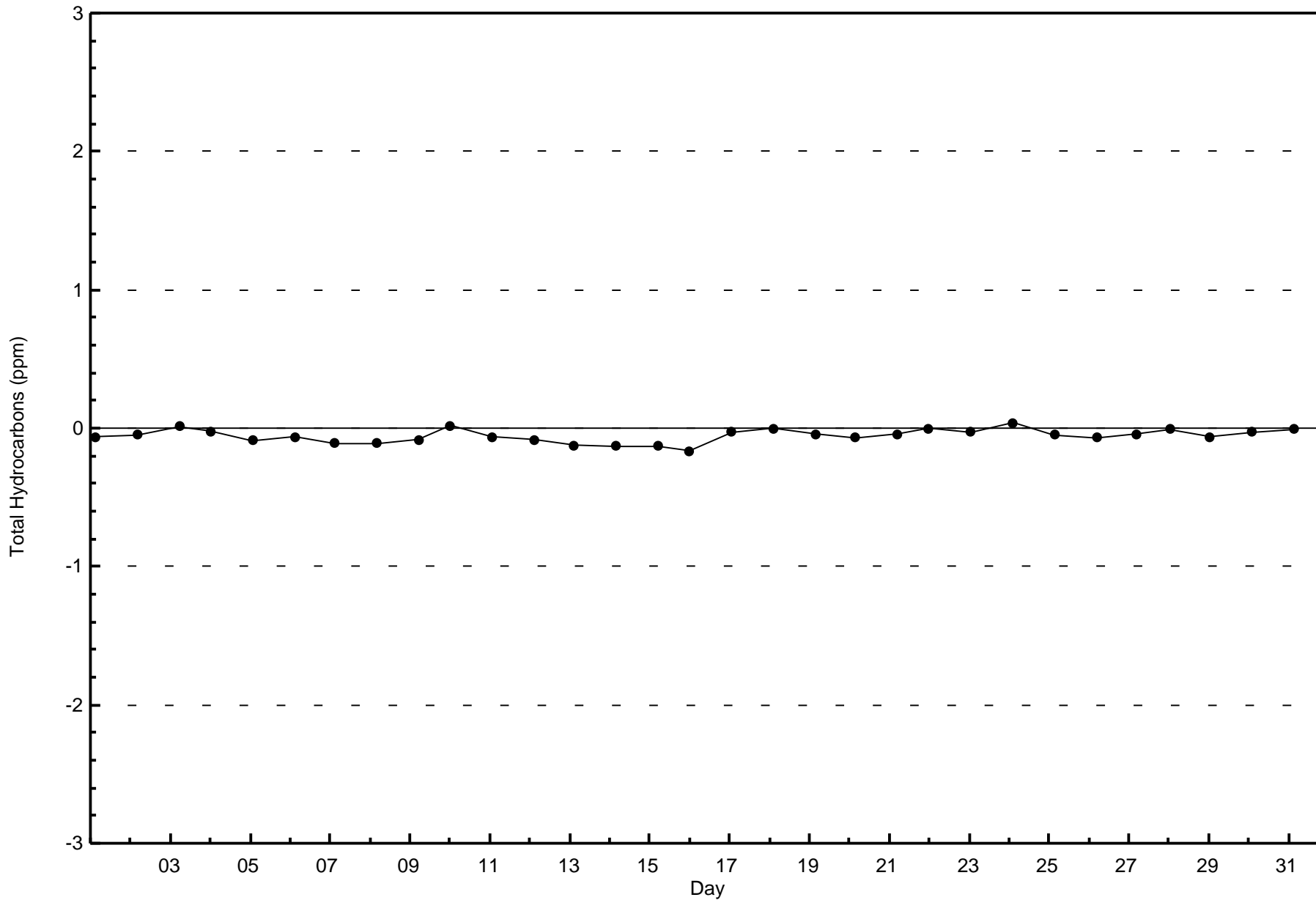


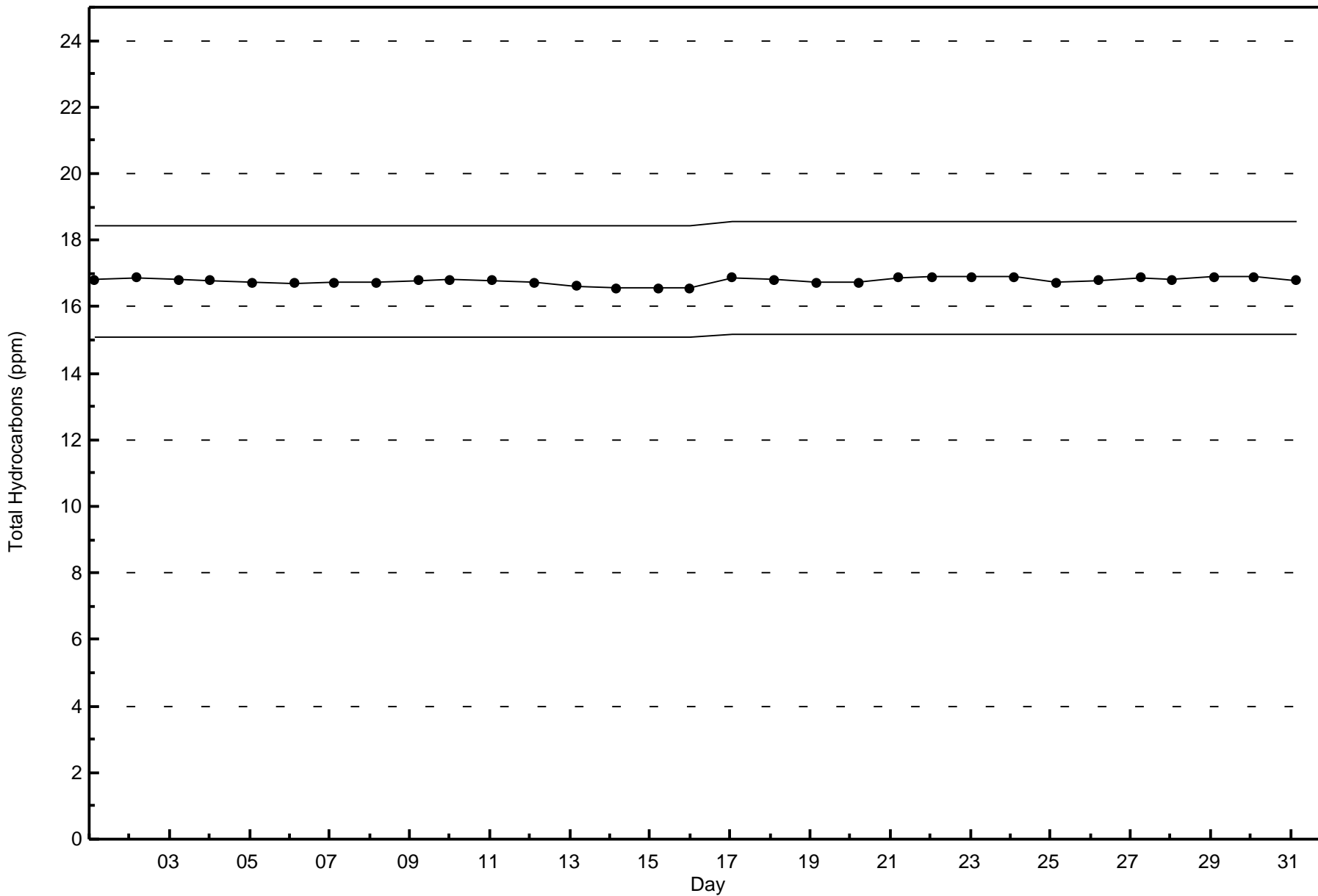
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Total Hydrocarbons (THC) - ppm
Firebag (AMS 19)



Total Number of Valid Hours: 707







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxide (NO) - ppb

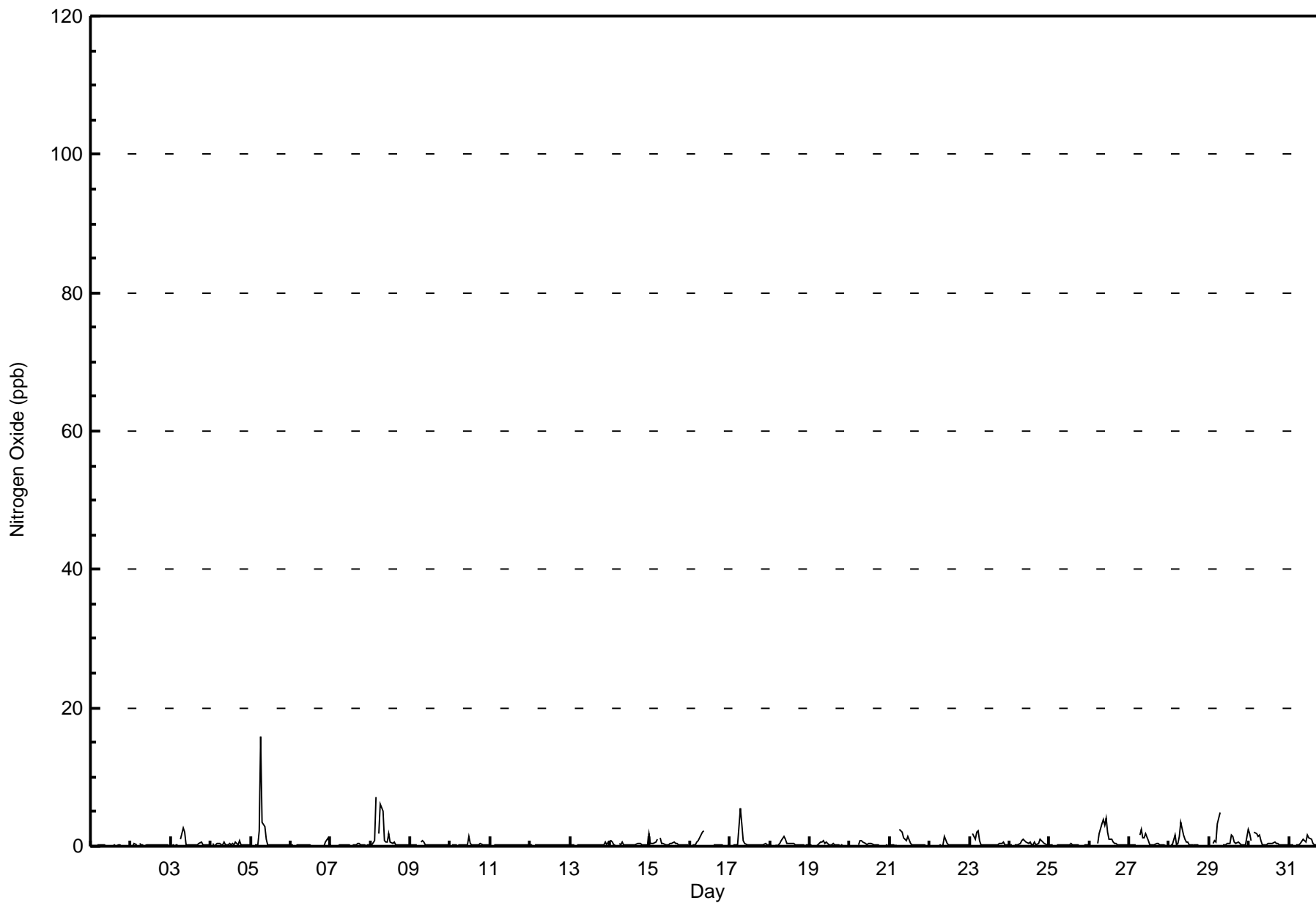
Firebag - August 2017

| Maximum Value: 16 ppb on Aug 5 07:00 | | | | | | | | | | | | | | | | | Maximum Daily Average: 1.2 ppb on Aug 5 | | | | | | | | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | |
|---|-------------------------------|---|---|---|---|---|----|----|---|----|----|----|----|----|----|----|--|----|----|----|----|----|----|-----|---------------|---------------|-----|-----|-----|-----|-----|-----|-----|---------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|
| Minimum Value: 0 ppb on Aug 29 00:00 | | | | | | | | | | | | | | | | | Minimum Daily Average: 0.1 ppb on Aug 1 | | | | | | | | | | | | | | | | | Hours of Data: 707 | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 1.6 ppb at hour 7 | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 0.2 ppb at hour 21 | | | | | | | | | | | | | | | | | Hours of Missing Data: 37 | | | | | | | | | | | | | | | |
| Monthly Average: 0.4 ppb | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 4 | | | | | | | | | | | | | | | | | Hours of Calibration: 36 | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | Percent Operational Time: 99.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 0 | 0 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | Z | 1 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0.4 | 3 | | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 0 | Z | 0 | 0 | 0 | 2 | 16 | 3 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1.2 | 16 | | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 0 | 0 | 1 | 7 | Z | 2 | 6 | 5 | 1 | 1 | 1 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.2 | 7 | | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 0 | 0 | 0 | 0 | 0 | Z | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 1 | 1 | 0 | 0 | Z | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0.4 | 2 | | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 0 | 0 | 0 | 1 | 1 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | Z | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 2 | C | C | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 2 | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 0 | Z | 0 | 0 | 0 | 3 | 6 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 6 | | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 0 | 0 | 0 | Z | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 0 | 0 | 0 | 0 | Z | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | Z | 2 | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 2 | | | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 0 | Z | 2 | 1 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0.5 | 2 | | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0.5 | 1 | | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 0 | 0 | 0 | 0 | Z | 0 | 2 | 3 | 4 | 3 | 4 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.0 | 4 | | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | Z | 2 | 2 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 2 | | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | Z | 0 | 0 | 2 | 0 | 0 | 1 | 3 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 3 | | | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 0 | Z | 0 | 1 | 1 | 3 | 5 | DF | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 0.9 | 5 | | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 2 | 1 | Z | 2 | 2 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 2 | | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 2 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.2 | 0.2 | 0.2 | 0.6 | 0.3 | 0.7 | 1.6 | 1.2 | 0.8 | 0.5 | 0.5 | 0.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | Diurnal Average |
| | | | | | | | | | | | | | | | | | | | | | | | | 2 | 1 | 2 | 7 | 2 | 3 | 16 | 5 | 4 | 3 | 4 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | Diurnal Maximum |
| Z - zerospan C - Calibration DF - DAS Failure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxide (NO) - ppb
Firebag - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Firebag - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 707 | 100.00 | 100.00 |
| 21 - 40 | 0 | 0.00 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Firebag - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|---|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 37 | 22 | 13 | 14 | 7 | 12 | 32 | 57 | 80 | 95 | 115 | 84 | 51 | 44 | 30 | 14 | 707 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 37 | 22 | 13 | 14 | 7 | 12 | 32 | 57 | 80 | 95 | 115 | 84 | 51 | 44 | 30 | 14 | 707 |

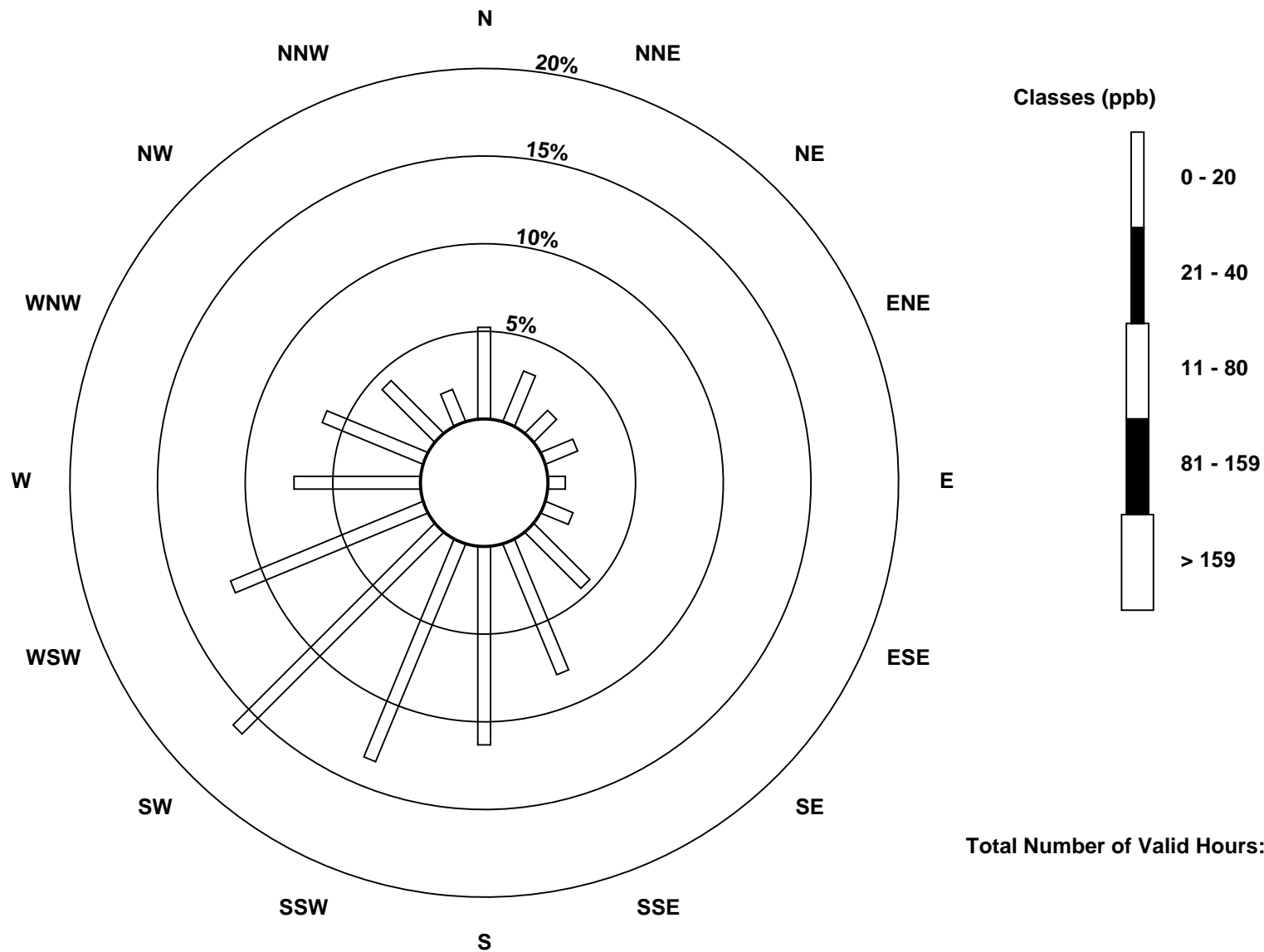
Total Number of Valid Hours: 707

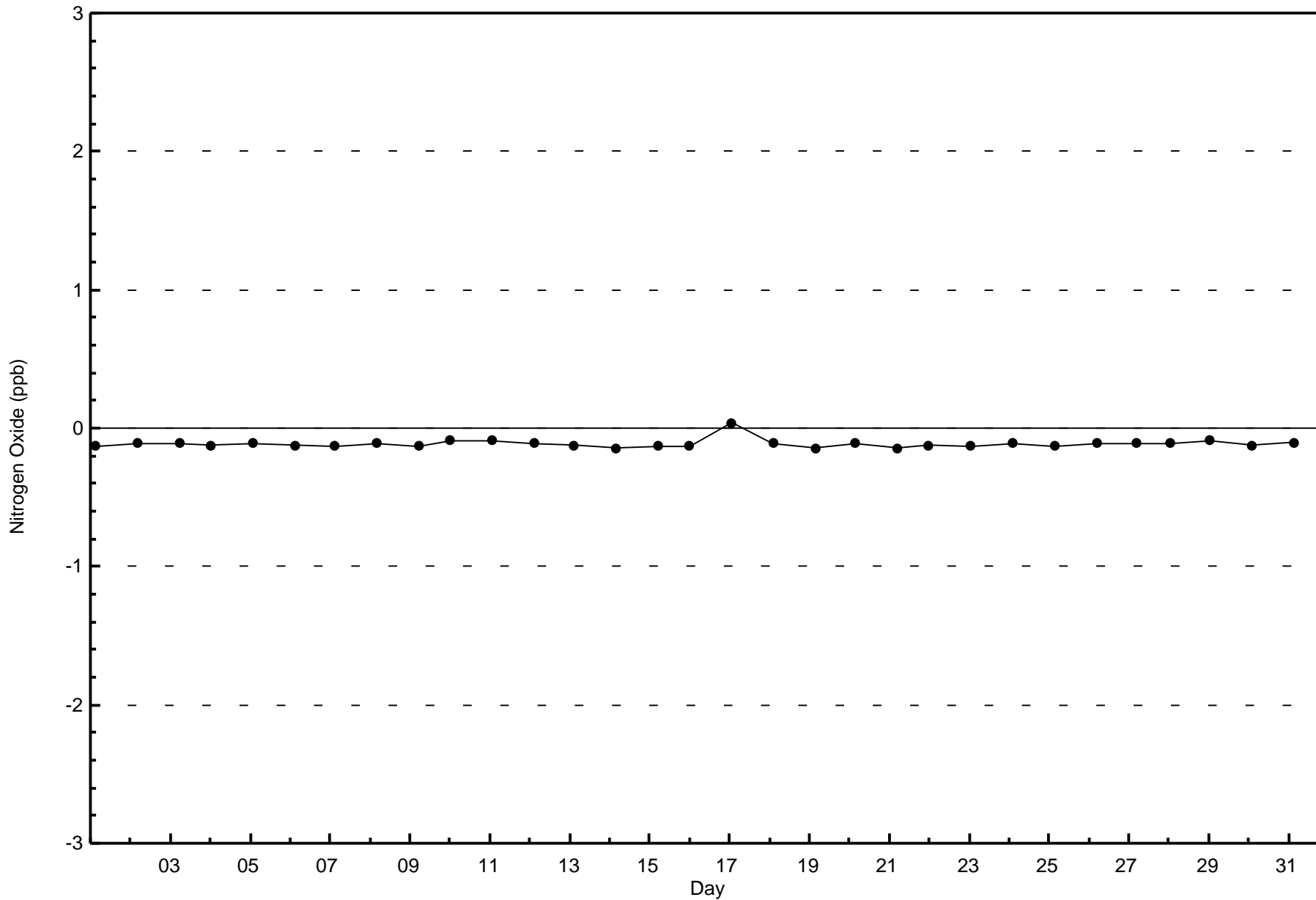
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Oxide (NO) - ppb
Firebag (AMS 19)

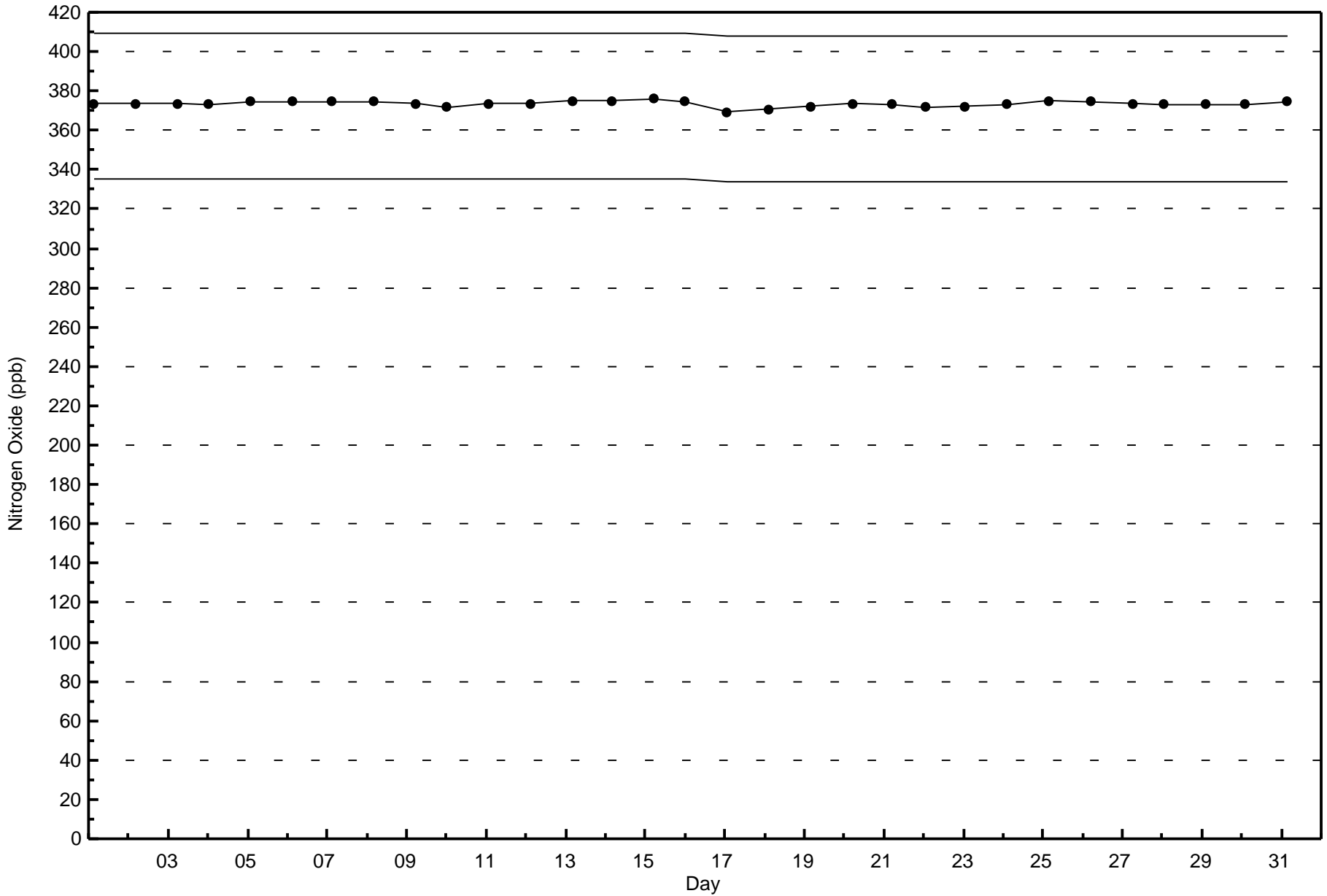






Wood Buffalo Environmental Association
Span Responses

Nitrogen Oxide (NO) - ppb
Firebag - August 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Firebag - August 2017

| | | | | |
|--|---|----------|---------------------------|------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 19 ppb on Aug 8 04:00 | Maximum Daily Average: 4.9 ppb on Aug 17 | | Hours of Data: | 707 |
| Minimum Value: 0 ppb on Aug 1 18:00 | Minimum Daily Average: 0.4 ppb on Aug 22 | | Hours of Missing Data: | 37 |
| Maximum Diurnal Average: 4.4 ppb at hour 4 | Minimum Diurnal Average: 1.1 ppb at hour 17 | | Hours of Calibration: | 36 |
| Monthly Average: 2.2 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 O ₃ = 3 P ₉₀ = 5 P ₉₉ = 13 | | Percent Operational Time: | 99.9 |

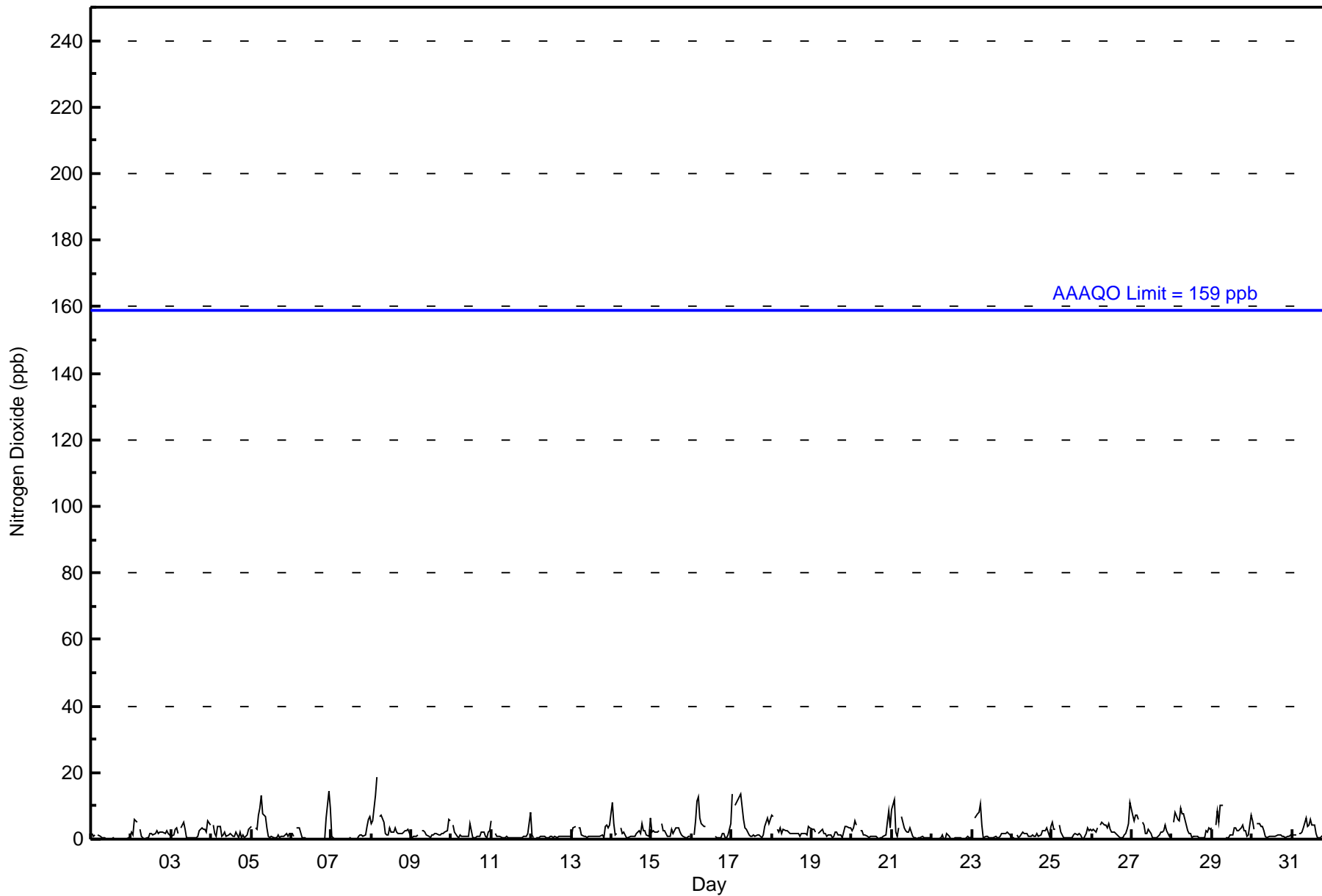
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | |
|--------|-------------------------------|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|---------------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 2 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.5 | 2 | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 2 | 1 | 6 | 5 | Z | 3 | 1 | 1 | 0 | 0 | 1 | 2 | 2 | 1 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 1 | 2.0 | 6 | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 1 | 1 | 3 | 3 | 2 | Z | 3 | 5 | 3 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 3 | 4 | 3 | 3 | 2 | 5 | 4 | 2.2 | 5 | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | Z | 4 | 2 | 1 | 4 | 4 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 0 | 2 | 1 | 1 | 1 | 1 | 3 | 3 | 1.8 | 4 | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 4 | Z | 3 | 3 | 7 | 9 | 13 | 8 | 7 | 3 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 3.0 | 13 | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 2 | 1 | Z | 3 | 4 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 15 | 9 | 2.0 | 15 | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 1 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 4 | 6 | 7 | 1.1 | 7 | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 5 | 6 | 13 | 19 | Z | 7 | 7 | 5 | 2 | 1 | 1 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 1 | 4.1 | 19 | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 1 | 1 | 1 | 1 | 1 | Z | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 6 | 6 | 1.8 | 6 | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | Z | 4 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 5 | 3 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 2 | 3 | 1.5 | 5 | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 5 | Z | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 8 | 1.3 | 8 | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 1 | 0 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.7 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 1 | 4 | 4 | Z | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 4 | 4 | 3 | 4 | 1.8 | 4 | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 11 | 5 | 1 | 2 | Z | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 2 | 5 | 3 | 3 | 1 | 1 | 6 | 2.4 | 11 | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 2 | 3 | 2 | 2 | 2 | Z | 5 | 3 | 3 | 1 | 1 | 1 | 3 | 2 | 3 | 3 | 4 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2.0 | 5 | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | Z | 1 | 5 | 12 | 13 | 7 | 5 | 4 | 4 | C | C | C | C | C | 1 | 1 | 0 | 1 | 2 | 2 | 1 | 1 | 1 | 5 | 3.5 | 13 | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 14 | Z | 10 | 11 | 13 | 14 | 10 | 6 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 4 | 6 | 5 | 6 | 4.9 | 14 | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 7 | 7 | Z | 3 | 2 | 3 | 2 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 1 | 4 | 3 | 2.6 | 7 | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 3 | 3 | 2 | Z | 2 | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 0 | 1 | 2 | 2 | 1 | 1 | 1 | 2 | 4 | 4 | 3 | 4 | 2.0 | 4 | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 3 | 3 | 6 | 4 | Z | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 9 | 4 | 2.1 | 9 | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 9 | 12 | 2 | 1 | 3 | Z | 7 | 4 | 2 | 2 | 2 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 2.3 | 12 | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | Z | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0.4 | 2 | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 1 | Z | 6 | 8 | 8 | 11 | 4 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 2.4 | 11 | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 0 | 0 | Z | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 3 | 4 | 1 | 4 | 1.5 | 4 | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 5 | 3 | 3 | Z | 4 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 2 | 1 | 0 | 0 | 2 | 3 | 3 | 3 | 1.7 | 5 | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 2 | 3 | 2 | 3 | Z | 4 | 5 | 4 | 4 | 4 | 5 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 5 | 11 | 3.1 | 11 | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 7 | 6 | 7 | 7 | 6 | Z | 5 | 4 | 2 | 2 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 4 | 3 | 1 | 1 | 3.0 | 7 | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | Z | 5 | 8 | 6 | 6 | 9 | 8 | 8 | 4 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 3 | 2 | 3 | 3 | 3 | 3.3 | 9 | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 3 | Z | 4 | 9 | 5 | 10 | 10 | DF | 0 | 0 | 0 | 1 | 1 | 3 | 4 | 3 | 2 | 4 | 4 | 3 | 3 | 1 | 1 | 7 | 3.6 | 10 | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 6 | 3 | Z | 5 | 5 | 4 | 4 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.8 | 6 | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 1 | 1 | 1 | Z | 2 | 2 | 2 | 4 | 6 | 4 | 4 | 6 | 4 | 4 | 2 | 0 | 1 | 1 | 1 | 2 | 2 | 8 | 5 | 5 | 2.9 | 8 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 3.7 | 3.0 | 3.8 | 4.4 | 3.7 | 4.2 | 3.5 | 2.5 | 1.9 | 1.3 | 1.2 | 1.4 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.2 | 1.4 | 1.3 | 1.7 | 2.5 | 3.0 | 3.7 | Diurnal Average |
| | | | | | | | | | | | | | | | | | | | | | | | | 14 | 12 | 13 | 19 | 13 | 14 | 13 | 8 | 7 | 4 | 5 | 6 | 4 | 4 | 4 | 3 | 4 | 4 | 5 | 3 | 4 | 8 | 15 | 11 | Diurnal Maximum |

Z - zerospan C - Calibration DF - DAS Failure
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Firebag - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Firebag - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 707 | 100.00 | 100.00 |
| 21 - 40 | 0 | 0.00 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Firebag - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|------------|-----------|------------|----------|------------|-----------|------------|-----------|------------|------------|------------|-----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 37 | 22 | 13 | 14 | 7 | 12 | 32 | 57 | 80 | 95 | 115 | 84 | 51 | 44 | 30 | 14 | 707 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 37 | 22 | 13 | 14 | 7 | 12 | 32 | 57 | 80 | 95 | 115 | 84 | 51 | 44 | 30 | 14 | 707 |

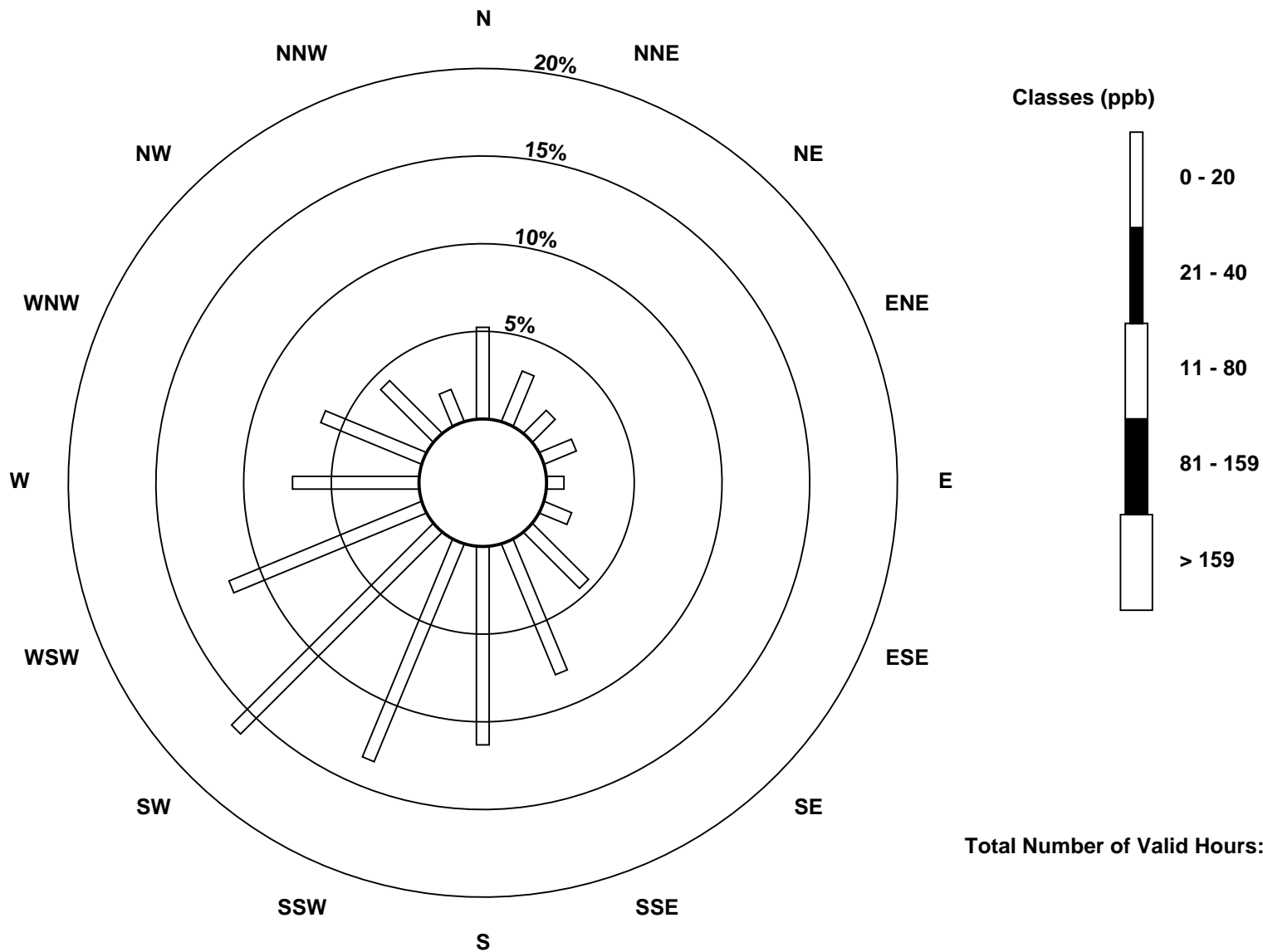
Total Number of Valid Hours: 707

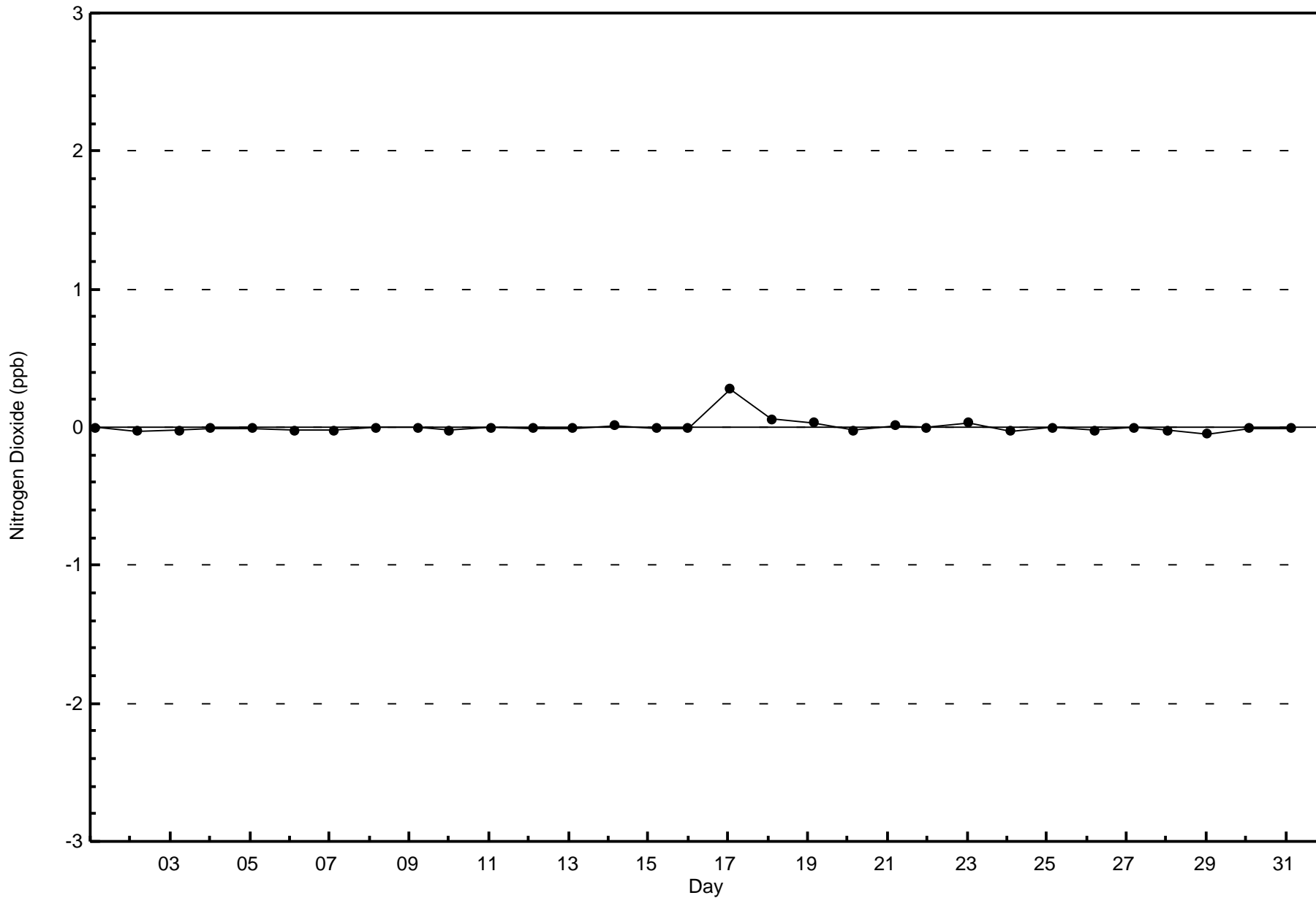
Total Number of Hours: 744

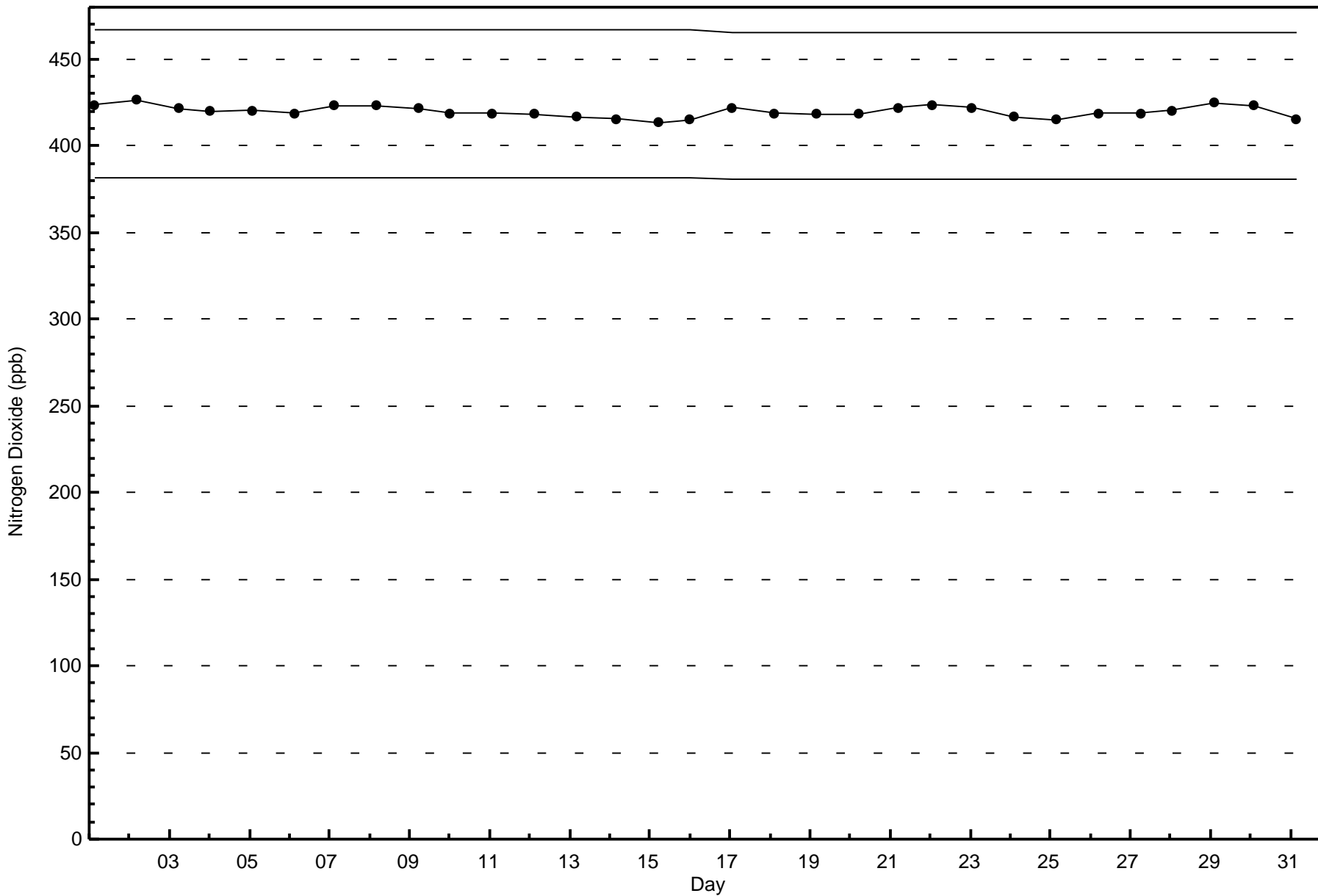


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Dioxide (NO₂) - ppb
Firebag (AMS 19)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb

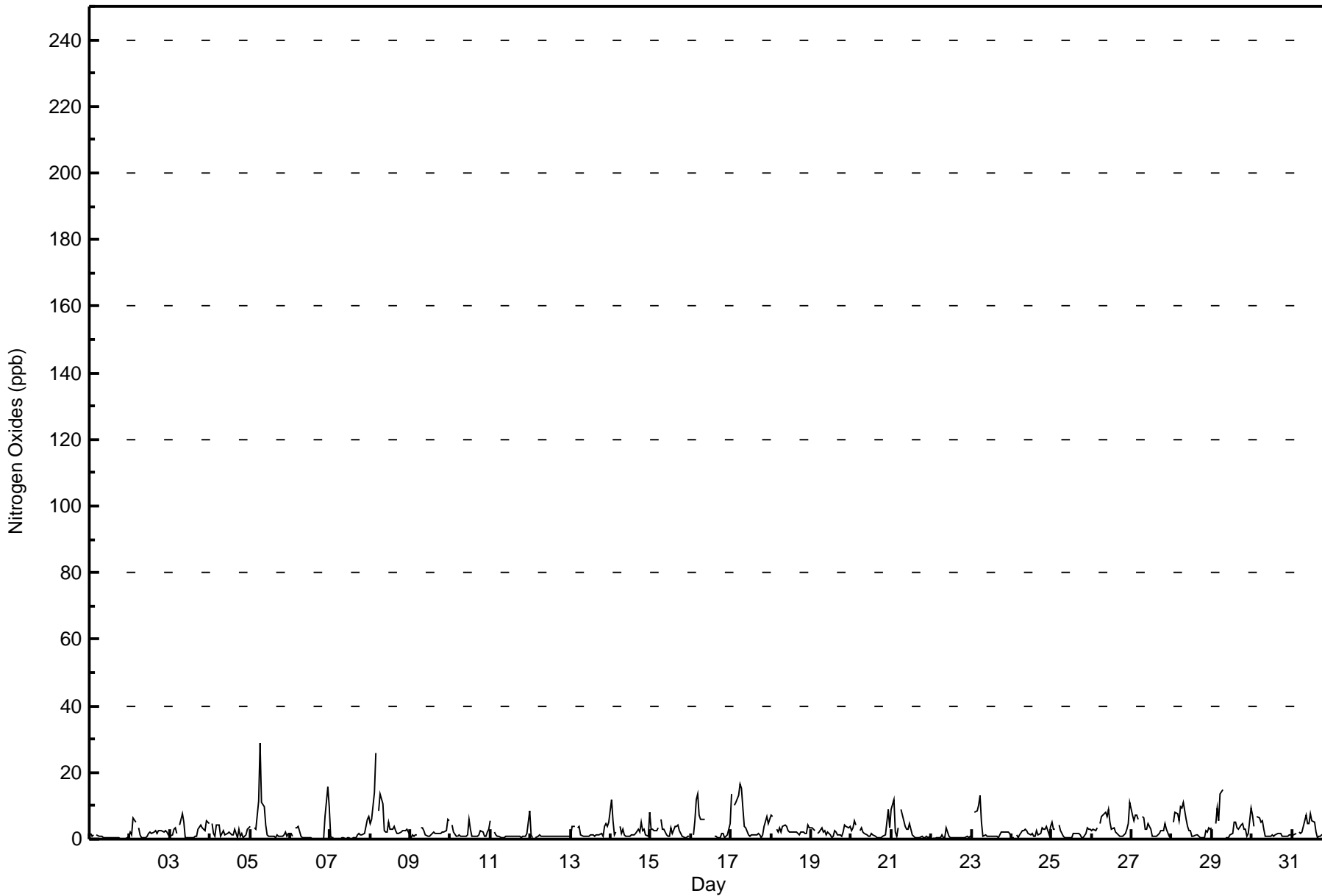
Firebag - August 2017

| Maximum Value: 29 ppb on Aug 5 07:00 | | | | | | | | | | | | | | | | | Maximum Daily Average: 5.6 ppb on Aug 17 | | | | | | | | | | | | | | | | | Hours in Service: 744 | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|-----------------|----|----|----|----|----|---------------|---------------|----|--|--|--|--|--|--|--------------------------------|--|
| Minimum Value: 0 ppb on Aug 6 21:00 | | | | | | | | | | | | | | | | | Minimum Daily Average: 0.6 ppb on Aug 1 | | | | | | | | | | | | | | | | | Hours of Data: 707 | |
| Maximum Diurnal Average: 5.2 ppb at hour 7 | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 1.3 ppb at hour 17 | | | | | | | | | | | | | | | | | Hours of Missing Data: 37 | |
| Monthly Average: 2.7 ppb | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 O ₃ = 3 P ₉₀ = 6 P ₉₉ = 13 | | | | | | | | | | | | | | | | | Hours of Calibration: 36 | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 99.9 | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | |
| 1-Aug | 2 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.6 | 2 | | | | | | | | | |
| 2-Aug | 2 | 1 | 6 | 5 | Z | 4 | 1 | 1 | 0 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 1 | 2.1 | 6 | | | | | | | | | |
| 3-Aug | 1 | 1 | 3 | 3 | 2 | Z | 4 | 7 | 5 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 4 | 3 | 3 | 2 | 6 | 4 | 2.5 | 7 | | | | | | | | | |
| 4-Aug | Z | 5 | 2 | 1 | 4 | 4 | 1 | 2 | 3 | 1 | 2 | 2 | 2 | 1 | 1 | 3 | 0 | 3 | 1 | 2 | 1 | 1 | 3 | 3 | 2.0 | 5 | | | | | | | | | |
| 5-Aug | 4 | Z | 3 | 3 | 7 | 11 | 29 | 11 | 10 | 4 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 4.2 | 29 | | | | | | | | | |
| 6-Aug | 2 | 1 | Z | 3 | 4 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 16 | 10 | 2.2 | 16 | | | | | | | | | |
| 7-Aug | 1 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 2 | 4 | 6 | 7 | 1.2 | 7 | | | | | | | | | |
| 8-Aug | 5 | 6 | 14 | 26 | Z | 9 | 13 | 10 | 2 | 2 | 2 | 5 | 3 | 3 | 4 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 1 | 5.4 | 26 | | | | | | | | | |
| 9-Aug | 1 | 1 | 1 | 1 | 1 | Z | 3 | 3 | 3 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 6 | 6 | 2.1 | 6 | | | | | | | | | |
| 10-Aug | Z | 4 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 6 | 3 | 1 | 1 | 1 | 1 | 1 | 3 | 2 | 1 | 1 | 2 | 3 | 1.7 | 6 | | | | | | | | | |
| 11-Aug | 5 | Z | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 8 | 1.4 | 8 | | | | | | | | | |
| 12-Aug | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.9 | 1 | | | | | | | | | |
| 13-Aug | 1 | 4 | 4 | Z | 3 | 4 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 4 | 5 | 4 | 5 | 2.1 | 5 | | | | | | | | | |
| 14-Aug | 12 | 5 | 1 | 2 | Z | 4 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 2 | 5 | 3 | 3 | 1 | 1 | 8 | 2.8 | 12 | | | | | | | | | |
| 15-Aug | 3 | 3 | 3 | 3 | 3 | Z | 6 | 3 | 3 | 1 | 1 | 1 | 3 | 2 | 4 | 4 | 4 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2.4 | 6 | | | | | | | | | |
| 16-Aug | Z | 1 | 6 | 12 | 14 | 7 | 6 | 6 | 6 | C | C | C | C | C | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 5 | 3.9 | 14 | | | | | | | | | |
| 17-Aug | 14 | Z | 10 | 11 | 13 | 17 | 15 | 9 | 4 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 4 | 7 | 5 | 6 | 5.6 | 17 | | | | | | | | |
| 18-Aug | 7 | 7 | Z | 3 | 2 | 3 | 2 | 4 | 4 | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 4 | 3 | 2.9 | 7 | | | | | | | | | |
| 19-Aug | 3 | 3 | 2 | Z | 2 | 2 | 4 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 3 | 2 | 1 | 1 | 1 | 2 | 4 | 4 | 4 | 4 | 2.3 | 4 | | | | | | | | | |
| 20-Aug | 3 | 4 | 6 | 4 | Z | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 5 | 9 | 4 | 2.4 | 9 | | | | | | | | | |
| 21-Aug | 9 | 12 | 2 | 1 | 3 | Z | 9 | 6 | 4 | 3 | 3 | 5 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 2.8 | 12 | | | | | | | | | |
| 22-Aug | Z | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0.6 | 3 | | | | | | | | | |
| 23-Aug | 1 | Z | 8 | 9 | 10 | 13 | 5 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2.9 | 13 | | | | | | | | | |
| 24-Aug | 1 | 1 | Z | 1 | 1 | 1 | 3 | 3 | 3 | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 1 | 2 | 3 | 3 | 3 | 4 | 1 | 4 | 2.0 | 4 | | | | | | | | | |
| 25-Aug | 5 | 3 | 3 | Z | 4 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 0 | 0 | 2 | 3 | 3 | 3 | 1.9 | 5 | | | | | | | | | |
| 26-Aug | 2 | 3 | 2 | 3 | Z | 5 | 7 | 8 | 8 | 7 | 9 | 5 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 3 | 5 | 11 | 4.1 | 11 | | | | | | | | | |
| 27-Aug | 7 | 6 | 7 | 7 | 6 | Z | 7 | 6 | 3 | 3 | 5 | 3 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 4 | 3 | 1 | 1 | 3.6 | 7 | | | | | | | | | |
| 28-Aug | Z | 5 | 8 | 8 | 6 | 10 | 9 | 11 | 6 | 4 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 3 | 2 | 3 | 3 | 3.9 | 11 | | | | | | | | | |
| 29-Aug | 3 | Z | 5 | 9 | 6 | 14 | 15 | DF | 0 | 0 | 0 | 1 | 2 | 5 | 5 | 3 | 3 | 4 | 5 | 3 | 3 | 1 | 2 | 10 | 4.5 | 15 | | | | | | | | | |
| 30-Aug | 7 | 4 | Z | 7 | 7 | 5 | 5 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2.4 | 7 | | | | | | | | | |
| 31-Aug | 1 | 1 | 2 | Z | 2 | 2 | 2 | 4 | 7 | 5 | 5 | 8 | 6 | 5 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 8 | 5 | 5 | 3.3 | 8 | | | | | | | | | |
| | | | | | | | | | | | | | | | | | Diurnal Average | | Diurnal Maximum | | | | | | | | | | | | | | | | |
| 3.9 3.2 4.0 5.0 4.0 4.9 5.2 3.7 2.7 1.9 1.6 1.9 1.4 1.4 1.4 1.4 1.3 1.4 1.6 1.5 1.9 2.6 3.2 4.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 12 14 26 14 17 29 11 10 7 9 8 6 5 5 4 4 4 4 5 3 4 8 16 11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Z - zerospan C - Calibration DF - DAS Failure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Firebag - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Firebag - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 705 | 99.72 | 99.72 |
| 21 - 40 | 2 | 0.28 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Firebag - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|---|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 37 | 22 | 13 | 14 | 7 | 12 | 32 | 57 | 80 | 94 | 114 | 84 | 51 | 44 | 30 | 14 | 705 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 37 | 22 | 13 | 14 | 7 | 12 | 32 | 57 | 80 | 95 | 115 | 84 | 51 | 44 | 30 | 14 | 707 |

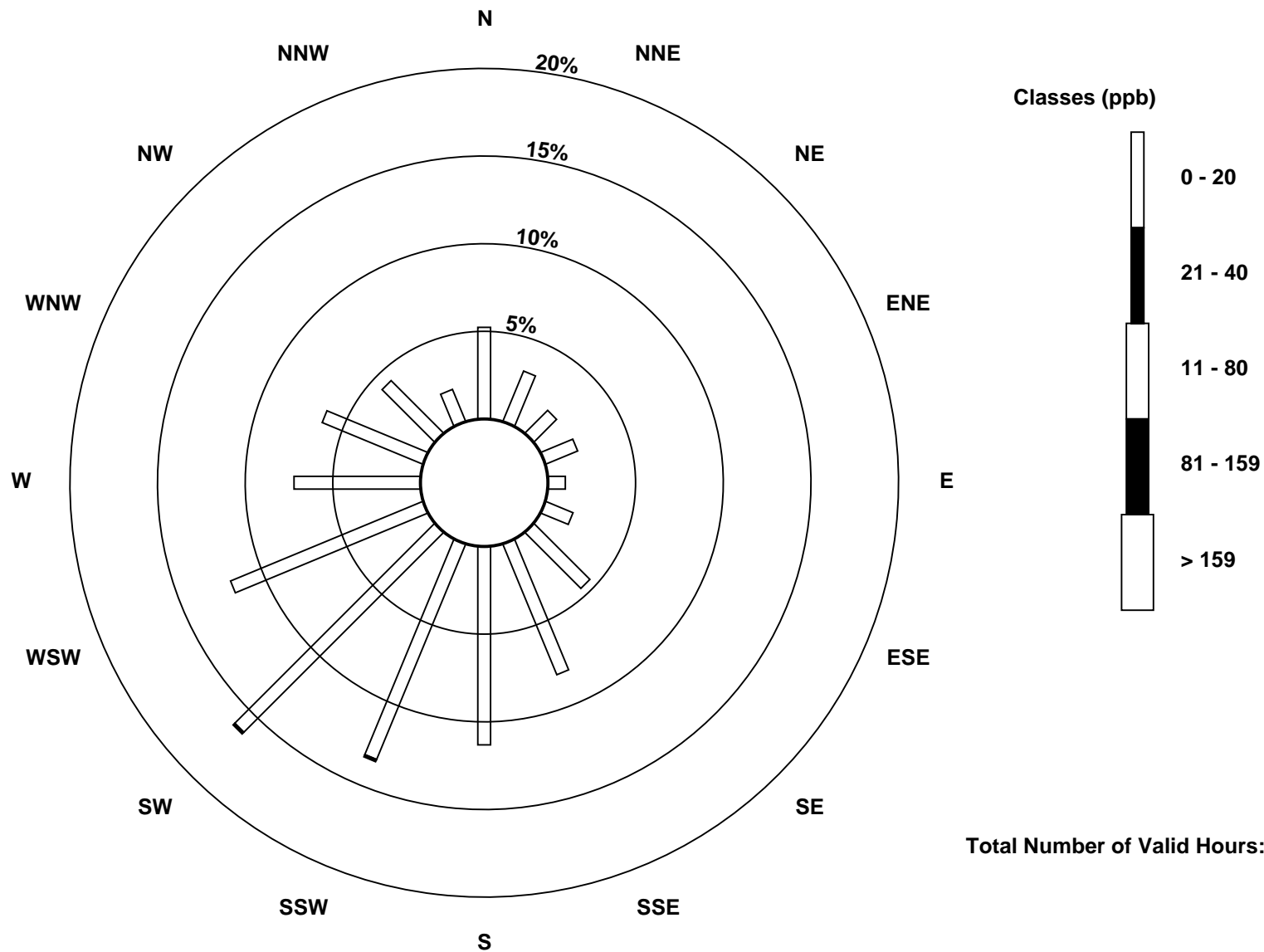
Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

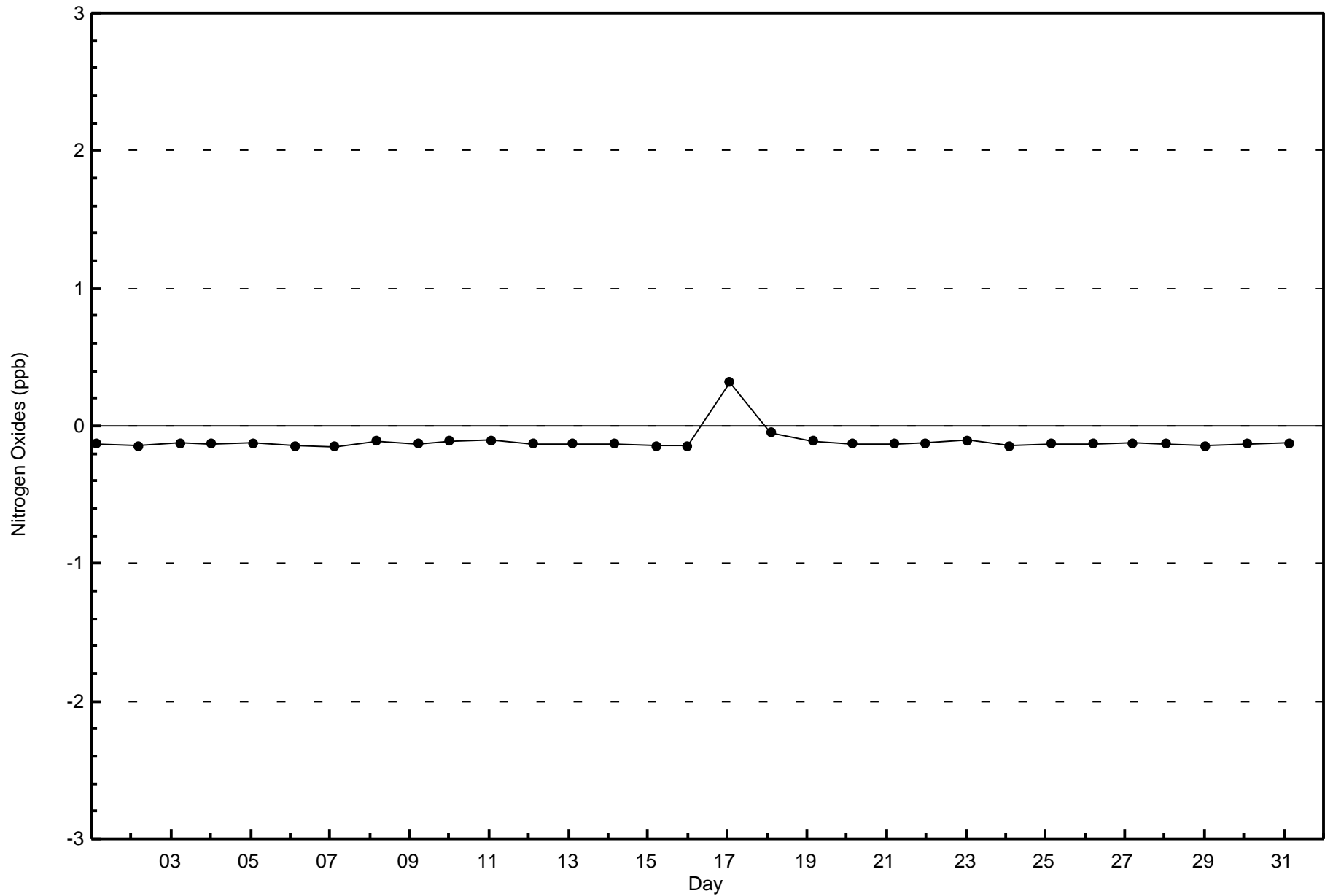
Nitrogen Oxides (NO_x) - ppb
Firebag (AMS 19)

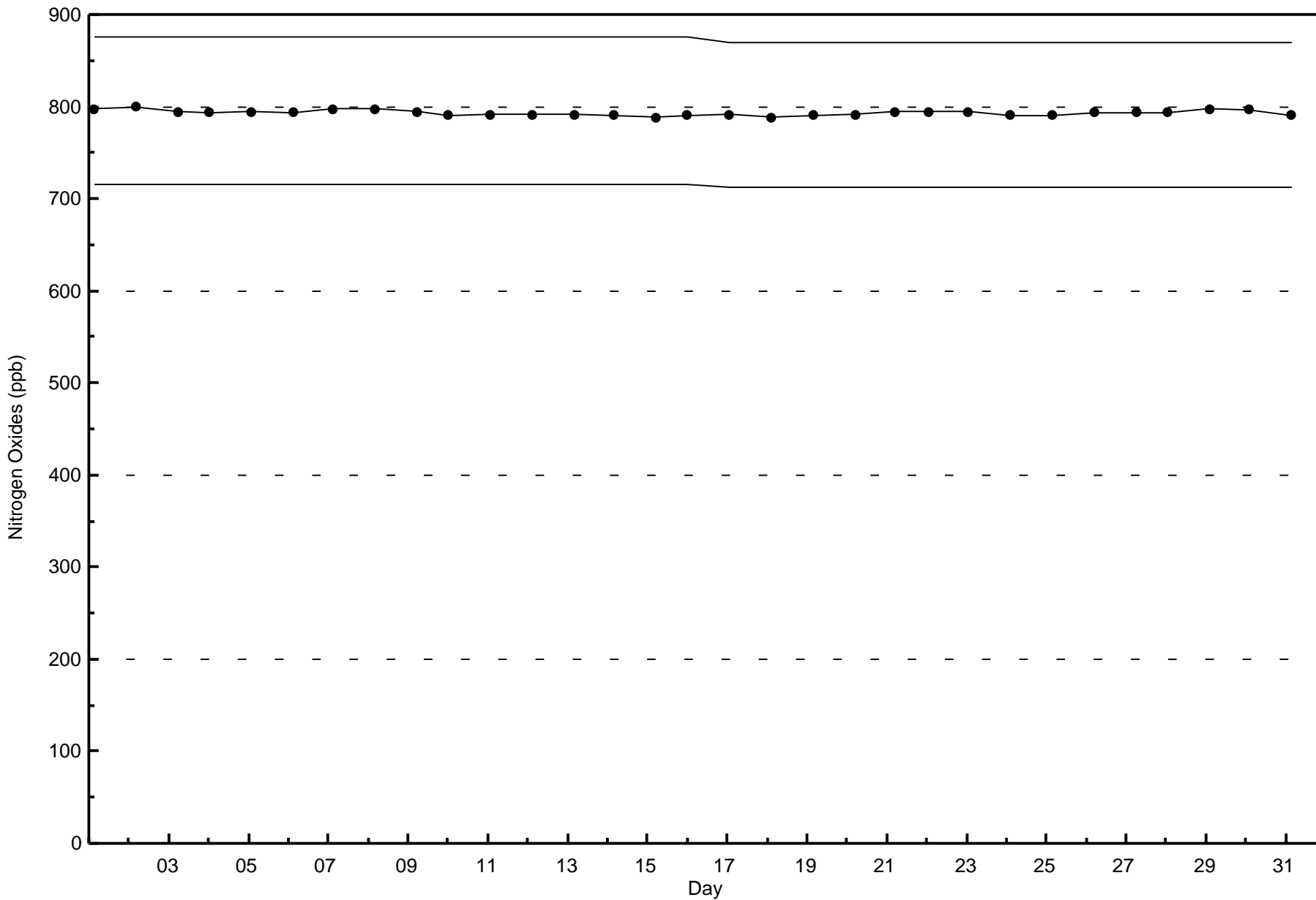




Wood Buffalo Environmental Association
Zero Responses

Nitrogen Oxides (NO_x) - ppb
Firebag - August 2017





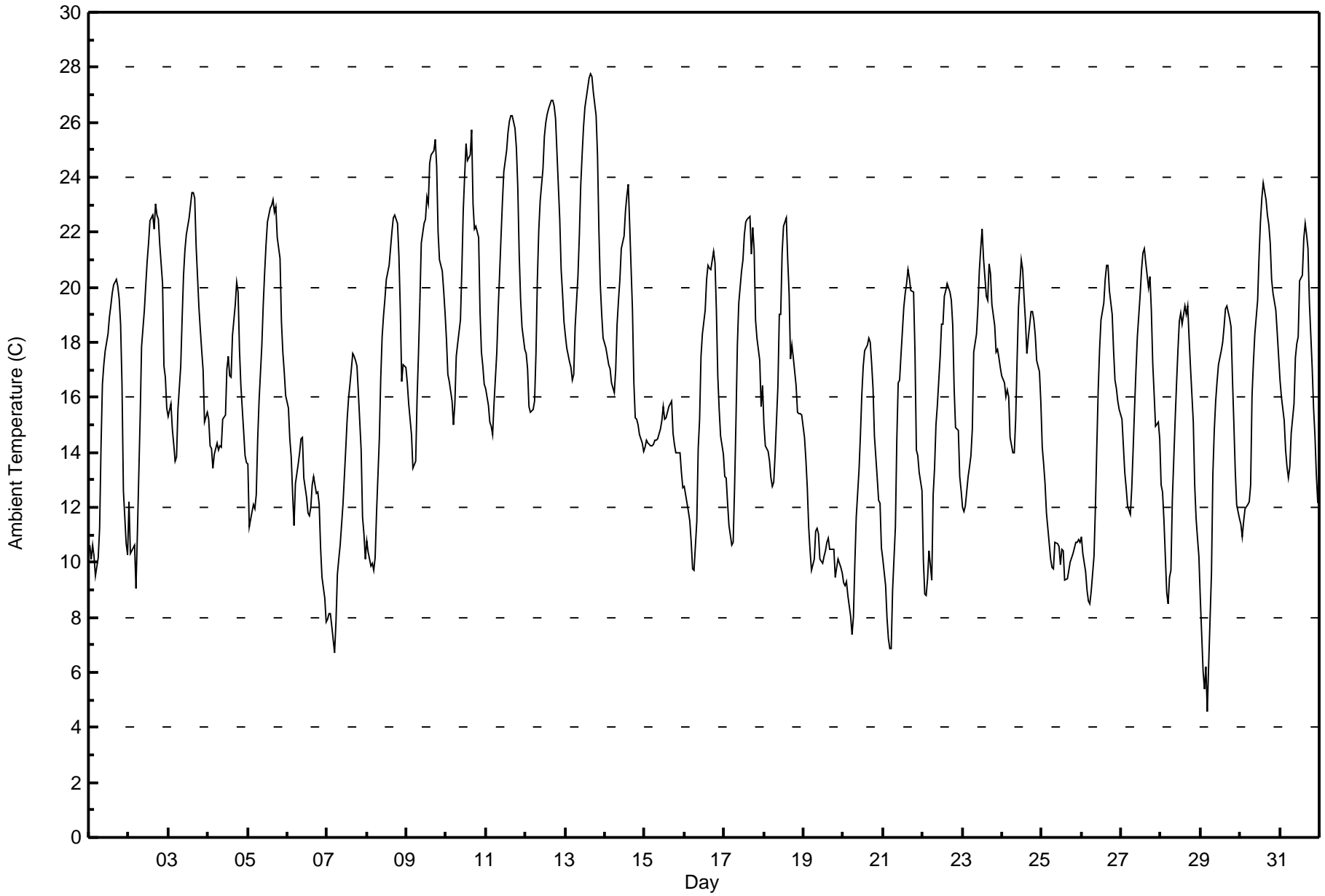


| Maximum Value: 27.8 C on Aug 13 16:00 Maximum Daily Average: 22.2 C on Aug 13 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: | 744 | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------------------|-------|------|---------------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|
| Minimum Value: 4.6 C on Aug 29 05:00 Minimum Daily Average: 10.7 C on Aug 25 | | | | | | | | | | | | | | | | | | | | | | Hours of Data: | 744 | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 20.4 C at hour 16 Minimum Diurnal Average: 11.7 C at hour 5 | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 16.35 C Percentiles: P ₁ = 6.9 P ₁₀ = 10.2 Q ₁ = 12.8 Median = 16.4 Q ₃ = 19.7 P ₉₀ = 22.5 P ₉₉ = 26.8 | | | | | | | | | | | | | | | | | | | | | | Hours of Calibration: | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: | 100.0 | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 10.6 | 10.1 | 10.6 | 10.2 | 9.5 | 10.2 | 11.2 | 14.2 | 16.5 | 17.2 | 17.7 | 18.3 | 18.9 | 19.3 | 19.8 | 20.1 | 20.3 | 20.1 | 19.6 | 18.7 | 16.5 | 12.6 | 10.7 | 10.3 | 15.1 | 20.3 | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 12.2 | 10.3 | 10.4 | 10.6 | 9.0 | 11.1 | 13.2 | 15.3 | 17.8 | 19.1 | 20.1 | 21.0 | 21.6 | 22.4 | 22.6 | 22.1 | 23.0 | 22.6 | 22.5 | 21.6 | 20.2 | 17.2 | 16.7 | 15.6 | 17.4 | 23.0 | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 15.3 | 15.7 | 14.9 | 14.3 | 13.7 | 13.8 | 15.6 | 17.1 | 18.9 | 20.4 | 21.3 | 21.9 | 22.5 | 23.0 | 23.5 | 23.4 | 23.3 | 21.5 | 19.3 | 18.5 | 17.7 | 17.0 | 15.1 | 15.5 | 18.5 | 23.5 | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 15.2 | 14.2 | 14.1 | 13.4 | 13.9 | 14.3 | 14.1 | 14.2 | 14.2 | 15.2 | 15.4 | 17.0 | 17.5 | 16.8 | 16.7 | 18.2 | 19.4 | 20.2 | 19.8 | 17.8 | 16.4 | 14.8 | 13.9 | 13.6 | 15.9 | 20.2 | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 13.6 | 11.3 | 11.8 | 12.1 | 12.0 | 12.4 | 14.5 | 15.9 | 17.9 | 19.4 | 20.5 | 21.6 | 22.4 | 22.9 | 23.0 | 23.2 | 22.7 | 22.9 | 21.8 | 21.0 | 18.8 | 17.6 | 16.9 | 16.0 | 18.0 | 23.2 | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 15.6 | 14.5 | 13.8 | 12.5 | 11.3 | 12.9 | 13.6 | 14.0 | 14.5 | 14.5 | 13.1 | 12.4 | 11.8 | 11.7 | 12.0 | 12.8 | 13.1 | 12.5 | 12.6 | 12.1 | 10.5 | 9.4 | 8.7 | 7.9 | 12.4 | 15.6 | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 7.9 | 8.1 | 8.1 | 7.7 | 6.7 | 7.8 | 9.6 | 10.1 | 10.6 | 12.1 | 13.1 | 14.1 | 15.2 | 16.0 | 16.5 | 17.6 | 17.5 | 17.4 | 17.1 | 16.2 | 14.1 | 11.6 | 11.0 | 10.1 | 12.3 | 17.6 | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 10.8 | 10.4 | 9.9 | 10.0 | 9.7 | 10.2 | 11.8 | 14.5 | 16.7 | 18.2 | 19.0 | 19.6 | 20.3 | 20.8 | 21.4 | 22.0 | 22.5 | 22.6 | 22.3 | 21.1 | 19.2 | 16.6 | 17.2 | 17.1 | 16.8 | 22.6 | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 16.5 | 15.7 | 15.2 | 14.6 | 13.4 | 13.7 | 16.0 | 17.6 | 19.5 | 21.6 | 22.3 | 22.5 | 23.3 | 23.0 | 24.5 | 24.8 | 25.0 | 25.4 | 24.4 | 22.0 | 21.0 | 20.6 | 19.9 | 19.1 | 20.1 | 25.4 | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 18.1 | 16.8 | 16.6 | 15.9 | 15.0 | 15.8 | 17.5 | 18.0 | 18.8 | 20.6 | 22.8 | 24.0 | 25.2 | 24.6 | 24.8 | 25.7 | 23.0 | 22.1 | 22.2 | 21.8 | 19.1 | 17.6 | 17.1 | 16.5 | 20.0 | 25.7 | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 16.3 | 15.7 | 15.1 | 15.0 | 14.6 | 15.8 | 17.6 | 19.2 | 20.5 | 21.8 | 23.1 | 24.2 | 25.0 | 25.6 | 26.0 | 26.3 | 26.2 | 25.8 | 25.1 | 23.6 | 21.2 | 19.6 | 18.6 | 17.8 | 20.8 | 26.3 | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 17.6 | 17.1 | 15.6 | 15.5 | 15.5 | 15.8 | 17.6 | 20.3 | 22.1 | 23.1 | 24.3 | 25.4 | 26.0 | 26.3 | 26.5 | 26.8 | 26.8 | 26.6 | 26.1 | 24.9 | 22.5 | 20.6 | 19.8 | 18.7 | 21.7 | 26.8 | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 18.3 | 17.8 | 17.3 | 17.1 | 16.6 | 16.9 | 18.6 | 20.4 | 21.9 | 23.7 | 24.8 | 25.9 | 26.6 | 27.2 | 27.6 | 27.8 | 27.6 | 27.1 | 26.2 | 24.8 | 22.0 | 20.1 | 19.0 | 18.2 | 22.2 | 27.8 | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 17.8 | 17.5 | 17.2 | 17.0 | 16.5 | 16.1 | 17.0 | 18.6 | 19.5 | 20.3 | 21.4 | 21.8 | 22.8 | 23.3 | 23.7 | 22.3 | 19.2 | 16.5 | 15.3 | 15.2 | 15.0 | 14.6 | 14.3 | 14.0 | 18.2 | 23.7 | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 14.2 | 14.4 | 14.3 | 14.2 | 14.2 | 14.3 | 14.4 | 14.4 | 14.5 | 14.9 | 15.2 | 15.7 | 15.2 | 15.2 | 15.7 | 15.8 | 15.8 | 14.7 | 14.3 | 14.0 | 14.0 | 14.0 | 13.3 | 12.7 | 14.6 | 15.8 | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 12.8 | 12.2 | 11.8 | 11.5 | 10.7 | 9.8 | 9.7 | 11.5 | 14.1 | 15.2 | 17.5 | 18.3 | 19.2 | 20.3 | 20.8 | 20.7 | 20.7 | 21.3 | 20.9 | 19.2 | 16.8 | 15.5 | 14.6 | 13.9 | 15.8 | 21.3 | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 13.1 | 13.1 | 12.2 | 11.4 | 10.7 | 10.7 | 12.7 | 15.2 | 17.9 | 19.4 | 20.6 | 21.0 | 21.9 | 22.4 | 22.5 | 22.6 | 21.2 | 22.2 | 21.4 | 18.8 | 18.2 | 17.3 | 15.7 | 16.4 | 17.4 | 22.6 | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 15.0 | 14.2 | 14.0 | 13.7 | 13.1 | 12.8 | 12.9 | 13.9 | 16.4 | 19.0 | 19.0 | 21.2 | 22.2 | 22.5 | 21.0 | 19.8 | 17.4 | 17.9 | 17.4 | 16.4 | 15.5 | 15.4 | 15.4 | 15.3 | 16.7 | 22.5 | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 14.6 | 13.7 | 12.7 | 11.3 | 10.4 | 9.7 | 10.1 | 11.1 | 11.2 | 11.1 | 10.1 | 10.0 | 10.2 | 10.4 | 10.7 | 10.9 | 10.5 | 10.5 | 10.5 | 9.5 | 9.8 | 10.1 | 9.8 | 9.6 | 10.8 | 14.6 | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 9.2 | 9.2 | 9.3 | 8.8 | 8.0 | 7.4 | 8.0 | 10.0 | 11.7 | 13.4 | 14.6 | 16.1 | 17.1 | 17.7 | 17.9 | 18.2 | 18.0 | 17.3 | 16.3 | 14.6 | 13.1 | 12.2 | 12.1 | 10.5 | 13.0 | 18.2 | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 10.1 | 9.1 | 8.0 | 7.2 | 6.9 | 6.9 | 9.0 | 11.3 | 14.4 | 16.5 | 16.7 | 17.5 | 19.3 | 19.8 | 20.1 | 20.6 | 20.3 | 19.9 | 19.8 | 17.6 | 14.1 | 13.9 | 13.3 | 12.6 | 14.4 | 20.6 | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 10.1 | 8.9 | 8.8 | 9.4 | 10.4 | 9.3 | 12.5 | 13.4 | 15.0 | 15.7 | 17.5 | 18.6 | 18.7 | 19.7 | 19.9 | 20.1 | 19.9 | 19.5 | 18.6 | 16.3 | 14.9 | 14.8 | 13.1 | 12.6 | 14.9 | 20.1 | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 12.0 | 11.9 | 12.1 | 13.1 | 13.4 | 13.9 | 14.9 | 17.7 | 18.3 | 19.3 | 20.6 | 21.4 | 22.1 | 21.1 | 19.7 | 19.6 | 20.8 | 20.5 | 19.4 | 18.6 | 17.6 | 17.8 | 17.5 | 17.1 | 17.5 | 22.1 | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 16.8 | 16.5 | 16.0 | 16.3 | 16.0 | 14.5 | 14.0 | 14.0 | 15.2 | 17.3 | 19.3 | 21.0 | 20.7 | 19.6 | 18.8 | 17.6 | 18.2 | 19.1 | 19.1 | 18.8 | 18.3 | 17.3 | 16.9 | 15.8 | 17.4 | 21.0 | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 14.2 | 13.6 | 12.9 | 11.8 | 10.7 | 10.1 | 9.8 | 9.8 | 10.7 | 10.7 | 10.6 | 9.9 | 10.5 | 10.4 | 9.4 | 9.4 | 9.7 | 10.0 | 10.2 | 10.3 | 10.7 | 10.7 | 10.8 | 10.7 | 10.7 | 14.2 | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 10.9 | 10.3 | 9.6 | 9.0 | 8.6 | 8.5 | 9.0 | 10.2 | 12.0 | 14.2 | 16.3 | 17.7 | 18.8 | 19.4 | 20.3 | 20.8 | 20.8 | 19.9 | 19.0 | 17.7 | 16.6 | 16.3 | 15.9 | 15.5 | 14.9 | 20.8 | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 15.2 | 14.2 | 13.3 | 12.7 | 12.1 | 11.7 | 12.7 | 14.1 | 15.6 | 17.0 | 18.2 | 19.7 | 20.6 | 21.2 | 21.4 | 20.9 | 20.0 | 20.4 | 19.2 | 17.2 | 16.1 | 14.9 | 15.1 | 14.5 | 16.6 | 21.4 | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 12.8 | 12.6 | 11.5 | 8.9 | 8.5 | 9.4 | 9.7 | 12.2 | 15.2 | 16.5 | 17.7 | 18.8 | 19.1 | 18.6 | 19.3 | 19.0 | 19.3 | 18.1 | 17.1 | 15.1 | 12.8 | 11.6 | 10.9 | 10.2 | 14.4 | 19.3 | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 8.7 | 6.0 | 5.4 | 6.2 | 4.6 | 6.3 | 9.6 | 13.2 | 14.8 | 15.9 | 16.6 | 17.2 | 17.7 | 18.0 | 18.5 | 19.2 | 19.3 | 18.9 | 18.6 | 16.7 | 15.1 | 13.3 | 12.1 | 11.6 | 13.5 | 19.3 | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 11.4 | 10.9 | 11.5 | 12.0 | 12.1 | 12.2 | 12.8 | 16.1 | 17.3 | 18.3 | 19.5 | 21.1 | 22.4 | 23.2 | 23.8 | 23.2 | 22.6 | 22.3 | 21.6 | 20.3 | 19.8 | 19.2 | 18.4 | 17.5 | 17.9 | 23.8 | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 16.7 | 16.0 | 15.2 | 14.1 | 13.5 | 13.1 | 13.5 | 14.7 | 15.8 | 17.4 | 18.0 | 18.2 | 20.3 | 20.5 | 21.8 | 22.3 | 21.9 | 21.4 | 19.5 | 17.1 | 15.6 | 14.6 | 13.2 | 12.1 | 16.9 | 22.3 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | 13.7 | 13.0 | 12.6 | 12.2 | 11.7 | 11.9 | 13.0 | 14.6 | 16.1 | 17.4 | 18.3 | 19.1 | 19.8 | 20.1 | 20.3 | 20.4 | 20.2 | 19.9 | 19.3 | 18.0 | 16.6 | 15.5 | 14.7 | 14.2 | Diurnal Average |
| | | | | | | | | | | | | | | | | | | | | | | 18.3 | 17.8 | 17.3 | 17.1 | 16.6 | 16.9 | 18.6 | 20.4 | 22.1 | 23.7 | 24.8 | 25.9 | 26.6 | 27.2 | 27.6 | 27.8 | 27.6 | 27.1 | 26.2 | 24.9 | 22.5 | 20.6 | 19.9 | 19.1 | Diurnal Maximum |



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Firebag - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Firebag - August 2017**

| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 63 | 8.47 | 8.47 |
| 10 - 20 | 511 | 68.68 | 77.15 |
| > 20 | 170 | 22.85 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

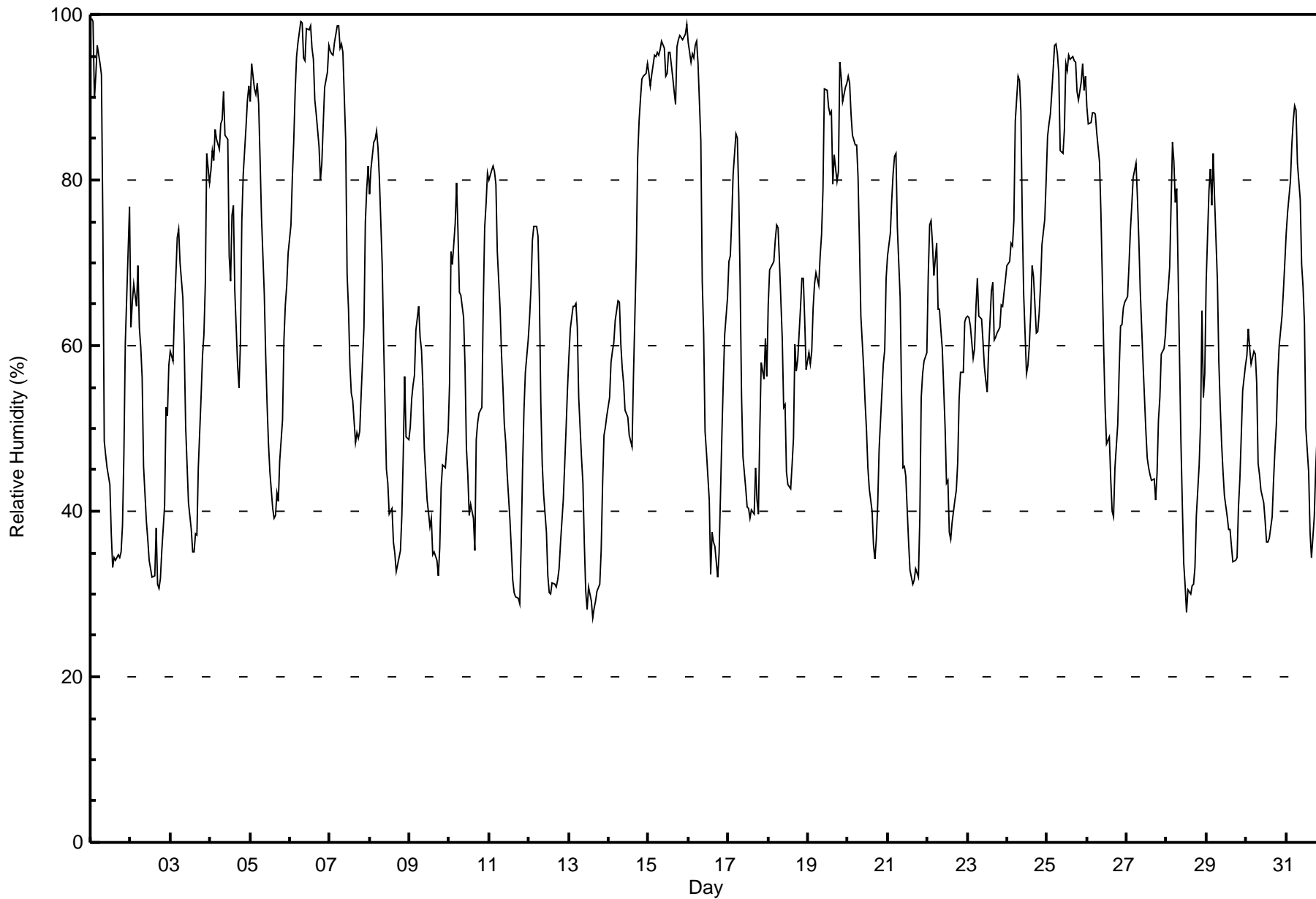
Firebag - August 2017

| Maximum Value: 99 % on Aug 1 01:00 | | | | | | | | | | | | | | | | | | Maximum Daily Average: 94.8 % on Aug 15 | | | | | | | | | | | | | | | | | | Hours in Service: 744 | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|------|------|------|------|------|------|---------------|---------------|------|------|------|------|------|------|------|------|------|---------------------------------|------|------|------|------|------|-----------------|--|
| Minimum Value: 27 % on Aug 13 15:00 | | | | | | | | | | | | | | | | | | Minimum Daily Average: 43.8 % on Aug 13 | | | | | | | | | | | | | | | | | | Hours of Data: 744 | | | | | | | |
| Maximum Diurnal Average: 80.1 % at hour 5 | | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 47.2 % at hour 16 | | | | | | | | | | | | | | | | | | Hours of Missing Data: 0 | | | | | | | |
| Monthly Average: 62.7 % | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 29 P ₁₀ = 36 Q ₁ = 45 Median = 62 Q ₃ = 80 P ₉₀ = 93 P ₉₉ = 99 | | | | | | | | | | | | | | | | | | Hours of Calibration: 0 | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 99 | 99 | 90 | 93 | 96 | 94 | 93 | 75 | 49 | 47 | 45 | 43 | 37 | 33 | 34 | 34 | 35 | 34 | 35 | 38 | 47 | 60 | 71 | 77 | 60.8 | 99 | | | | | | | | | | | | | | | | | |
| 2-Aug | 62 | 65 | 67 | 65 | 70 | 62 | 60 | 56 | 45 | 39 | 37 | 34 | 33 | 32 | 32 | 38 | 31 | 31 | 32 | 35 | 41 | 53 | 51 | 58 | 47.0 | 70 | | | | | | | | | | | | | | | | | |
| 3-Aug | 59 | 58 | 64 | 68 | 73 | 74 | 70 | 66 | 60 | 50 | 46 | 41 | 38 | 35 | 35 | 37 | 37 | 45 | 54 | 59 | 61 | 68 | 83 | 80 | 56.7 | 83 | | | | | | | | | | | | | | | | | |
| 4-Aug | 81 | 84 | 82 | 86 | 85 | 84 | 87 | 87 | 91 | 85 | 85 | 71 | 68 | 76 | 77 | 67 | 58 | 55 | 60 | 75 | 81 | 86 | 90 | 91 | 78.8 | 91 | | | | | | | | | | | | | | | | | |
| 5-Aug | 90 | 94 | 91 | 90 | 92 | 89 | 83 | 76 | 66 | 59 | 53 | 48 | 45 | 40 | 39 | 40 | 42 | 41 | 46 | 51 | 61 | 65 | 67 | 71 | 64.1 | 94 | | | | | | | | | | | | | | | | | |
| 6-Aug | 75 | 80 | 85 | 91 | 95 | 97 | 99 | 99 | 95 | 94 | 98 | 98 | 99 | 96 | 95 | 90 | 88 | 84 | 80 | 82 | 87 | 91 | 93 | 96 | 91.1 | 99 | | | | | | | | | | | | | | | | | |
| 7-Aug | 96 | 95 | 95 | 97 | 99 | 99 | 96 | 96 | 95 | 85 | 69 | 64 | 58 | 54 | 53 | 48 | 49 | 49 | 50 | 54 | 62 | 75 | 79 | 82 | 74.9 | 99 | | | | | | | | | | | | | | | | | |
| 8-Aug | 78 | 81 | 85 | 85 | 86 | 84 | 80 | 70 | 61 | 53 | 45 | 43 | 40 | 40 | 36 | 35 | 33 | 34 | 35 | 39 | 47 | 56 | 49 | 49 | 56.0 | 86 | | | | | | | | | | | | | | | | | |
| 9-Aug | 50 | 54 | 55 | 56 | 62 | 65 | 61 | 59 | 55 | 48 | 41 | 40 | 38 | 39 | 35 | 35 | 34 | 32 | 36 | 43 | 46 | 45 | 48 | 50 | 46.9 | 65 | | | | | | | | | | | | | | | | | |
| 10-Aug | 55 | 71 | 70 | 75 | 80 | 74 | 66 | 66 | 63 | 58 | 48 | 44 | 39 | 41 | 39 | 35 | 49 | 51 | 52 | 53 | 65 | 74 | 77 | 81 | 59.4 | 81 | | | | | | | | | | | | | | | | | |
| 11-Aug | 80 | 81 | 82 | 81 | 80 | 71 | 64 | 59 | 55 | 50 | 48 | 44 | 39 | 35 | 32 | 30 | 30 | 29 | 29 | 36 | 45 | 52 | 57 | 61 | 53.0 | 82 | | | | | | | | | | | | | | | | | |
| 12-Aug | 63 | 67 | 73 | 74 | 74 | 73 | 66 | 53 | 46 | 42 | 38 | 32 | 30 | 30 | 31 | 31 | 31 | 32 | 33 | 36 | 41 | 46 | 50 | 55 | 47.8 | 74 | | | | | | | | | | | | | | | | | |
| 13-Aug | 59 | 62 | 65 | 65 | 65 | 62 | 54 | 46 | 43 | 36 | 30 | 28 | 31 | 29 | 27 | 28 | 29 | 30 | 31 | 35 | 43 | 49 | 50 | 51 | 43.8 | 65 | | | | | | | | | | | | | | | | | |
| 14-Aug | 54 | 58 | 59 | 60 | 63 | 65 | 65 | 60 | 57 | 55 | 52 | 51 | 49 | 48 | 48 | 56 | 71 | 83 | 87 | 90 | 92 | 93 | 93 | 94 | 66.9 | 94 | | | | | | | | | | | | | | | | | |
| 15-Aug | 93 | 91 | 93 | 95 | 95 | 95 | 95 | 96 | 97 | 96 | 93 | 93 | 95 | 96 | 92 | 91 | 89 | 96 | 97 | 98 | 97 | 97 | 98 | 99 | 94.8 | 99 | | | | | | | | | | | | | | | | | |
| 16-Aug | 97 | 94 | 95 | 95 | 96 | 97 | 94 | 85 | 68 | 62 | 50 | 47 | 41 | 32 | 37 | 36 | 36 | 32 | 35 | 42 | 49 | 56 | 61 | 66 | 62.6 | 97 | | | | | | | | | | | | | | | | | |
| 17-Aug | 70 | 71 | 75 | 81 | 86 | 85 | 78 | 68 | 54 | 47 | 43 | 41 | 40 | 39 | 40 | 40 | 45 | 41 | 40 | 50 | 58 | 56 | 61 | 56 | 56.8 | 86 | | | | | | | | | | | | | | | | | |
| 18-Aug | 65 | 69 | 70 | 70 | 73 | 75 | 74 | 70 | 61 | 53 | 53 | 45 | 43 | 43 | 46 | 49 | 60 | 57 | 58 | 65 | 68 | 68 | 63 | 57 | 60.6 | 75 | | | | | | | | | | | | | | | | | |
| 19-Aug | 59 | 58 | 59 | 65 | 67 | 69 | 67 | 71 | 73 | 79 | 91 | 91 | 89 | 88 | 88 | 79 | 83 | 80 | 81 | 94 | 92 | 89 | 91 | 92 | 79.0 | 94 | | | | | | | | | | | | | | | | | |
| 20-Aug | 93 | 92 | 88 | 85 | 84 | 84 | 80 | 72 | 64 | 57 | 53 | 50 | 45 | 43 | 40 | 36 | 34 | 37 | 41 | 47 | 54 | 58 | 60 | 68 | 61.1 | 93 | | | | | | | | | | | | | | | | | |
| 21-Aug | 71 | 74 | 78 | 81 | 83 | 83 | 74 | 66 | 54 | 45 | 45 | 44 | 36 | 33 | 32 | 31 | 32 | 33 | 32 | 39 | 54 | 57 | 58 | 59 | 53.9 | 83 | | | | | | | | | | | | | | | | | |
| 22-Aug | 69 | 75 | 75 | 72 | 69 | 72 | 64 | 64 | 62 | 60 | 50 | 43 | 44 | 37 | 37 | 39 | 41 | 43 | 46 | 54 | 57 | 57 | 63 | 63 | 56.5 | 75 | | | | | | | | | | | | | | | | | |
| 23-Aug | 64 | 63 | 62 | 58 | 60 | 65 | 68 | 64 | 63 | 60 | 57 | 56 | 54 | 59 | 67 | 68 | 61 | 61 | 61 | 62 | 65 | 65 | 66 | 68 | 62.4 | 68 | | | | | | | | | | | | | | | | | |
| 24-Aug | 70 | 70 | 72 | 72 | 75 | 87 | 93 | 92 | 88 | 75 | 66 | 57 | 58 | 60 | 64 | 70 | 68 | 62 | 62 | 64 | 67 | 72 | 75 | 80 | 71.6 | 93 | | | | | | | | | | | | | | | | | |
| 25-Aug | 85 | 87 | 88 | 91 | 96 | 96 | 95 | 93 | 84 | 83 | 86 | 94 | 93 | 95 | 95 | 95 | 94 | 94 | 91 | 90 | 92 | 94 | 91 | 93 | 91.4 | 96 | | | | | | | | | | | | | | | | | |
| 26-Aug | 89 | 87 | 87 | 88 | 88 | 88 | 86 | 82 | 76 | 68 | 59 | 52 | 48 | 49 | 44 | 40 | 39 | 45 | 51 | 57 | 62 | 63 | 65 | 65 | 65.8 | 89 | | | | | | | | | | | | | | | | | |
| 27-Aug | 66 | 70 | 74 | 77 | 80 | 82 | 78 | 73 | 67 | 62 | 58 | 50 | 46 | 45 | 44 | 44 | 44 | 41 | 45 | 51 | 54 | 59 | 60 | 61 | 59.6 | 82 | | | | | | | | | | | | | | | | | |
| 28-Aug | 65 | 67 | 70 | 85 | 82 | 77 | 79 | 69 | 48 | 41 | 34 | 31 | 28 | 31 | 30 | 31 | 31 | 33 | 40 | 46 | 51 | 64 | 54 | 57 | 51.7 | 85 | | | | | | | | | | | | | | | | | |
| 29-Aug | 68 | 79 | 81 | 77 | 83 | 78 | 68 | 58 | 53 | 48 | 45 | 42 | 39 | 38 | 38 | 36 | 34 | 34 | 34 | 41 | 44 | 49 | 55 | 58 | 53.2 | 83 | | | | | | | | | | | | | | | | | |
| 30-Aug | 59 | 62 | 60 | 58 | 59 | 59 | 56 | 46 | 44 | 43 | 41 | 39 | 36 | 36 | 37 | 39 | 44 | 47 | 50 | 56 | 60 | 64 | 67 | 70 | 51.3 | 70 | | | | | | | | | | | | | | | | | |
| 31-Aug | 73 | 76 | 80 | 84 | 87 | 89 | 88 | 82 | 78 | 70 | 67 | 63 | 50 | 45 | 37 | 34 | 37 | 39 | 45 | 53 | 57 | 58 | 66 | 70 | 63.7 | 89 | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | 72.8 | 75.3 | 76.4 | 78.1 | 80.1 | 79.8 | 76.8 | 71.6 | 65.0 | 59.7 | 55.7 | 52.3 | 49.4 | 48.4 | 47.8 | 47.2 | 48.0 | 48.6 | 50.6 | 55.9 | 61.3 | 65.8 | 68.1 | 70.2 | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | 99 | 99 | 95 | 97 | 99 | 99 | 99 | 99 | 97 | 96 | 98 | 98 | 99 | 96 | 95 | 95 | 94 | 96 | 97 | 98 | 97 | 97 | 98 | 99 | Diurnal Maximum | |



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Firebag - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity (RH) - %
Firebag - August 2017**

| Concentration Ranges (%) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 0 | 0.00 | 0.00 |
| 20 - 40 | 122 | 16.40 | 16.40 |
| 40 - 60 | 230 | 30.91 | 47.31 |
| 60 - 80 | 207 | 27.82 | 75.13 |
| 80 - 100 | 185 | 24.87 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Firebag - August 2017

| | | |
|--|--|---------------------------------|
| Maximum Speed: 35 km/h on Aug 25 17:00 | Maximum Daily Speed Average: 23.1 km/h on Aug 30 | Hours in Service: 744 |
| Minimum Speed Value: 0 km/h on Aug 29 03:00 | Minimum Daily Speed Average: 0.9 km/h on Aug 15 | Hours of Data: 744 |
| Maximum Diurnal Speed Average: 9.7 km/h at hour 10 | Minimum Diurnal Speed Average: 5.0 km/h at hour 21 | Hours of Missing Data: 0 |
| Monthly Average Velocity: 7.3 km/h 218.3 deg | Percentiles: P ₁ = 2 P ₁₀ = 6 Q ₁ = 8 Median = 12 Q ₃ = 18 P ₉₀ = 23 P ₉₉ = 32 | Percent Operational Time: 100.0 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | NW5 | N4 | N10 | N8 | N6 | NNE7 | NE9 | NNE10 | NNE15 | NNE17 | N17 | N19 | N16 | N13 | N13NNW13 | N14 | NNW13 | N12 | N9 | N6 | NNE3 | ENE2 | SSE2 | N9.6 | N19 | |
| 2-Aug | SE5 | SE3 | SSE4 | S5 | S6 | SSW6 | SSW6 | SW6 | SW6 | SW6 | SSW5 | SW10 | SW7 | SW10 | SW9 | WSW9 | WSW12 | W14 | WSW11 | SW8 | SW7 | S6 | S10 | S9 | SW6.3 | W14 |
| 3-Aug | SSW11 | SSW10 | SSW9 | SSW10 | SSW11 | SSW12 | SSW9 | SSW10 | SW11 | SSW14 | SSW15 | S12 | SSW11 | SSW10 | SW13 | SSW11 | SW6 | ESE10 | SE13 | SE8 | NNE5 | S14 | S12 | SE8 | SSW9.1 | SSW15 |
| 4-Aug | S7 | E8 | E12 | N3 | E4 | SE4 | ENE5 | ESE6 | S11 | S14 | S6 | ENE6 | ESE9 | SSE14 | S7 | NE10 | ENE11 | ENE9 | E3 | WSW9 | WSW5 | NNW5 | W6 | SW3 | SE3.4 | S14 |
| 5-Aug | S2 | NNE6 | NE9 | ENE9 | ENE2 | S5 | SW4 | SW8 | SW6 | SSW6 | SW6 | SW8 | SSW10 | SSW14 | SSW14 | SSW16 | SSE16 | SSW17 | SW13 | SSW14 | SW9 | SSW9 | SSW12 | SW13 | SSW7.0 | SSW17 |
| 6-Aug | SSW12 | SW10 | SW10 | SW7 | WNN5 | N9 | NNE11 | NE11 | NE9 | NNW8 | N15 | N15 | N16 | NNE13 | N13 | N15 | N14 | N14 | N12 | N9 | NNW7 | NW8 | NNW7 | NNW9 | N7.4 | N16 |
| 7-Aug | N9 | N10 | NNE10 | NNE9 | NNE6 | N6 | NNE8 | N10 | N9 | N8 | N9 | NNE6 | N9 | N6 | NNW7 | NW7 | NNW7 | NW8 | WNN7 | WNN6 | WSW6 | WSW6 | WSW5 | SSW5 | NNW5.7 | N10 |
| 8-Aug | SW7 | SSW8 | SSW8 | SSW9 | SW9 | SSW9 | SW10 | SW12 | WSW12 | WSW11 | W10 | SW9 | WSW9 | W10 | WSW10 | WSW9 | WSW7 | SW6 | SW8 | SW7 | SSW8 | S6 | SSW10 | SSW10 | SW8.2 | WSW12 |
| 9-Aug | SSW10 | SSW11 | SSW13 | SSW13 | SW13 | SW12 | SW11 | SW9 | SW8 | WSW7 | W9 | W11 | WSW11 | NW9 | WSW11 | W7 | WNN6 | WNN2 | W6 | SW8 | SSW8 | SSW9 | SSW8 | SSW9 | SW7.9 | SSW13 |
| 10-Aug | WSW8 | SSW10 | S16 | S16 | S12 | S10 | SW10 | SW13 | SW14 | SW11 | WSW1 | SW4 | WNN2 | NE6 | NNE9 | N12 | S15 | SSW12 | SE11 | SSW5 | SW7 | SW7 | SW8 | SSW6 | SSW6.4 | S16 |
| 11-Aug | SSW8 | SSW8 | SSW6 | SSW10 | SSW9 | SSW9 | SW10 | SW13 | SW16 | SW15 | SW14 | SSW12 | SSW13 | SSW14 | SSW14 | SW17 | SSW17 | SSW18 | SSW17 | S12 | S11 | S11 | S12 | SSE13 | SSW11.8 | SSW18 |
| 12-Aug | S15 | S12 | S12 | S12 | S14 | S16 | S16 | SSW19 | SSW23 | SSW24 | SSW24 | SSW26 | SSW29 | S29 | S30 | SSW27 | SSW27 | SSW26 | S22 | S18 | S14 | S14 | S15 | S16 | S19.8 | S30 |
| 13-Aug | S17 | SSE18 | SSE17 | SSE17 | SSE18 | SSE19 | S22 | S28 | S27 | S28 | S32 | S30 | SSE28 | SSE26 | S26 | S28 | S28 | S29 | SSE27 | S21 | SSE12 | SSE14 | SSE16 | SSE15 | SSE22.5 | S32 |
| 14-Aug | SSE15 | SE13 | SE13 | SE14 | SE14 | SE12 | SE15 | SSE18 | S21 | S18 | S21 | S21 | S20 | SSW19 | SW16 | SW18 | WSW19 | WSW16 | WSW10 | SSW9 | SSW10 | S12 | S11 | SSE11 | S12.5 | S21 |
| 15-Aug | S11 | S12 | SE8 | SE14 | SE11 | SE11 | SSE10 | SE7 | ESE6 | ESE7 | SE3 | WNN5 | WNN10 | WNN11 | NW11 | NNW9 | N9 | NNE10 | NNE9 | NE9 | N9 | NNW11 | NW8 | WNN7 | ENE0.9 | SE14 |
| 16-Aug | NW9 | NW8 | WNN7 | WNN8 | W7 | W9 | WSW9 | WSW8 | W9 | W8 | W13 | W13 | W14 | WNN11 | W11 | W12 | W12 | WSW12 | WSW11 | SW10 | SW9 | SW9 | SW10 | SW9 | W8.9 | W14 |
| 17-Aug | SW8 | SW10 | SW11 | SW10 | SW9 | SW6 | WSW6 | WSW8 | WNN7 | NW9 | NW12 | NW12 | WNN13 | WNN14 | W13 | W14 | WNN8 | WNN8 | NW9 | W3 | S4 | SSE4 | S5 | SSW11 | W6.9 | WNN14 |
| 18-Aug | SW11 | SSW12 | SSW11 | SSW13 | SW16 | SSW16 | SSW17 | SW17 | SW21 | WSW25 | WSW25 | WSW27 | WSW25 | WSW28 | WSW28 | SW28 | SSW24 | SSW24 | SW22 | SW18 | SW16 | SW17 | SW15 | SW17 | SW19.0 | WSW28 |
| 19-Aug | SW15 | WSW16 | WSW16 | WSW13 | WSW15 | W16 | WSW15 | W19 | WSW24 | WSW27 | WSW22 | WSW18 | WSW17 | W19 | W18 | W25 | WNN23 | WNN23 | WNN21 | W16 | W14 | W15 | W13 | WSW9 | W17.2 | WSW27 |
| 20-Aug | SW14 | SW16 | SW15 | WSW15 | WSW15 | WSW14 | WSW14 | WSW18 | WSW20 | WSW21 | W23 | W24 | W26 | W27 | WNN28 | WNN27 | NW27 | NW23 | NW17 | WNN15 | W13 | W12 | NW11 | W8 | W16.7 | WNN28 |
| 21-Aug | WSW8 | WSW10 | SW11 | WSW11 | SW9 | SW12 | SW12 | WSW12 | W11 | W19 | W19 | WSW20 | W22 | W22 | W18 | WSW18 | W16 | W14 | NW12 | NW7 | NNE8 | ENE8 | ENE8 | E7 | W9.8 | W22 |
| 22-Aug | ENE7 | ENE6 | NE10 | ENE8 | ENE9 | ENE8 | E7 | NE10 | NE8 | NE7 | NNE6 | N6 | NNW6 | NW10 | NNW9 | NW7 | NNE6 | NNE8 | NNE8 | NE8 | ENE9 | ESE10 | ESE10 | SE12 | NE5.7 | SE12 |
| 23-Aug | SE12 | SE11 | SSE12 | SSE15 | SSE13 | SSE11 | SSE14 | S23 | S22 | S23 | S20 | S20 | SSW21 | SSW21 | S19 | S18 | S26 | SSE23 | SSE21 | SSE21 | SSE18 | SSE22 | SSE19 | SSE20 | S17.7 | S26 |
| 24-Aug | S19 | S19 | SSE19 | S21 | S18 | S14 | SE11 | SE12 | SE13 | SSE14 | SE17 | SE22 | SE24 | SE24 | SE19 | SSE13 | ESE18 | SE17 | SSE22 | SSE19 | SSE18 | SSE16 | S14 | SW14 | SSE16.0 | SE24 |
| 25-Aug | SW18 | SW17 | SW17 | WSW19 | SW19 | SW20 | SW22 | SW23 | SW24 | SSW22 | SSW27 | SSW23 | SSW22 | SW27 | WSW32 | WSW34 | WSW35 | WSW31 | W29 | W23 | WSW18 | WSW13 | WSW16 | WSW13 | SSW21.7 | WSW35 |
| 26-Aug | WSW20 | WSW17 | WSW16 | SW16 | SW17 | SW15 | SW17 | SW19 | SW21 | SW19 | SW19 | WSW19 | WSW22 | SW21 | WSW21 | WSW22 | WSW23 | WSW19 | WSW13 | SW11 | SW8 | SW10 | SW11 | SSW11 | SW16.6 | WSW23 |
| 27-Aug | SSW13 | SW13 | SW13 | SW14 | SW14 | SW15 | SW18 | WSW21 | WSW21 | SW20 | WSW23 | WSW27 | W23 | W22 | W21 | WNN19 | WNN14 | WNN14 | WNN11 | W8 | W6 | NW6 | NW3 | WSW2 | WSW13.6 | WSW27 |
| 28-Aug | NNW6 | WNN2 | S3 | SW2 | SW6 | SW6 | SW8 | WSW9 | W13 | WNN16 | WNN18 | WNN20 | NW24 | WNN21 | WNN22 | WNN20 | NW19 | NW15 | WNN9 | WNN8 | NW5 | WNN4 | NW8 | NW7 | WNN10.1 | NW24 |
| 29-Aug | W3 | SSW2 | S0 | SE3 | SSE4 | SSE5 | S5 | SSW3 | N5 | W4 | WNN8 | NW11 | NW11 | NNW9 | N4 | NNE2 | E3 | ENE6 | ESE8 | ESE10 | ESE10 | ESE12 | SE13 | SSE15 | ESE1.7 | SSE15 |
| 30-Aug | SSE14 | SE14 | SSE16 | SSE18 | SE17 | SE16 | SE17 | SSE23 | SSE28 | S29 | SSE30 | SSE32 | SSE32 | SSE31 | SSE31 | SSE32 | SSE32 | SSE27 | SSE23 | S20 | S26 | SSW24 | SSW22 | SSW19 | SSE23.1 | SSE32 |
| 31-Aug | SSW18 | SW17 | SW14 | SW10 | SSW9 | SSW8 | SW7 | SSW10 | SW16 | SW12 | SW18 | SW21 | WSW21 | WSW21 | WSW25 | W24 | W19 | WNN20 | WNN16 | WNN10 | WNN11 | WSW7 | WSW10 | WSW11 | WSW13.0 | WSW25 |

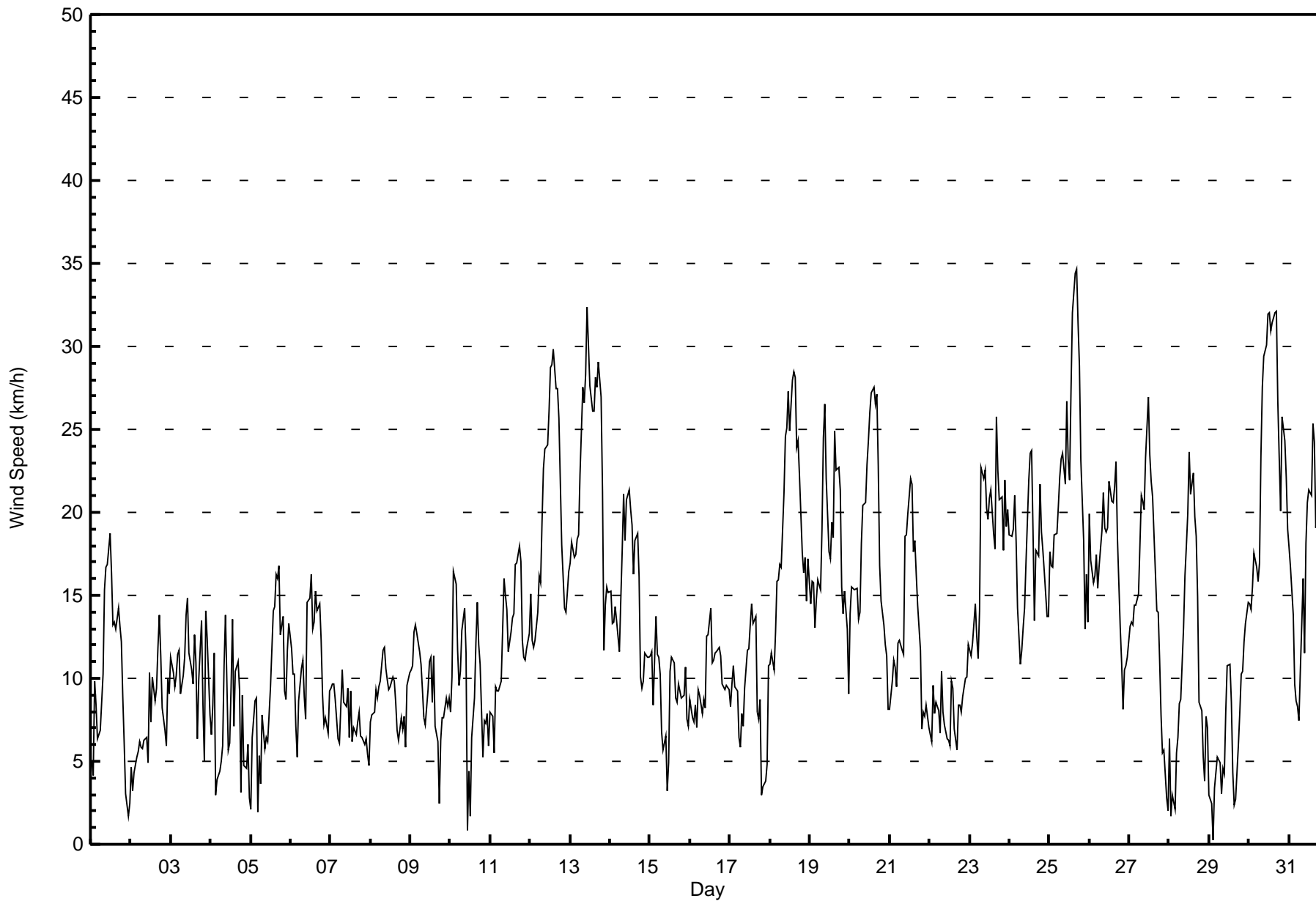
| | | | | | | | | | | | | | | | | | | | | | | | | |
|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|-------|-------|--------|--------|--------|--------|-----------------|
| SSW7.4 | SSW6.9 | SSW6.4 | SSW7.0 | SSW7.3 | SSW7.2 | SSW7.1 | SSW8.6 | SW9.4 | SW9.7 | SW9.3 | SW9.2 | SW9.2 | WSW9.3 | WSW9.7 | WSW9.6 | WSW7.6 | WSW6.8 | SW5.8 | SW5.7 | SSW5.0 | SSW6.0 | SSW6.7 | SSW7.2 | Diurnal Average |
| WSW20 | S19 | SSE19 | S21 | SW19 | SW20 | S22 | S28 | SSE28 | S29 | S32 | SSE32 | SSE32 | SSE31 | WSW32 | WSW34 | WSW35 | WSW31 | W29 | W23 | S26 | SSW24 | SSW22 | SSE20 | Diurnal Maximum |

All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Firebag - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Firebag - August 2017**

| Wind Speed Ranges (km/h) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 5 | 57 | 7.66 | 7.66 |
| 6 - 11 | 296 | 39.78 | 47.45 |
| 12 - 19 | 256 | 34.41 | 81.85 |
| 20 - 28 | 116 | 15.59 | 97.45 |
| 29 - 38 | 19 | 2.55 | 100.00 |
| > 38 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Firebag - August 2017**

| Wind Speed Ranges (km/h) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------------|-----------------------|-----------|-----------|-----------|----------|-----------|-----------|-----------|-----------|------------|------------|-----------|-----------|-----------|-----------|-----------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 5 | 4 | 3 | 0 | 3 | 3 | 0 | 5 | 5 | 8 | 5 | 5 | 3 | 3 | 6 | 3 | 1 | 57 |
| 6 - 11 | 19 | 17 | 13 | 12 | 3 | 10 | 9 | 3 | 14 | 46 | 57 | 28 | 16 | 18 | 19 | 12 | 296 |
| 12 - 19 | 15 | 4 | 0 | 0 | 1 | 2 | 18 | 32 | 33 | 32 | 47 | 30 | 24 | 10 | 6 | 2 | 256 |
| 20 - 28 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 13 | 22 | 17 | 12 | 24 | 11 | 11 | 3 | 0 | 116 |
| 29 - 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 6 | 1 | 0 | 4 | 1 | 0 | 0 | 0 | 19 |
| > 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 38 | 24 | 13 | 15 | 7 | 12 | 35 | 60 | 83 | 101 | 121 | 89 | 55 | 45 | 31 | 15 | 744 |

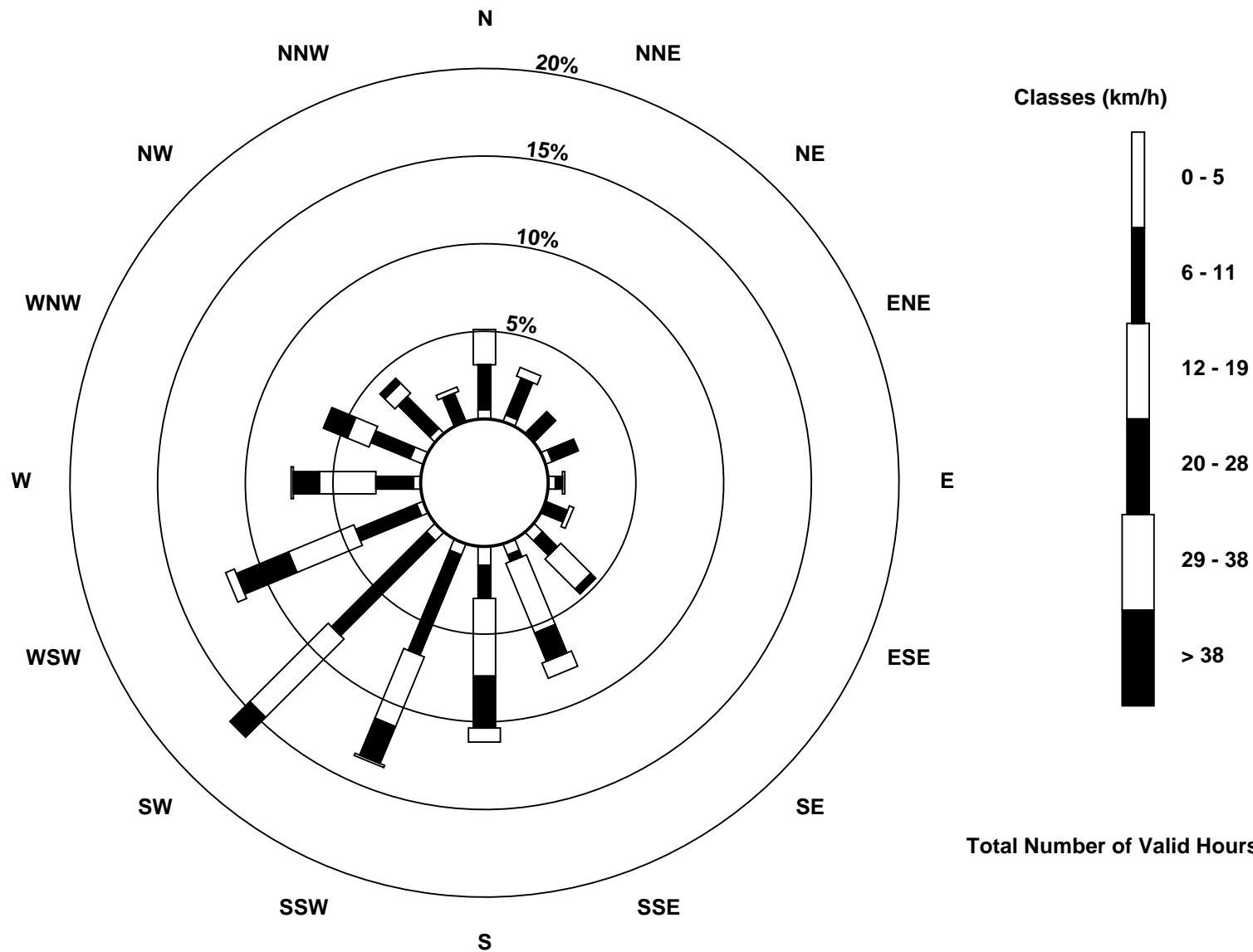
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Wind Speed (WS) - km/h
Firebag (AMS 19)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Firebag - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Aug 25 14:00 Minimum Value: 1 km/h on Aug 2 03:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 7 | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | |
|--|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 3 | 2 | 1 | 2 | 1 | 1 | 5 |
| 2-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 1 | 1 | 1 | 2 | 1 | 4 |
| 3-Aug | 1 | 1 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 3 | 4 | 5 | 4 | 4 | 4 | 3 | 3 | 5 | 3 | 3 | 2 | 6 | 7 | 3 | 7 |
| 4-Aug | 2 | 1 | 2 | 3 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 4 | 3 | 5 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 5 |
| 5-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 3 | 4 | 4 | 6 | 5 | 4 | 3 | 3 | 5 | 3 | 1 | 1 | 2 | 2 | 6 |
| 6-Aug | 2 | 2 | 1 | 1 | 1 | 3 | 2 | 2 | 2 | 3 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 2 | 1 | 1 | 1 | 1 | 4 |
| 7-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 2 | 2 | 3 | 3 | 4 | 4 | 4 | 4 | 3 | 3 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 4 |
| 8-Aug | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 4 |
| 9-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 2 | 3 | 5 | 4 | 3 | 4 | 4 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 5 |
| 10-Aug | 2 | 2 | 3 | 3 | 1 | 2 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 3 | 3 | 5 | 8 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 8 |
| 11-Aug | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 3 | 2 | 3 | 3 | 3 | 3 | 5 | 4 | 4 | 4 | 3 | 3 | 2 | 1 | 1 | 1 | 3 | 5 |
| 12-Aug | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 5 | 5 | 6 | 5 | 4 | 3 | 3 | 2 | 2 | 2 | 2 | 6 |
| 13-Aug | 2 | 3 | 2 | 2 | 3 | 3 | 4 | 5 | 4 | 5 | 6 | 6 | 5 | 6 | 6 | 6 | 5 | 5 | 5 | 4 | 2 | 3 | 2 | 2 | 6 |
| 14-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 3 | 3 | 4 | 4 | 5 | 4 | 4 | 3 | 3 | 4 | 2 | 1 | 1 | 2 | 2 | 2 | 5 |
| 15-Aug | 2 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 3 |
| 16-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 5 | 4 | 5 | 4 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 5 |
| 17-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 4 | 4 | 4 | 4 | 5 | 5 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 5 |
| 18-Aug | 1 | 2 | 1 | 2 | 3 | 3 | 3 | 2 | 4 | 5 | 6 | 6 | 5 | 6 | 6 | 6 | 4 | 5 | 5 | 3 | 2 | 3 | 2 | 3 | 6 |
| 19-Aug | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 5 | 6 | 6 | 4 | 3 | 4 | 5 | 5 | 6 | 7 | 5 | 6 | 3 | 3 | 3 | 3 | 2 | 7 |
| 20-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 5 | 6 | 6 | 6 | 7 | 7 | 6 | 6 | 5 | 4 | 2 | 2 | 3 | 1 | 7 |
| 21-Aug | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 4 | 4 | 5 | 5 | 6 | 6 | 5 | 6 | 5 | 3 | 2 | 2 | 2 | 2 | 2 | 6 |
| 22-Aug | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 3 | 2 | 1 | 2 | 2 | 2 | 2 | 4 |
| 23-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 4 |
| 24-Aug | 3 | 3 | 3 | 4 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 4 | 5 | 5 | 5 | 3 | 4 | 4 | 5 | 3 | 3 | 2 | 2 | 4 | 5 |
| 25-Aug | 3 | 4 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 8 | 7 | 7 | 8 | 7 | 6 | 5 | 3 | 4 | 3 | 2 | 8 |
| 26-Aug | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 3 | 2 | 1 | 1 | 1 | 1 | 5 |
| 27-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 3 | 4 | 4 | 6 | 6 | 6 | 6 | 4 | 3 | 4 | 3 | 1 | 1 | 1 | 1 | 1 | 6 |
| 28-Aug | 2 | 2 | 2 | 1 | 2 | 2 | 1 | 1 | 3 | 4 | 4 | 5 | 6 | 5 | 5 | 5 | 5 | 4 | 1 | 1 | 1 | 2 | 1 | 2 | 6 |
| 29-Aug | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 4 | 3 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 4 |
| 30-Aug | 2 | 2 | 3 | 3 | 3 | 2 | 3 | 5 | 5 | 5 | 5 | 6 | 5 | 6 | 5 | 6 | 6 | 6 | 4 | 3 | 4 | 3 | 3 | 3 | 6 |
| 31-Aug | 3 | 3 | 3 | 1 | 2 | 2 | 3 | 3 | 3 | 2 | 4 | 4 | 4 | 5 | 6 | 5 | 4 | 5 | 3 | 2 | 2 | 1 | 1 | 1 | 6 |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Firebag - August 2017

| | |
|---|---------------------------------|
| Direction of Maximum Speed: 250 deg on Aug 25 17:00 | Hours in Service: 744 |
| Direction of Maximum Daily Speed Average: 165.5 deg on Aug 30 | Hours of Data: 744 |
| Direction of Minimum Speed: 172 deg on Aug 29 03:00 | Hours of Missing Data: 0 |
| Direction of Minimum Daily Speed Average: 0.9 deg on Aug 15 | Percent Operational Time: 100.0 |
| Monthly Average Direction: 235.5 deg | |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average |
|--------|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 319 | 357 | 5 | 357 | 358 | 25 | 34 | 27 | 19 | 13 | 1 | 352 | 349 | 354 | 4 | 335 | 350 | 346 | 353 | 356 | 6 | 28 | 68 | 156 | 0.8 |
| 2-Aug | 125 | 138 | 164 | 179 | 188 | 197 | 202 | 217 | 226 | 223 | 210 | 214 | 214 | 234 | 236 | 256 | 253 | 269 | 252 | 232 | 215 | 179 | 182 | 181 | 218.0 |
| 3-Aug | 195 | 204 | 204 | 201 | 199 | 204 | 202 | 209 | 218 | 211 | 210 | 189 | 200 | 206 | 226 | 213 | 227 | 123 | 139 | 136 | 21 | 179 | 176 | 136 | 193.5 |
| 4-Aug | 187 | 86 | 84 | 359 | 98 | 127 | 64 | 122 | 169 | 177 | 177 | 66 | 120 | 158 | 177 | 51 | 70 | 75 | 85 | 249 | 247 | 345 | 260 | 223 | 125.9 |
| 5-Aug | 177 | 22 | 36 | 38 | 68 | 174 | 224 | 228 | 223 | 210 | 223 | 230 | 197 | 193 | 193 | 197 | 167 | 194 | 214 | 209 | 224 | 207 | 212 | 215 | 201.9 |
| 6-Aug | 212 | 220 | 221 | 234 | 293 | 4 | 23 | 47 | 35 | 346 | 0 | 2 | 8 | 12 | 11 | 9 | 2 | 1 | 359 | 356 | 336 | 319 | 330 | 347 | 354.5 |
| 7-Aug | 350 | 357 | 12 | 13 | 16 | 5 | 14 | 2 | 2 | 353 | 1 | 14 | 1 | 7 | 343 | 320 | 332 | 309 | 295 | 290 | 252 | 243 | 229 | 200 | 344.3 |
| 8-Aug | 214 | 208 | 213 | 209 | 214 | 213 | 219 | 231 | 241 | 254 | 271 | 231 | 255 | 260 | 245 | 248 | 255 | 236 | 232 | 225 | 209 | 178 | 193 | 194 | 228.2 |
| 9-Aug | 196 | 206 | 203 | 209 | 215 | 218 | 230 | 233 | 232 | 256 | 280 | 278 | 256 | 305 | 250 | 281 | 286 | 299 | 260 | 225 | 209 | 211 | 209 | 206 | 234.0 |
| 10-Aug | 242 | 202 | 185 | 179 | 185 | 182 | 214 | 219 | 215 | 230 | 238 | 215 | 284 | 40 | 30 | 6 | 186 | 193 | 138 | 200 | 220 | 221 | 230 | 211 | 201.6 |
| 11-Aug | 207 | 194 | 195 | 194 | 194 | 195 | 214 | 222 | 224 | 222 | 219 | 208 | 200 | 210 | 201 | 214 | 207 | 202 | 200 | 189 | 172 | 172 | 169 | 163 | 201.2 |
| 12-Aug | 175 | 183 | 172 | 173 | 174 | 175 | 177 | 193 | 197 | 199 | 198 | 194 | 196 | 184 | 190 | 194 | 192 | 193 | 184 | 183 | 176 | 173 | 178 | 177 | 186.8 |
| 13-Aug | 174 | 163 | 161 | 162 | 160 | 161 | 171 | 176 | 176 | 174 | 169 | 169 | 168 | 168 | 178 | 170 | 169 | 171 | 166 | 171 | 150 | 148 | 163 | 159 | 167.9 |
| 14-Aug | 154 | 146 | 134 | 136 | 144 | 135 | 136 | 155 | 169 | 184 | 179 | 178 | 178 | 202 | 223 | 231 | 247 | 258 | 238 | 201 | 192 | 178 | 171 | 160 | 180.3 |
| 15-Aug | 170 | 178 | 136 | 139 | 139 | 137 | 152 | 145 | 122 | 106 | 127 | 289 | 300 | 298 | 308 | 336 | 9 | 24 | 18 | 37 | 4 | 342 | 311 | 302 | 60.2 |
| 16-Aug | 319 | 313 | 292 | 288 | 274 | 260 | 255 | 254 | 272 | 268 | 272 | 279 | 274 | 302 | 268 | 272 | 263 | 245 | 242 | 225 | 223 | 221 | 221 | 223 | 262.9 |
| 17-Aug | 222 | 217 | 220 | 225 | 230 | 220 | 241 | 255 | 288 | 313 | 306 | 308 | 290 | 285 | 271 | 266 | 282 | 299 | 304 | 265 | 187 | 165 | 170 | 210 | 261.1 |
| 18-Aug | 215 | 213 | 202 | 203 | 214 | 213 | 213 | 218 | 231 | 248 | 251 | 246 | 240 | 246 | 247 | 231 | 210 | 213 | 222 | 214 | 217 | 215 | 230 | 232 | 227.5 |
| 19-Aug | 228 | 242 | 255 | 255 | 253 | 259 | 256 | 259 | 252 | 257 | 242 | 253 | 257 | 265 | 281 | 281 | 286 | 288 | 291 | 264 | 273 | 274 | 277 | 256 | 263.7 |
| 20-Aug | 235 | 234 | 236 | 243 | 247 | 244 | 242 | 246 | 249 | 257 | 262 | 264 | 279 | 281 | 290 | 297 | 315 | 309 | 307 | 293 | 281 | 274 | 304 | 271 | 272.0 |
| 21-Aug | 248 | 240 | 234 | 237 | 228 | 229 | 235 | 238 | 260 | 264 | 260 | 252 | 268 | 269 | 273 | 253 | 271 | 277 | 311 | 319 | 32 | 77 | 78 | 89 | 260.0 |
| 22-Aug | 68 | 67 | 53 | 72 | 78 | 77 | 82 | 53 | 51 | 47 | 20 | 359 | 344 | 321 | 346 | 326 | 20 | 14 | 26 | 48 | 76 | 111 | 123 | 129 | 51.2 |
| 23-Aug | 136 | 142 | 148 | 161 | 156 | 156 | 168 | 182 | 183 | 182 | 188 | 191 | 204 | 203 | 180 | 182 | 179 | 167 | 160 | 160 | 157 | 162 | 165 | 166 | 172.5 |
| 24-Aug | 172 | 171 | 162 | 172 | 187 | 179 | 127 | 135 | 144 | 149 | 136 | 137 | 139 | 129 | 132 | 152 | 111 | 135 | 148 | 154 | 156 | 160 | 175 | 225 | 152.4 |
| 25-Aug | 229 | 234 | 227 | 237 | 235 | 230 | 224 | 220 | 224 | 211 | 203 | 209 | 204 | 236 | 242 | 247 | 250 | 254 | 261 | 260 | 246 | 249 | 246 | 242 | 235.0 |
| 26-Aug | 241 | 250 | 239 | 235 | 236 | 232 | 226 | 228 | 223 | 226 | 226 | 238 | 245 | 233 | 246 | 246 | 247 | 247 | 241 | 235 | 222 | 215 | 214 | 206 | 234.9 |
| 27-Aug | 211 | 214 | 220 | 223 | 229 | 224 | 231 | 241 | 239 | 235 | 240 | 250 | 276 | 272 | 272 | 284 | 288 | 285 | 289 | 275 | 271 | 304 | 308 | 258 | 251.7 |
| 28-Aug | 331 | 282 | 182 | 229 | 231 | 217 | 228 | 245 | 281 | 284 | 285 | 299 | 306 | 303 | 290 | 297 | 311 | 309 | 296 | 294 | 323 | 293 | 316 | 313 | 292.1 |
| 29-Aug | 278 | 198 | 172 | 140 | 152 | 160 | 174 | 195 | 9 | 268 | 301 | 323 | 308 | 345 | 357 | 13 | 97 | 61 | 112 | 107 | 114 | 123 | 134 | 149 | 117.1 |
| 30-Aug | 150 | 145 | 149 | 151 | 146 | 144 | 146 | 160 | 167 | 170 | 164 | 161 | 165 | 165 | 159 | 158 | 162 | 161 | 168 | 172 | 188 | 192 | 200 | 206 | 165.5 |
| 31-Aug | 208 | 216 | 215 | 216 | 208 | 212 | 232 | 207 | 216 | 219 | 226 | 232 | 245 | 242 | 256 | 263 | 272 | 295 | 297 | 297 | 286 | 247 | 238 | 247 | 243.3 |

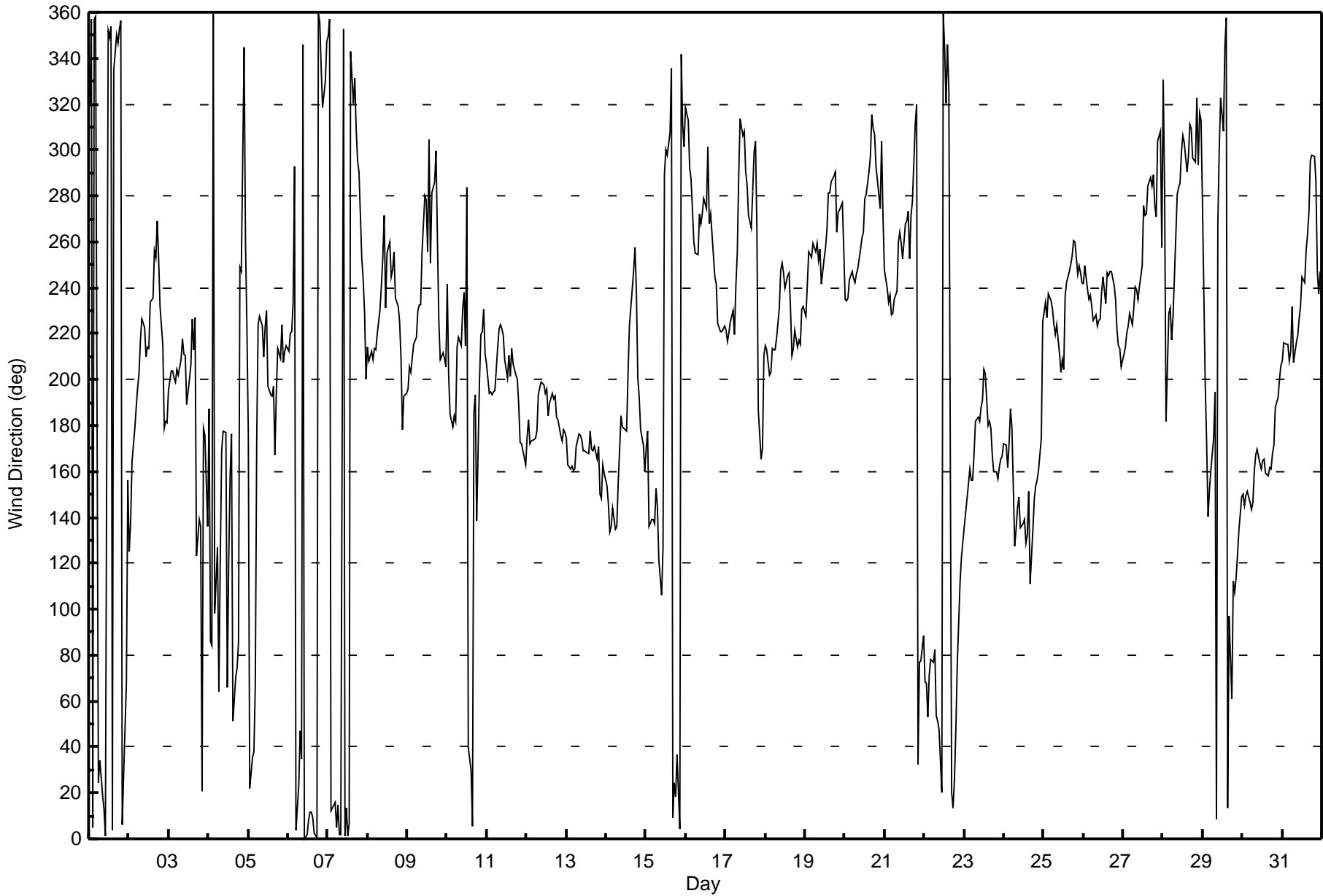
203.5 201.7 194.3 197.3 200.4 198.7 202.8 208.7 216.2 222.5 226.3 229.7 236.1 238.3 242.0 246.2 238.8 239.4 229.6 217.0 210.2 197.7 201.8 199.6
 Diurnal Average

All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Firebag - August 2017





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Firebag - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 102 deg on Aug 10 11:00 Minimum Value: 4 deg on Aug 5 03:00 Percentiles: P ₁ = 6 P ₁₀ = 8 Q ₁ = 10 Median = 13 Q ₃ = 19 P ₉₀ = 34 P ₉₉ = 80 | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|---|----|----|----|----|----|----|----|----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 10 | 19 | 10 | 9 | 14 | 15 | 10 | 10 | 13 | 19 | 19 | 21 | 23 | 28 | 29 | 25 | 24 | 19 | 16 | 13 | 9 | 23 | 37 | 36 | 37 |
| 2-Aug | 12 | 13 | 12 | 8 | 12 | 9 | 13 | 11 | 14 | 32 | 60 | 39 | 52 | 31 | 46 | 29 | 31 | 17 | 19 | 10 | 11 | 12 | 13 | 7 | 60 |
| 3-Aug | 9 | 9 | 9 | 6 | 5 | 6 | 9 | 13 | 17 | 19 | 21 | 31 | 30 | 45 | 18 | 28 | 28 | 41 | 18 | 55 | 52 | 27 | 18 | 24 | 55 |
| 4-Aug | 27 | 32 | 12 | 82 | 33 | 36 | 32 | 21 | 16 | 10 | 40 | 18 | 29 | 20 | 62 | 12 | 14 | 17 | 71 | 20 | 21 | 27 | 24 | 61 | 82 |
| 5-Aug | 29 | 20 | 4 | 7 | 64 | 14 | 44 | 10 | 35 | 42 | 60 | 42 | 36 | 26 | 24 | 21 | 14 | 25 | 12 | 13 | 7 | 9 | 9 | 9 | 64 |
| 6-Aug | 9 | 13 | 8 | 8 | 29 | 18 | 13 | 17 | 19 | 28 | 15 | 15 | 13 | 13 | 15 | 14 | 13 | 14 | 12 | 7 | 9 | 6 | 7 | 29 | |
| 7-Aug | 9 | 9 | 9 | 7 | 11 | 12 | 14 | 13 | 16 | 23 | 29 | 62 | 43 | 62 | 65 | 52 | 45 | 30 | 23 | 9 | 17 | 18 | 12 | 19 | 65 |
| 8-Aug | 11 | 8 | 10 | 9 | 10 | 10 | 10 | 10 | 18 | 18 | 37 | 43 | 40 | 39 | 48 | 41 | 47 | 33 | 17 | 10 | 10 | 8 | 6 | 5 | 48 |
| 9-Aug | 7 | 8 | 7 | 9 | 10 | 9 | 9 | 10 | 18 | 30 | 30 | 37 | 33 | 35 | 27 | 52 | 53 | 87 | 40 | 11 | 8 | 9 | 9 | 12 | 87 |
| 10-Aug | 43 | 29 | 10 | 9 | 9 | 9 | 13 | 11 | 13 | 20 | 102 | 61 | 83 | 52 | 35 | 31 | 63 | 31 | 15 | 42 | 15 | 14 | 12 | 15 | 102 |
| 11-Aug | 13 | 6 | 14 | 8 | 5 | 5 | 13 | 10 | 11 | 14 | 16 | 30 | 27 | 30 | 22 | 19 | 18 | 14 | 10 | 8 | 9 | 8 | 7 | 8 | 30 |
| 12-Aug | 11 | 9 | 7 | 8 | 8 | 8 | 9 | 11 | 10 | 12 | 13 | 13 | 13 | 15 | 13 | 13 | 12 | 11 | 12 | 9 | 9 | 8 | 9 | 9 | 15 |
| 13-Aug | 9 | 9 | 9 | 9 | 10 | 10 | 11 | 10 | 11 | 12 | 13 | 14 | 15 | 17 | 15 | 16 | 12 | 12 | 10 | 9 | 14 | 11 | 11 | 11 | 17 |
| 14-Aug | 11 | 10 | 13 | 13 | 10 | 13 | 11 | 12 | 14 | 13 | 14 | 16 | 21 | 15 | 20 | 16 | 16 | 12 | 18 | 13 | 12 | 11 | 10 | 10 | 21 |
| 15-Aug | 10 | 26 | 31 | 12 | 12 | 12 | 12 | 14 | 26 | 16 | 63 | 34 | 17 | 13 | 14 | 16 | 23 | 12 | 14 | 16 | 15 | 17 | 17 | 13 | 63 |
| 16-Aug | 12 | 10 | 8 | 8 | 9 | 8 | 8 | 9 | 19 | 17 | 22 | 22 | 22 | 33 | 35 | 28 | 20 | 16 | 16 | 8 | 6 | 8 | 7 | 6 | 35 |
| 17-Aug | 7 | 9 | 8 | 7 | 8 | 11 | 16 | 12 | 25 | 22 | 19 | 28 | 25 | 26 | 22 | 21 | 20 | 18 | 17 | 68 | 13 | 22 | 12 | 9 | 68 |
| 18-Aug | 9 | 9 | 7 | 9 | 9 | 10 | 12 | 9 | 12 | 14 | 12 | 16 | 17 | 13 | 13 | 12 | 12 | 13 | 11 | 9 | 9 | 11 | 9 | 9 | 17 |
| 19-Aug | 9 | 10 | 11 | 10 | 11 | 10 | 11 | 13 | 12 | 12 | 12 | 18 | 12 | 13 | 13 | 13 | 13 | 13 | 13 | 11 | 12 | 12 | 12 | 21 | 21 |
| 20-Aug | 8 | 8 | 9 | 9 | 9 | 10 | 10 | 10 | 11 | 14 | 14 | 16 | 17 | 15 | 17 | 18 | 15 | 15 | 14 | 12 | 11 | 10 | 17 | 20 | 20 |
| 21-Aug | 11 | 7 | 7 | 8 | 8 | 8 | 10 | 12 | 19 | 15 | 15 | 14 | 18 | 20 | 24 | 23 | 23 | 24 | 20 | 29 | 22 | 19 | 14 | 19 | 29 |
| 22-Aug | 13 | 18 | 8 | 12 | 8 | 8 | 18 | 11 | 18 | 25 | 48 | 46 | 52 | 34 | 40 | 52 | 63 | 22 | 17 | 13 | 14 | 14 | 11 | 11 | 63 |
| 23-Aug | 12 | 10 | 11 | 9 | 10 | 13 | 11 | 11 | 10 | 10 | 17 | 14 | 17 | 12 | 13 | 10 | 10 | 10 | 10 | 10 | 10 | 9 | 9 | 9 | 17 |
| 24-Aug | 9 | 9 | 9 | 10 | 13 | 14 | 18 | 15 | 12 | 14 | 16 | 18 | 16 | 15 | 16 | 17 | 12 | 14 | 12 | 11 | 11 | 9 | 11 | 35 | 35 |
| 25-Aug | 12 | 12 | 11 | 10 | 10 | 10 | 10 | 10 | 12 | 12 | 9 | 11 | 10 | 17 | 11 | 11 | 11 | 11 | 11 | 11 | 10 | 13 | 10 | 10 | 17 |
| 26-Aug | 9 | 11 | 9 | 9 | 9 | 11 | 9 | 9 | 9 | 11 | 15 | 17 | 13 | 18 | 20 | 16 | 14 | 12 | 9 | 10 | 12 | 9 | 9 | 8 | 20 |
| 27-Aug | 9 | 9 | 8 | 8 | 9 | 8 | 10 | 10 | 11 | 14 | 13 | 15 | 19 | 19 | 17 | 16 | 13 | 13 | 10 | 5 | 7 | 11 | 50 | 62 | 62 |
| 28-Aug | 13 | 69 | 67 | 53 | 9 | 12 | 7 | 16 | 17 | 16 | 17 | 21 | 16 | 15 | 19 | 15 | 17 | 15 | 10 | 6 | 8 | 21 | 8 | 9 | 69 |
| 29-Aug | 39 | 27 | 99 | 18 | 7 | 15 | 14 | 40 | 32 | 68 | 37 | 32 | 31 | 52 | 87 | 98 | 86 | 34 | 17 | 9 | 9 | 11 | 12 | 9 | 99 |
| 30-Aug | 10 | 11 | 10 | 10 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 13 | 12 | 13 | 12 | 11 | 11 | 10 | 10 | 8 | 8 | 9 | 10 | 13 |
| 31-Aug | 10 | 9 | 9 | 9 | 8 | 10 | 40 | 18 | 9 | 11 | 12 | 10 | 12 | 13 | 15 | 14 | 16 | 14 | 12 | 9 | 9 | 19 | 8 | 8 | 40 |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association

SO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|---------------|
| Station Name: | Firebag | Station number: | AMS 19 |
| Calibration Date: | August 16, 2017 | Last Cal Date: | July 20, 2017 |
| Start time (MST): | 9:29 | End time (MST): | 13:45 |
| Reason: | Routine | | |

Calibration Standards

| | | | | |
|-----------------------|------------------|-----|------------------|------------------|
| Cal Gas Concentration | <u>49</u> | ppm | Cal Gas Exp Date | November 4, 2019 |
| Cal Gas Cylinder # | <u>EY0000652</u> | | | |
| Calibrator Make/Model | API T700 | | Serial Number | 996 |
| ZAG Make/Model | API 701 | | Serial Number | 201 |

Analyzer Information

| | | | | | |
|----------------------|--------------|---------------|--------------------|--------------|---------------|
| Analyzer make: | Thermo 43i | | Analyzer serial #: | 1410661308 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Analyzer Range | 0 - 1000 ppb | | PMT voltage | -605.7 | -605.7 |
| Calculated slope | 1.006797 | 1.003625 | Lamp voltage | 793 | 795 |
| Calculated intercept | -2.776175 | -2.469306 | Pressure | 679.8 | 677.7 |
| Analyzer Background | 8.3 | 8.4 | Flow | 0.444 | 0.444 |
| Analyzer Coefficient | 0.974 | 0.982 | Intensity | 90 | 90 |

SO₂ Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 4999 | 0.0 | 0.0 | 0.0 | ---- |
| as found span | 4930 | 79.8 | 780.5 | 774.5 | 1.008 |
| calibrator zero | 4999 | 0.0 | 0.0 | 0.0 | ---- |
| high point | 4932 | 79.8 | 780.2 | 778.1 | 1.003 |
| second point | 4972 | 39.9 | 390.1 | 393.8 | 0.991 |
| third point | 4992 | 20.1 | 196.5 | 199.8 | 0.984 |
| as left zero | 4999 | 0.0 | 0.0 | 0.3 | ---- |
| as left span | 4930 | 79.8 | 780.5 | 778.4 | 1.003 |
| Average Correction Factor | | | | | 0.992 |
| Corrected As found | 774.50 | Previous response | 778.02 | *% change | 0.5% |

* = > +/-5% change initiates investigation

Notes:

Changed inlet filter after asfinds. Adjusted the span.

Calibration Performed By: Jayme Marcoux



Wood Buffalo Environmental Association

SO₂ Calibration Summary

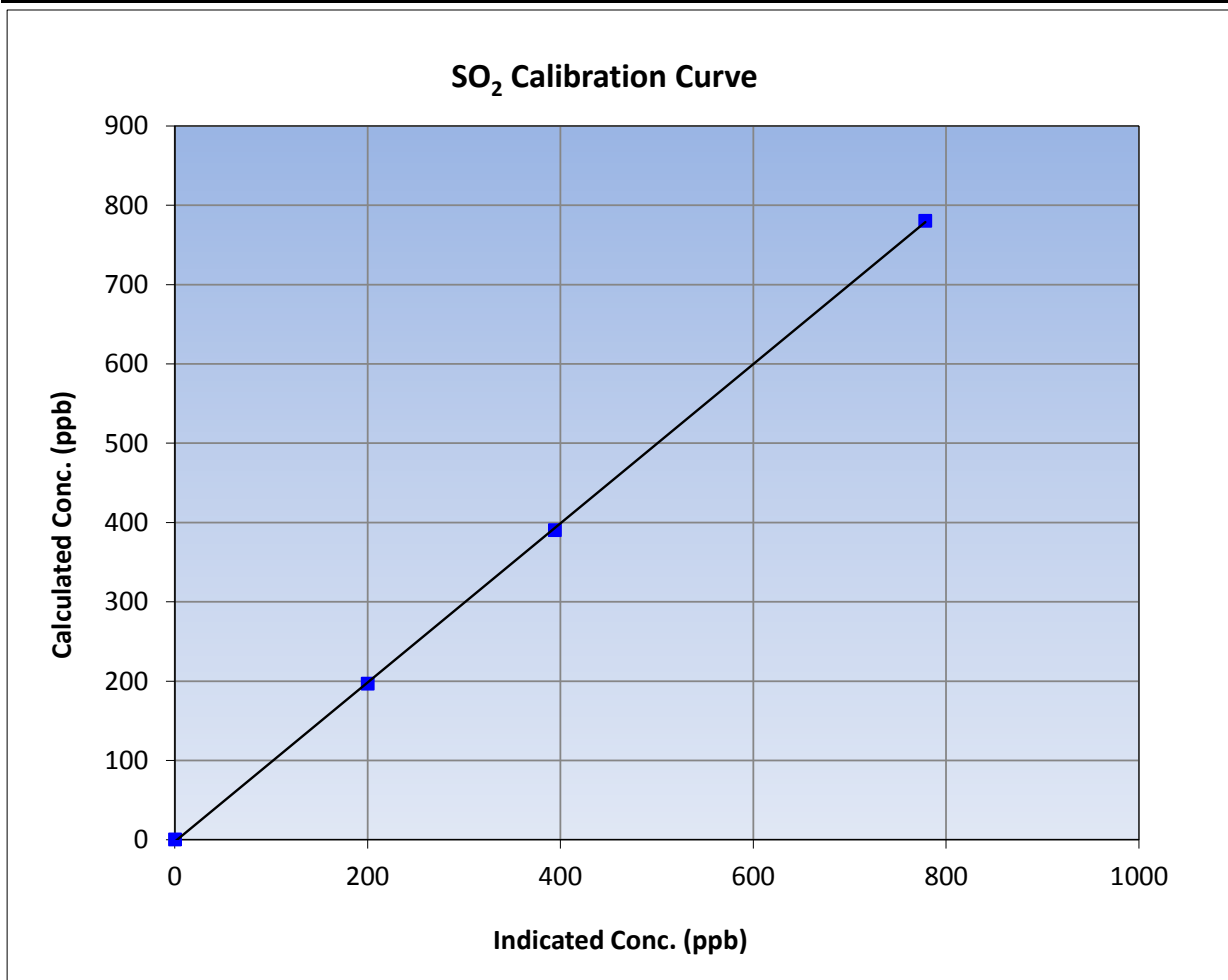
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 16, 2017 | Previous Calibration | July 20, 2017 |
| Station Name | Firebag | Station Number | AMS 19 |
| Start Time (MST) | 9:29 | End Time (MST) | 13:45 |
| Analyzer make | Thermo 43i | Analyzer serial # | 1410661308 |

Calibration Data

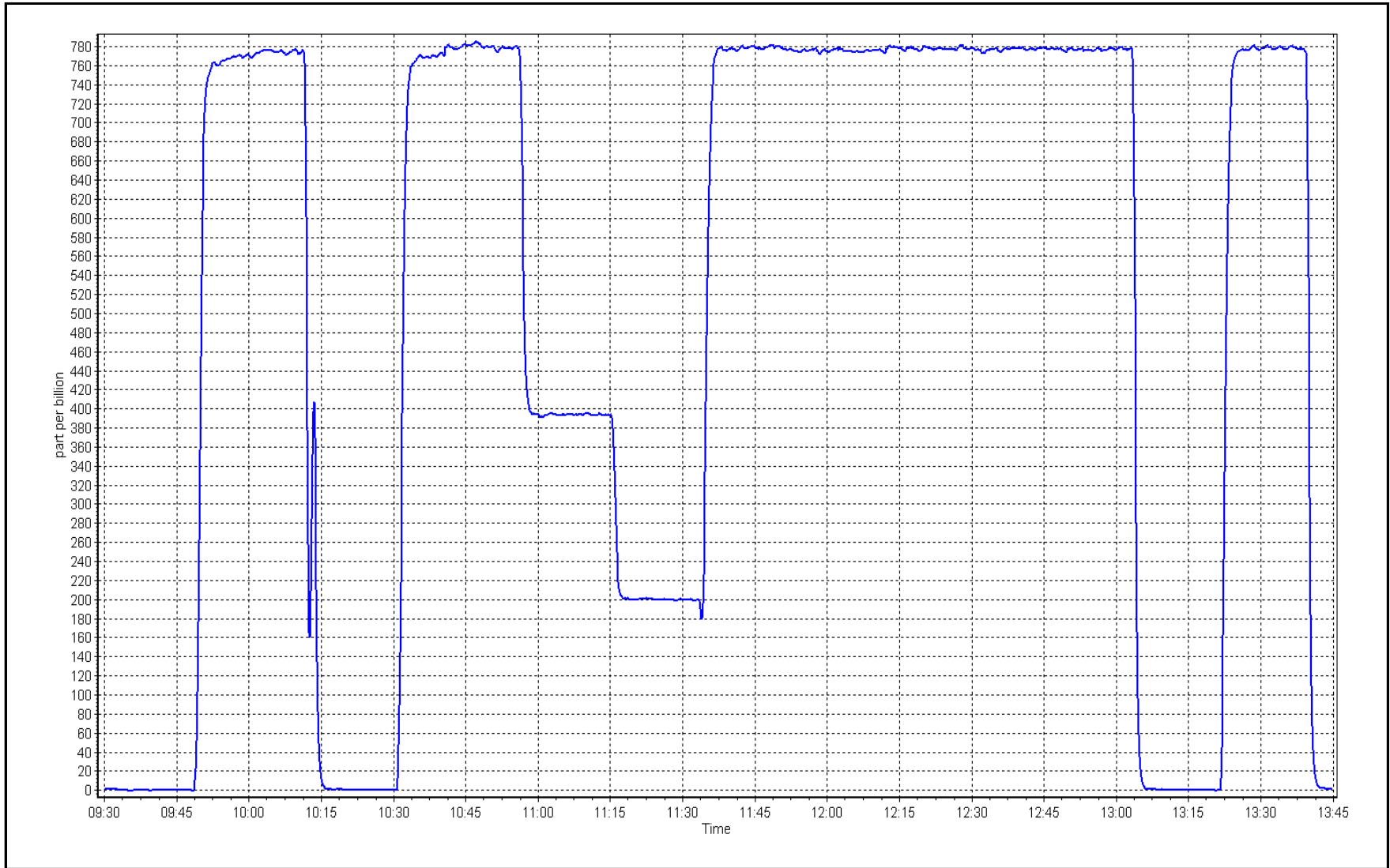
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | 0.999944 | ≥0.995 |
| 780.2 | 778.1 | 1.0027 | | | |
| 390.1 | 393.8 | 0.9906 | Slope | 1.003625 | 0.90 - 1.10 |
| 196.5 | 199.8 | 0.9835 | | | |
| | | | Intercept | -2.469306 | +/-30 |



SO2 Calibration Plot

Date: August 16, 2017

Location: Firebag





Wood Buffalo Environmental Association

H₂S Calibration Report

Version-06-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|---------------|
| Station Name: | Firebag | Station number: | AMS 19 |
| Calibration Date: | August 18, 2017 | Last Cal Date: | July 25, 2017 |
| Start time (MST): | 9:07 | End time (MST): | 12:00 |
| Reason: | Routine | | |

Calibration Standards

| | | | | |
|-----------------------|----------------|-----|------------------|-------------------|
| Cal Gas Concentration | <u>5.30</u> | ppm | Cal Gas Exp Date | February 13, 2018 |
| Cal Gas Cylinder # | <u>LL77486</u> | | | |
| Calibrator Make/Model | API T700 | | Serial Number | 996 |
| ZAG Make/Model | API 701 | | Serial Number | 201 |

Analyzer Information

Analyzer make: Thermo 450i

Analyzer serial #: 815129098

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|----------------------|--------------|---------------|--------------|--------------|---------------|
| Analyzer Range | 0 - 100 ppb | | PMT voltage | -574 | -574 |
| Calculated slope | 1.003458 | 1.002689 | Lamp voltage | 935 | 932 |
| Calculated intercept | -0.521167 | -0.318468 | Pressure | 535.8 | 539.5 |
| Analyzer Background | 13.6 | 14.2 | Flow | 0.947 | 0.937 |
| Analyzer Coefficient | 1.139 | 1.139 | Intensity | 85 | 85 |

H₂S Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|-----------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5000 | 0.0 | 0.0 | 0.2 | ---- |
| as found span | 4936 | 75.6 | 80.0 | 79.8 | 1.002 |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | ---- |
| high point | 4936 | 75.6 | 80.0 | 79.8 | 1.002 |
| second point | 4975 | 37.8 | 40.0 | 40.6 | 0.984 |
| third point | 4995 | 19.1 | 20.2 | 20.6 | 0.980 |
| as left zero | 5000 | 0.0 | 0.0 | 0.2 | ---- |
| as left span | 4936 | 75.6 | 80.0 | 79.6 | 1.004 |

SO₂ Scrubber Check

| | | | | Average Correction Factor | 0.989 |
|--------------------|-------|-------------------|-------|---------------------------|-------|
| Corrected As found | 79.60 | Previous response | 80.20 | *% change | 0.7% |

* = > +/-5% change initiates investigation

Notes:

Changed inlet filter after as founds. Installed new pump. Adjusted the zero.

Calibration Performed By: Jayme Marcoux



Wood Buffalo Environmental Association

H₂S Calibration Summary

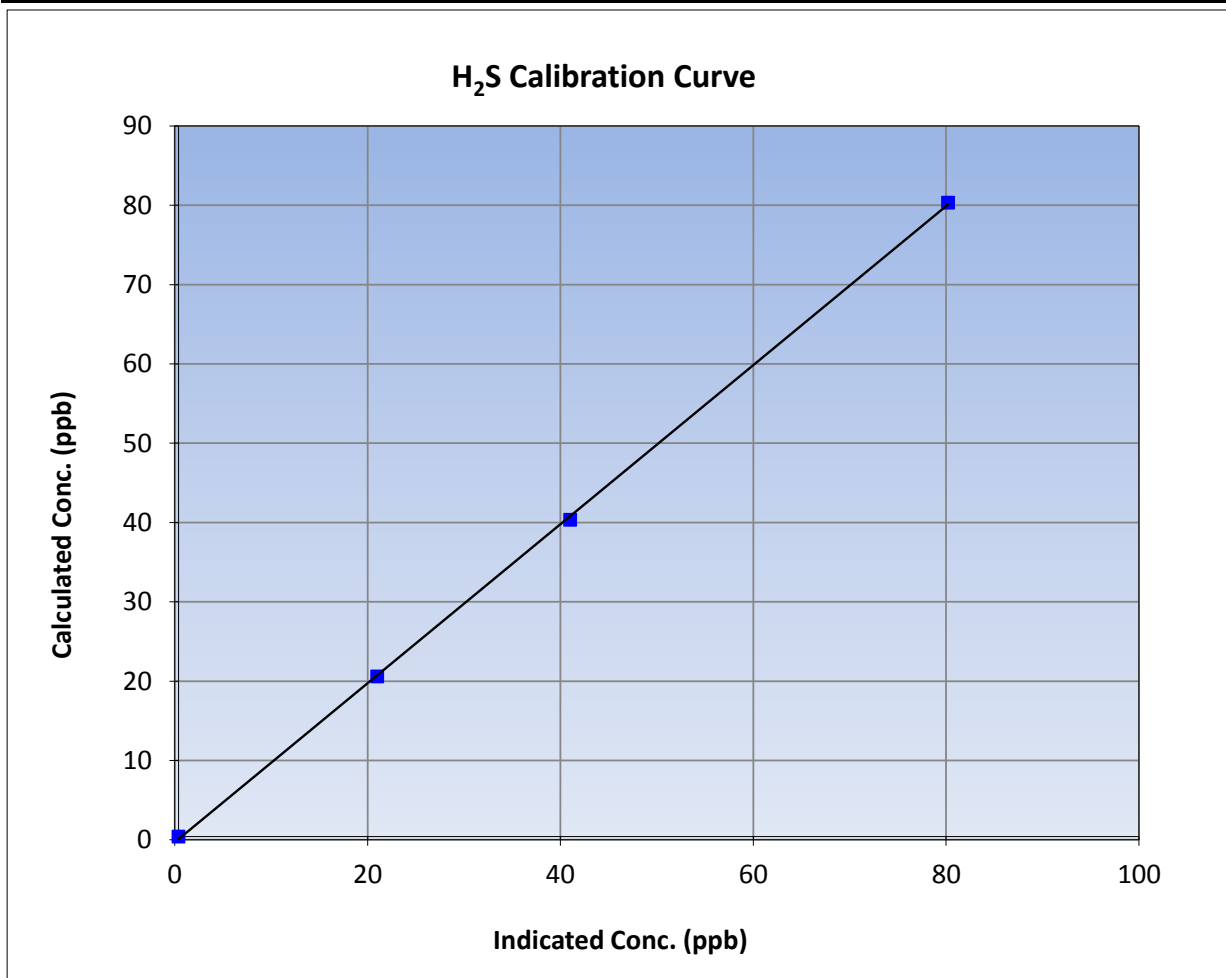
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 18, 2017 | Previous Calibration | July 25, 2017 |
| Station Name | Firebag | Station Number | AMS 19 |
| Start Time (MST) | 9:07 | End Time (MST) | 12:00 |
| Analyzer make | Thermo 450i | Analyzer serial # | 815129098 |

Calibration Data

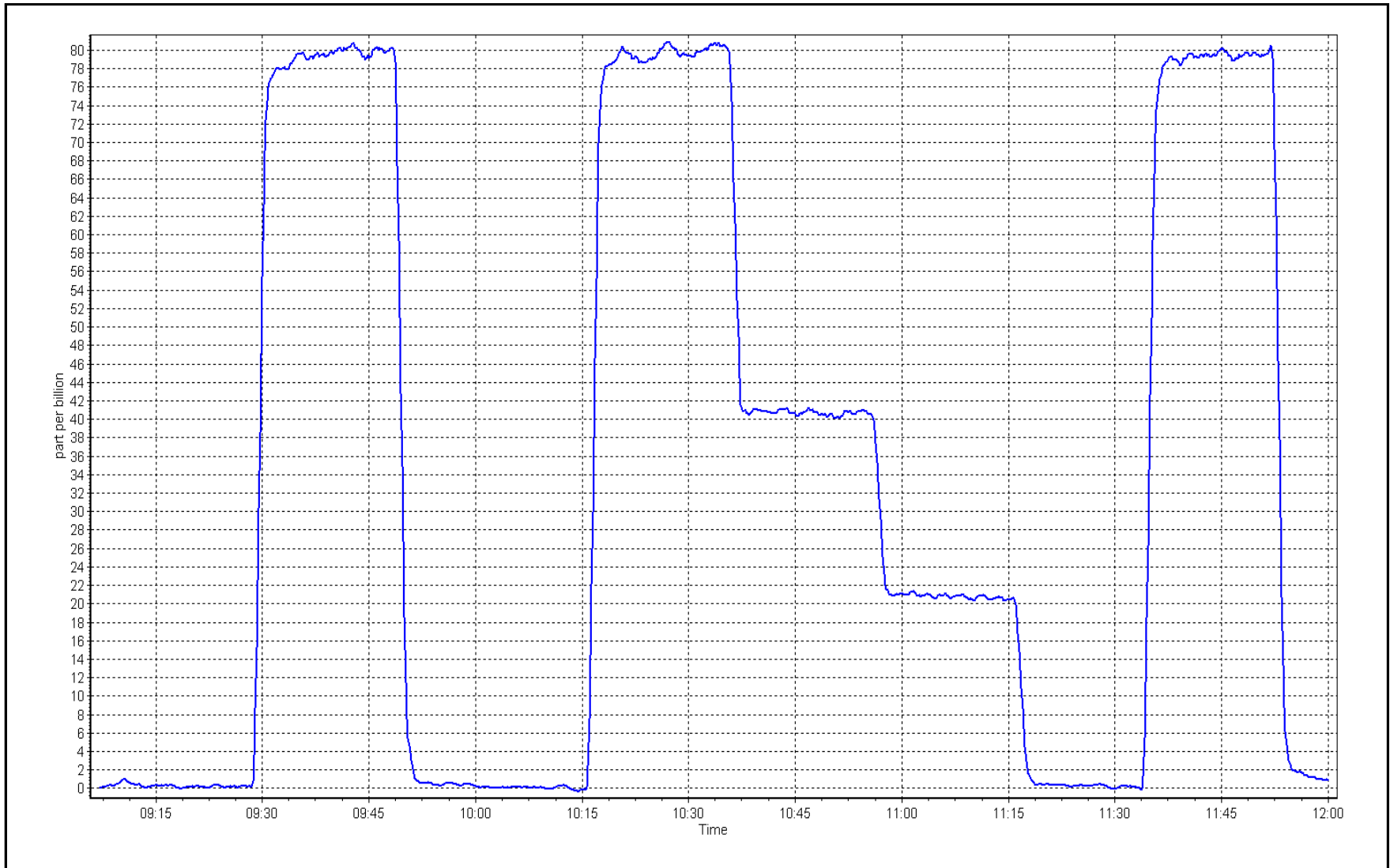
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | 0.999894 | ≥0.995 |
| 80.0 | 79.8 | 1.0019 | | | |
| 40.0 | 40.6 | 0.9844 | Slope | 1.002689 | 0.90 - 1.10 |
| 20.2 | 20.6 | 0.9801 | | | |
| | | | Intercept | -0.318468 | +/-3 |



H₂S Calibration Plot

Date: August 18, 2017

Location: Firebag





Wood Buffalo Environmental Association

THC Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|---------------|
| Station Name: | Firebag | Station number: | AMS 19 |
| Calibration Date: | August 16, 2017 | Last Cal Date: | July 20, 2017 |
| Start time (MST): | 9:29 | End time (MST): | 13:41 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|-----------------------|------------------|---------------------|------------------|
| Gas Cert Reference | EY0000652 | Cal Gas Expiry Date | November 4, 2019 |
| CH4 Cal Gas Conc. | <u>513.0</u> ppm | CH4 Equiv Conc. | 1057.5 ppm |
| C3H8 Cal Gas Conc. | <u>198.0</u> ppm | Station temp. | 22 Deg C |
| Calibrator Make/Model | API T700 | Serial Number | 996 |
| ZAG Make/Model | API 701 | Serial Number | 201 |

Analyzer Information

| | | | |
|----------------------|---------------|---------------------|----------------------------|
| Analyzer make: | Thermo 51i-LT | Analyzer serial #: | 1336160089 |
| | <u>Start</u> | <u>Finish</u> | <u>Start</u> <u>Finish</u> |
| Analyzer Range | 0 - 25 ppm | Bias voltage supply | -306 -307 |
| Calculated slope | 0.997462 | Sample pressure | 8.6 8.6 |
| Calculated intercept | -0.044966 | Fuel pressure | 23.0 23.0 |
| Analyzer Background | 1.72 | Air pressure | 34.9 34.9 |
| Analyzer Coefficient | 3.618 | Flame temperature | 155.9 156.3 |

THC Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 4999 | 0.0 | 0.00 | -0.09 | ---- |
| as found span | 4930 | 79.8 | 16.84 | 16.63 | 1.013 |
| calibrator zero | 4999 | 0.0 | 0.00 | 0.02 | ---- |
| high point | 4929 | 79.8 | 16.85 | 16.86 | 0.999 |
| second point | 4972 | 39.9 | 8.42 | 8.51 | 0.989 |
| third point | 4991 | 20.1 | 4.24 | 4.36 | 0.973 |
| as left zero | 4999 | 0.0 | 0.00 | 0.10 | ---- |
| as left span | 4930 | 79.8 | 16.84 | 16.87 | 0.998 |
| Average Correction Factor | | | | | 0.987 |
| Corrected As found | 16.73 | Previous response | 16.93 | *% change | 1.2% |

* = > +/-5% change initiates investigation

Notes:

Changed inlet filter. Adjusted the zero and the span.

Calibration Performed By: Jayme Marcoux



Wood Buffalo Environmental Association

THC Calibration Summary

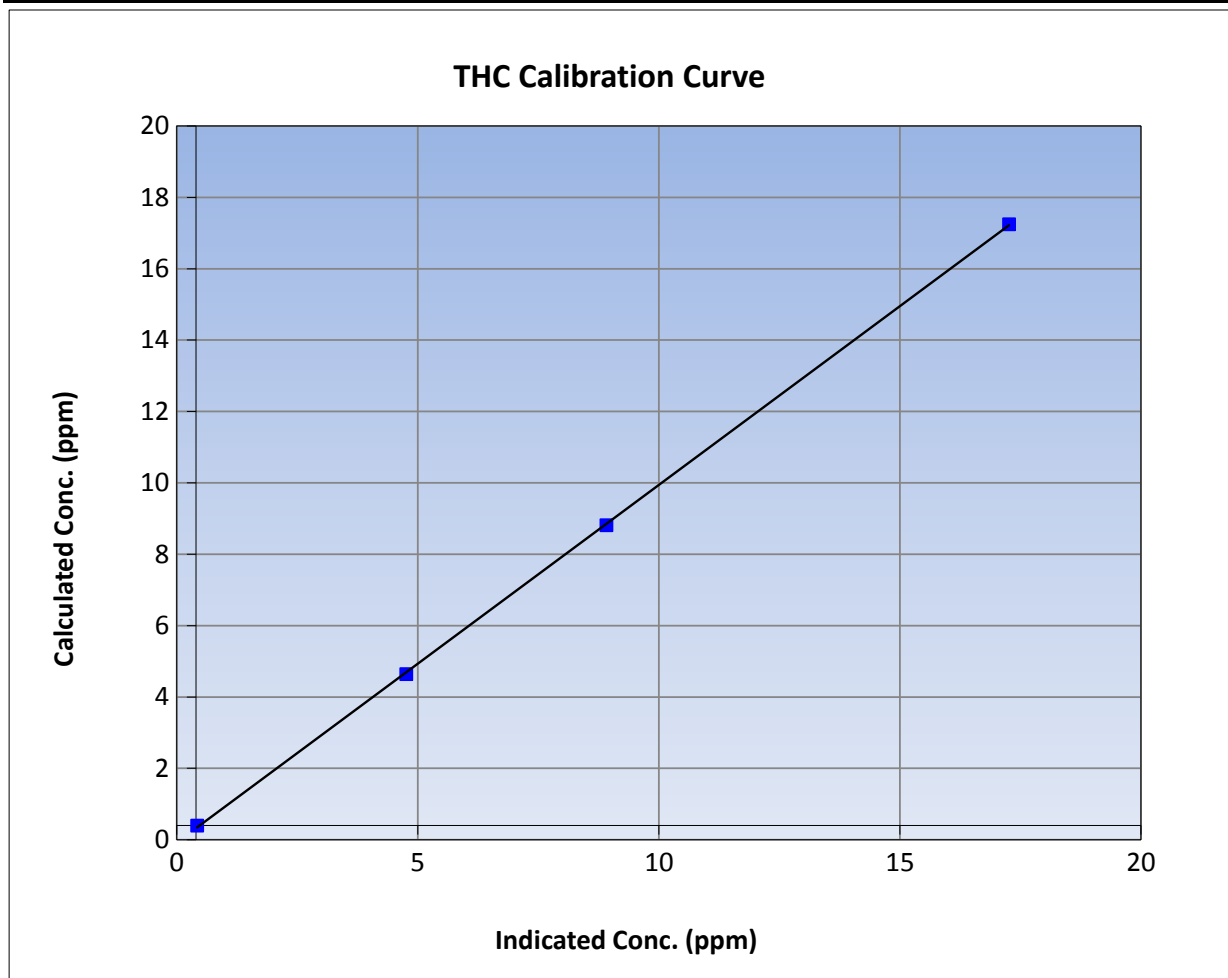
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 16, 2017 | Previous Calibration | July 20, 2017 |
| Station Name | Firebag | Station Number | AMS 19 |
| Start Time (MST) | 9:29 | End Time (MST) | 13:41 |
| Analyzer make | Thermo 51i-LT | Analyzer serial # | 1336160089 |

Calibration Data

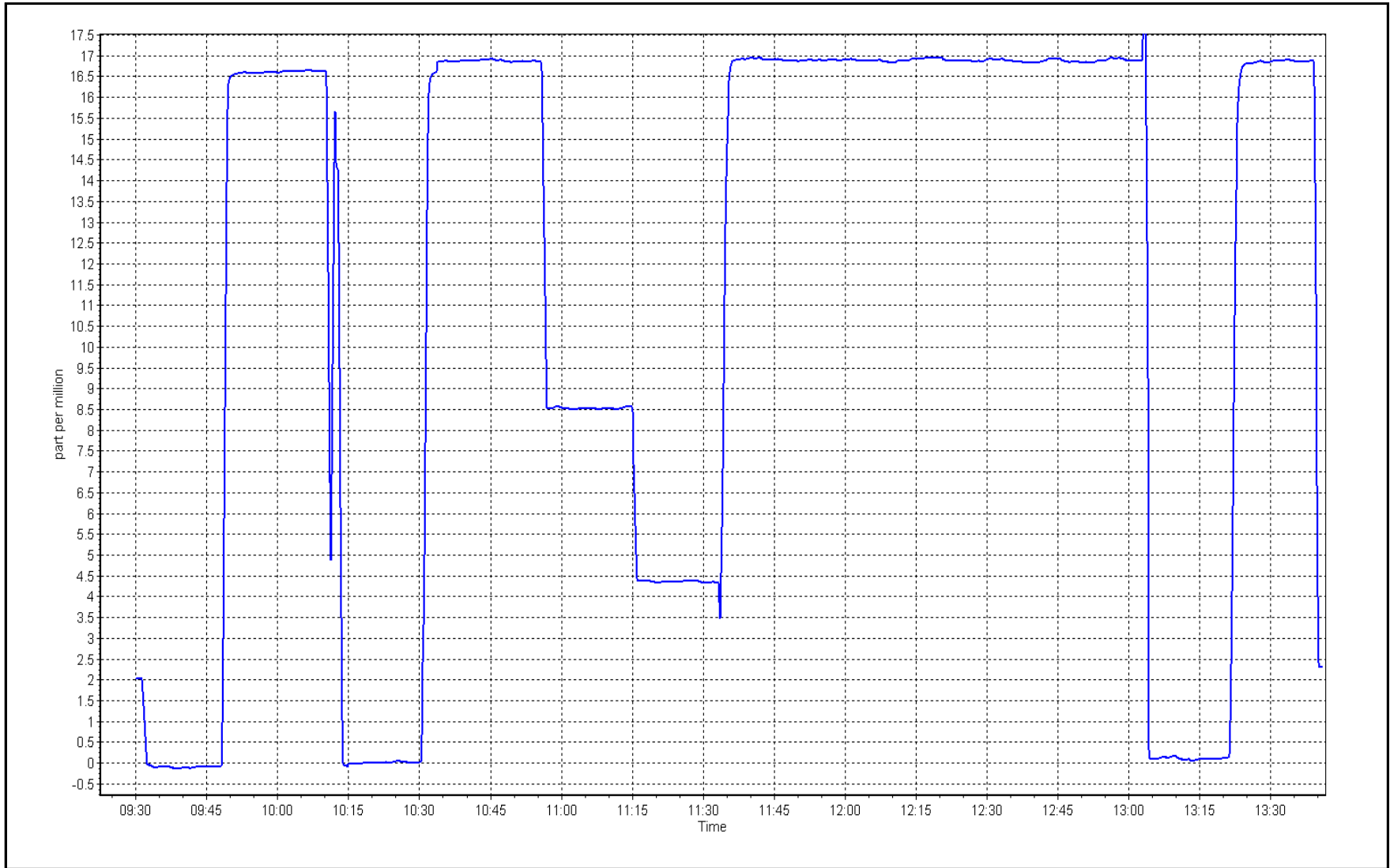
| Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (lc) | Correction factor (Cc/lc) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | 0.999952 | ≥0.995 |
| 16.8 | 16.9 | 0.9992 | | | |
| 8.4 | 8.5 | 0.9888 | Slope | 1.001882 | 0.90 - 1.10 |
| 4.2 | 4.4 | 0.9731 | | | |
| | | | Intercept | -0.076100 | +/-1.5 |



THC Calibration Plot

Date: August 16, 2017

Location: Firebag





Wood Buffalo Environmental Association

NO_x - NO - NO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|---------------|
| Station Name: | Firebag | Station number: | AMS 19 |
| Calibration Date: | August 16, 2017 | Last Cal Date: | July 20, 2017 |
| Start time (MST): | 9:29 | End time (MST): | 13:42 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|-------------------|-----------------|---------------------|------------------|
| NO Gas Cylinder # | EY0000652 | Cal Gas Expiry Date | November 4, 2019 |
| NOX Cal Gas Conc. | <u>50.2</u> ppb | NO Cal Gas Conc. | <u>50.2</u> ppb |
| Calibrator Model | API T700 | Serial Number | 996 |
| ZAG make/model | API T701H | Serial Number | 201 |

Analyzer Information

| | | | | |
|-----------------|--------------|--------------------|---------------------|---------------|
| Analyzer make: | Thermo 42i | Analyzer serial #: | 1410661309 | |
| | <u>Start</u> | <u>Finish</u> | <u>Start</u> | <u>Finish</u> |
| NO coefficient | 0.934 | 0.934 | NOX Range (ppb) | 0 - 1000 ppb |
| NOX coefficient | 1.000 | 1.000 | PMT Temperature | -3.1 -2.7 |
| NO2 coefficient | 1.000 | 1.000 | Reaction cell Press | 163.9 162.3 |
| NO bkgrnd | 4.2 | 4.2 | Sample Flow | 0.623 0.611 |
| NOX bkgrnd | 4.2 | 4.2 | PMT Voltage | -780.3 -780.3 |

Calibration Statistics

| | | |
|----------------------------|--------------|---------------|
| | <u>Start</u> | <u>Finish</u> |
| NO _x Cal Slope | 0.997803 | 1.001409 |
| NO _x Cal Offset | -2.107609 | -1.979128 |
| NO Cal Slope | 0.998650 | 1.002005 |
| NO Cal Offset | -2.306888 | -2.038481 |
| NO ₂ Cal Slope | 0.994256 | 0.998299 |
| NO ₂ Cal Offset | -0.980414 | -0.135941 |



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Version-03-2017

Dilution Calibration Data

| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|----------------------------------|---------------------------|-----------------------------|---|--|---|--|---------------------------------------|--|---|--|
| as found zero | 4999 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | -0.2 | 0.1 | ---- | ---- |
| as found span | 4930 | 79.8 | 799.6 | 799.6 | 0.0 | 799.4 | 798.8 | 0.7 | 1.0003 | 1.0010 |
| calibrator zero | 4999 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | -0.2 | 0.1 | ---- | ---- |
| high point | 4929 | 79.8 | 799.8 | 799.8 | 0.0 | 799.4 | 798.8 | 0.7 | 1.0005 | 1.0012 |
| second point | 4971 | 39.9 | 399.7 | 399.7 | 0.0 | 402.7 | 402.9 | -0.2 | 0.9926 | 0.9921 |
| third point | 4991 | 20.1 | 201.4 | 201.4 | 0.0 | 204.8 | 204.7 | 0.0 | 0.9832 | 0.9837 |
| as left zero | 4999 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | ---- | ---- |
| as left span | 4929 | 79.8 | 799.8 | 376.7 | 423.1 | 786.4 | 367.8 | 418.6 | 1.0170 | 1.0242 |
| Average Correction Factor | | | | | | | | | 0.9921 | 0.9923 |

| | | | | | |
|--|-----------------------------|----------------|--|-----------------|------------------------|
| Corrected As found | NO _x = 799.5 ppb | NO = 799.0 ppb | | *Percent Change | NO _x = 0.5% |
| Previous Response | NO _x = 803.5 ppb | NO = 803.0 ppb | | *Percent Change | NO = 0.5% |
| <i>* = > +/-5% change initiates investigation</i> | | | | | |

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO drop conc (ppb) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | Converter Efficiency <i>Limit = 96-104%</i> |
|----------------------------------|------------------------------|---|--|---------------------------------------|--|---|--|---|--|
| 1st NO ref point | | 0.0 | 794.7 | 794.2 | 0.5 | 1.0064 | 1.0070 | ---- | ---- |
| 1st NO2 (400 ppb O3) | 376.7 | 417.5 | 794.9 | 376.7 | 418.3 | 1.0061 | ---- | 0.9981 | 100.2% |
| 2nd NO2 (200 ppb O3) | 583.2 | 211.0 | 794.9 | 583.2 | 211.6 | 1.0061 | ---- | 0.9972 | 100.3% |
| 3rd NO2 (100 ppb O3) | 685.8 | 108.4 | 794.5 | 685.8 | 108.7 | 1.0067 | ---- | 0.9972 | 100.3% |
| 2nd NO ref point | ---- | 0.0 | 795.0 | 794.2 | 0.8 | 1.0060 | 1.0070 | ---- | ---- |
| Average Correction Factor | | | | | | 1.0062 | 1.0070 | 0.9975 | 100.3% |

Notes: Changed inlet filter after asfound. No adjustments made.

Calibration Performed By: Jayme Marcoux



Wood Buffalo Environmental Association

NO_x Calibration Summary

Version-03-2017

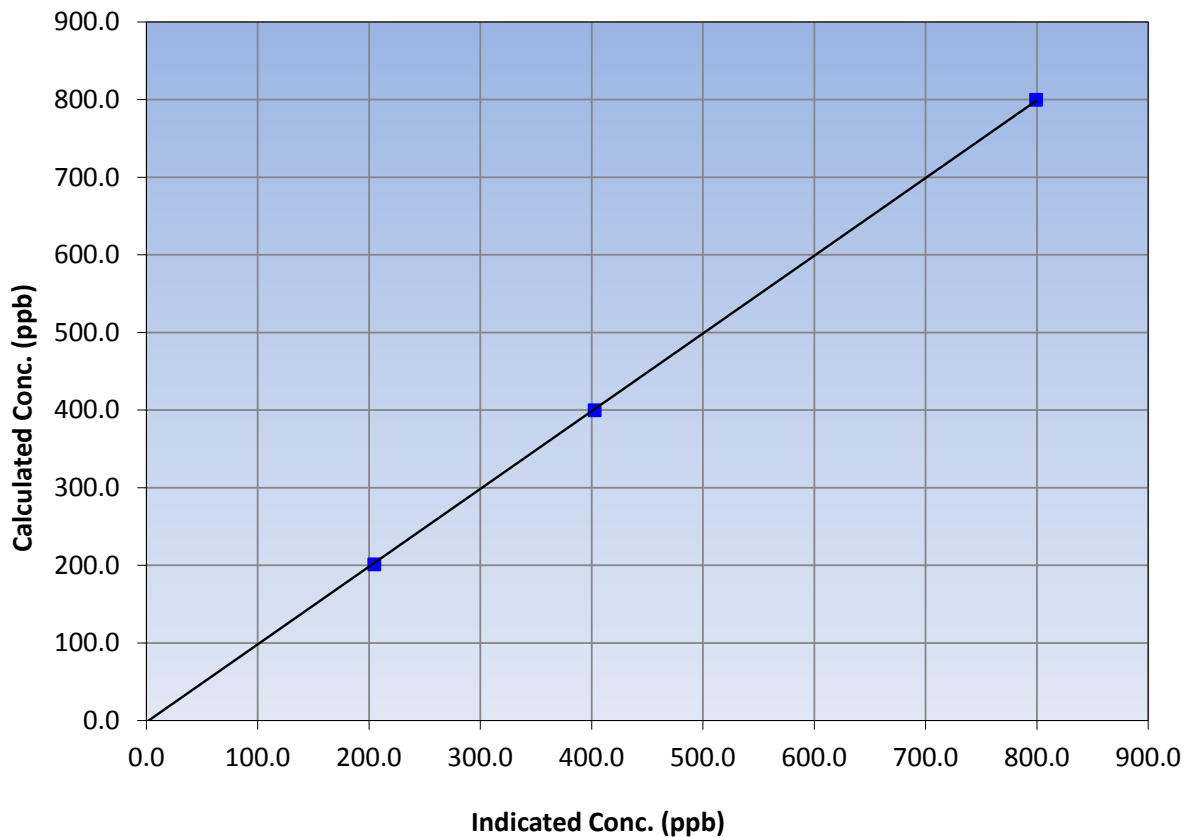
Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 16, 2017 | Previous Calibration | July 20, 2017 |
| Station Name | Firebag | Station Number | AMS 19 |
| Start Time (MST) | 9:29 | End Time (MST) | 13:42 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1410661309 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | -0.1 | ---- | Correlation Coefficient | ≥0.995 | |
| 799.8 | 799.4 | 1.0005 | | | |
| 399.7 | 402.7 | 0.9926 | | | |
| 201.4 | 204.8 | 0.9832 | | | |
| | | | Slope | 1.001409 | 0.90 - 1.10 |
| | | | Intercept | -1.979128 | +/-20 |

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

Version-03-2017

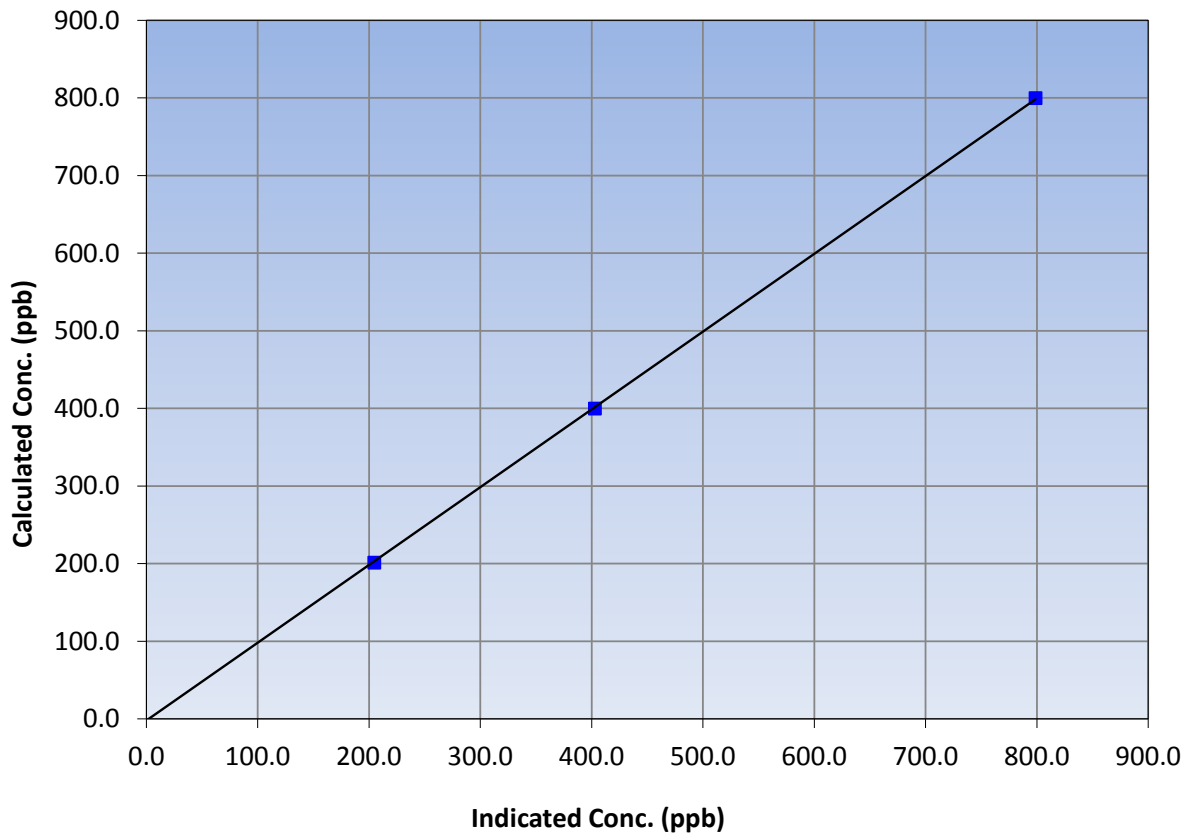
Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 16, 2017 | Previous Calibration | July 20, 2017 |
| Station Name | Firebag | Station Number | AMS 19 |
| Start Time (MST) | 9:29 | End Time (MST) | 13:42 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1410661309 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | -0.2 | ---- | Correlation Coefficient | ≥0.995 | |
| 799.8 | 798.8 | 1.0012 | | | |
| 399.7 | 402.9 | 0.9921 | | | |
| 201.4 | 204.7 | 0.9837 | | | |
| | | | Slope | 1.002005 | 0.90 - 1.10 |
| | | | Intercept | -2.038481 | +/-20 |

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

Version-03-2017

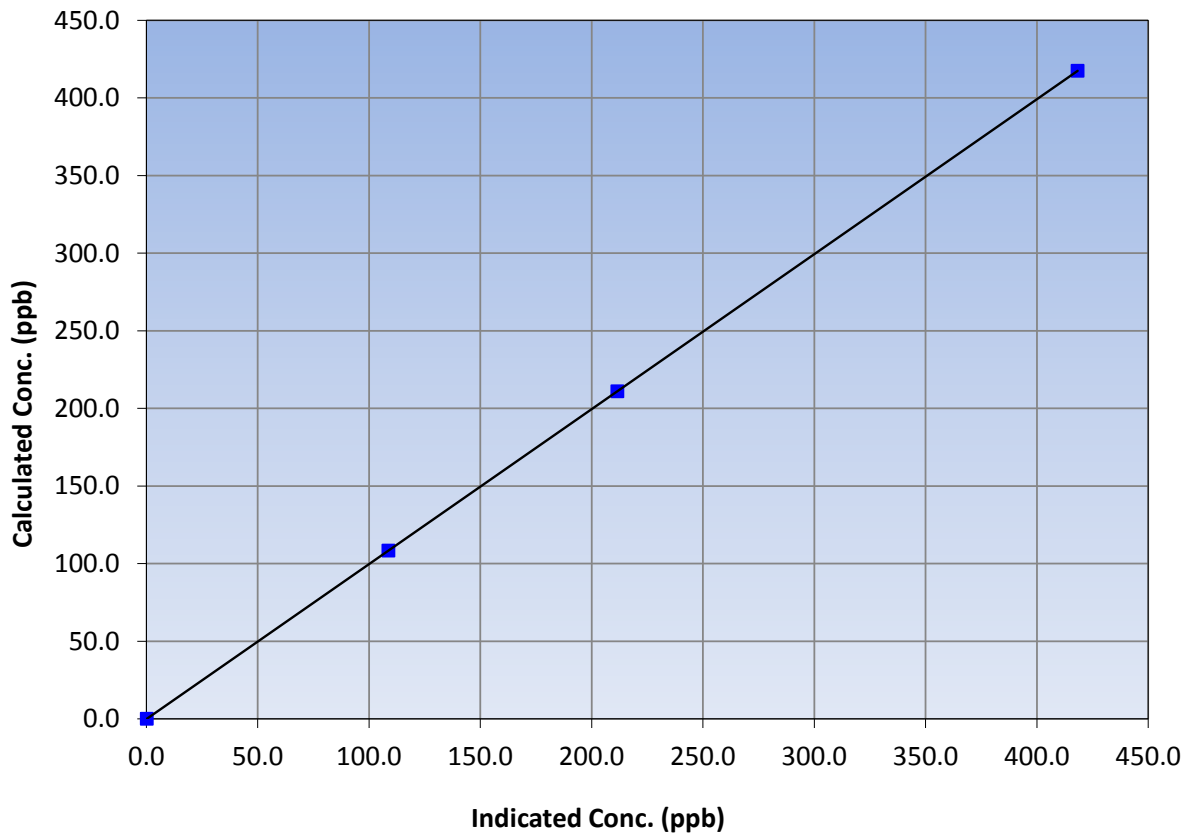
Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 16, 2017 | Previous Calibration | July 20, 2017 |
| Station Name | Firebag | Station Number | AMS 19 |
| Start Time (MST) | 9:29 | End Time (MST) | 13:42 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1410661309 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.1 | ---- | Correlation Coefficient | ≥0.995 | |
| 417.5 | 418.3 | 0.9981 | | | |
| 211.0 | 211.6 | 0.9972 | | | |
| 108.4 | 108.7 | 0.9972 | | | |
| | | | Slope | 0.998299 | 0.90 - 1.10 |
| | | | Intercept | -0.135941 | +/-20 |

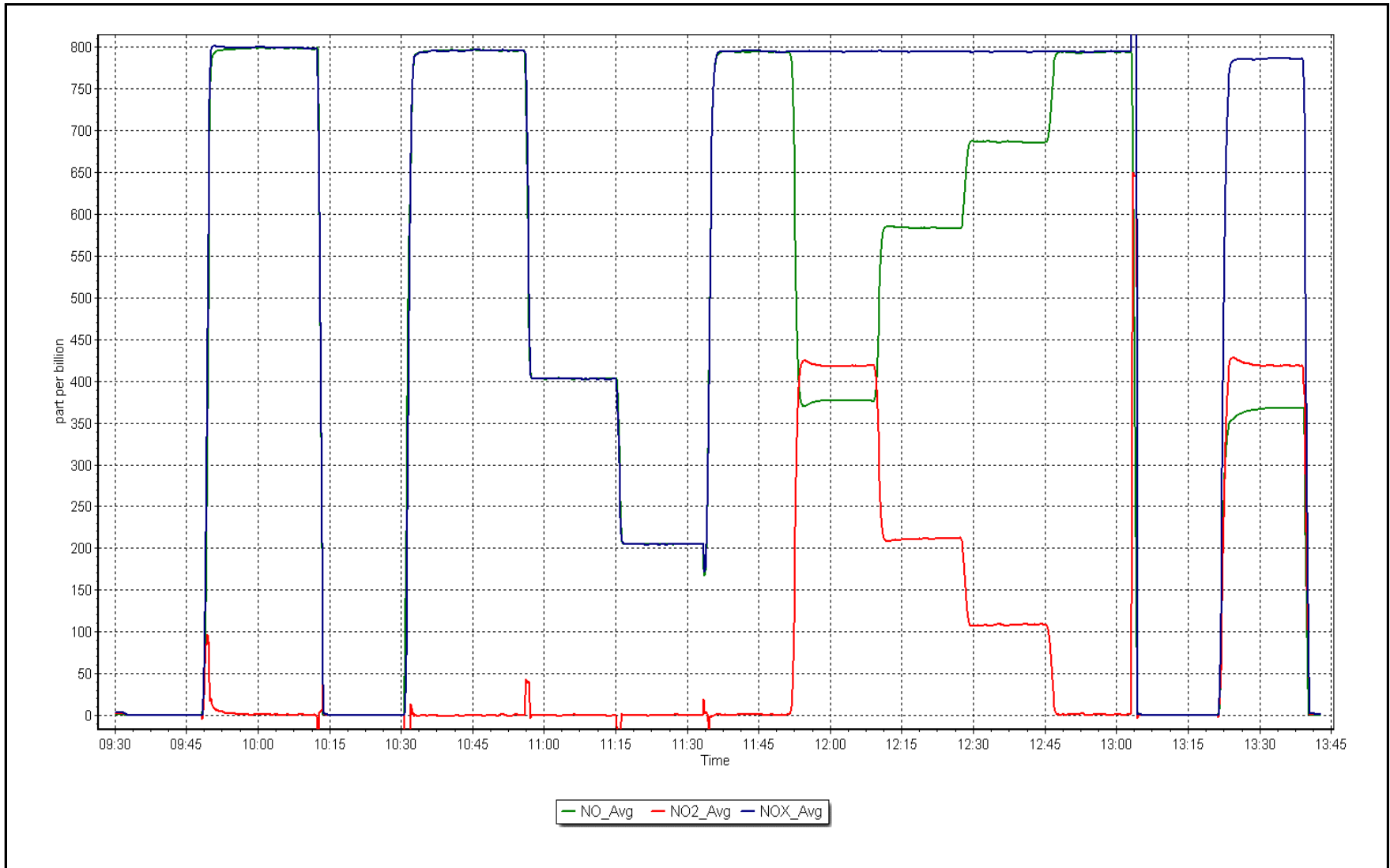
NO₂ Calibration Curve



NO_x Calibration Plot

Date: August 16, 2017

Location: Firebag





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 20
MACKAY RIVER
AUGUST 2017**

Operations, Data Collection,
QA/QC, Data Validation and Reporting by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

September 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MACKAY RIVER (AMS 20)
AUGUST 2017

MONTHLY SUMMARY for
AMD SECTION III.B.1(c)

| Parameter | Hours of Data | Hours of Calibration | Hours without Data | Operational Time | Maximum 1-Hour Value | 1-Hour Exceedances | Maximum 24-Hour Value | 24-Hour Exceedances |
|-----------------------------------|------------------|-------------------------|-----------------------|---------------------|-------------------------|-----------------------|--------------------------|------------------------|
| SO2 (ppb) Average | 707 | 35 | 37 | 99.73 | 16 | 0 | 3 | 0 |
| H2S (ppb) Average | 701 | 34 | 43 | 98.79 | 3 | 0 | 0 | 0 |
| THC (ppm) Average | 706 | 35 | 38 | 99.6 | 2.6 | - | 2.3 | - |
| NO2 (ppb) Average | 707 | 35 | 37 | 99.73 | 11 | 0 | 4 | - |
| NO (ppb) Average | 707 | 35 | 37 | 99.73 | 6 | - | 1 | - |
| NOX (ppb) Average | 707 | 35 | 37 | 99.73 | 17 | - | 5 | - |
| Temperature 2 m (C) Average | 744 | 0 | 0 | 100 | 29.8 | - | 22.8 | - |
| Relative Humidity (%) Average | 744 | 0 | 0 | 100 | 99 | - | 93 | - |
| Precipitation (mm) Total | 744 | 0 | 0 | 100 | 4.3 | - | 12.4 | - |
| Wind Speed 10 m (km/h) Average | 744 | 0 | 0 | 100 | 18 | - | 11 | - |
| Wind Direction 10 m (deg) Average | 744 | 0 | 0 | 100 | - | - | - | - |

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MACKAY RIVER (AMS 20)
AUGUST 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

| Parameter | Number | Mean | StnDev | Total | Percentile | | | | | | |
|-----------------------------------|--------|-------|--------|-------|------------|-----|------|--------|------|------|------|
| | | | | | Min | P10 | Q1 | Median | Q3 | P90 | Max |
| SO2 (ppb) Average | 707 | 0.3 | 1 | - | 0 | 0 | 0 | 0 | 0 | 1 | 16 |
| H2S (ppb) Average | 701 | 0.2 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| THC (ppm) Average | 706 | 2.1 | 0.1 | - | 1.9 | 1.9 | 2 | 2.1 | 2.2 | 2.3 | 2.6 |
| NO2 (ppb) Average | 707 | 0.7 | 1 | - | 0 | 0 | 0 | 0 | 1 | 1 | 11 |
| NO (ppb) Average | 707 | 0.1 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| NOX (ppb) Average | 707 | 0.8 | 1 | - | 0 | 0 | 0 | 0 | 1 | 1 | 17 |
| Temperature 2 m (C) Average | 744 | 16.21 | 5.6 | - | 0.1 | 9.6 | 12.1 | 15.7 | 20.6 | 23.7 | 29.8 |
| Relative Humidity (%) Average | 744 | 64.6 | 21 | - | 25 | 34 | 47 | 67 | 82 | 93 | 99 |
| Precipitation (mm) Total | 744 | - | - | 27.39 | - | - | - | - | - | - | - |
| Wind Speed 10 m (km/h) Average | 744 | 6.7 | 3 | - | 0 | 2 | 4 | 6 | 9 | 11 | 18 |
| Wind Direction 10 m (deg) Average | 744 | - | - | - | - | - | - | - | - | - | - |

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -MACKAY RIVER (AMS 20)
AUGUST 2017

OPERATIONAL NOTES

| Parameter | Period Start | Period End | Duration (Hours) | Notes |
|-------------------|-------------------|-------------------|---------------------|---|
| NO2, NO, NOX, THC | 11 Aug 2017 10:00 | 11 Aug 2017 11:00 | 2 | Station power failure |
| SO2 | 11 Aug 2017 10:00 | 11 Aug 2017 10:00 | 1 | Station power failure |
| SO2 | 12 Aug 2017 09:00 | 12 Aug 2017 09:00 | 1 | Maintenance - verify daily QA response |
| H2S | 09 Aug 2017 16:00 | 09 Aug 2017 17:00 | 2 | Unstable operation - excessive baseline drift |
| H2S | 11 Aug 2017 10:00 | 11 Aug 2017 12:00 | 3 | Station power failure |
| H2S | 23 Aug 2017 11:00 | 23 Aug 2017 11:00 | 1 | Maintenance - manifold cleaning |
| H2S | 23 Aug 2017 15:00 | 23 Aug 2017 15:00 | 1 | Unstable operation - excessive baseline drift |
| H2S | 27 Aug 2017 20:00 | 27 Aug 2017 21:00 | 2 | Unstable operation - excessive baseline drift |



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

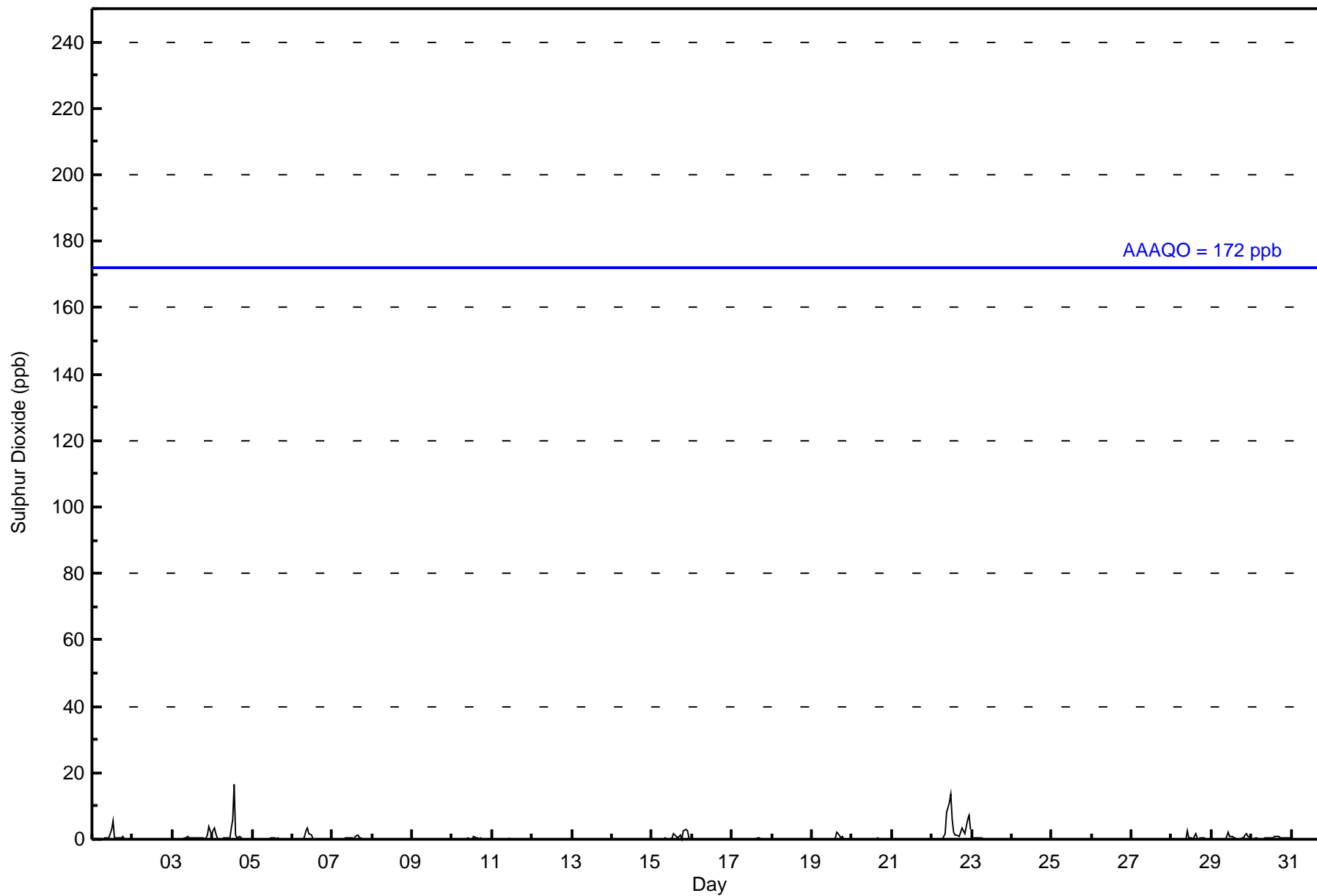
Mackay River - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|---|---|---|---|---|---|---|---|--|----|----|----|----|----|----|----|----|----|--------------------------------|----|----|----|-----|---------------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|-----------------|
| Maximum Value: 16 ppb on Aug 4 14:00 | | | | | | | | | | Maximum Daily Average: 3.2 ppb on Aug 22 | | | | | | | | | | Hours of Data: 707 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum Value: 0 ppb on Aug 2 07:00 | | | | | | | | | | Minimum Daily Average: 0.0 ppb on Aug 14 | | | | | | | | | | Hours of Missing Data: 37 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 0.8 ppb at hour 12 | | | | | | | | | | Minimum Diurnal Average: 0.1 ppb at hour 6 | | | | | | | | | | Hours of Calibration: 35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 0.3 ppb | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 6 | | | | | | | | | | Percent Operational Time: 99.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 5 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 5 | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 1 | 0.5 | 4 | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 2 | 3 | 2 | 1 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 3 | 6 | 16 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.7 | 16 | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 3 | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | PF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 2 | 3 | 2 | 0 | 0 | 0 | 0.6 | 3 | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0.3 | 2 | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 1 | 2 | 8 | 11 | 14 | 6 | 2 | 1 | 1 | 1 | 2 | 4 | 2 | 2 | 6 | 7 | 3 | 3.2 | 14 | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | C | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 2 | | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 0.5 | 2 | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.3 | 0.6 | 0.6 | 0.8 | 0.7 | 0.8 | 0.3 | 0.3 | 0.3 | 0.2 | 0.3 | 0.3 | 0.3 | 0.4 | 0.5 | 0.2 | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | | | | | | | 2 | 3 | 2 | 1 | 0 | 0 | 0 | 1 | 2 | 8 | 11 | 14 | 6 | 16 | 1 | 2 | 2 | 2 | 2 | 4 | 2 | 3 | 6 | 7 | 3 | Diurnal Maximum |
| Z - zerospan C - Calibration M - Maintenance PF - Power Failure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Mackay River - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Mackay River - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 10 | 704 | 99.58 | 99.58 |
| 11 - 20 | 3 | 0.42 | 100.00 |
| 21 - 60 | 0 | 0.00 | 100.00 |
| 61 - 110 | 0 | 0.00 | 100.00 |
| 111 - 172 | 0 | 0.00 | 100.00 |
| > 172 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Mackay River - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 10 | 13 | 23 | 14 | 6 | 6 | 32 | 74 | 77 | 85 | 67 | 82 | 105 | 63 | 32 | 15 | 10 | 704 |
| 11 - 20 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 21 - 60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 61 - 110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 111 - 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 14 | 23 | 15 | 6 | 7 | 32 | 74 | 77 | 85 | 67 | 82 | 105 | 63 | 32 | 15 | 10 | 707 |

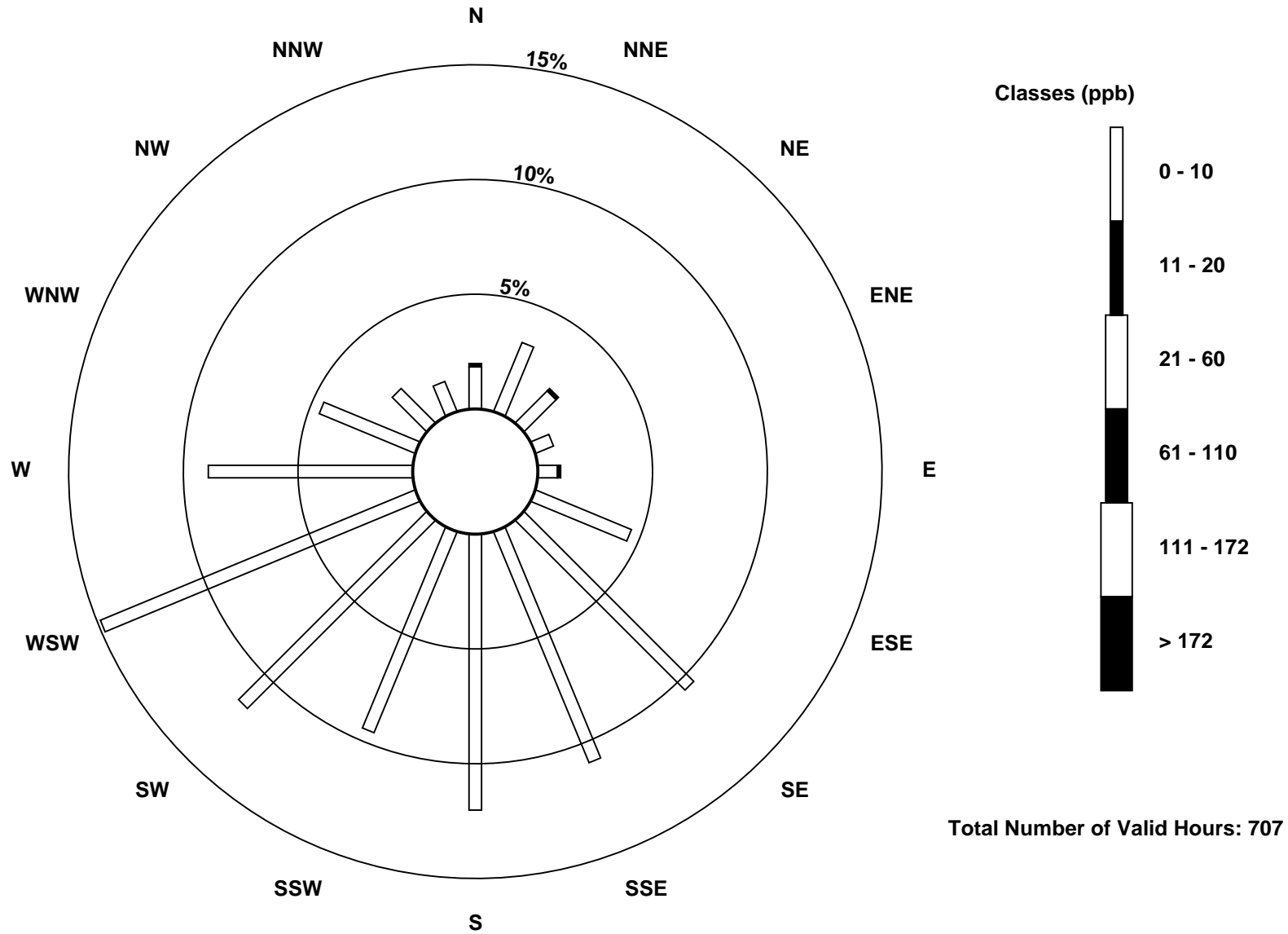
Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

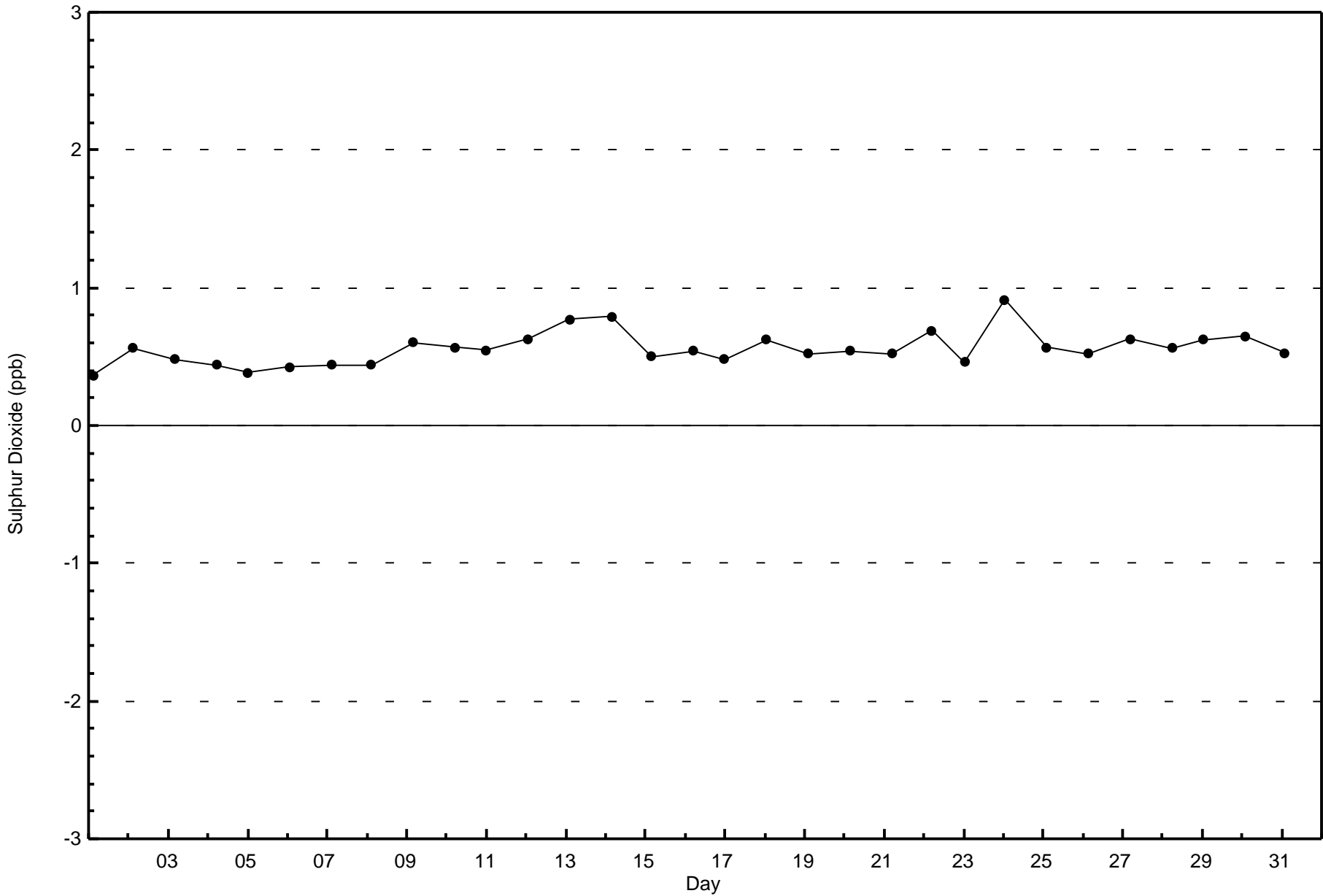
Sulphur Dioxide (SO₂) - ppb
Mackay River (AMS 20)

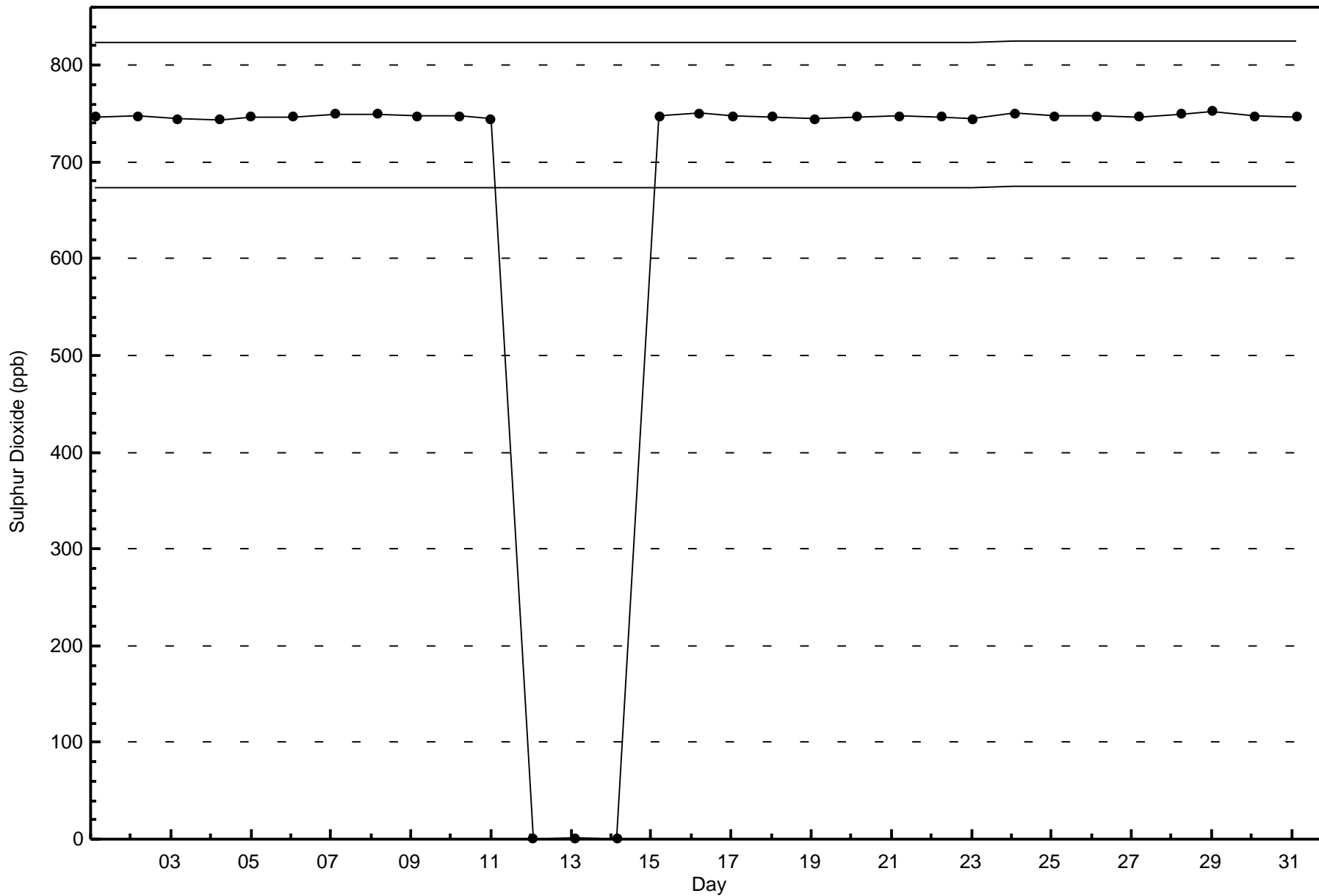




Wood Buffalo Environmental Association
Zero Responses

Sulphur Dioxide (SO₂) - ppb
Mackay River - August 2017







Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H₂S) - ppb

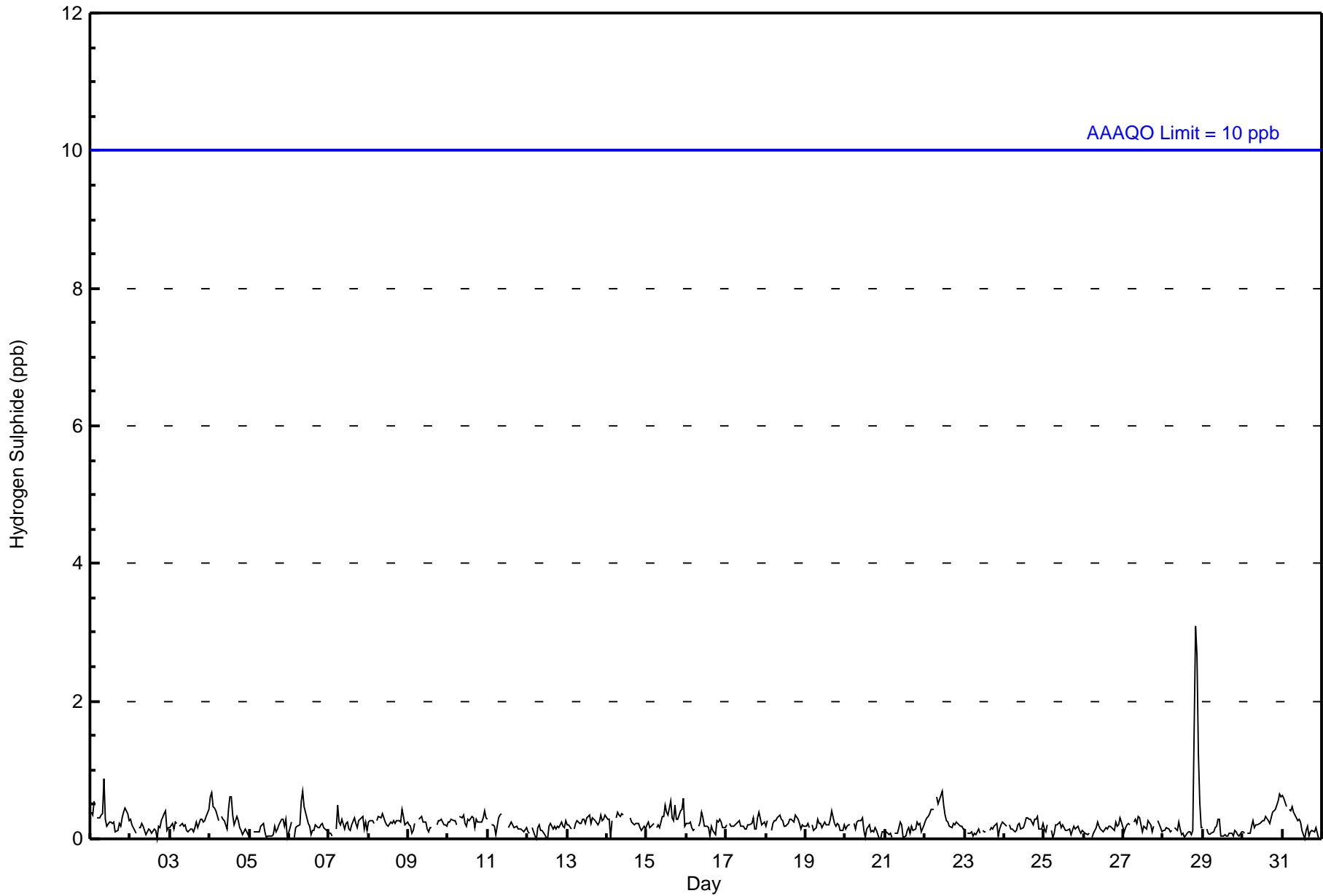
Mackay River - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|---|---|---|---|---|---|---|---|--|----|----|----|----|----|----|----|----|----|--------------------------------|----|----|----|-----|---------------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|--|
| Maximum Value: 3 ppb on Aug 28 20:00 | | | | | | | | | | Maximum Daily Average: 0.4 ppb on Aug 28 | | | | | | | | | | Hours of Data: 701 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum Value: 0 ppb on Aug 2 17:00 | | | | | | | | | | Minimum Daily Average: 0.1 ppb on Aug 29 | | | | | | | | | | Hours of Missing Data: 43 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 0.3 ppb at hour 20 | | | | | | | | | | Minimum Diurnal Average: 0.2 ppb at hour 4 | | | | | | | | | | Hours of Calibration: 34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 0.2 ppb | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1 | | | | | | | | | | Percent Operational Time: 98.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 0 | 0 | 1 | Z | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 1 | 1 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | UO | UO | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | PF | PF | PF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | M | 0 | 0 | 0 | UO | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | UO | UO | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 1 | 1 | 0 | 0.4 | 3 | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 1 | 1 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 3 | 3 | 1 | 1 | 1 | Diurnal Maximum | |
| Z - zerospan C - Calibration M - Maintenance UO - Unstable Operation PF - Power Failure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Mackay River - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Mackay River - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2 | 699 | 99.71 | 99.71 |
| 3 - 4 | 2 | 0.29 | 100.00 |
| 5 - 7 | 0 | 0.00 | 100.00 |
| 8 - 11 | 0 | 0.00 | 100.00 |
| > 11 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 701

Total Number of Hours: 744



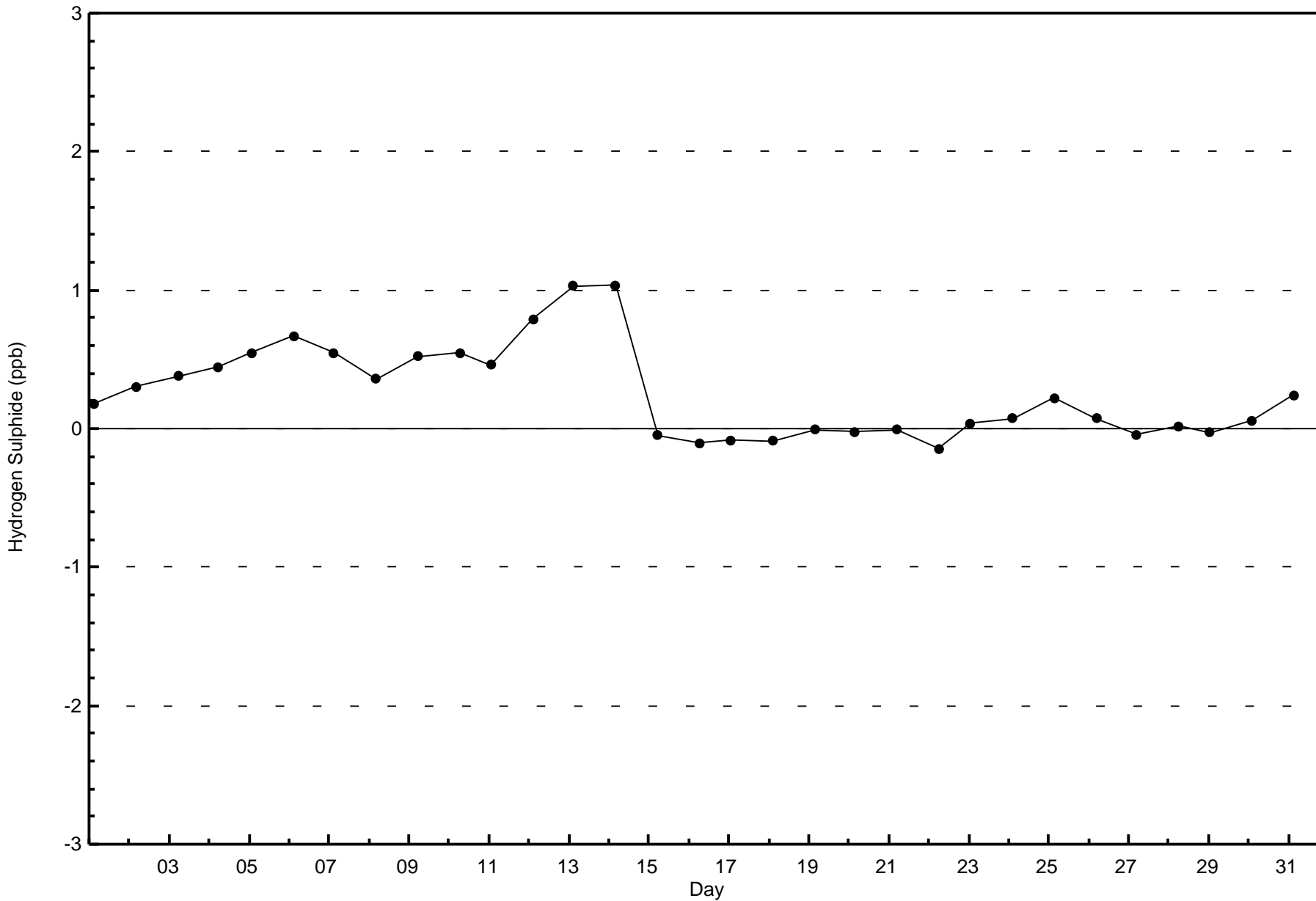
**Wood Buffalo Environmental Association
Frequency Distribution**

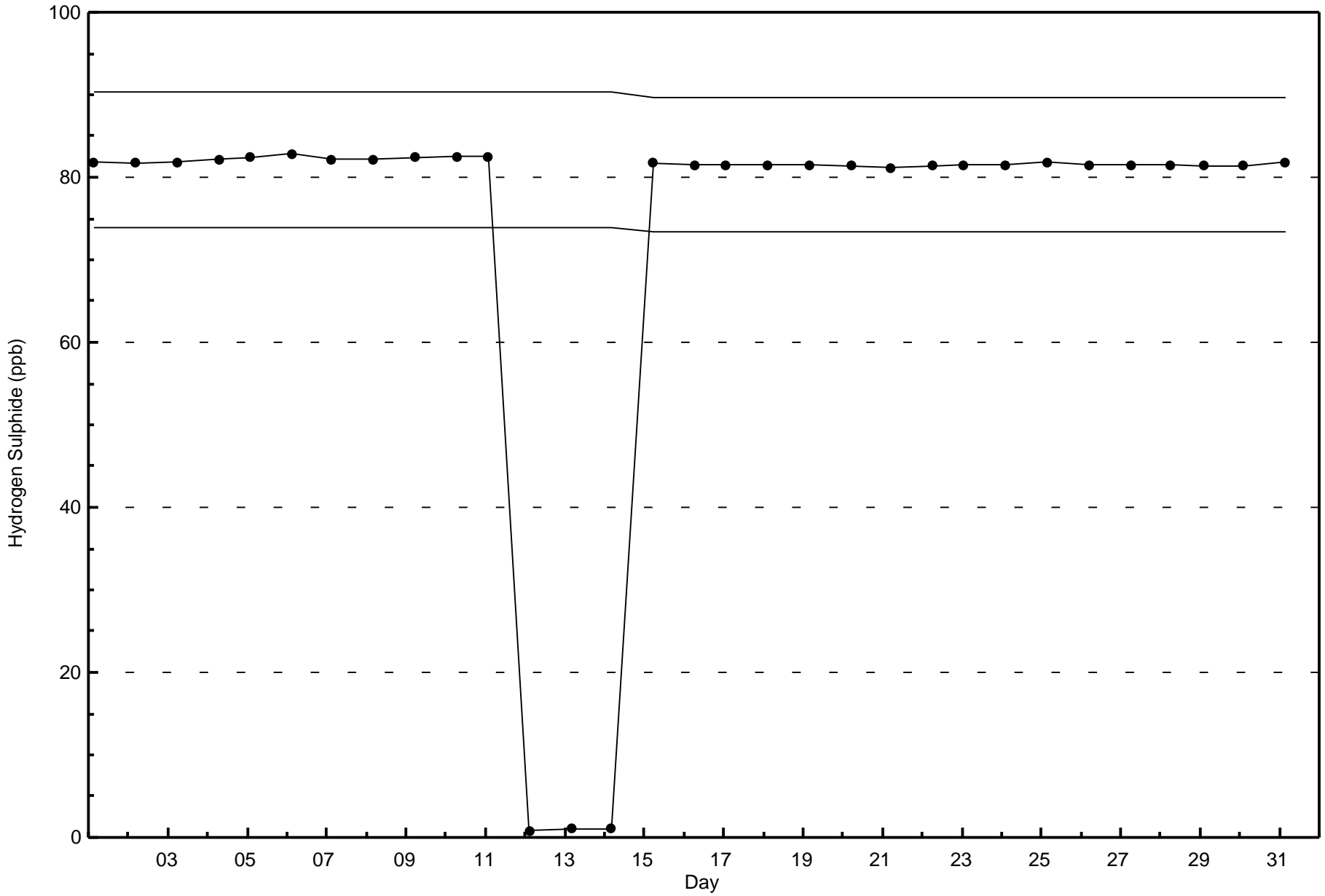
**Hydrogen Sulphide (H₂S) - ppb
Mackay River - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2 | 15 | 23 | 15 | 7 | 7 | 32 | 76 | 73 | 88 | 62 | 81 | 99 | 63 | 32 | 15 | 11 | 699 |
| 3 - 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 |
| 5 - 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 - 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 15 | 23 | 15 | 7 | 7 | 32 | 76 | 74 | 88 | 62 | 81 | 99 | 63 | 33 | 15 | 11 | 701 |

Total Number of Valid Hours: 701

Total Number of Hours: 744







Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

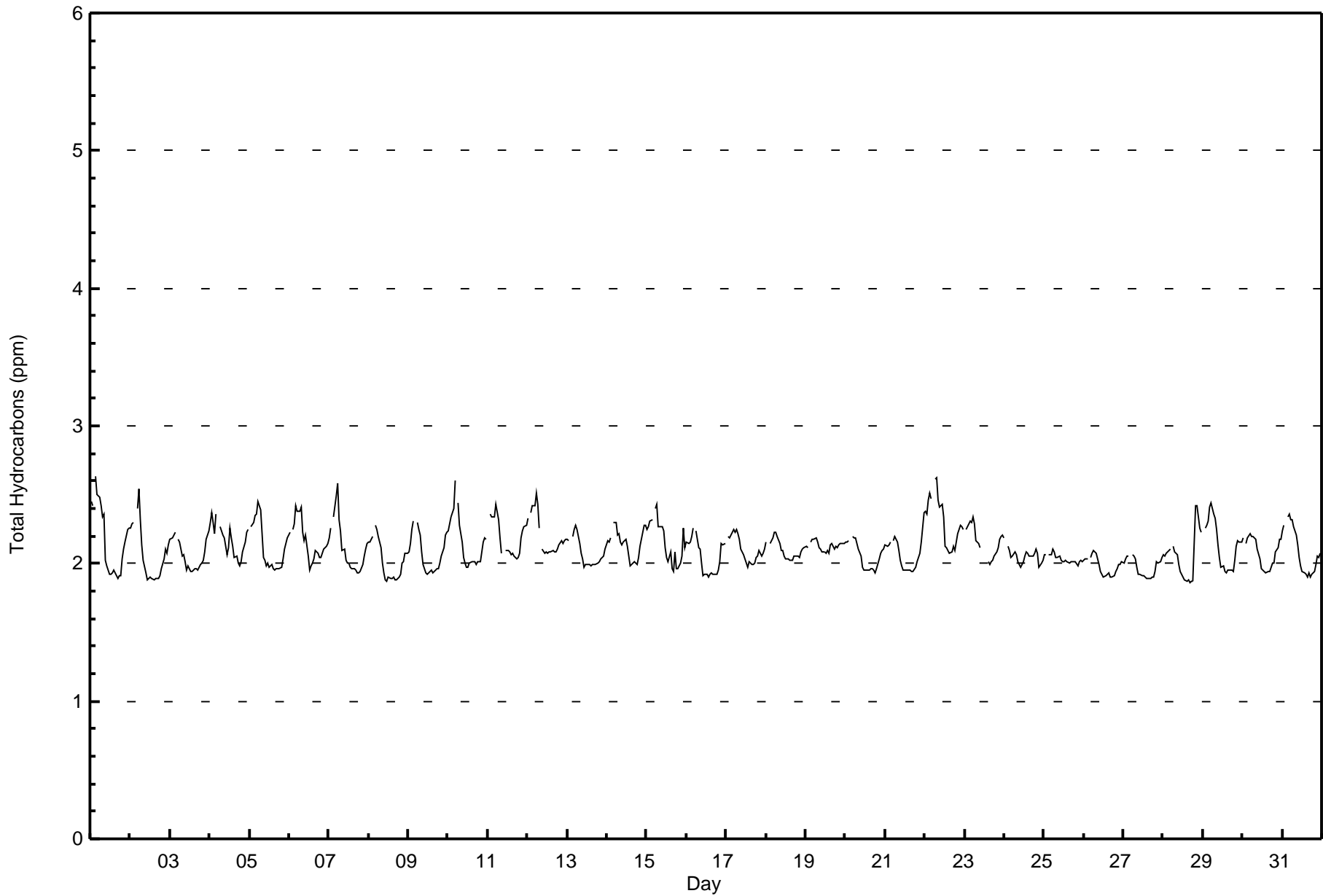
Mackay River - August 2017

| Maximum Value: 2.6 ppm on Aug 1 04:00 Maximum Daily Average: 2.3 ppm on Aug 22 | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 706 Hours of Missing Data: 38 Hours of Calibration: 35 Percent Operational Time: 99.6 | | | | | | |
|--|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|-----|-----|-----|-----------------|---------------|---------------|
| Minimum Value: 1.9 ppm on Aug 28 17:00 Minimum Daily Average: 2.0 ppm on Aug 27 Maximum Diurnal Average: 2.3 ppm at hour 5 Minimum Diurnal Average: 2.0 ppm at hour 16 Monthly Average: 2.10 ppm Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 2.0 Median = 2.1 Q ₃ = 2.2 P ₉₀ = 2.3 P ₉₉ = 2.5 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 2.5 | 2.4 | Z | 2.6 | 2.5 | 2.5 | 2.4 | 2.3 | 2.4 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.1 | 2.2 | 2.2 | 2.3 | 2.2 | 2.6 |
| 2-Aug | 2.3 | 2.3 | Z | Z | 2.4 | 2.5 | 2.3 | 2.1 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.5 |
| 3-Aug | 2.2 | 2.2 | 2.2 | 2.2 | Z | 2.2 | 2.2 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 1.9 | 2.0 | 2.0 | 2.0 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 |
| 4-Aug | 2.3 | 2.4 | 2.3 | 2.2 | 2.4 | Z | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.3 | 2.2 | 2.1 | 2.0 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.2 | 2.2 | 2.3 | 2.4 |
| 5-Aug | Z | 2.3 | 2.3 | 2.3 | 2.4 | 2.5 | 2.4 | 2.4 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.2 | 2.5 |
| 6-Aug | 2.2 | Z | 2.3 | 2.3 | 2.4 | 2.4 | 2.4 | 2.4 | 2.2 | 2.2 | 2.2 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.4 |
| 7-Aug | 2.2 | 2.3 | Z | 2.3 | 2.5 | 2.6 | 2.3 | 2.2 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.6 |
| 8-Aug | 2.2 | 2.2 | 2.2 | Z | 2.3 | 2.2 | 2.2 | 2.1 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.3 |
| 9-Aug | 2.1 | 2.2 | 2.3 | 2.3 | Z | 2.3 | 2.2 | 2.2 | 2.1 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.3 |
| 10-Aug | 2.2 | 2.3 | 2.3 | 2.4 | 2.6 | Z | 2.4 | 2.3 | 2.2 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.6 |
| 11-Aug | Z | 2.4 | 2.3 | 2.3 | 2.3 | 2.4 | 2.3 | 2.2 | 2.1 | PF | PF | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.1 | 2.2 | 2.2 | 2.3 | 2.3 | 2.4 | |
| 12-Aug | 2.3 | Z | 2.4 | 2.4 | 2.4 | 2.5 | 2.4 | 2.3 | M | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.2 | 2.2 | 2.5 | |
| 13-Aug | 2.2 | 2.2 | Z | 2.2 | 2.2 | 2.3 | 2.2 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.3 | |
| 14-Aug | 2.2 | 2.2 | 2.2 | Z | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.2 | 2.2 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.2 | 2.3 | 2.3 | 2.3 |
| 15-Aug | 2.2 | 2.3 | 2.3 | 2.3 | Z | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.1 | 2.0 | 2.0 | 2.1 | 2.0 | 1.9 | 2.1 | 2.0 | 2.0 | 2.0 | 2.1 | 2.3 | 2.1 | 2.4 | |
| 16-Aug | 2.2 | 2.1 | 2.2 | 2.2 | 2.3 | Z | 2.2 | 2.1 | 2.1 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.1 | 2.1 | 2.1 | 2.3 | |
| 17-Aug | Z | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | |
| 18-Aug | 2.2 | Z | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.0 | 2.1 | 2.1 | 2.2 | |
| 19-Aug | 2.1 | 2.1 | Z | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | |
| 20-Aug | 2.2 | 2.2 | 2.2 | Z | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | |
| 21-Aug | 2.1 | 2.1 | 2.1 | 2.2 | Z | 2.2 | 2.2 | 2.2 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 2.0 | 2.0 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.1 | 2.2 | 2.4 | 2.4 | |
| 22-Aug | 2.4 | 2.4 | 2.5 | 2.5 | 2.5 | Z | 2.6 | 2.6 | 2.5 | 2.4 | 2.4 | 2.3 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.3 | 2.3 | 2.6 | |
| 23-Aug | Z | 2.2 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.1 | 2.1 | C | C | C | C | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | |
| 24-Aug | 2.2 | Z | 2.1 | 2.1 | 2.0 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.2 | |
| 25-Aug | 2.1 | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | |
| 26-Aug | 2.0 | 2.0 | 2.0 | Z | 2.0 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | |
| 27-Aug | 2.0 | 2.0 | 2.1 | 2.1 | Z | 2.1 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | |
| 28-Aug | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.4 | 2.4 | 2.3 | 2.3 | 2.4 | |
| 29-Aug | Z | 2.3 | 2.3 | 2.3 | 2.4 | 2.4 | 2.4 | 2.3 | 2.2 | 2.1 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 2.0 | 2.0 | 1.9 | 1.9 | 2.0 | 2.1 | 2.2 | 2.2 | 2.2 | 2.4 | |
| 30-Aug | 2.2 | Z | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | |
| 31-Aug | 2.2 | 2.3 | Z | 2.3 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.1 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.1 | 2.4 | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| Z - zerospan C - Calibration M - Maintenance PF - Power Failure | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Mackay River - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Mackay River - August 2017

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2.0 | 296 | 41.93 | 41.93 |
| 2.1 - 3.0 | 410 | 58.07 | 100.00 |
| 3.1 - 10.0 | 0 | 0.00 | 100.00 |
| > 10.0 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 706

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Mackay River - August 2017

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---|-----------------------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2.0 | 6 | 11 | 5 | 2 | 3 | 8 | 18 | 21 | 21 | 34 | 44 | 50 | 42 | 22 | 6 | 3 | 296 |
| 2.1 - 3.0 | 8 | 12 | 10 | 4 | 4 | 24 | 56 | 56 | 64 | 32 | 38 | 55 | 21 | 10 | 9 | 7 | 410 |
| 3.1 - 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 14 | 23 | 15 | 6 | 7 | 32 | 74 | 77 | 85 | 66 | 82 | 105 | 63 | 32 | 15 | 10 | 706 |

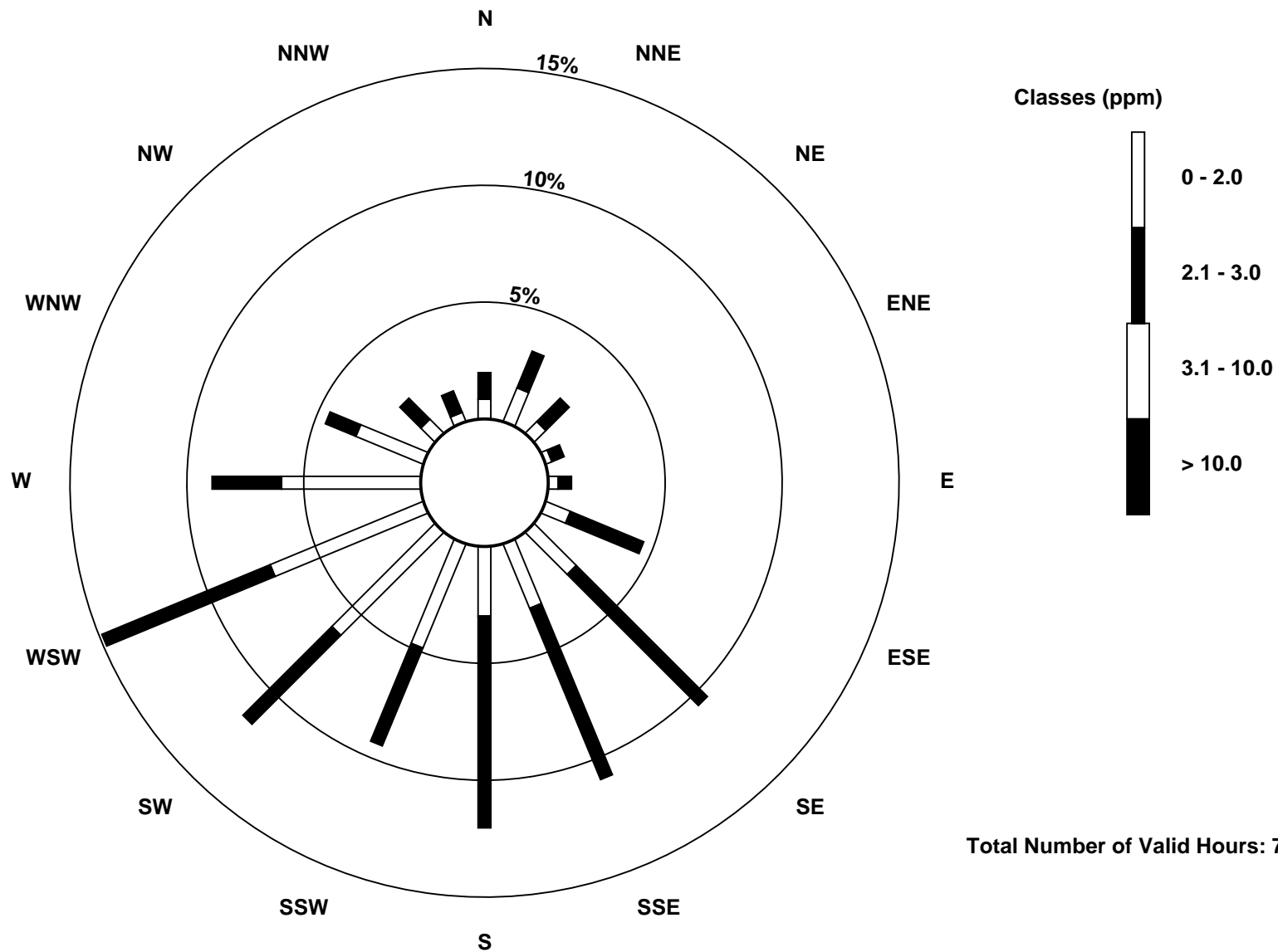
Total Number of Valid Hours: 706

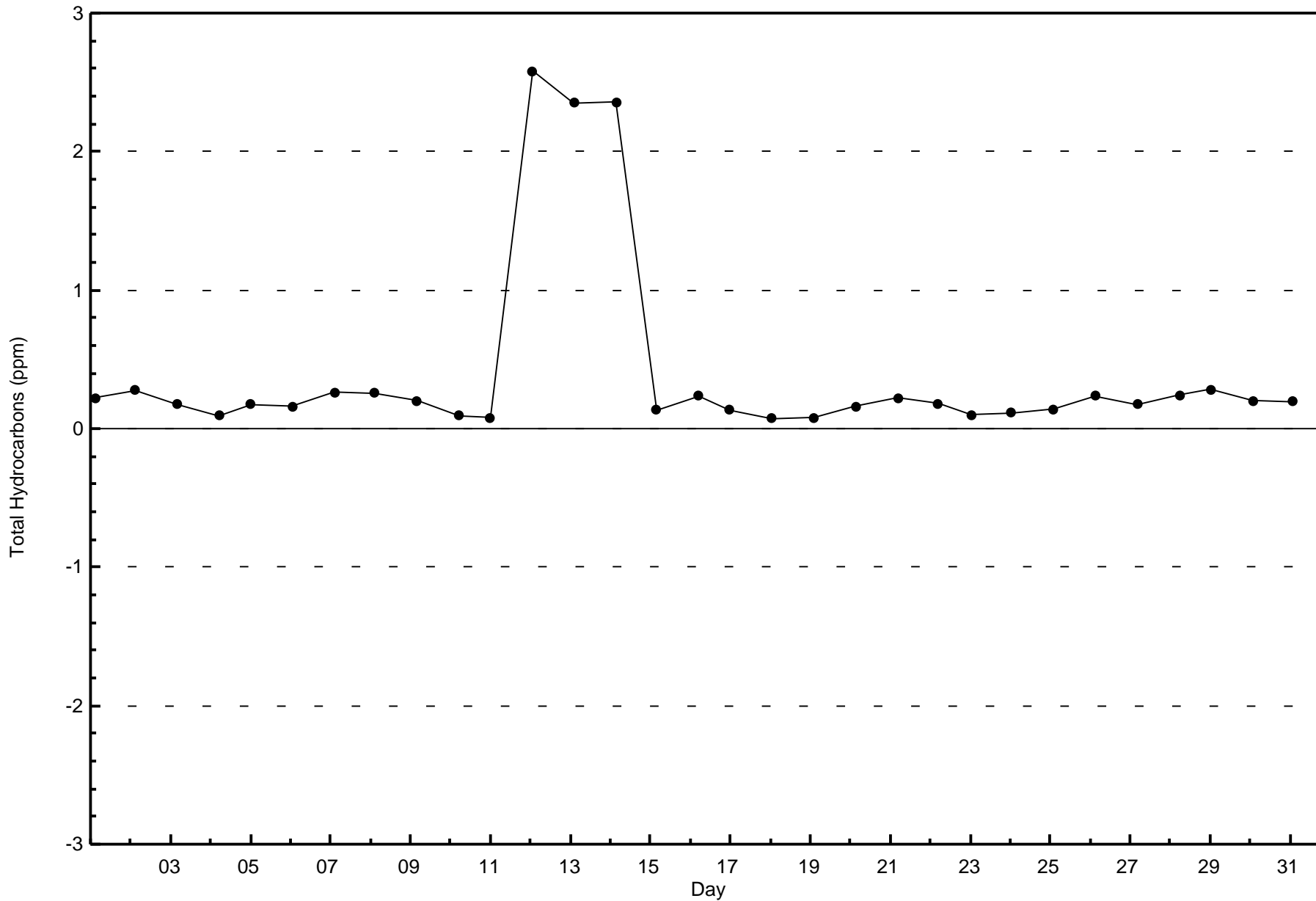
Total Number of Hours: 744

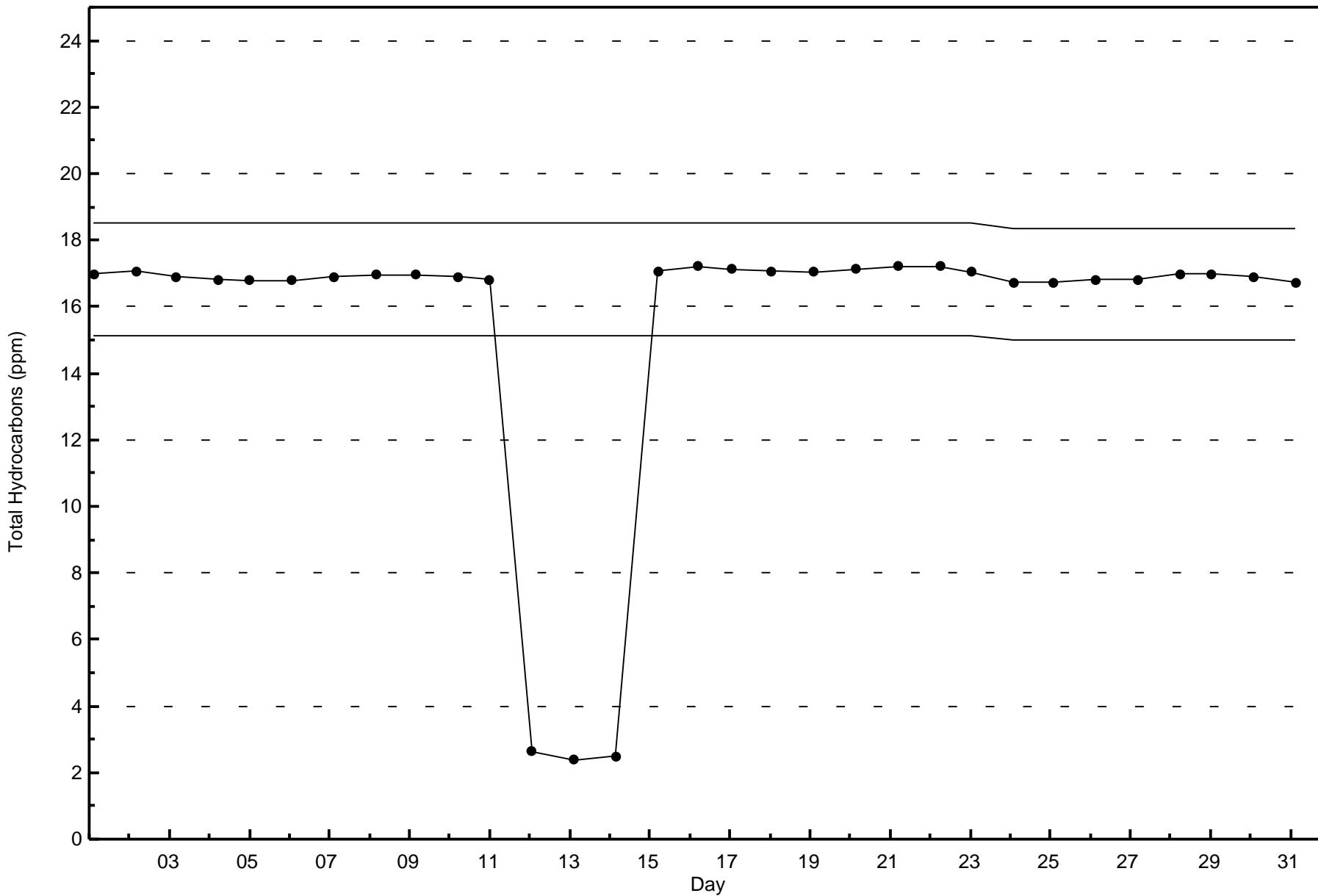


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Total Hydrocarbons (THC) - ppm
Mackay River (AMS 20)









Wood Buffalo Environmental Association
Summary of Hour Averages

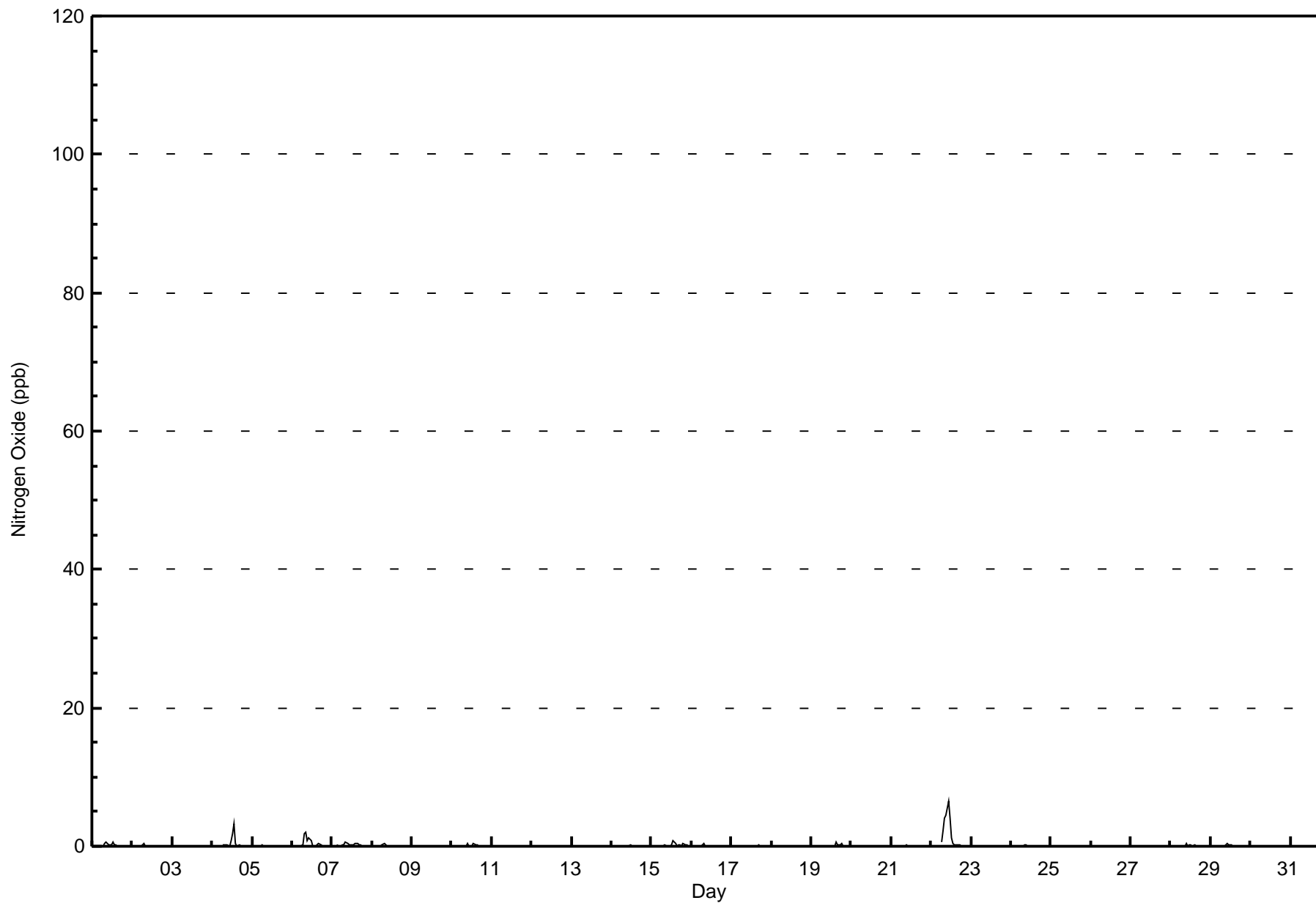
Nitrogen Oxide (NO) - ppb
Mackay River - August 2017

| Maximum Value: 6 ppb on Aug 22 11:00 | | | | | | | | | | | | | | | | | Maximum Daily Average: 1.1 ppb on Aug 22 | | | | | | | Hours in Service: 744 | | |
|---|-------------------------------|---|-----------------|---|---|--------------------|---|---|---|----|----|----|----|----|----|----|--|----|----|----|----|----|----|---------------------------|---------------|---------------|
| Minimum Value: 0 ppb on Aug 2 03:00 | | | | | | | | | | | | | | | | | Minimum Daily Average: 0.0 ppb on Aug 25 | | | | | | | Hours of Data: 707 | | |
| Maximum Diurnal Average: 0.3 ppb at hour 11 | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 0.0 ppb at hour 3 | | | | | | | Hours of Missing Data: 37 | | |
| Monthly Average: 0.1 ppb | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 2 | | | | | | | Hours of Calibration: 35 | | |
| | | | | | | | | | | | | | | | | | Percent Operational Time: 99.7 | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 2-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 3-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 4-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 3 |
| 5-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 6-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 2 |
| 7-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 8-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 9-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 10-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 11-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | PF | PF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 12-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 13-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 14-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 15-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 17-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 18-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 19-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 |
| 20-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 21-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 22-Aug | 0 | 0 | 0 | 0 | 0 | Z | 1 | 2 | 4 | 5 | 6 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.1 | 6 |
| 23-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | C | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 24-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 25-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 26-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 27-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 29-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 30-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 31-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 0.0 | | | | | | | | | | | | | | | | | 0.1 | | | | | | | Diurnal Average | | |
| 0 | | | | | | | | | | | | | | | | | 1 | | | | | | | Diurnal Maximum | | |
| Z - zerspan | | | C - Calibration | | | PF - Power Failure | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxide (NO) - ppb
Mackay River - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Mackay River - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 707 | 100.00 | 100.00 |
| 21 - 40 | 0 | 0.00 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Mackay River - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 14 | 23 | 15 | 6 | 7 | 32 | 74 | 77 | 86 | 66 | 82 | 105 | 63 | 32 | 15 | 10 | 707 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 14 | 23 | 15 | 6 | 7 | 32 | 74 | 77 | 86 | 66 | 82 | 105 | 63 | 32 | 15 | 10 | 707 |

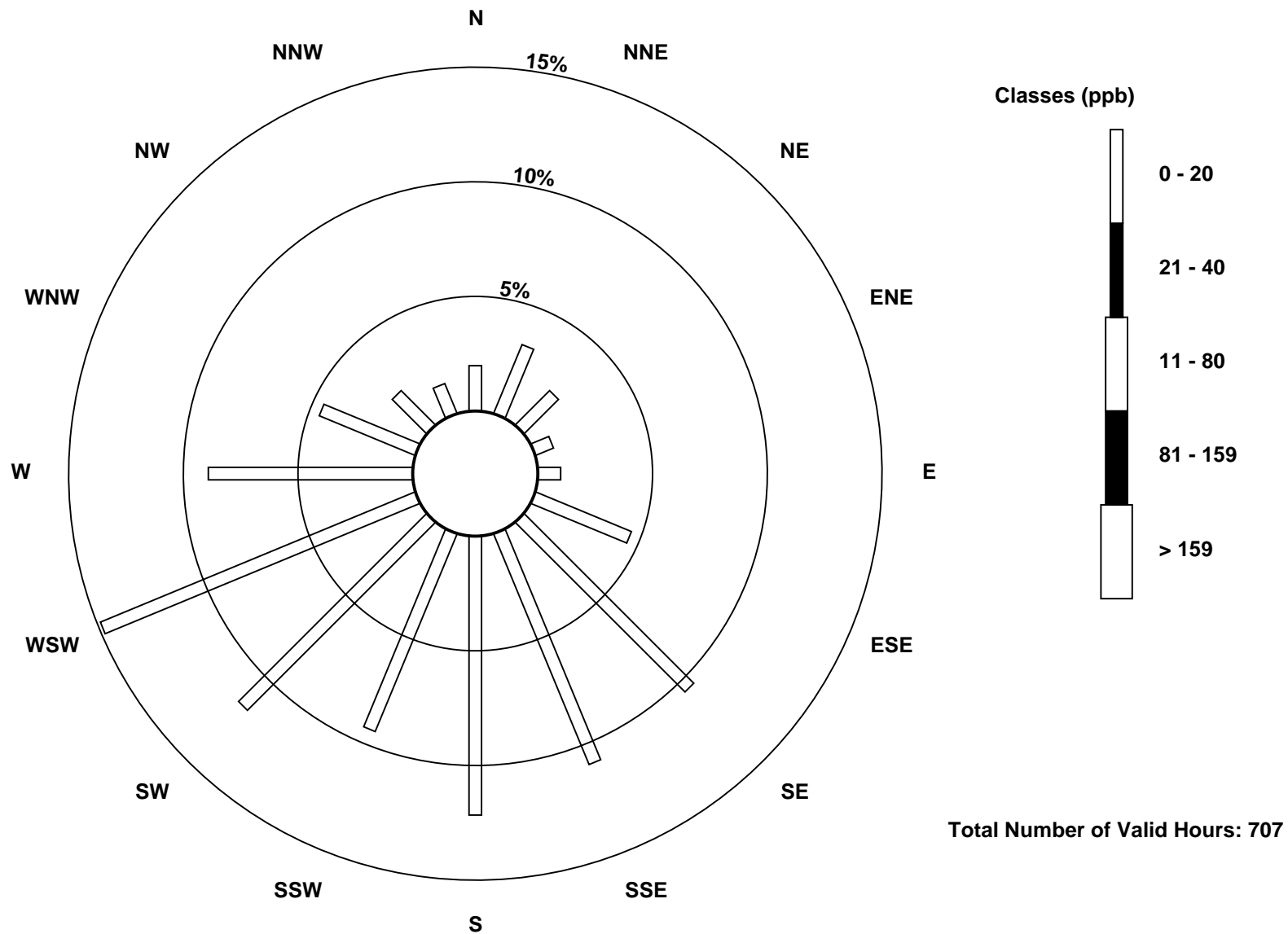
Total Number of Valid Hours: 707

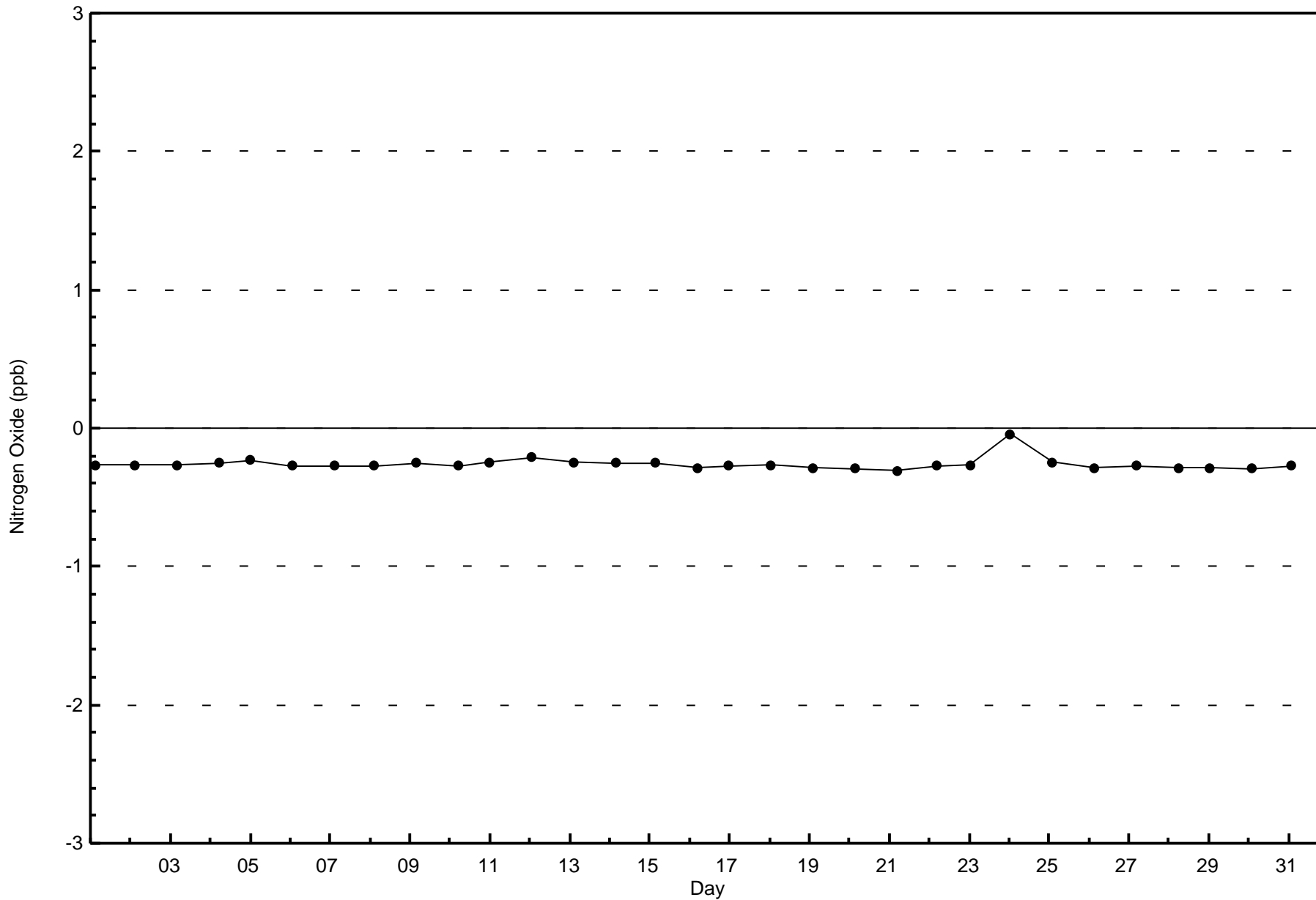
Total Number of Hours: 744

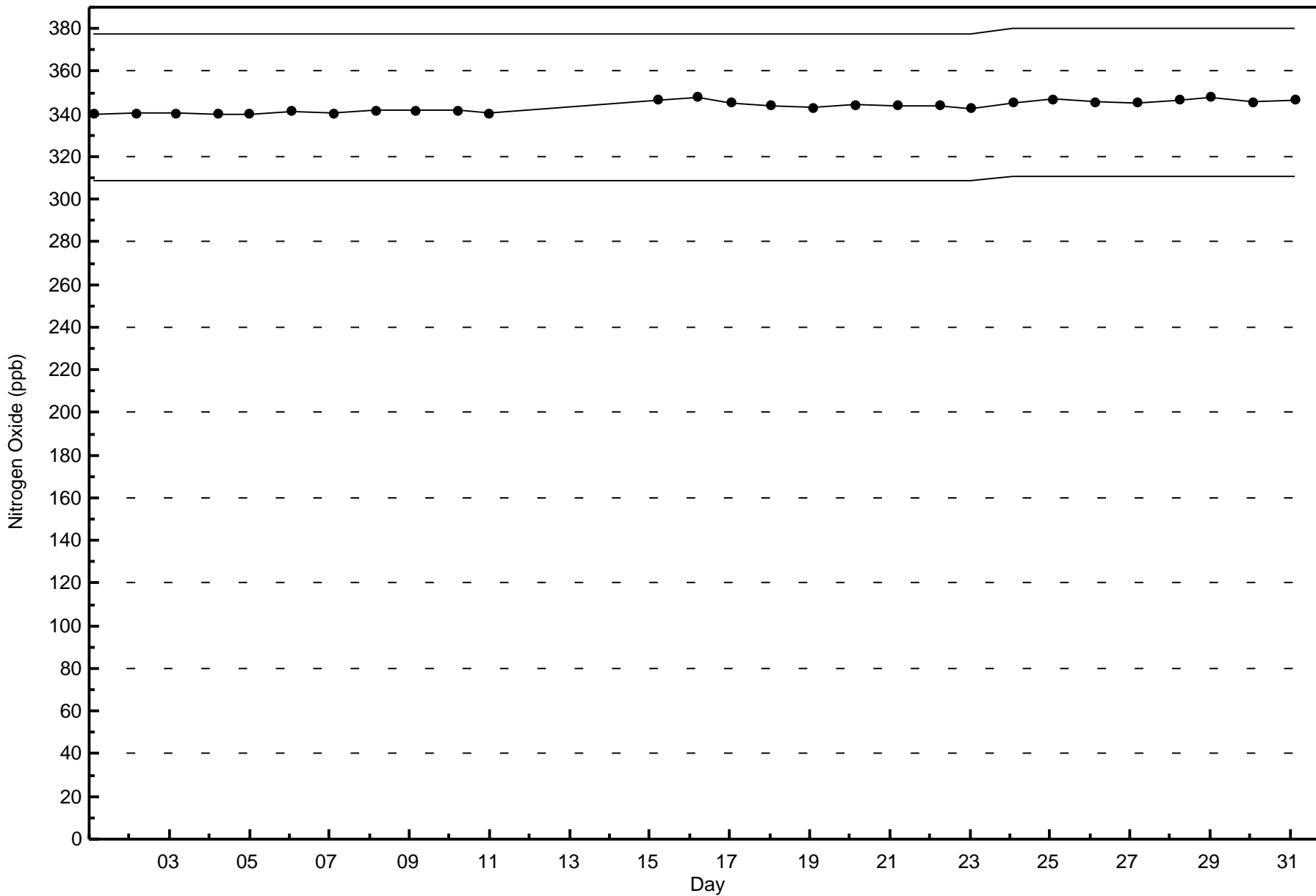


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Oxide (NO) - ppb
Mackay River (AMS 20)









Wood Buffalo Environmental Association
Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb
Mackay River - August 2017

| | |
|---|--|
| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | Hours in Service: 744 |
| Maximum Value: 11 ppb on Aug 22 11:00 | Maximum Daily Average: 3.8 ppb on Aug 22 |
| Minimum Value: 0 ppb on Aug 1 06:00 | Hours of Data: 707 |
| Maximum Diurnal Average: 1.0 ppb at hour 10 | Hours of Missing Data: 37 |
| Monthly Average: 0.7 ppb | Hours of Calibration: 35 |
| Minimum Daily Average: 0.2 ppb on Aug 20 | Percent Operational Time: 99.7 |
| Minimum Diurnal Average: 0.4 ppb at hour 6 | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 6 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 2 | 3 | 2 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1.0 | 3 |
| 2-Aug | 0 | 0 | 0 | Z | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 3-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 4 | 3 | 0.9 | 4 |
| 4-Aug | 4 | 5 | 3 | 2 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 4 | 7 | 9 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 2.1 | 9 |
| 5-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 6-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 5 | 5 | 5 | 5 | 3 | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 1 | 2 | 1 | 1 | 1 | 1.5 | 5 |
| 7-Aug | 1 | 0 | Z | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 1 |
| 8-Aug | 0 | 0 | 0 | Z | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 9-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 10-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 11-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | PF | PF | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0.4 | 1 |
| 12-Aug | 0 | Z | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.6 | 1 |
| 13-Aug | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.8 | 1 |
| 14-Aug | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 1 |
| 15-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 2 | 1 | 1 | 1 | 0 | 2 | 1 | 2 | 1 | 0 | 0.7 | 2 |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 17-Aug | Z | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 18-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0.5 | 1 |
| 19-Aug | 0 | 0 | Z | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 20-Aug | 0 | 0 | 0 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 21-Aug | 0 | 0 | 0 | 1 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 22-Aug | 0 | 2 | 2 | 3 | 6 | Z | 5 | 6 | 8 | 10 | 11 | 9 | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 3.8 | 11 |
| 23-Aug | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | C | C | C | C | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.7 | 1 |
| 24-Aug | 1 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0.6 | 1 |
| 25-Aug | 1 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 26-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 27-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.3 | 1 |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | Z | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 29-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 2 | 1 | 1 | 0.5 | 2 |
| 30-Aug | 0 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.8 | 1 |
| 31-Aug | 1 | 1 | Z | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.6 | 1 |

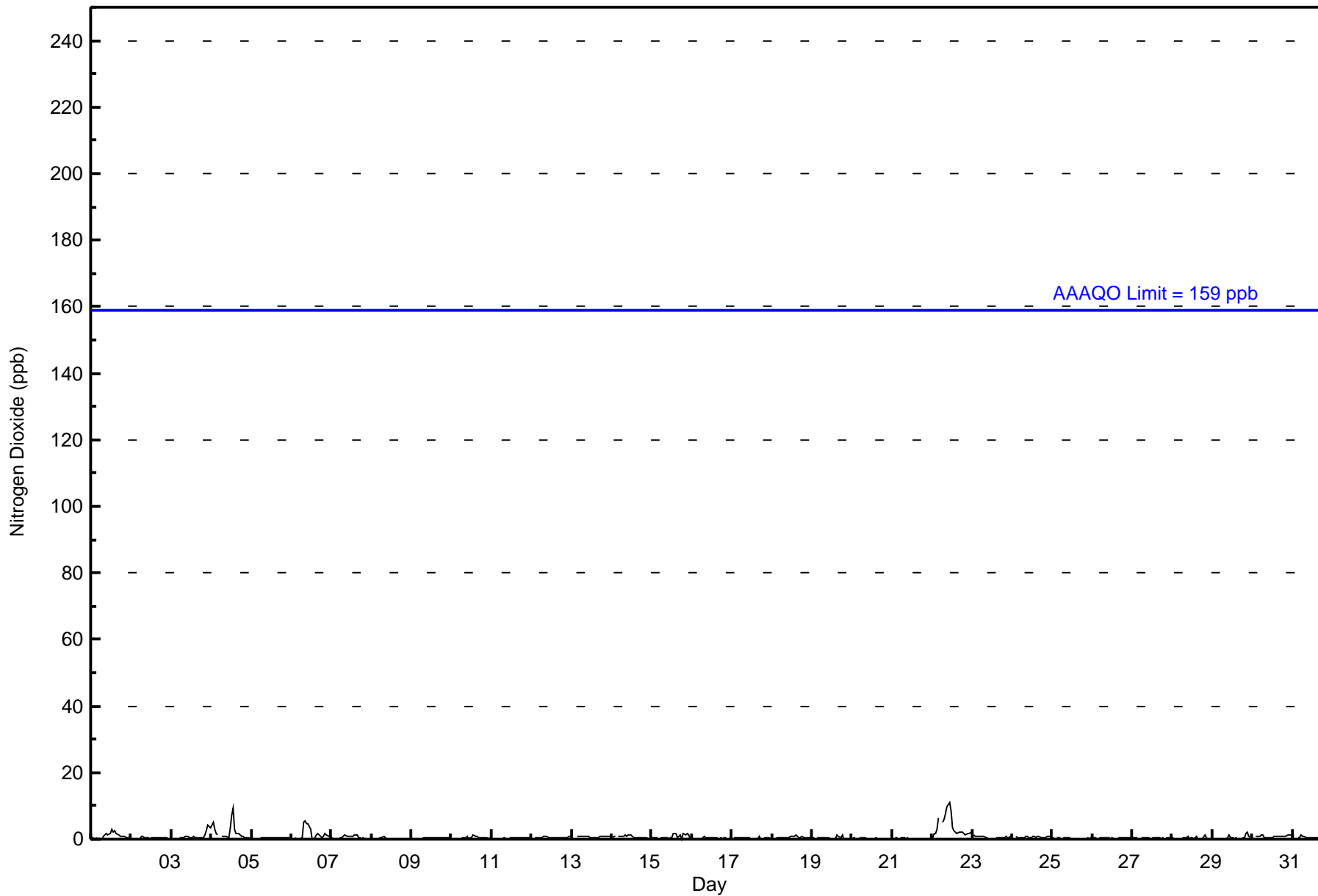
| | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|
| 0.5 | 0.6 | 0.5 | 0.5 | 0.6 | 0.4 | 0.6 | 0.9 | 0.9 | 1.0 | 1.0 | 0.9 | 0.8 | 0.9 | 0.7 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.6 | 0.5 | Diurnal Average |
| 4 | 5 | 3 | 3 | 6 | 1 | 5 | 6 | 8 | 10 | 11 | 9 | 7 | 9 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 3 | Diurnal Maximum |

Z - zerospan C - Calibration PF - Power Failure
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Mackay River - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Mackay River - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 707 | 100.00 | 100.00 |
| 21 - 40 | 0 | 0.00 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Mackay River - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 14 | 23 | 15 | 6 | 7 | 32 | 74 | 77 | 86 | 66 | 82 | 105 | 63 | 32 | 15 | 10 | 707 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 14 | 23 | 15 | 6 | 7 | 32 | 74 | 77 | 86 | 66 | 82 | 105 | 63 | 32 | 15 | 10 | 707 |

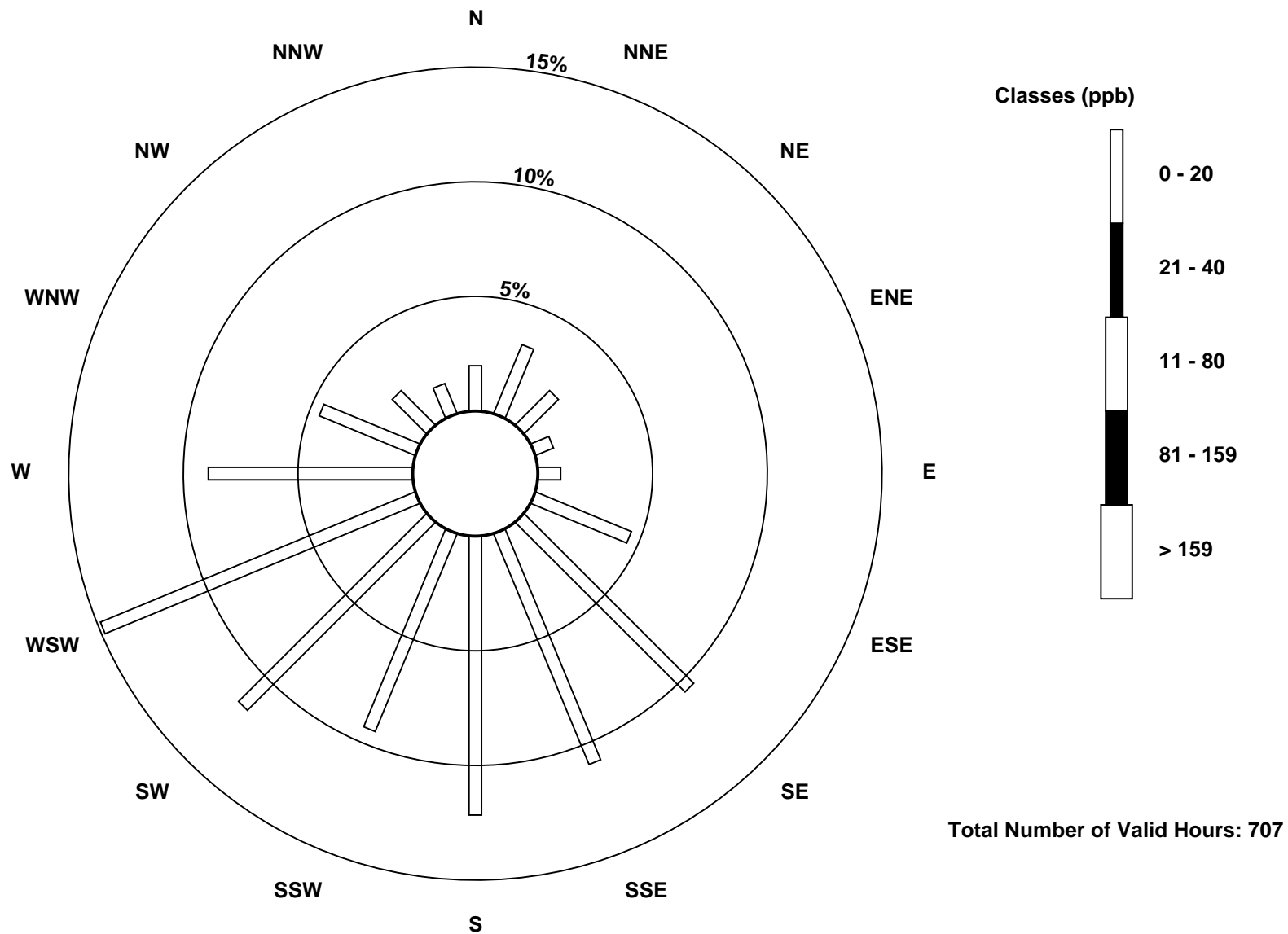
Total Number of Valid Hours: 707

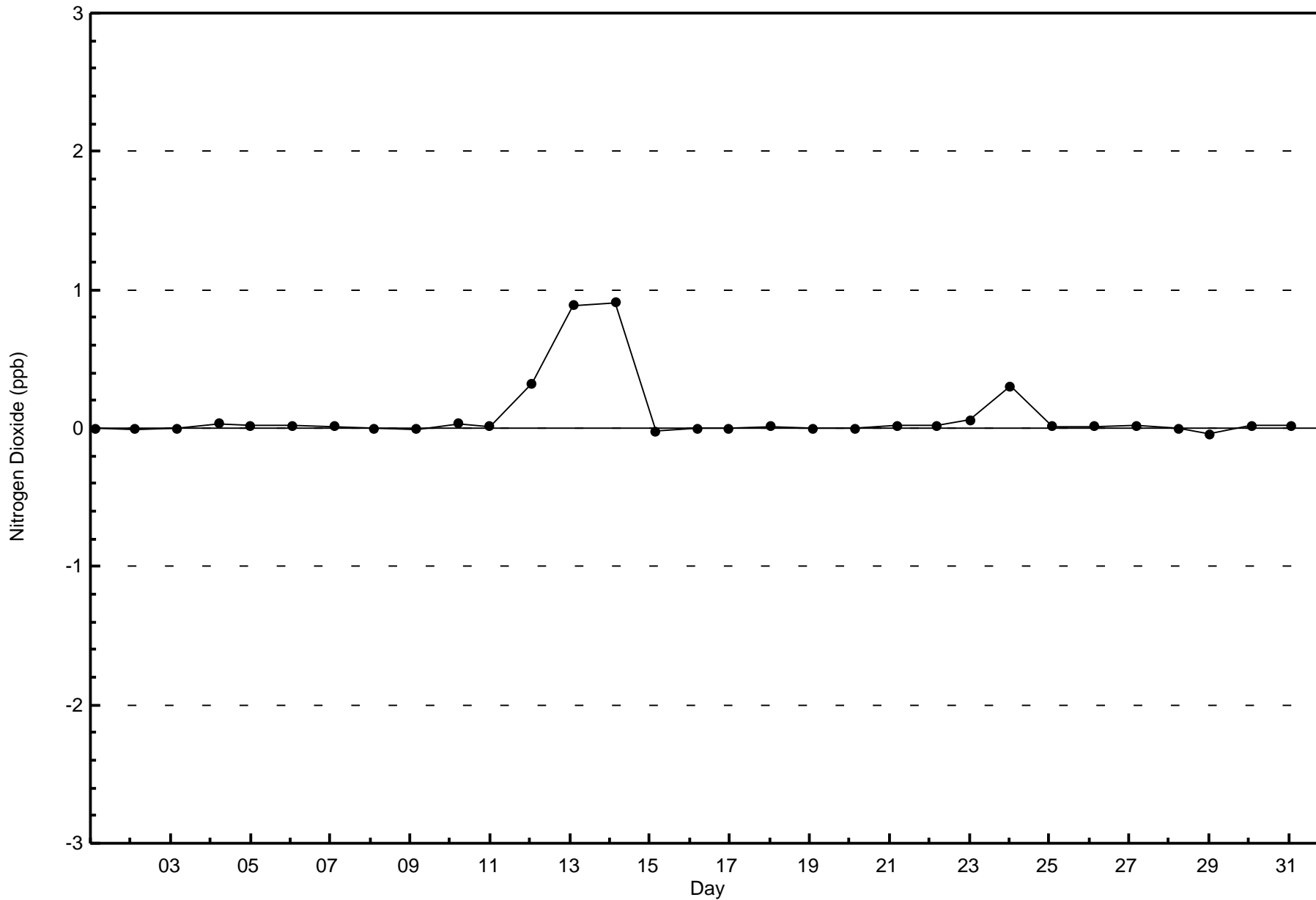
Total Number of Hours: 744

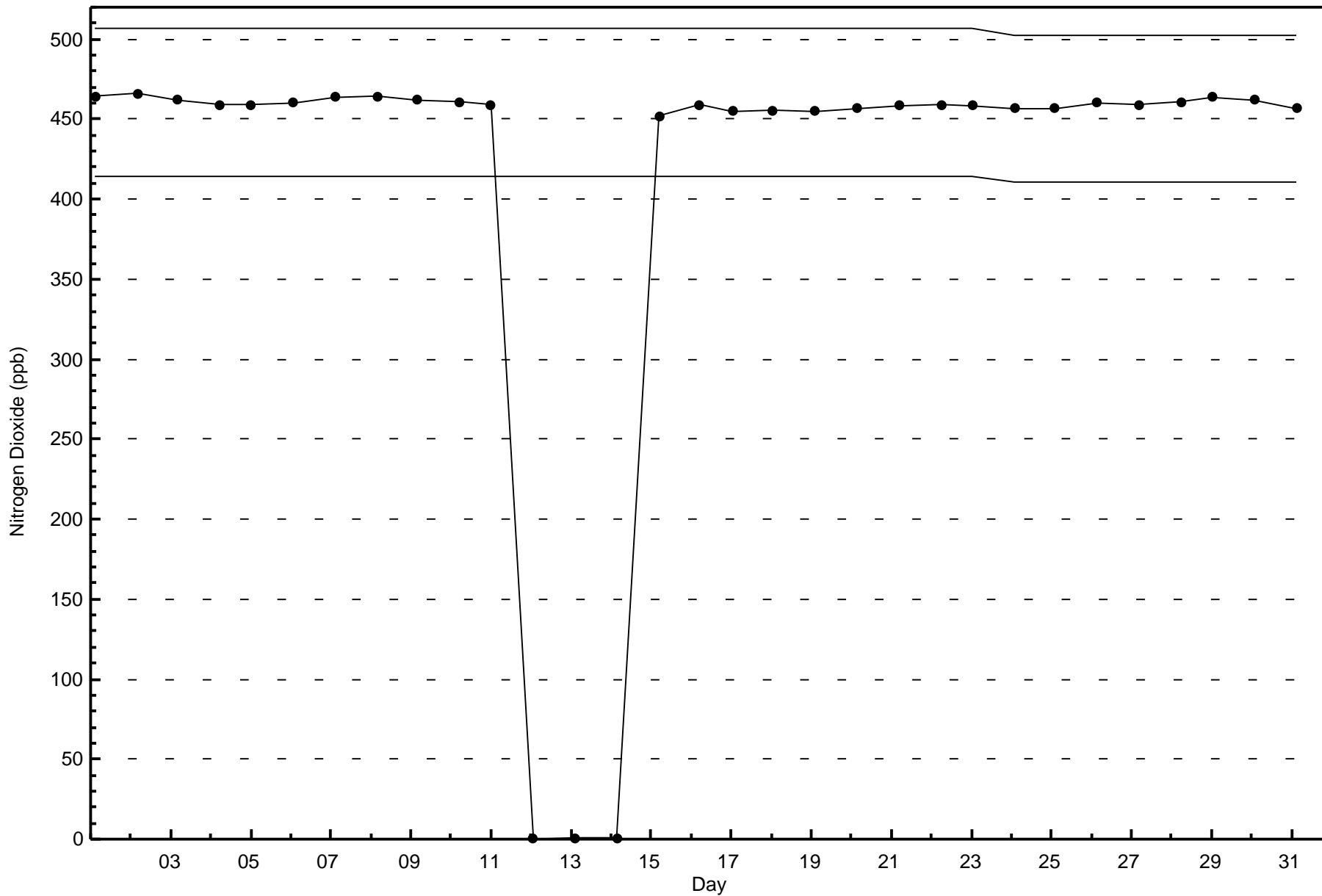


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Dioxide (NO₂) - ppb
Mackay River (AMS 20)









Wood Buffalo Environmental Association
Summary of Hour Averages

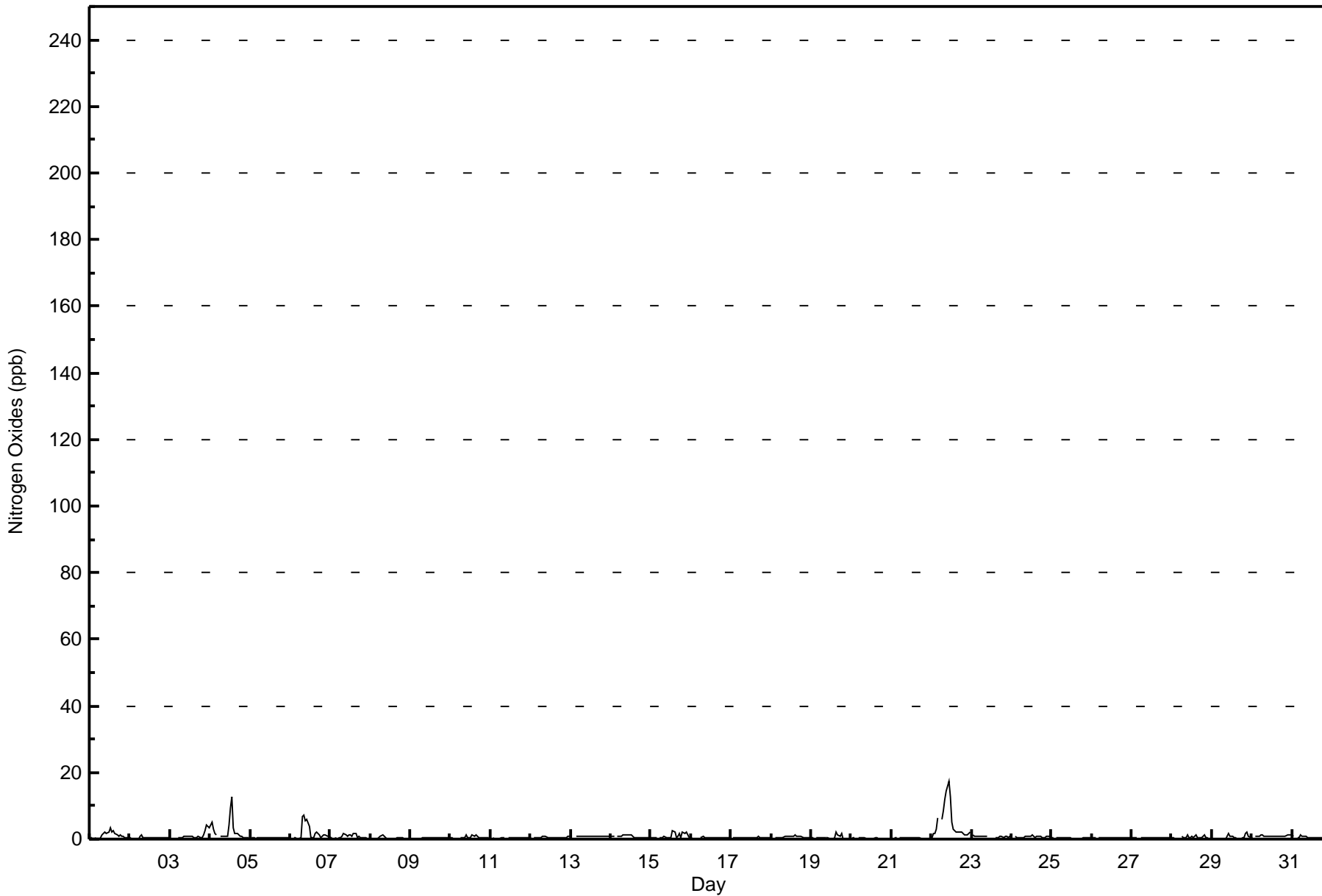
Nitrogen Oxides (NO_x) - ppb
Mackay River - August 2017

| Maximum Value: 17 ppb on Aug 22 11:00 | | Maximum Daily Average: 4.8 ppb on Aug 22 | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|--|---|--------------------------------|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|---------------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|
| Minimum Value: 0 ppb on Aug 29 06:00 | | Minimum Daily Average: 0.2 ppb on Aug 20 | | Hours of Data: 707 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 1.3 ppb at hour 11 | | Minimum Diurnal Average: 0.4 ppb at hour 6 | | Hours of Missing Data: 37 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 0.8 ppb | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 8 | | Hours of Calibration: 35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Percent Operational Time: 99.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1.2 | 3 | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 0 | 0 | 0 | Z | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 4 | 3 | 0.9 | 4 | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 4 | 5 | 3 | 2 | 1 | Z | 1 | 1 | 1 | 1 | 4 | 9 | 13 | 3 | 2 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 2.5 | 13 | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 0 | Z | 0 | 0 | 0 | 0 | 1 | 7 | 7 | 5 | 6 | 4 | 0 | 0 | 0 | 2 | 2 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1.9 | 7 | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 0 | 0 | Z | 0 | 0 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 2 | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 0 | 0 | 0 | Z | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | PF | PF | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 0 | Z | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.6 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.8 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 2 | 2 | 1 | 1 | 2 | 0 | 2 | 2 | 2 | 1 | 0 | 0.9 | 2 | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | Z | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0.6 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0.5 | 2 | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 0 | 0 | 0 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 0 | 0 | 0 | 1 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 0 | 2 | 2 | 3 | 6 | Z | 6 | 8 | 12 | 14 | 17 | 13 | 5 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 2 | 4.8 | 17 | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | C | C | C | C | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.8 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 1 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0.6 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | Z | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 0.5 | 2 | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 0 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.9 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 1 | 1 | Z | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.5 | 0.6 | 0.5 | 0.5 | 0.6 | 0.4 | 0.7 | 1.1 | 1.2 | 1.3 | 1.3 | 1.2 | 1.0 | 1.1 | 0.8 | 0.7 | 0.7 | 0.6 | 0.5 | 0.6 | 0.6 | 0.6 | 0.6 | 0.5 | Diurnal Average |
| | | | | | | | | | | | | | | | | | | | | | | | | 4 | 5 | 3 | 3 | 6 | 1 | 6 | 8 | 12 | 14 | 17 | 13 | 9 | 13 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 3 | Diurnal Maximum |
| Z - zerspan C - Calibration PF - Power Failure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Mackay River - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Mackay River - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 707 | 100.00 | 100.00 |
| 21 - 40 | 0 | 0.00 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Mackay River - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 14 | 23 | 15 | 6 | 7 | 32 | 74 | 77 | 86 | 66 | 82 | 105 | 63 | 32 | 15 | 10 | 707 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 14 | 23 | 15 | 6 | 7 | 32 | 74 | 77 | 86 | 66 | 82 | 105 | 63 | 32 | 15 | 10 | 707 |

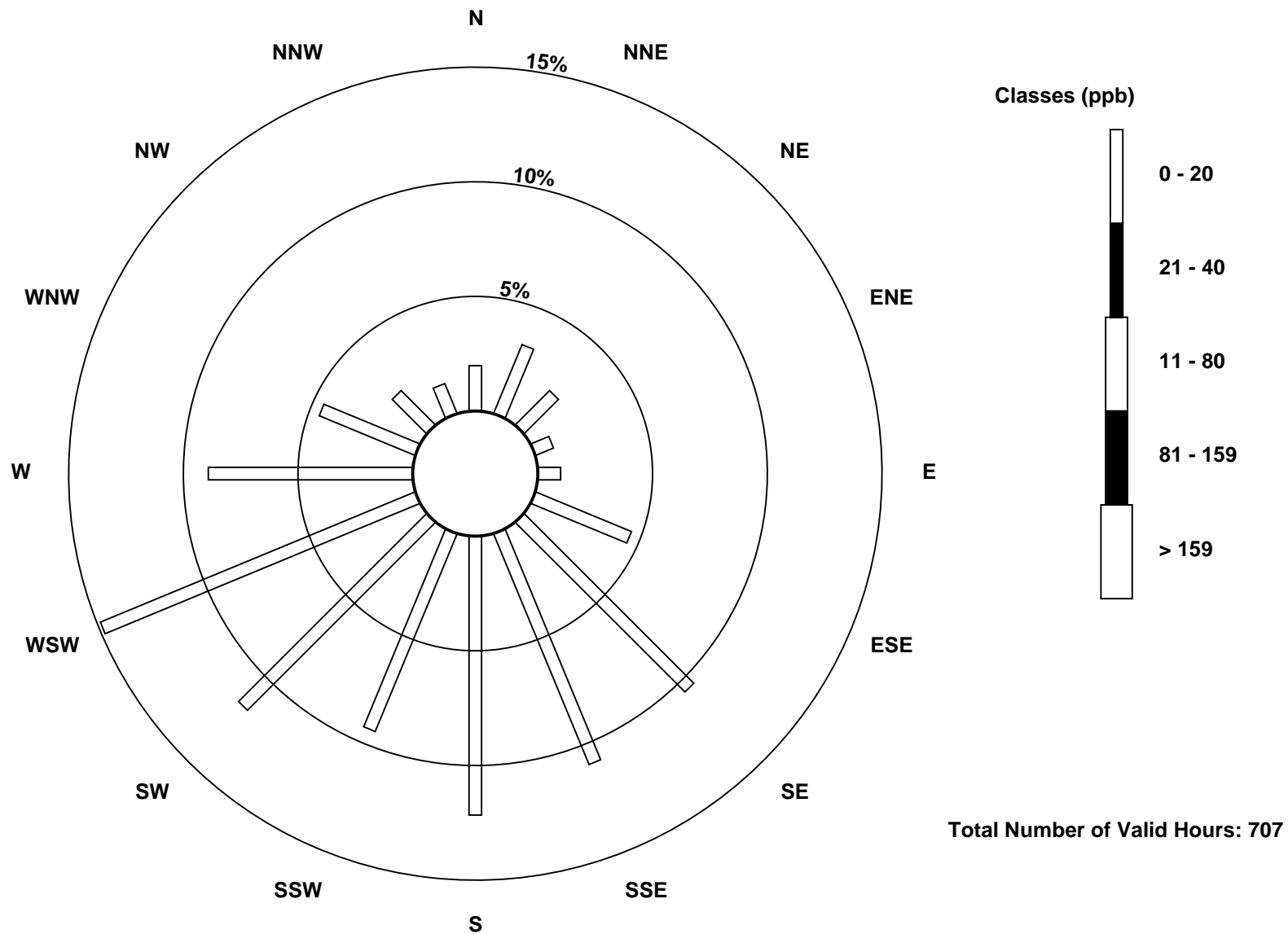
Total Number of Valid Hours: 707

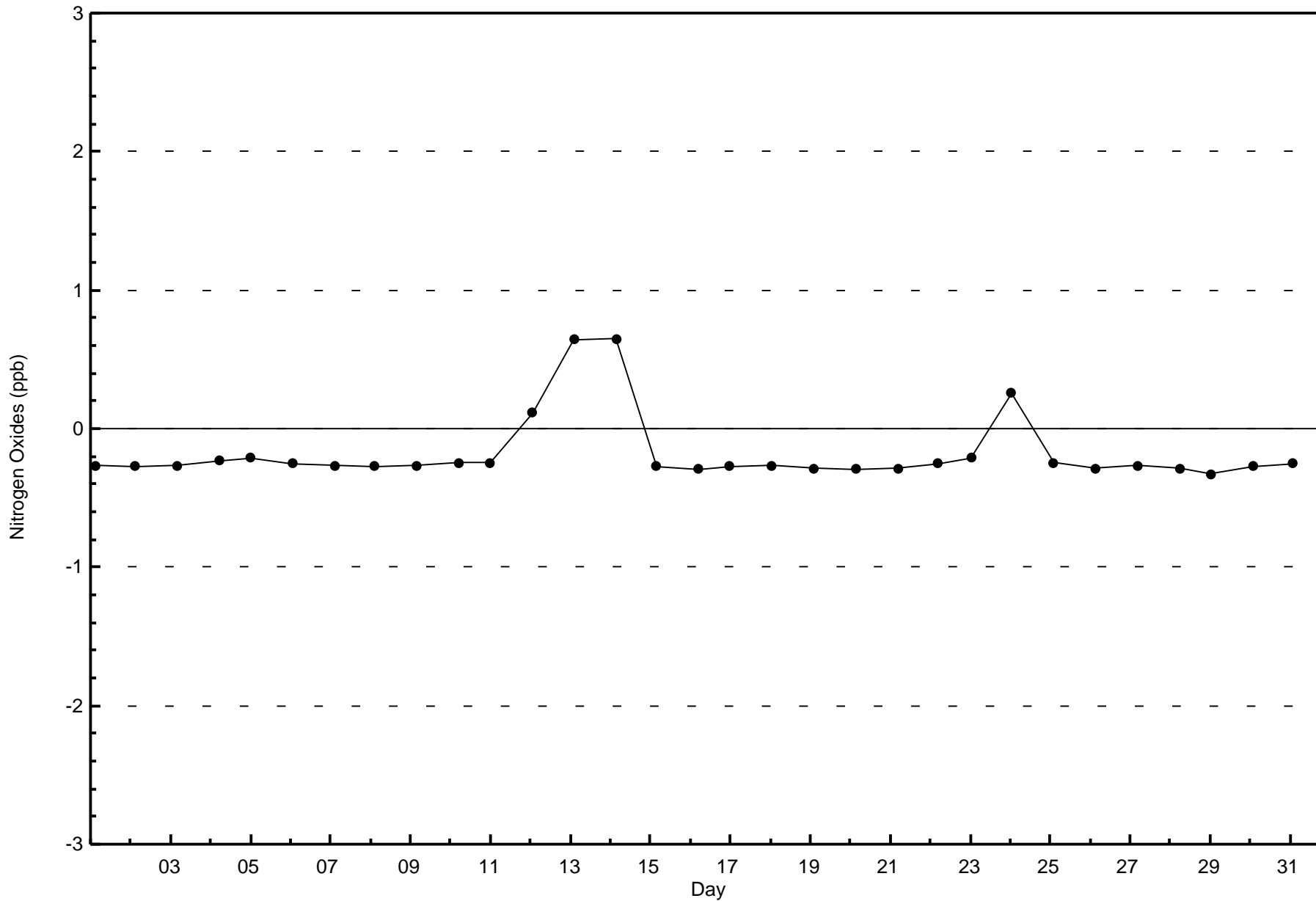
Total Number of Hours: 744

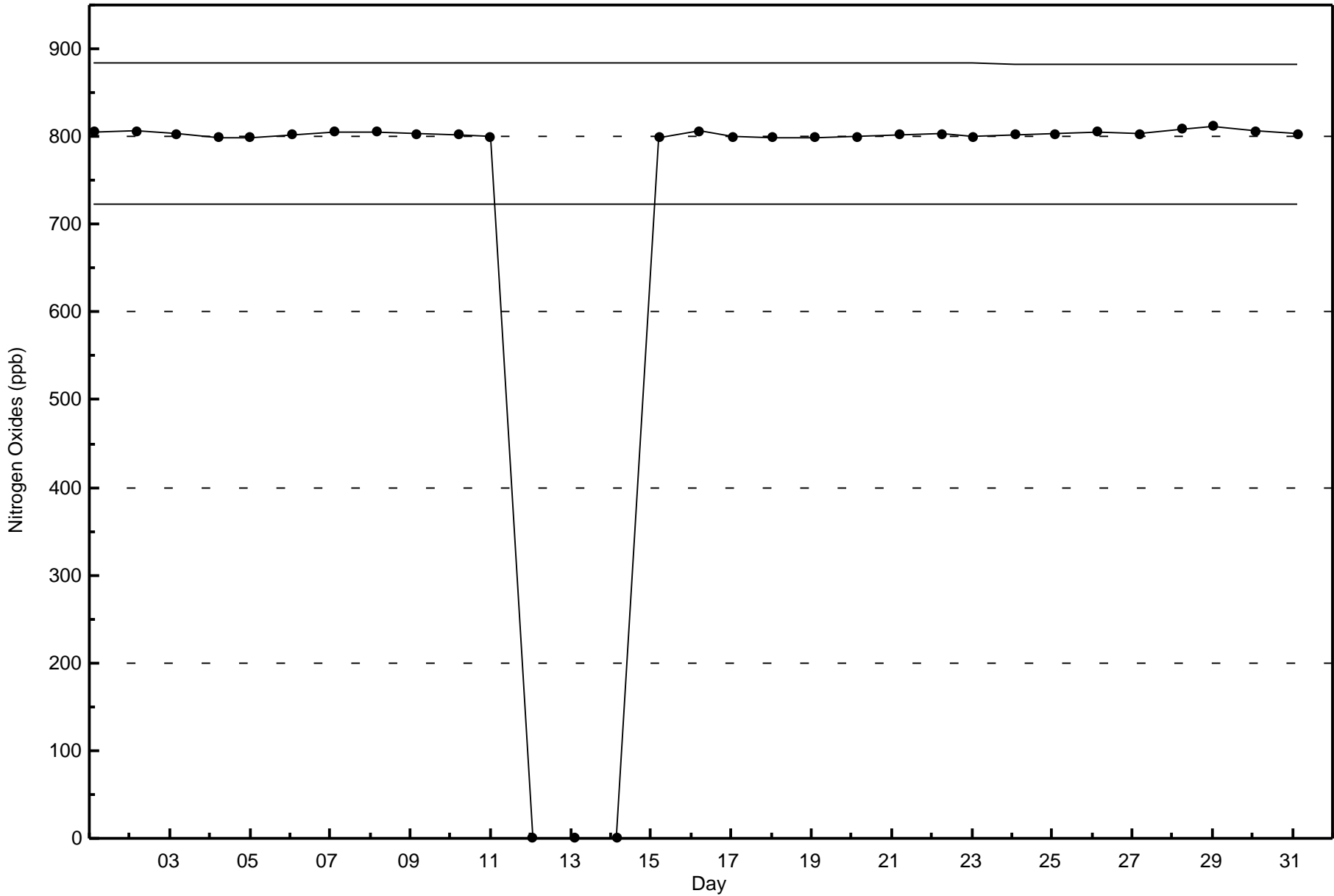


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Oxides (NO_x) - ppb
Mackay River (AMS 20)









Wood Buffalo Environmental Association
Summary of Hour Averages

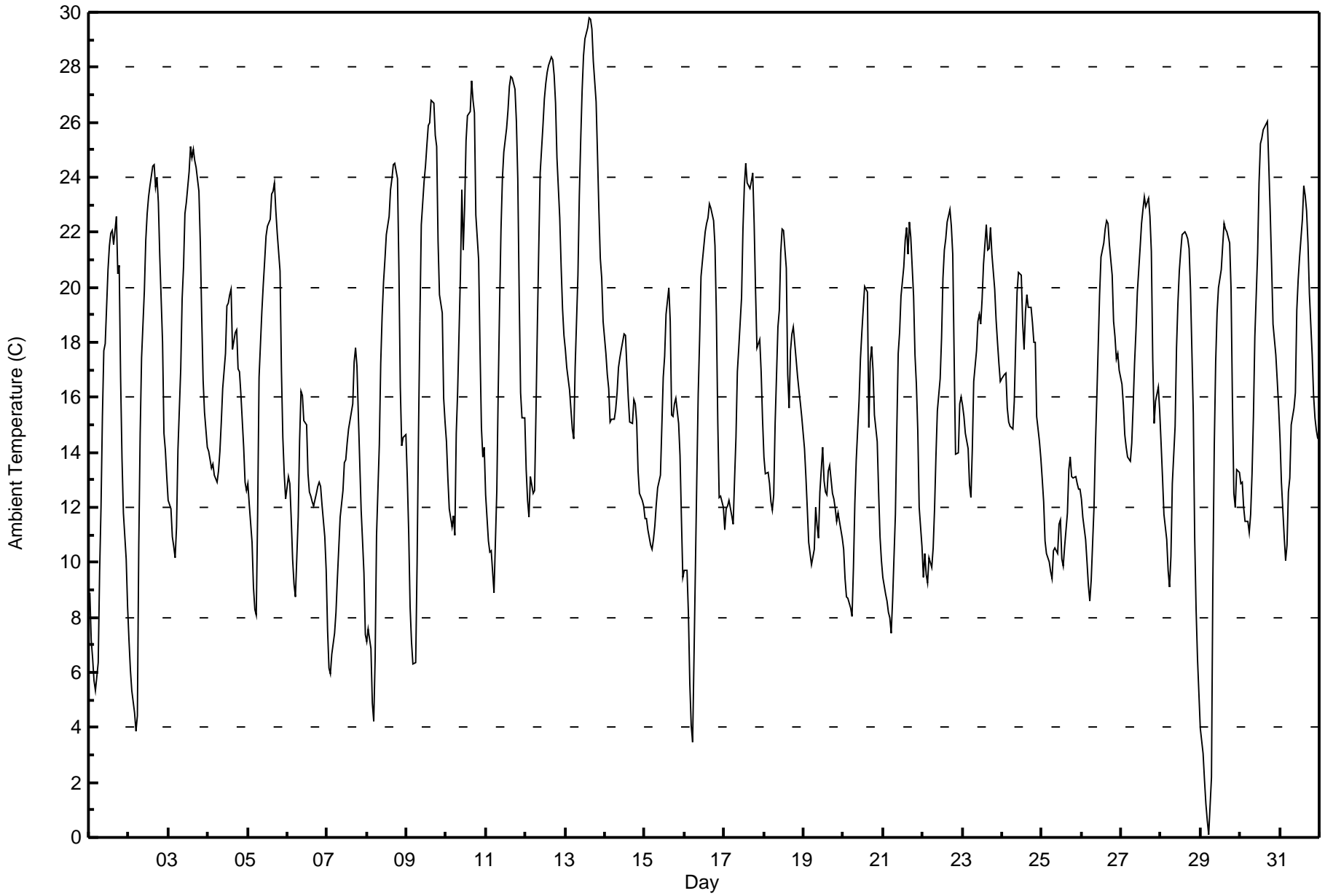
Ambient Temperature (AT) - C
Mackay River - August 2017

| Maximum Value: 29.8 C on Aug 13 15:00 Maximum Daily Average: 22.8 C on Aug 13 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|------|------|---------------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|
| Minimum Value: 0.1 C on Aug 29 06:00 Minimum Daily Average: 11.5 C on Aug 25 Maximum Diurnal Average: 21.6 C at hour 15 Minimum Diurnal Average: 9.7 C at hour 6 Monthly Average: 16.21 C Percentiles: P ₁ = 3.8 P ₁₀ = 9.6 Q ₁ = 12.1 Median = 15.7 Q ₃ = 20.6 P ₉₀ = 23.7 P ₉₉ = 28.3 | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 8.9 | 7.2 | 6.5 | 5.7 | 5.4 | 6.4 | 9.7 | 12.0 | 15.3 | 17.7 | 18.0 | 20.6 | 21.5 | 22.0 | 22.1 | 21.6 | 22.6 | 20.5 | 20.8 | 16.7 | 13.8 | 11.8 | 10.1 | 8.4 | 14.4 | 22.6 | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 7.2 | 6.1 | 5.3 | 4.5 | 3.8 | 4.4 | 10.6 | 14.7 | 17.4 | 19.9 | 21.7 | 22.7 | 23.3 | 23.7 | 24.4 | 24.4 | 23.6 | 24.0 | 23.1 | 21.2 | 18.0 | 14.7 | 14.1 | 13.1 | 16.1 | 24.4 | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 12.2 | 12.0 | 10.9 | 10.6 | 10.2 | 11.3 | 14.1 | 17.0 | 19.6 | 20.7 | 22.7 | 23.1 | 24.2 | 25.1 | 24.7 | 25.0 | 24.6 | 24.3 | 23.5 | 21.6 | 18.9 | 16.6 | 15.5 | 14.2 | 18.4 | 25.1 | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 14.0 | 13.7 | 13.4 | 13.6 | 13.2 | 12.9 | 13.3 | 14.0 | 15.1 | 16.3 | 17.6 | 19.3 | 19.4 | 19.7 | 20.0 | 17.7 | 18.3 | 18.4 | 17.0 | 16.9 | 16.1 | 14.2 | 12.9 | 12.6 | 15.8 | 20.0 | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 12.8 | 12.1 | 10.8 | 9.1 | 8.3 | 8.1 | 11.8 | 16.7 | 19.1 | 20.1 | 20.9 | 21.9 | 22.2 | 22.5 | 23.4 | 23.5 | 23.8 | 22.8 | 22.0 | 20.6 | 17.0 | 14.6 | 13.2 | 12.3 | 17.1 | 23.8 | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 13.1 | 12.9 | 11.6 | 10.1 | 9.2 | 8.8 | 11.7 | 14.5 | 16.2 | 16.1 | 15.2 | 15.0 | 13.2 | 12.5 | 12.4 | 12.2 | 12.0 | 12.5 | 12.7 | 12.9 | 12.8 | 12.1 | 10.9 | 9.7 | 12.5 | 16.2 | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 7.5 | 6.2 | 6.0 | 6.7 | 7.4 | 8.2 | 9.4 | 10.5 | 11.6 | 12.6 | 13.6 | 13.7 | 14.3 | 14.8 | 15.1 | 15.7 | 17.3 | 17.8 | 17.2 | 15.4 | 11.9 | 10.8 | 9.6 | 7.4 | 11.7 | 17.8 | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 7.1 | 7.6 | 6.8 | 4.9 | 4.2 | 6.5 | 11.0 | 14.3 | 17.2 | 19.0 | 20.2 | 21.0 | 21.9 | 22.6 | 23.6 | 23.9 | 24.5 | 24.5 | 24.0 | 20.7 | 16.4 | 14.2 | 14.5 | 14.6 | 16.1 | 24.5 | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 13.1 | 11.1 | 8.4 | 7.1 | 6.3 | 6.3 | 10.0 | 14.6 | 18.7 | 22.3 | 23.8 | 24.4 | 25.2 | 25.9 | 26.0 | 26.8 | 26.7 | 25.5 | 25.1 | 21.6 | 19.7 | 19.1 | 16.0 | 15.1 | 18.3 | 26.8 | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 14.4 | 13.1 | 12.0 | 11.3 | 11.7 | 11.0 | 14.7 | 16.2 | 20.5 | 23.6 | 21.4 | 22.9 | 25.3 | 26.2 | 26.4 | 27.5 | 26.8 | 26.4 | 22.6 | 21.0 | 17.7 | 14.9 | 13.8 | 14.2 | 19.0 | 27.5 | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 12.5 | 10.8 | 10.4 | 10.4 | 9.7 | 8.9 | 12.6 | 16.2 | 19.4 | 22.1 | 24.0 | 24.9 | 25.8 | 26.5 | 27.3 | 27.7 | 27.6 | 27.2 | 26.1 | 23.9 | 19.7 | 16.2 | 15.2 | 15.2 | 19.2 | 27.7 | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 13.4 | 12.3 | 11.6 | 13.1 | 12.5 | 12.6 | 15.5 | 18.6 | 21.5 | 24.2 | 25.9 | 26.9 | 27.4 | 27.8 | 28.1 | 28.4 | 28.3 | 27.7 | 26.7 | 24.7 | 22.5 | 20.7 | 19.2 | 18.3 | 21.2 | 28.4 | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 17.7 | 17.1 | 16.3 | 15.6 | 14.9 | 14.5 | 17.1 | 20.4 | 23.3 | 25.4 | 27.2 | 28.4 | 29.0 | 29.5 | 29.8 | 29.7 | 29.4 | 28.2 | 26.7 | 24.8 | 22.8 | 21.1 | 20.4 | 18.7 | 22.8 | 29.8 | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 17.6 | 16.8 | 16.3 | 15.1 | 15.2 | 15.2 | 15.5 | 16.2 | 17.1 | 17.4 | 17.8 | 18.3 | 18.2 | 17.1 | 16.0 | 15.1 | 15.0 | 15.9 | 15.8 | 15.1 | 13.3 | 12.5 | 12.2 | 12.0 | 15.7 | 18.3 | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 11.6 | 11.6 | 11.2 | 10.6 | 10.5 | 10.8 | 11.4 | 12.1 | 12.7 | 13.2 | 15.0 | 16.7 | 17.5 | 19.0 | 20.0 | 18.8 | 15.4 | 15.3 | 15.8 | 15.9 | 15.0 | 13.9 | 11.6 | 9.5 | 14.0 | 20.0 | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 9.7 | 9.7 | 8.1 | 5.6 | 4.1 | 3.5 | 6.5 | 13.1 | 16.1 | 18.1 | 20.4 | 21.0 | 22.0 | 22.3 | 22.5 | 23.0 | 22.9 | 22.4 | 21.5 | 19.0 | 15.1 | 12.4 | 12.4 | 12.0 | 15.1 | 23.0 | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 11.2 | 12.0 | 12.0 | 12.3 | 11.7 | 11.4 | 13.0 | 14.5 | 16.9 | 17.8 | 19.6 | 22.1 | 23.7 | 24.5 | 23.8 | 23.6 | 23.9 | 24.1 | 22.3 | 19.9 | 17.8 | 18.1 | 16.9 | 15.2 | 17.8 | 24.5 | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 13.8 | 13.2 | 13.3 | 12.9 | 12.2 | 11.9 | 12.5 | 15.1 | 18.5 | 19.1 | 21.3 | 22.1 | 22.1 | 20.7 | 16.8 | 15.6 | 17.7 | 18.3 | 18.6 | 17.4 | 16.8 | 16.3 | 15.8 | 15.3 | 16.6 | 22.1 | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 14.1 | 13.1 | 11.9 | 10.7 | 10.3 | 9.9 | 10.5 | 12.0 | 11.3 | 10.9 | 12.6 | 14.2 | 13.0 | 12.5 | 12.4 | 13.3 | 13.5 | 12.5 | 12.3 | 11.9 | 11.5 | 11.8 | 11.2 | 10.9 | 12.0 | 14.2 | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 10.5 | 9.4 | 8.8 | 8.7 | 8.3 | 8.1 | 9.8 | 12.1 | 13.7 | 15.9 | 17.4 | 18.4 | 19.2 | 20.0 | 19.8 | 14.9 | 17.3 | 17.9 | 17.0 | 15.4 | 14.4 | 12.6 | 10.9 | 10.1 | 13.8 | 20.0 | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 9.5 | 8.8 | 8.6 | 8.2 | 8.0 | 7.4 | 8.7 | 11.8 | 14.8 | 17.6 | 18.4 | 19.7 | 20.8 | 21.7 | 22.2 | 21.2 | 22.3 | 21.8 | 19.7 | 17.5 | 16.5 | 14.8 | 12.0 | 10.6 | 15.1 | 22.3 | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 9.5 | 10.3 | 9.6 | 9.3 | 10.2 | 9.8 | 10.6 | 11.9 | 13.9 | 15.5 | 16.7 | 18.2 | 20.4 | 21.3 | 21.8 | 22.4 | 22.8 | 22.2 | 21.2 | 17.5 | 13.9 | 14.0 | 15.8 | 16.0 | 15.6 | 22.8 | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 15.7 | 15.3 | 14.7 | 14.1 | 12.8 | 12.3 | 14.1 | 16.6 | 17.7 | 18.8 | 19.0 | 18.7 | 19.6 | 20.9 | 22.3 | 21.3 | 21.4 | 22.2 | 21.2 | 19.9 | 18.8 | 18.0 | 17.3 | 16.6 | 17.9 | 22.3 | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 16.7 | 16.8 | 16.9 | 15.6 | 15.1 | 14.9 | 14.8 | 15.9 | 18.0 | 19.9 | 20.5 | 20.4 | 18.7 | 17.8 | 19.1 | 19.7 | 19.3 | 19.2 | 18.7 | 18.0 | 18.0 | 15.3 | 14.4 | 13.8 | 17.4 | 20.5 | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 13.0 | 12.2 | 10.8 | 10.3 | 10.0 | 9.7 | 9.4 | 10.4 | 10.5 | 10.3 | 11.4 | 11.5 | 10.1 | 9.9 | 10.6 | 11.8 | 13.4 | 13.8 | 13.1 | 13.1 | 13.1 | 12.9 | 12.7 | 12.7 | 11.5 | 13.8 | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 12.3 | 11.6 | 10.8 | 10.0 | 9.2 | 8.6 | 9.4 | 12.0 | 14.2 | 16.0 | 17.8 | 19.7 | 21.1 | 21.6 | 22.1 | 22.4 | 22.3 | 21.5 | 20.5 | 18.8 | 18.2 | 17.4 | 17.6 | 17.0 | 16.3 | 22.4 | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 16.5 | 15.7 | 14.7 | 14.2 | 13.8 | 13.7 | 14.3 | 15.7 | 17.2 | 18.4 | 19.8 | 21.5 | 22.3 | 22.8 | 23.3 | 23.0 | 23.2 | 22.6 | 21.3 | 17.4 | 15.0 | 15.8 | 16.4 | 15.5 | 18.1 | 23.3 | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 14.3 | 13.1 | 11.7 | 10.8 | 9.7 | 9.1 | 10.2 | 12.8 | 14.9 | 17.8 | 19.4 | 20.6 | 21.3 | 21.9 | 22.0 | 21.9 | 21.8 | 21.4 | 20.0 | 15.4 | 10.9 | 8.3 | 6.5 | 5.3 | 15.0 | 22.0 | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 4.0 | 3.0 | 2.1 | 1.2 | 0.6 | 0.1 | 2.2 | 9.4 | 14.2 | 17.3 | 19.0 | 20.0 | 20.6 | 21.5 | 22.3 | 22.1 | 22.0 | 21.6 | 19.9 | 15.7 | 12.5 | 12.0 | 13.4 | 13.3 | 12.9 | 22.3 | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 12.9 | 12.9 | 12.0 | 11.5 | 11.5 | 11.1 | 11.8 | 13.2 | 15.3 | 18.2 | 21.2 | 23.8 | 25.2 | 25.4 | 25.7 | 26.0 | 26.0 | 24.4 | 22.7 | 20.8 | 18.7 | 17.5 | 16.6 | 15.6 | 18.3 | 26.0 | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 14.5 | 12.9 | 10.9 | 10.1 | 10.6 | 12.5 | 13.1 | 15.0 | 15.6 | 16.2 | 19.2 | 20.3 | 21.1 | 22.5 | 23.7 | 23.3 | 22.8 | 21.6 | 19.8 | 17.5 | 16.1 | 15.2 | 14.8 | 14.5 | 16.8 | 23.7 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 12.3 | 11.6 | 10.8 | 10.1 | 9.7 | 9.7 | 11.6 | 14.2 | 16.4 | 18.0 | 19.3 | 20.4 | 21.0 | 21.4 | 21.6 | 21.4 | 21.6 | 21.3 | 20.3 | 18.3 | 16.2 | 14.8 | 14.0 | 13.2 | Diurnal Average |
| | | | | | | | | | | | | | | | | | | | | | | | | 17.7 | 17.1 | 16.9 | 15.6 | 15.2 | 15.2 | 17.1 | 20.4 | 23.3 | 25.4 | 27.2 | 28.4 | 29.0 | 29.5 | 29.8 | 29.7 | 29.4 | 28.2 | 26.7 | 24.8 | 22.8 | 21.1 | 20.4 | 18.7 | Diurnal Maximum |



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Mackay River - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Mackay River - August 2017**

| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 87 | 11.69 | 11.69 |
| 10 - 20 | 455 | 61.16 | 72.85 |
| > 20 | 202 | 27.15 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

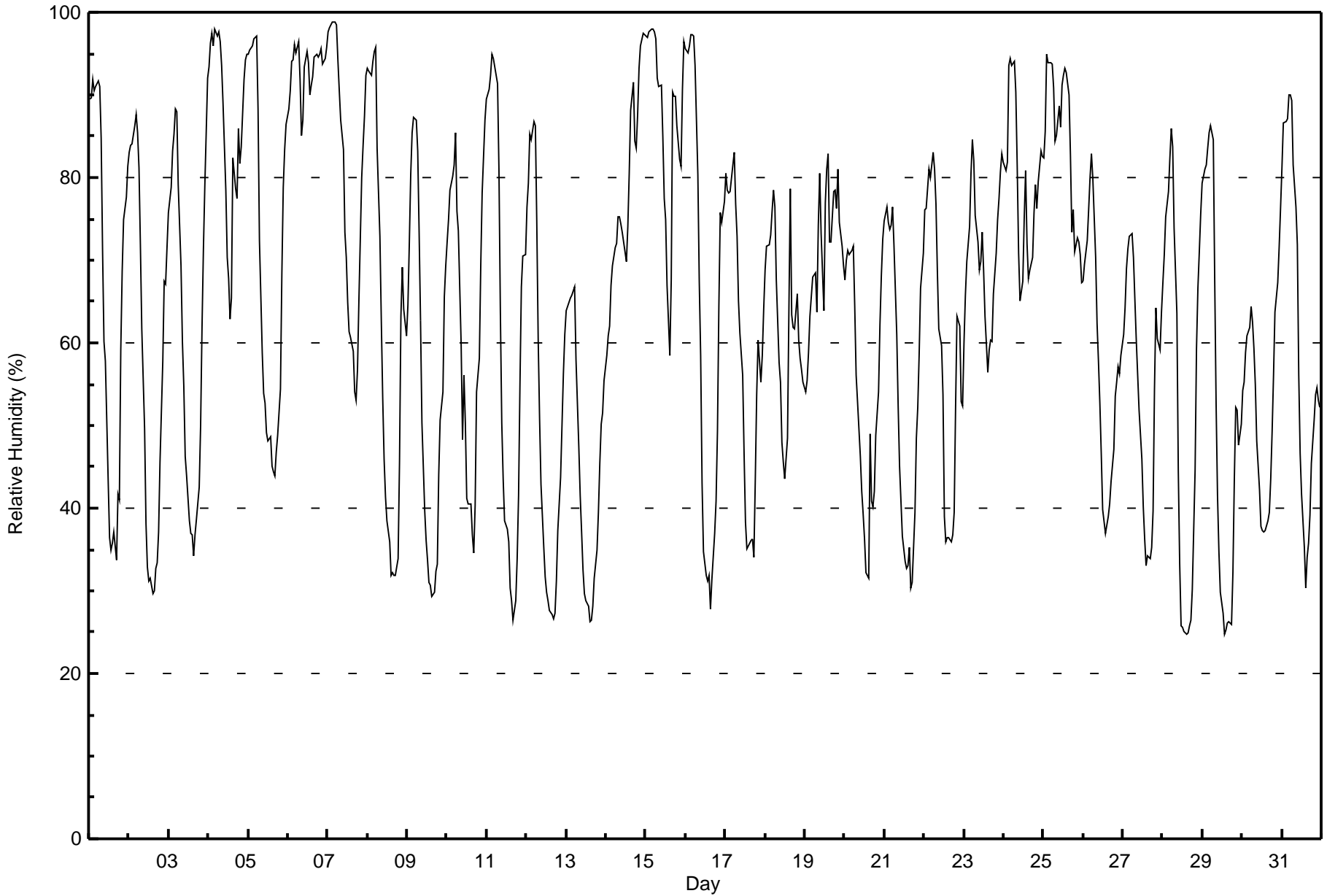
Relative Humidity (RH) - %
Mackay River - August 2017

| Maximum Value: 99 % on Aug 7 05:00 Maximum Daily Average: 93.1 % on Aug 6 | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|-----------------|---------------|---------------|--|--|--|
| Minimum Value: 25 % on Aug 28 15:00 Minimum Daily Average: 45.2 % on Aug 13 Maximum Diurnal Average: 85.4 % at hour 6 Minimum Diurnal Average: 45.7 % at hour 15 Monthly Average: 64.6 % Percentiles: P ₁ = 26 P ₁₀ = 34 Q ₁ = 47 Median = 67 Q ₃ = 82 P ₉₀ = 93 P ₉₉ = 98 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | |
| 1-Aug | 90 | 90 | 92 | 90 | 91 | 92 | 91 | 85 | 71 | 60 | 58 | 43 | 36 | 35 | 36 | 37 | 34 | 42 | 41 | 59 | 69 | 75 | 78 | 81 | 65.6 | 92 | | | |
| 2-Aug | 83 | 84 | 84 | 86 | 88 | 85 | 81 | 72 | 62 | 50 | 38 | 33 | 31 | 32 | 30 | 30 | 33 | 33 | 37 | 46 | 58 | 68 | 67 | 72 | 57.5 | 88 | | | |
| 3-Aug | 76 | 79 | 83 | 85 | 88 | 88 | 79 | 69 | 60 | 55 | 46 | 44 | 38 | 37 | 37 | 34 | 37 | 39 | 43 | 50 | 62 | 71 | 79 | 92 | 61.3 | 92 | | | |
| 4-Aug | 93 | 96 | 97 | 96 | 98 | 97 | 98 | 96 | 94 | 89 | 78 | 70 | 68 | 63 | 65 | 82 | 79 | 77 | 86 | 82 | 84 | 92 | 94 | 95 | 86.3 | 98 | | | |
| 5-Aug | 95 | 95 | 96 | 97 | 97 | 97 | 88 | 72 | 59 | 54 | 53 | 49 | 48 | 49 | 45 | 44 | 44 | 47 | 49 | 54 | 68 | 79 | 83 | 87 | 68.7 | 97 | | | |
| 6-Aug | 88 | 91 | 94 | 94 | 96 | 95 | 97 | 92 | 85 | 87 | 93 | 95 | 94 | 90 | 91 | 92 | 95 | 95 | 95 | 95 | 96 | 94 | 94 | 96 | 93.1 | 97 | | | |
| 7-Aug | 98 | 98 | 99 | 99 | 99 | 98 | 94 | 91 | 87 | 83 | 73 | 70 | 65 | 61 | 61 | 59 | 54 | 53 | 57 | 65 | 80 | 84 | 87 | 92 | 79.5 | 99 | | | |
| 8-Aug | 93 | 93 | 92 | 94 | 95 | 96 | 84 | 73 | 63 | 53 | 46 | 41 | 38 | 36 | 32 | 32 | 32 | 32 | 34 | 46 | 63 | 69 | 64 | 61 | 60.9 | 96 | | | |
| 9-Aug | 65 | 72 | 80 | 85 | 87 | 87 | 83 | 73 | 63 | 50 | 40 | 36 | 34 | 31 | 31 | 29 | 30 | 32 | 33 | 44 | 51 | 54 | 66 | 69 | 55.2 | 87 | | | |
| 10-Aug | 72 | 75 | 79 | 80 | 82 | 85 | 76 | 73 | 60 | 48 | 56 | 50 | 41 | 40 | 40 | 37 | 35 | 40 | 54 | 58 | 69 | 78 | 83 | 87 | 62.5 | 87 | | | |
| 11-Aug | 90 | 91 | 92 | 95 | 94 | 93 | 91 | 81 | 64 | 50 | 44 | 38 | 37 | 36 | 30 | 29 | 26 | 29 | 34 | 42 | 55 | 67 | 70 | 71 | 60.4 | 95 | | | |
| 12-Aug | 77 | 79 | 85 | 85 | 87 | 86 | 75 | 60 | 51 | 43 | 35 | 32 | 30 | 29 | 28 | 27 | 27 | 27 | 31 | 37 | 44 | 50 | 56 | 61 | 51.7 | 87 | | | |
| 13-Aug | 64 | 64 | 65 | 66 | 66 | 67 | 58 | 47 | 42 | 37 | 33 | 30 | 29 | 28 | 26 | 26 | 28 | 31 | 35 | 39 | 45 | 50 | 52 | 55 | 45.2 | 67 | | | |
| 14-Aug | 58 | 61 | 62 | 67 | 69 | 72 | 72 | 75 | 75 | 74 | 73 | 71 | 70 | 74 | 81 | 88 | 91 | 84 | 84 | 88 | 93 | 96 | 97 | 97 | 78.1 | 97 | | | |
| 15-Aug | 97 | 97 | 98 | 98 | 98 | 98 | 97 | 92 | 91 | 91 | 85 | 77 | 75 | 67 | 59 | 68 | 90 | 90 | 90 | 86 | 82 | 81 | 91 | 96 | 87.2 | 98 | | | |
| 16-Aug | 96 | 95 | 96 | 97 | 97 | 97 | 94 | 80 | 67 | 59 | 43 | 35 | 32 | 31 | 32 | 28 | 31 | 37 | 41 | 49 | 64 | 76 | 75 | 77 | 63.7 | 97 | | | |
| 17-Aug | 80 | 79 | 78 | 78 | 82 | 83 | 77 | 73 | 65 | 61 | 56 | 47 | 38 | 35 | 36 | 36 | 36 | 34 | 43 | 54 | 60 | 55 | 59 | 64 | 58.7 | 83 | | | |
| 18-Aug | 69 | 72 | 72 | 73 | 76 | 79 | 76 | 68 | 58 | 55 | 48 | 46 | 44 | 48 | 64 | 79 | 63 | 62 | 62 | 66 | 60 | 58 | 57 | 55 | 62.8 | 79 | | | |
| 19-Aug | 54 | 55 | 59 | 63 | 66 | 68 | 69 | 64 | 74 | 80 | 73 | 64 | 77 | 81 | 83 | 72 | 72 | 78 | 79 | 76 | 81 | 75 | 72 | 69 | 71.0 | 83 | | | |
| 20-Aug | 68 | 70 | 71 | 71 | 71 | 72 | 64 | 56 | 53 | 46 | 42 | 39 | 36 | 32 | 31 | 49 | 41 | 40 | 42 | 49 | 54 | 62 | 68 | 73 | 54.2 | 73 | | | |
| 21-Aug | 75 | 76 | 75 | 74 | 74 | 76 | 72 | 61 | 52 | 45 | 41 | 37 | 34 | 33 | 33 | 35 | 30 | 31 | 39 | 49 | 52 | 59 | 67 | 71 | 53.7 | 76 | | | |
| 22-Aug | 76 | 76 | 79 | 81 | 80 | 83 | 81 | 77 | 69 | 62 | 60 | 54 | 39 | 36 | 36 | 36 | 36 | 37 | 40 | 52 | 63 | 62 | 53 | 52 | 59.1 | 83 | | | |
| 23-Aug | 60 | 66 | 70 | 74 | 81 | 85 | 82 | 75 | 72 | 69 | 70 | 73 | 69 | 63 | 56 | 59 | 60 | 60 | 66 | 71 | 75 | 78 | 81 | 83 | 70.7 | 85 | | | |
| 24-Aug | 82 | 81 | 82 | 94 | 94 | 94 | 94 | 90 | 81 | 71 | 65 | 67 | 75 | 81 | 72 | 68 | 69 | 70 | 76 | 79 | 76 | 80 | 83 | 83 | 79.4 | 94 | | | |
| 25-Aug | 82 | 86 | 95 | 94 | 94 | 94 | 91 | 84 | 85 | 89 | 86 | 91 | 92 | 93 | 93 | 90 | 83 | 73 | 76 | 71 | 73 | 72 | 71 | 67 | 84.4 | 95 | | | |
| 26-Aug | 68 | 70 | 72 | 76 | 80 | 83 | 80 | 70 | 62 | 58 | 53 | 47 | 40 | 37 | 38 | 39 | 40 | 43 | 47 | 53 | 55 | 57 | 56 | 59 | 57.6 | 83 | | | |
| 27-Aug | 61 | 64 | 69 | 71 | 73 | 73 | 70 | 65 | 60 | 56 | 52 | 46 | 40 | 36 | 33 | 34 | 34 | 35 | 40 | 54 | 64 | 61 | 59 | 64 | 54.9 | 73 | | | |
| 28-Aug | 67 | 71 | 75 | 78 | 82 | 86 | 84 | 74 | 64 | 45 | 33 | 26 | 26 | 25 | 25 | 25 | 26 | 26 | 30 | 45 | 59 | 67 | 71 | 76 | 53.5 | 86 | | | |
| 29-Aug | 79 | 81 | 82 | 84 | 85 | 86 | 85 | 68 | 53 | 41 | 35 | 30 | 27 | 25 | 25 | 26 | 26 | 26 | 32 | 43 | 52 | 52 | 48 | 50 | 51.7 | 86 | | | |
| 30-Aug | 54 | 55 | 59 | 61 | 62 | 64 | 63 | 59 | 55 | 48 | 42 | 38 | 37 | 37 | 37 | 39 | 39 | 43 | 49 | 56 | 64 | 67 | 72 | 76 | 53.2 | 76 | | | |
| 31-Aug | 81 | 87 | 87 | 87 | 90 | 90 | 89 | 81 | 76 | 72 | 56 | 47 | 42 | 35 | 30 | 34 | 36 | 39 | 45 | 51 | 54 | 55 | 53 | 52 | 61.2 | 90 | | | |
| | | | | | | | | | | | | | | | | | | Diurnal Average | | | | | | Diurnal Maximum | | | | | |
| 77.1 79.0 81.3 83.0 84.6 85.4 81.7 74.2 66.8 60.7 55.0 50.5 47.8 46.3 45.7 47.3 47.0 48.0 51.9 58.4 65.4 69.1 71.1 73.7 | | | | | | | | | | | | | | | | | | 98 | | | | | | 99 | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Mackay River - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity (RH) - %
Mackay River - August 2017**

| Concentration Ranges (%) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 0 | 0.00 | 0.00 |
| 20 - 40 | 138 | 18.55 | 18.55 |
| 40 - 60 | 156 | 20.97 | 39.52 |
| 60 - 80 | 236 | 31.72 | 71.24 |
| 80 - 100 | 214 | 28.76 | 100.00 |

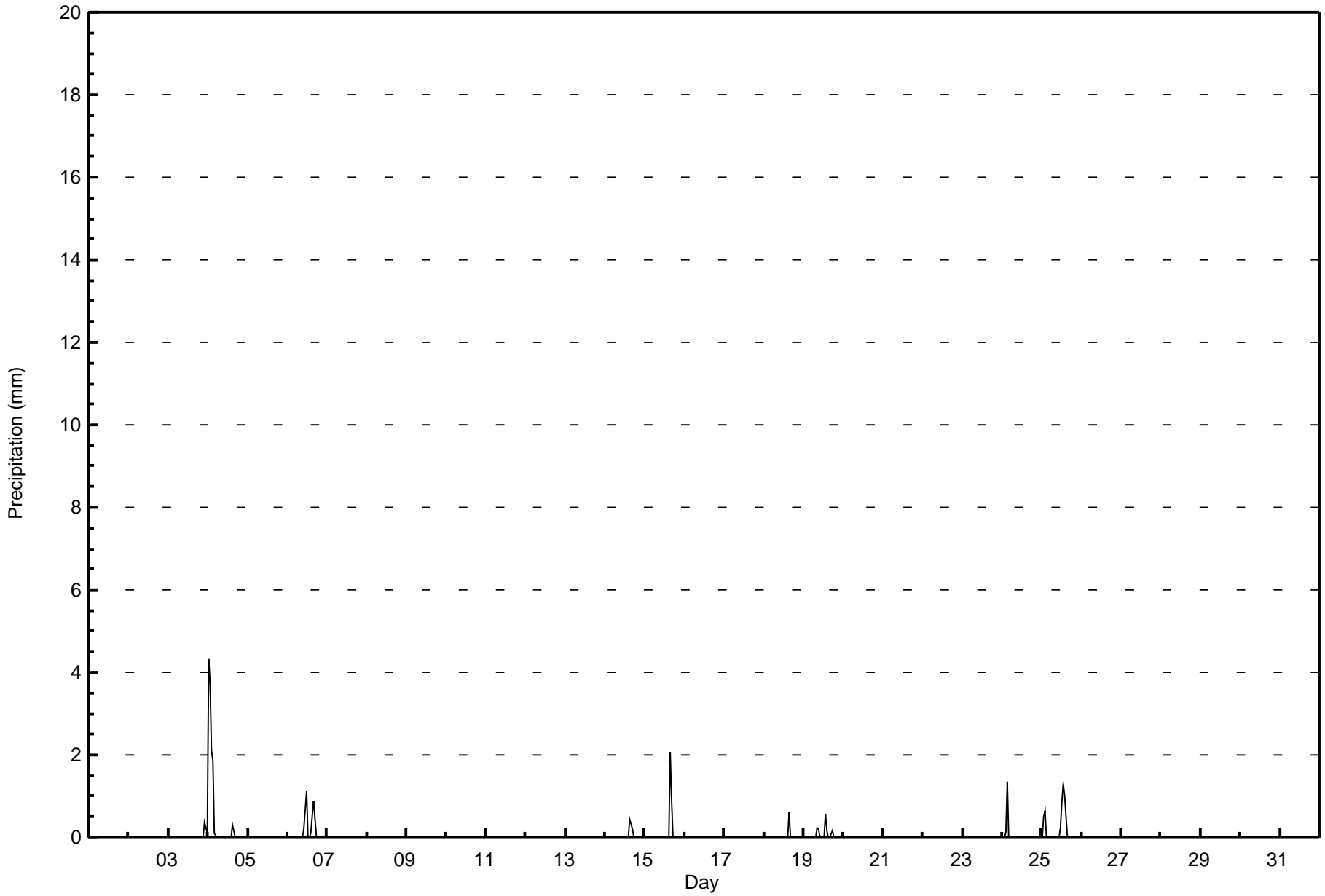
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Mackay River - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Precipitation (PC) - mm
Mackay River - August 2017

| Concentration Ranges (mm) | Number of Hours | % | Cumulative % |
|----------------------------------|------------------------|----------|---------------------|
| 0 - 0.3 | 725 | 97.45 | 97.45 |
| 0.4 - 0.5 | 4 | 0.54 | 97.98 |
| 0.6 - 0.7 | 3 | 0.40 | 98.39 |
| 0.8 - 1.4 | 7 | 0.94 | 99.33 |
| 1.5 - 10 | 5 | 0.67 | 100.00 |
| > 10 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Mackay River - August 2017

| | | |
|--|--|---------------------------------|
| Maximum Speed: 18 km/h on Aug 13 13:00 | Maximum Daily Speed Average: 10.7 km/h on Aug 13 | Hours in Service: 744 |
| Minimum Speed Value: 0 km/h on Aug 5 01:00 | Minimum Daily Speed Average: 0.7 km/h on Aug 7 | Hours of Data: 744 |
| Maximum Diurnal Speed Average: 4.2 km/h at hour 15 | Minimum Diurnal Speed Average: 3.0 km/h at hour 5 | Hours of Missing Data: 0 |
| Monthly Average Velocity: 3.5 km/h 207.6 deg | Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 4 Median = 6 Q ₃ = 9 P ₉₀ = 11 P ₉₉ = 16 | Percent Operational Time: 100.0 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|-------|------|------|-------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|-------|------|------|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | SW1 | WNW1 | WNW2 | SSW1 | S2 | W2 | W3 | WNW3 | N3 | NNE7 | NNE5 | NE7 | NE7 | N9 | NE7 | N7 | NNE7 | NNE3 | NW4 | SSE1 | SE2 | SW2 | SSE3 | SSE2 | N2.1 | N9 |
| 2-Aug | SSE2 | SE2 | SE2 | SE2 | SSE2 | SE2 | WSW3 | WSW4 | WSW5 | SW6 | WSW6 | WSW4 | WSW4 | W4 | WSW7 | WSW6 | SW3 | SSW5 | WSW6 | SSW2 | SSE3 | S4 | S5 | S6 | SW3.1 | WSW7 |
| 3-Aug | S6 | S6 | S6 | S6 | S6 | S7 | S7 | S7 | SSW6 | S7 | SSW7 | SSW7 | SSW4 | SSW7 | S7 | SSW5 | SW7 | SW5 | SW5 | WSW2 | NNE7 | NE2 | N4 | ENE2 | SSW4.2 | NNE7 |
| 4-Aug | N4 | NW4 | SSE5 | E1 | N3 | N2 | SSW1 | SSE3 | NNW2 | NE3 | SE2 | N3 | NNE8 | E8 | SE9 | SW3 | S1 | ENE2 | E3 | ESE4 | SE2 | SE1 | SSE1 | ESE1 | E1.4 | SE9 |
| 5-Aug | NE0 | SSE1 | SE2 | SSE3 | SSE3 | SW1 | S1 | SE4 | SSE8 | SE8 | S7 | SSE7 | SSE8 | SSE6 | S9 | S10 | SSW9 | S9 | SSW8 | SSW4 | S4 | S4 | S4 | S5 | S4.9 | S10 |
| 6-Aug | S6 | S6 | S6 | SSE4 | E1 | SE2 | NE1 | ENE6 | NE8 | NNE9 | NE8 | NNE9 | NNE11 | NNE10 | NNE9 | N7 | NE5 | NNE5 | N4 | N4 | N4 | NNE4 | NNE2 | NNE3 | NNE3.6 | NNE11 |
| 7-Aug | NNW1 | NW2 | WNW1 | WNW2 | NW2 | NNW3 | NNW3 | NNW4 | NNE6 | NNE7 | NNE6 | NNE5 | NE5 | NNW5 | NNW3 | ENE3 | SE2 | SSW4 | SSW5 | SSW6 | S4 | S6 | S5 | S5 | N0.7 | NNE7 |
| 8-Aug | S6 | SSW5 | SW4 | SW3 | SW4 | SW5 | SW5 | SW5 | WSW5 | WSW7 | W6 | SW5 | WSW4 | SSW7 | W6 | WNW6 | WNW5 | WNW5 | W5 | SSW2 | S4 | S5 | S6 | SSW6 | SW4.3 | WSW7 |
| 9-Aug | S6 | S5 | SE3 | SSE3 | SSE3 | SSE4 | S5 | SSW4 | SW5 | WSW4 | SW5 | SW5 | SW6 | WSW5 | SSW1 | WSW5 | SW5 | SSW7 | SSW5 | S4 | S4 | SW3 | SSE2 | SSE3 | SSW3.7 | SSW7 |
| 10-Aug | S3 | SE2 | SSE3 | SE3 | SSE5 | SSE4 | SSW4 | SSW4 | SW4 | W3 | WSW5 | SW5 | W4 | NW6 | NW8 | N5 | NE7 | SE10 | S12 | SSW5 | SSE1 | SSE3 | SSE5 | S6 | S2.2 | S12 |
| 11-Aug | S3 | SSE3 | SSE4 | SSE6 | SSE4 | SE3 | SSE6 | S6 | S8 | S7 | SSW9 | S10 | SSW9 | S8 | S9 | S9 | SSE10 | SSE9 | S9 | S5 | SSE3 | SE3 | S4 | S5 | S6.1 | SSE10 |
| 12-Aug | S4 | SSE4 | SSE4 | SSE5 | SE5 | SE6 | SSE7 | S11 | S12 | S12 | S15 | S16 | SSE16 | SSE17 | S17 | S16 | S15 | S14 | SSE11 | SSE9 | SSE7 | SSE7 | SE6 | SE7 | SSE9.8 | SSE17 |
| 13-Aug | SE7 | SE7 | SE7 | SE6 | SE6 | SE7 | SE8 | SE12 | SE12 | SE15 | SE16 | SE17 | SSE18 | SSE16 | SSE16 | SSE15 | SSE14 | SSE15 | SSE13 | SSE8 | SE8 | SE7 | SE6 | ESE5 | SE10.7 | SSE18 |
| 14-Aug | ESE6 | SE6 | SE6 | SE5 | ESE6 | SSE4 | SSE4 | SW4 | SW6 | WSW8 | WSW7 | WSW8 | WSW7 | SW9 | SW7 | SSW6 | SSW5 | S4 | S4 | SSE4 | SE4 | SE5 | SE6 | SE6 | S3.7 | SW9 |
| 15-Aug | SSE5 | SE7 | SSE5 | SSE3 | SSE4 | SSE3 | SW2 | WNW5 | WNW3 | W5 | W6 | W7 | WNW8 | NW10 | NW11 | WNW9 | NW9 | NW7 | W6 | WNW8 | WNW8 | NW7 | WNW1 | WSW3 | WNW3.6 | NW11 |
| 16-Aug | WSW5 | W4 | W1 | S1 | WSW2 | SW3 | SW2 | WSW5 | WSW5 | SW6 | WSW7 | W8 | WSW7 | WSW7 | SW7 | WSW9 | W7 | W10 | WSW7 | SW5 | SSW4 | S4 | SSW5 | SSW5 | WSW4.8 | W10 |
| 17-Aug | SW5 | WSW6 | WSW6 | WSW4 | WSW3 | WSW5 | W6 | WSW5 | WSW5 | WSW6 | W5 | W5 | WSW7 | W8 | WNW8 | WNW6 | WNW4 | W5 | SW3 | S2 | SSW5 | SW7 | SW6 | SSW6 | WSW4.8 | WNW8 |
| 18-Aug | S7 | S8 | SSW8 | SSW7 | S8 | S10 | S11 | SSW10 | SSW8 | SW9 | SW13 | SW12 | WSW14 | WSW14 | SW12 | S12 | SSW14 | SSW12 | SSW13 | SSW9 | SSW9 | SSW9 | SSW8 | SSW9 | SSW9.7 | WSW14 |
| 19-Aug | SW9 | WSW10 | WSW8 | WSW7 | WSW7 | WSW8 | WSW8 | WSW11 | WSW10 | WSW11 | WSW14 | WSW14 | W10 | WNW11 | WNW11 | NW12 | NNW7 | NW7 | WNW8 | W5 | SW5 | W5 | WSW6 | WSW5 | W7.6 | WSW14 |
| 20-Aug | SW6 | SW7 | SW7 | WSW8 | WSW7 | WSW7 | WSW8 | W11 | W10 | W12 | W13 | W13 | WNW14 | W14 | WNW15 | W11 | W11 | W11 | W9 | WSW6 | W7 | WSW5 | WSW5 | WSW6 | W8.9 | WNW15 |
| 21-Aug | WSW7 | WSW6 | WSW6 | WSW6 | WSW6 | WSW7 | WSW7 | WSW7 | WSW7 | SW7 | SW7 | WSW8 | W9 | WSW12 | W11 | W8 | W10 | WNW9 | WSW3 | SSW4 | SW4 | SW4 | S1 | NW1 | WSW6.1 | WSW12 |
| 22-Aug | NNE1 | NNW2 | SSE1 | NNE3 | NE2 | NNW1 | W2 | N5 | NNE5 | NE4 | N5 | NE3 | ESE6 | SE4 | SSE6 | SSE4 | SE1 | ENE7 | NE5 | ESE3 | SE3 | ESE5 | ESE6 | ESE6 | E2.0 | ENE7 |
| 23-Aug | SE5 | SE6 | SE6 | SE7 | SE6 | SE7 | SSE8 | S10 | S10 | S11 | S8 | S7 | SSE8 | SSE11 | SSE13 | SE13 | SE10 | SE10 | SE8 | SE6 | SE5 | SE8 | SE7 | SE6 | SSE7.7 | SSE13 |
| 24-Aug | SE6 | SE7 | SSE8 | SSE7 | SE8 | ESE6 | E2 | ESE7 | ESE9 | ESE7 | E7 | ESE8 | ESE7 | ENE7 | ESE7 | ESE11 | ESE10 | ESE6 | S2 | SE3 | SSW8 | WSW10 | SW7 | SW11 | SE4.9 | SW11 |
| 25-Aug | SW9 | SW10 | SW8 | SW9 | SSW9 | SSW9 | SSW9 | SSW11 | SSW13 | SSW10 | SSW12 | SW11 | WSW17 | WSW13 | SW16 | WSW13 | WSW12 | WSW11 | SW9 | SW10 | SW11 | SW11 | SW11 | SW11 | SW10.6 | WSW17 |
| 26-Aug | WSW10 | SW9 | SW9 | SW8 | SW8 | SW8 | SW7 | SW7 | WSW10 | WSW9 | WSW10 | SW10 | WSW12 | WSW13 | SW12 | WSW10 | WSW11 | WSW11 | SW9 | SSW7 | SSW7 | SSW8 | SSW8 | SSW8 | SW8.9 | WSW13 |
| 27-Aug | SW8 | SW7 | SW8 | SW8 | SW8 | SW8 | WSW9 | WSW10 | W10 | W12 | WSW11 | W12 | W13 | W13 | W12 | W11 | W10 | W9 | W6 | S2 | SSE2 | SW4 | W4 | WSW6 | WSW7.9 | W13 |
| 28-Aug | W6 | W6 | WSW5 | WSW5 | WSW4 | W5 | WSW5 | W5 | W5 | WNW7 | WNW9 | WNW11 | WNW10 | W10 | WNW12 | WNW13 | WNW11 | WNW10 | WNW7 | WNW1 | SSE2 | SSE2 | SSE2 | SSE2 | W5.6 | WNW13 |
| 29-Aug | S2 | WSW1 | S2 | SSE1 | SSE2 | SSE1 | WSW2 | WSW3 | WSW3 | W4 | NNW5 | NNE6 | NW4 | E4 | ESE2 | SSE6 | SE7 | ESE8 | ESE8 | ESE4 | ESE5 | ESE6 | ESE8 | ESE8 | ESE2.2 | ESE8 |
| 30-Aug | ESE7 | ESE7 | SE7 | ESE8 | ESE10 | SE11 | SE11 | SE10 | ESE11 | SE13 | SE13 | SE15 | SE15 | SE16 | SSE16 | SSE15 | S13 | S12 | S10 | S8 | S7 | SSW10 | SSW9 | S7 | SSE9.9 | SE16 |
| 31-Aug | S7 | S4 | SSE3 | SSE3 | SW2 | WSW3 | SSW3 | SSW4 | SSW6 | SW7 | WSW10 | WSW11 | WSW11 | W12 | W13 | W13 | W13 | W13 | WSW8 | SW5 | SW6 | SW7 | SW7 | WSW8 | WSW6.5 | W13 |

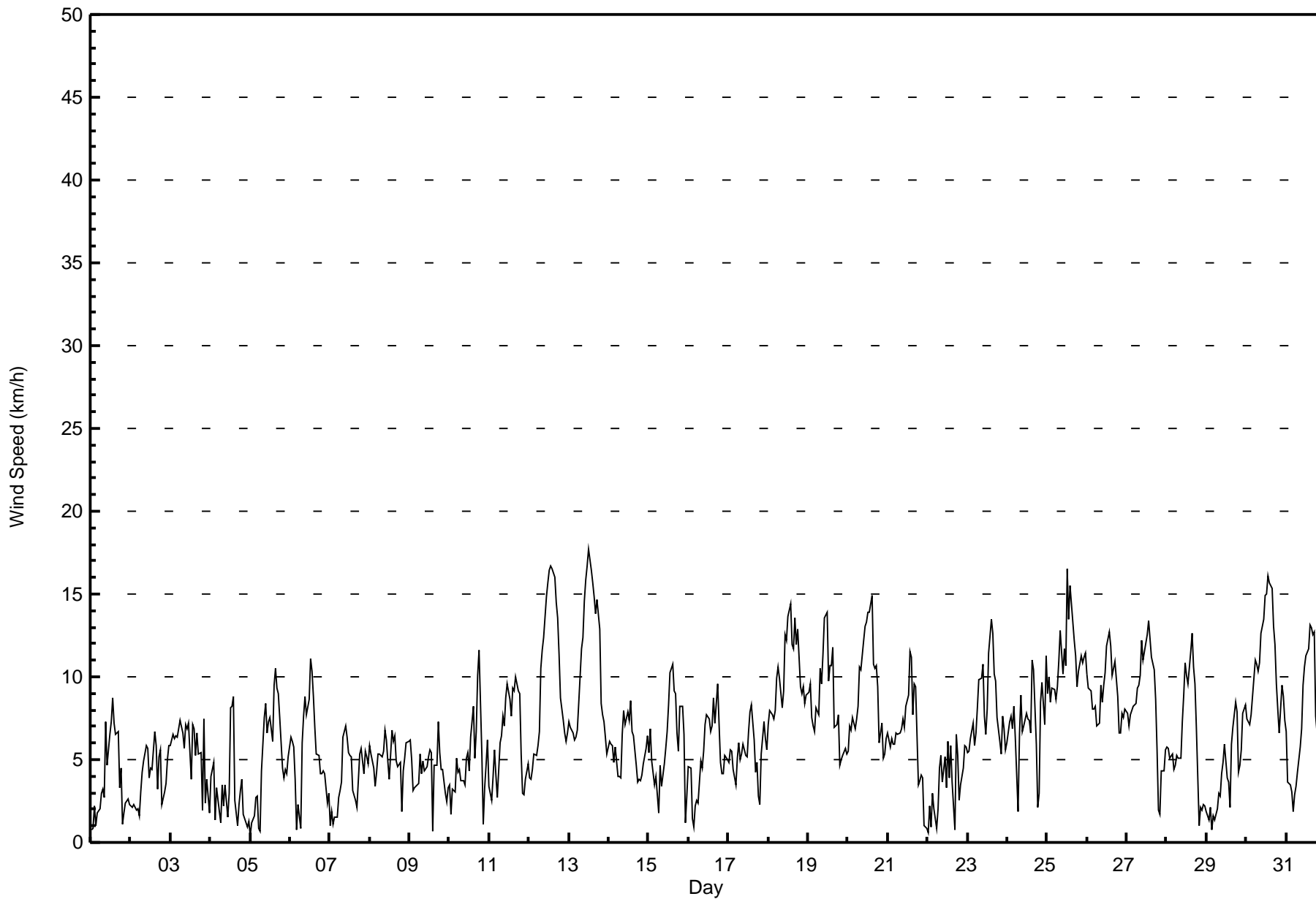
| | | | | | | | | | | | | | | | | | | | | | | | | |
|--------|--------|------|------|-------|--------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|------|--------|------|--------|-----------------|
| SSW3.5 | SSW3.3 | S3.5 | S3.2 | S3.0 | SSW3.1 | SSW3.6 | SSW3.9 | SSW3.6 | SW3.5 | SW4.1 | SW4.1 | SW3.9 | SW4.0 | SW4.2 | SW4.0 | SW3.4 | SW3.7 | SSW3.9 | SSW3.1 | S3.1 | SSW3.4 | S3.6 | SSW3.7 | Diurnal Average |
| WSW10 | SW10 | SW9 | SW9 | ESE10 | SE11 | SE11 | SE12 | SSW13 | SE15 | SE16 | SE17 | SSE18 | SSE17 | S17 | S16 | S15 | SSE15 | SSW13 | SW10 | SW11 | SW11 | SW11 | SW11 | Diurnal Maximum |

All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Mackay River - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Mackay River - August 2017**

| Wind Speed Ranges (km/h) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 5 | 303 | 40.73 | 40.73 |
| 6 - 11 | 366 | 49.19 | 89.92 |
| 12 - 19 | 75 | 10.08 | 100.00 |
| 20 - 28 | 0 | 0.00 | 100.00 |
| 29 - 38 | 0 | 0.00 | 100.00 |
| > 38 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Mackay River - August 2017**

| Wind Speed Ranges (km/h) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-----------------------------|----------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 5 | 12 | 10 | 9 | 4 | 5 | 8 | 27 | 51 | 35 | 25 | 34 | 35 | 20 | 12 | 6 | 10 | 303 |
| 6 - 11 | 3 | 13 | 6 | 3 | 2 | 25 | 41 | 21 | 47 | 37 | 49 | 62 | 30 | 18 | 8 | 1 | 366 |
| 12 - 19 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 12 | 12 | 5 | 5 | 11 | 14 | 4 | 1 | 0 | 75 |
| 20 - 28 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29 - 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 15 | 23 | 15 | 7 | 7 | 33 | 79 | 84 | 94 | 67 | 88 | 108 | 64 | 34 | 15 | 11 | 744 |

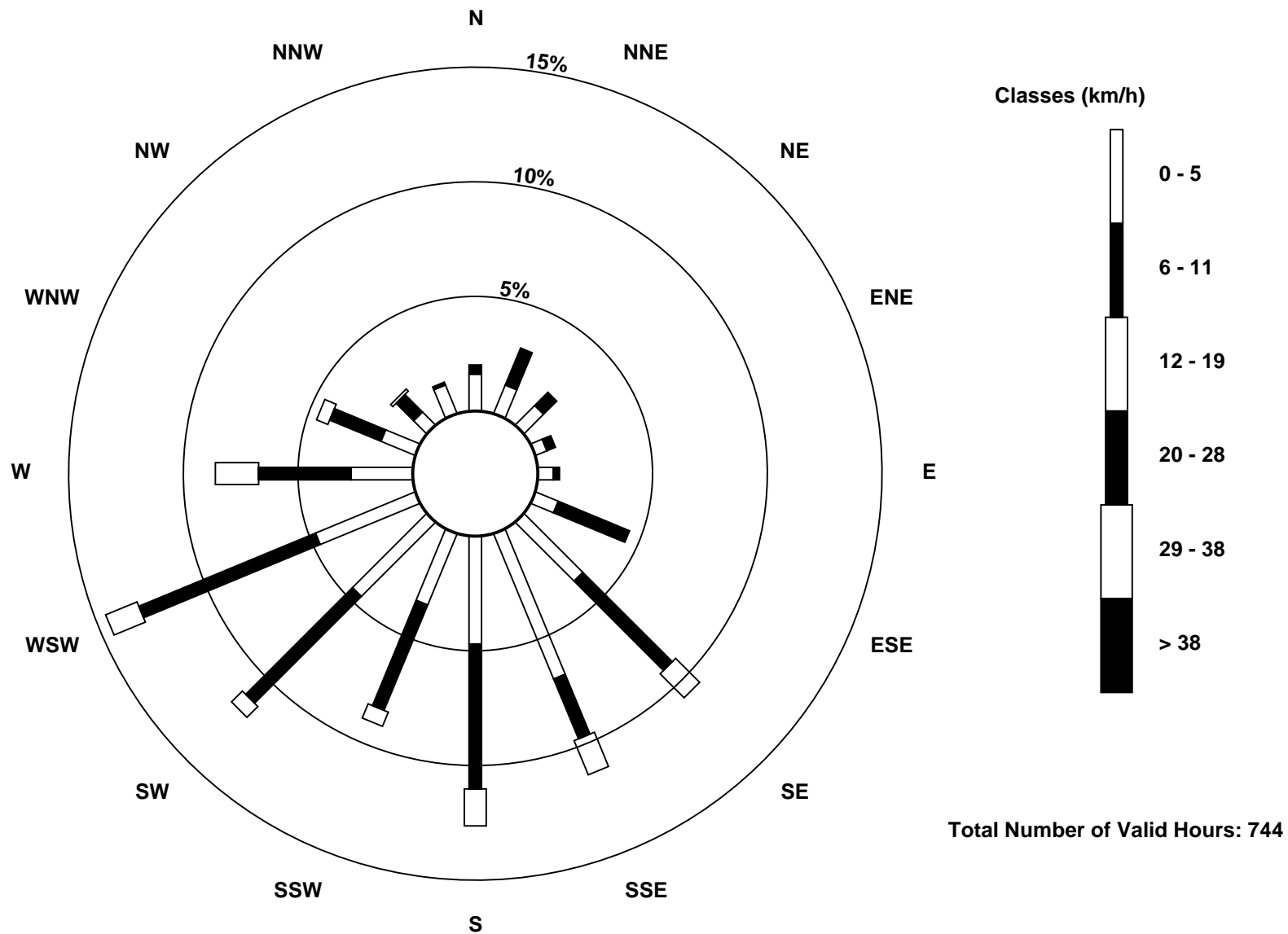
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Wind Speed (WS) - km/h
Mackay River (AMS 20)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Mackay River - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Aug 20 16:00 Minimum Value: 0 km/h on Aug 2 02:00 Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 6 | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | |
|--|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 3 | 2 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 0 | 4 |
| 2-Aug | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 3 |
| 3-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 4 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 3 | 1 | 3 | 1 | 4 |
| 4-Aug | 3 | 3 | 2 | 3 | 3 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 3 |
| 5-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 4 |
| 6-Aug | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 3 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 2 | 2 | 1 | 1 | 4 |
| 7-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 |
| 8-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 3 |
| 9-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 0 | 3 |
| 10-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 4 | 3 | 1 | 1 | 2 | 1 | 4 |
| 11-Aug | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 2 | 1 | 1 | 2 | 1 | 4 |
| 12-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 4 | 4 | 4 | 5 | 5 | 6 | 6 | 5 | 5 | 5 | 5 | 4 | 3 | 2 | 2 | 1 | 2 | 6 |
| 13-Aug | 2 | 2 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 5 | 6 | 6 | 6 | 6 | 5 | 5 | 5 | 4 | 3 | 2 | 2 | 2 | 1 | 6 |
| 14-Aug | 2 | 2 | 1 | 1 | 2 | 2 | 1 | 1 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 3 |
| 15-Aug | 2 | 2 | 1 | 1 | 2 | 2 | 1 | 2 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 4 | 3 | 2 | 2 | 2 | 3 | 2 | 1 | 1 | 4 |
| 16-Aug | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 4 | 3 | 2 | 1 | 1 | 1 | 1 | 4 |
| 17-Aug | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 3 | 1 | 1 | 2 | 2 | 2 | 1 | 3 |
| 18-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 5 | 5 | 6 | 7 | 5 | 3 | 5 | 4 | 4 | 3 | 3 | 3 | 2 | 3 | 7 |
| 19-Aug | 3 | 4 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 5 | 6 | 7 | 5 | 5 | 4 | 4 | 3 | 4 | 5 | 2 | 1 | 2 | 2 | 2 | 7 |
| 20-Aug | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 5 | 5 | 6 | 6 | 6 | 7 | 8 | 5 | 5 | 4 | 3 | 3 | 2 | 2 | 2 | 8 |
| 21-Aug | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 5 | 5 | 3 | 4 | 3 | 2 | 1 | 1 | 1 | 2 | 2 | 5 |
| 22-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 3 |
| 23-Aug | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 3 | 3 | 2 | 2 | 1 | 2 | 2 | 1 | 4 |
| 24-Aug | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 1 | 1 | 4 | 4 | 3 | 5 | 5 |
| 25-Aug | 3 | 4 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 3 | 4 | 5 | 7 | 6 | 6 | 5 | 5 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 7 |
| 26-Aug | 4 | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 4 | 3 | 4 | 4 | 5 | 5 | 5 | 4 | 4 | 5 | 4 | 2 | 2 | 3 | 2 | 2 | 5 |
| 27-Aug | 3 | 2 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 6 | 5 | 5 | 4 | 4 | 3 | 1 | 1 | 1 | 2 | 2 | 6 |
| 28-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 5 | 4 | 5 | 5 | 4 | 4 | 3 | 2 | 0 | 1 | 1 | 0 | 5 |
| 29-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 2 | 2 | 3 |
| 30-Aug | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 5 | 5 | 6 | 5 | 5 | 5 | 4 | 3 | 3 | 2 | 3 | 3 | 2 | 6 |
| 31-Aug | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 4 | 5 | 5 | 6 | 5 | 5 | 5 | 3 | 2 | 2 | 2 | 3 | 3 | 6 |
| | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | | | |



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Mackay River - August 2017

| | | | |
|---|--|---------------------------|-------|
| Direction of Maximum Speed: 155 deg on Aug 13 13:00 | | Hours in Service: | 744 |
| Direction of Maximum Daily Speed Average: 144.5 deg on Aug 13 | | Hours of Data: | 744 |
| Direction of Minimum Speed: 56 deg on Aug 5 01:00 | | Hours of Missing Data: | 0 |
| Direction of Minimum Daily Speed Average: 0.7 deg on Aug 7 | | Percent Operational Time: | 100.0 |
| Monthly Average Direction: 223.2 deg | | | |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average |
|--------|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 232 | 287 | 299 | 203 | 180 | 265 | 264 | 291 | 352 | 23 | 30 | 35 | 38 | 3 | 36 | 2 | 23 | 18 | 326 | 156 | 130 | 222 | 155 | 163 | 11.0 |
| 2-Aug | 156 | 142 | 139 | 145 | 147 | 129 | 239 | 245 | 251 | 233 | 258 | 245 | 250 | 263 | 252 | 242 | 223 | 195 | 241 | 205 | 160 | 178 | 187 | 183 | 219.2 |
| 3-Aug | 182 | 183 | 186 | 178 | 177 | 181 | 179 | 182 | 194 | 172 | 196 | 213 | 194 | 199 | 180 | 207 | 224 | 236 | 225 | 242 | 33 | 38 | 351 | 61 | 191.9 |
| 4-Aug | 355 | 311 | 150 | 95 | 359 | 7 | 197 | 152 | 347 | 36 | 131 | 11 | 22 | 84 | 129 | 215 | 174 | 74 | 87 | 117 | 132 | 128 | 153 | 112 | 80.2 |
| 5-Aug | 56 | 161 | 136 | 149 | 151 | 218 | 184 | 143 | 161 | 141 | 179 | 167 | 153 | 151 | 171 | 190 | 208 | 178 | 199 | 200 | 180 | 185 | 182 | 180 | 173.4 |
| 6-Aug | 187 | 184 | 181 | 163 | 98 | 139 | 51 | 67 | 41 | 33 | 39 | 20 | 26 | 13 | 26 | 11 | 36 | 18 | 3 | 349 | 359 | 26 | 21 | 17 | 32.7 |
| 7-Aug | 346 | 322 | 289 | 290 | 306 | 340 | 346 | 343 | 16 | 24 | 16 | 14 | 40 | 346 | 337 | 78 | 127 | 203 | 207 | 208 | 182 | 184 | 177 | 170 | 355.8 |
| 8-Aug | 180 | 199 | 217 | 230 | 226 | 225 | 236 | 235 | 254 | 241 | 262 | 233 | 239 | 208 | 269 | 285 | 290 | 293 | 268 | 208 | 175 | 182 | 191 | 195 | 231.2 |
| 9-Aug | 189 | 188 | 142 | 152 | 153 | 150 | 173 | 192 | 226 | 241 | 218 | 221 | 236 | 237 | 199 | 256 | 228 | 195 | 197 | 187 | 181 | 220 | 152 | 151 | 199.0 |
| 10-Aug | 178 | 144 | 156 | 132 | 155 | 148 | 193 | 203 | 228 | 265 | 245 | 232 | 262 | 319 | 324 | 358 | 46 | 137 | 182 | 201 | 157 | 147 | 166 | 184 | 190.5 |
| 11-Aug | 171 | 152 | 156 | 157 | 147 | 145 | 168 | 171 | 176 | 184 | 201 | 179 | 194 | 183 | 171 | 176 | 162 | 167 | 182 | 172 | 147 | 139 | 175 | 175 | 172.9 |
| 12-Aug | 169 | 162 | 149 | 160 | 145 | 143 | 155 | 178 | 176 | 177 | 176 | 179 | 163 | 165 | 170 | 176 | 177 | 178 | 168 | 156 | 153 | 152 | 140 | 139 | 166.9 |
| 13-Aug | 135 | 139 | 139 | 136 | 132 | 127 | 136 | 145 | 138 | 128 | 133 | 143 | 155 | 157 | 160 | 152 | 150 | 154 | 159 | 152 | 146 | 135 | 135 | 123 | 144.5 |
| 14-Aug | 122 | 124 | 124 | 138 | 120 | 168 | 161 | 233 | 233 | 252 | 255 | 241 | 243 | 234 | 221 | 207 | 208 | 185 | 186 | 147 | 133 | 141 | 141 | 142 | 188.2 |
| 15-Aug | 159 | 142 | 148 | 155 | 156 | 160 | 217 | 283 | 282 | 270 | 260 | 272 | 299 | 308 | 316 | 283 | 317 | 312 | 279 | 303 | 302 | 306 | 297 | 251 | 283.3 |
| 16-Aug | 257 | 260 | 262 | 181 | 246 | 229 | 222 | 239 | 241 | 232 | 239 | 272 | 242 | 254 | 235 | 257 | 276 | 264 | 257 | 220 | 196 | 185 | 203 | 200 | 242.3 |
| 17-Aug | 219 | 240 | 240 | 243 | 247 | 248 | 263 | 254 | 248 | 256 | 260 | 264 | 258 | 264 | 299 | 290 | 284 | 280 | 219 | 181 | 202 | 221 | 216 | 208 | 249.4 |
| 18-Aug | 186 | 186 | 201 | 195 | 185 | 189 | 188 | 198 | 210 | 215 | 216 | 227 | 245 | 255 | 215 | 186 | 201 | 204 | 200 | 194 | 203 | 202 | 202 | 213 | 206.7 |
| 19-Aug | 225 | 237 | 248 | 242 | 246 | 247 | 240 | 241 | 238 | 238 | 242 | 256 | 266 | 282 | 297 | 312 | 331 | 308 | 297 | 277 | 231 | 264 | 240 | 242 | 259.3 |
| 20-Aug | 235 | 225 | 233 | 242 | 251 | 245 | 247 | 264 | 262 | 265 | 277 | 279 | 284 | 277 | 290 | 275 | 266 | 268 | 272 | 258 | 262 | 257 | 253 | 257 | 264.6 |
| 21-Aug | 256 | 252 | 244 | 245 | 243 | 251 | 257 | 243 | 238 | 232 | 234 | 240 | 260 | 256 | 271 | 272 | 278 | 287 | 245 | 209 | 221 | 215 | 186 | 325 | 251.9 |
| 22-Aug | 23 | 335 | 162 | 31 | 37 | 327 | 278 | 358 | 27 | 46 | 10 | 40 | 121 | 129 | 159 | 167 | 131 | 67 | 50 | 107 | 125 | 121 | 121 | 121 | 83.1 |
| 23-Aug | 132 | 126 | 129 | 139 | 144 | 145 | 151 | 174 | 173 | 177 | 181 | 170 | 155 | 147 | 150 | 137 | 139 | 137 | 130 | 129 | 127 | 132 | 132 | 135 | 147.1 |
| 24-Aug | 134 | 133 | 151 | 149 | 128 | 122 | 98 | 119 | 115 | 112 | 101 | 113 | 106 | 77 | 119 | 109 | 109 | 115 | 184 | 126 | 211 | 250 | 236 | 235 | 134.4 |
| 25-Aug | 225 | 221 | 217 | 217 | 213 | 204 | 200 | 196 | 203 | 197 | 201 | 225 | 247 | 239 | 234 | 241 | 253 | 256 | 230 | 227 | 222 | 226 | 221 | 234 | 224.3 |
| 26-Aug | 237 | 235 | 233 | 226 | 220 | 216 | 219 | 229 | 247 | 240 | 240 | 234 | 243 | 244 | 232 | 244 | 239 | 237 | 226 | 213 | 201 | 209 | 206 | 211 | 230.2 |
| 27-Aug | 222 | 221 | 218 | 225 | 230 | 231 | 237 | 245 | 260 | 259 | 254 | 264 | 265 | 266 | 264 | 269 | 272 | 271 | 272 | 183 | 157 | 216 | 264 | 254 | 250.7 |
| 28-Aug | 260 | 266 | 251 | 251 | 238 | 264 | 256 | 265 | 273 | 299 | 299 | 299 | 285 | 276 | 283 | 290 | 283 | 289 | 295 | 299 | 155 | 156 | 149 | 165 | 276.8 |
| 29-Aug | 172 | 250 | 184 | 168 | 147 | 166 | 250 | 249 | 241 | 280 | 346 | 27 | 322 | 80 | 114 | 150 | 130 | 115 | 108 | 118 | 114 | 121 | 121 | 120 | 122.8 |
| 30-Aug | 121 | 116 | 125 | 119 | 123 | 125 | 126 | 125 | 123 | 133 | 135 | 143 | 139 | 145 | 150 | 149 | 172 | 185 | 173 | 183 | 185 | 194 | 194 | 187 | 147.5 |
| 31-Aug | 182 | 180 | 163 | 160 | 224 | 257 | 208 | 203 | 209 | 224 | 253 | 239 | 242 | 260 | 268 | 269 | 274 | 262 | 258 | 233 | 231 | 235 | 234 | 255 | 242.8 |

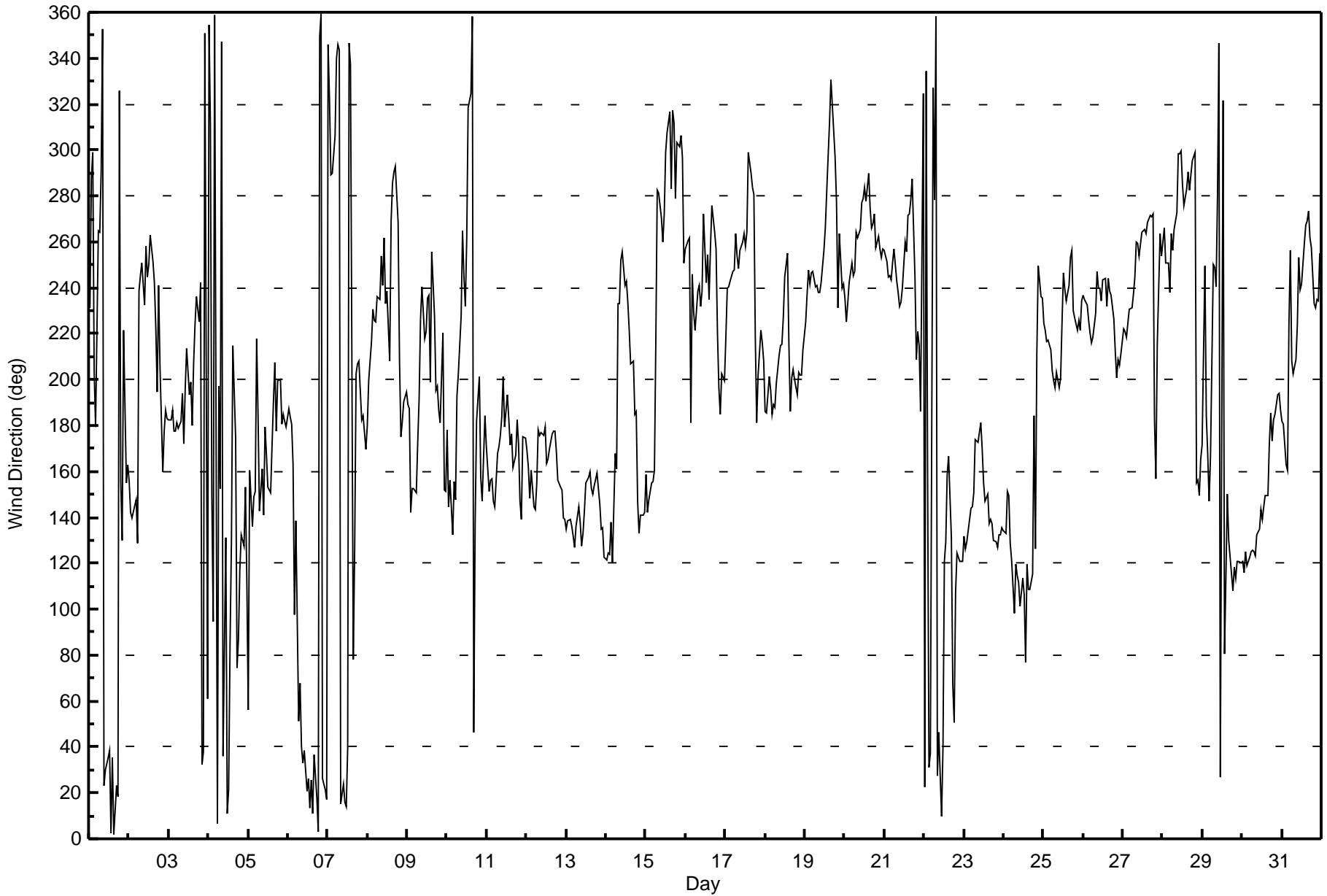
| | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 193.0 | 196.2 | 188.6 | 186.2 | 183.6 | 192.9 | 202.1 | 206.5 | 211.4 | 214.0 | 223.3 | 226.2 | 231.1 | 234.7 | 226.3 | 226.2 | 224.0 | 216.0 | 212.9 | 194.9 | 188.4 | 194.8 | 188.4 | 192.6 |
| Diurnal Average | | | | | | | | | | | | | | | | | | | | | | | |

All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Mackay River - August 2017





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Mackay River - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 111 deg on Aug 9 15:00 | | Hours in Service: 744 Hours of Data: 744 | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|--|----|----|----|----|----|----|----|----|----|----|----|----|-----|----|----|----|----|----|----|----|----|----|---------------|
| Minimum Value: 7 deg on Aug 28 21:00 | | Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | |
| Percentiles: P ₁ = 12 P ₁₀ = 17 Q ₁ = 24 Median = 33 Q ₃ = 47 P ₉₀ = 57 P ₉₉ = 82 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 45 | 61 | 21 | 60 | 25 | 32 | 36 | 34 | 62 | 38 | 53 | 49 | 50 | 39 | 56 | 49 | 55 | 44 | 23 | 56 | 26 | 40 | 16 | 22 | 62 |
| 2-Aug | 23 | 17 | 15 | 34 | 23 | 27 | 45 | 47 | 53 | 44 | 61 | 78 | 78 | 79 | 57 | 47 | 64 | 52 | 41 | 31 | 10 | 14 | 15 | 13 | 79 |
| 3-Aug | 12 | 13 | 15 | 12 | 12 | 15 | 20 | 29 | 40 | 33 | 63 | 45 | 81 | 59 | 56 | 53 | 38 | 41 | 30 | 55 | 34 | 37 | 59 | 45 | 81 |
| 4-Aug | 62 | 59 | 36 | 96 | 57 | 35 | 67 | 23 | 82 | 45 | 81 | 81 | 26 | 43 | 40 | 56 | 82 | 59 | 30 | 17 | 74 | 46 | 87 | 53 | 96 |
| 5-Aug | 84 | 54 | 36 | 18 | 21 | 75 | 75 | 26 | 29 | 33 | 50 | 49 | 41 | 61 | 43 | 32 | 38 | 30 | 29 | 25 | 12 | 13 | 15 | 12 | 84 |
| 6-Aug | 17 | 14 | 14 | 40 | 73 | 39 | 81 | 33 | 34 | 26 | 30 | 29 | 28 | 24 | 28 | 28 | 34 | 25 | 29 | 26 | 25 | 23 | 29 | 28 | 81 |
| 7-Aug | 40 | 32 | 26 | 30 | 29 | 19 | 32 | 30 | 29 | 27 | 33 | 35 | 51 | 49 | 68 | 77 | 82 | 61 | 33 | 21 | 14 | 14 | 13 | 12 | 82 |
| 8-Aug | 12 | 18 | 21 | 17 | 18 | 21 | 29 | 33 | 47 | 46 | 54 | 64 | 80 | 48 | 58 | 65 | 72 | 53 | 49 | 47 | 14 | 11 | 17 | 17 | 80 |
| 9-Aug | 15 | 17 | 24 | 14 | 17 | 14 | 16 | 34 | 36 | 55 | 65 | 60 | 61 | 66 | 111 | 70 | 67 | 31 | 25 | 15 | 17 | 44 | 30 | 13 | 111 |
| 10-Aug | 28 | 52 | 15 | 30 | 12 | 21 | 25 | 31 | 50 | 68 | 40 | 47 | 64 | 55 | 30 | 64 | 33 | 39 | 28 | 53 | 75 | 19 | 24 | 16 | 75 |
| 11-Aug | 28 | 37 | 20 | 13 | 17 | 28 | 19 | 21 | 26 | 37 | 37 | 37 | 42 | 55 | 39 | 36 | 32 | 28 | 27 | 23 | 28 | 17 | 19 | 16 | 55 |
| 12-Aug | 18 | 15 | 16 | 21 | 16 | 18 | 24 | 26 | 26 | 29 | 28 | 29 | 30 | 30 | 30 | 28 | 30 | 28 | 27 | 26 | 26 | 25 | 19 | 21 | 30 |
| 13-Aug | 20 | 21 | 21 | 20 | 20 | 17 | 20 | 23 | 26 | 24 | 27 | 30 | 30 | 31 | 32 | 30 | 29 | 28 | 27 | 26 | 22 | 20 | 21 | 16 | 32 |
| 14-Aug | 15 | 17 | 16 | 27 | 30 | 40 | 32 | 41 | 36 | 46 | 50 | 44 | 46 | 39 | 34 | 28 | 34 | 47 | 26 | 25 | 16 | 18 | 20 | 22 | 50 |
| 15-Aug | 24 | 18 | 18 | 24 | 37 | 39 | 70 | 41 | 44 | 41 | 45 | 46 | 33 | 29 | 25 | 39 | 30 | 28 | 38 | 21 | 22 | 22 | 52 | 16 | 70 |
| 16-Aug | 50 | 56 | 73 | 58 | 15 | 23 | 49 | 35 | 48 | 44 | 47 | 48 | 52 | 54 | 49 | 47 | 47 | 47 | 46 | 25 | 15 | 16 | 17 | 17 | 73 |
| 17-Aug | 25 | 33 | 36 | 49 | 46 | 49 | 57 | 56 | 46 | 49 | 48 | 58 | 56 | 51 | 38 | 40 | 49 | 54 | 30 | 31 | 20 | 27 | 23 | 18 | 58 |
| 18-Aug | 15 | 15 | 20 | 18 | 17 | 17 | 18 | 22 | 30 | 29 | 30 | 38 | 45 | 42 | 40 | 25 | 28 | 27 | 25 | 24 | 23 | 23 | 23 | 24 | 45 |
| 19-Aug | 29 | 39 | 47 | 44 | 49 | 45 | 43 | 41 | 41 | 39 | 44 | 48 | 48 | 39 | 29 | 26 | 32 | 44 | 43 | 42 | 28 | 45 | 35 | 46 | 49 |
| 20-Aug | 35 | 23 | 35 | 39 | 50 | 47 | 50 | 48 | 47 | 50 | 43 | 42 | 39 | 46 | 40 | 48 | 50 | 48 | 42 | 47 | 44 | 49 | 41 | 42 | 50 |
| 21-Aug | 48 | 48 | 42 | 41 | 46 | 47 | 48 | 48 | 42 | 38 | 37 | 47 | 49 | 44 | 44 | 46 | 44 | 34 | 43 | 19 | 19 | 18 | 74 | 81 | 81 |
| 22-Aug | 69 | 15 | 62 | 35 | 52 | 75 | 47 | 27 | 30 | 41 | 35 | 78 | 52 | 79 | 66 | 83 | 96 | 32 | 28 | 24 | 16 | 15 | 16 | 18 | 96 |
| 23-Aug | 17 | 18 | 19 | 22 | 24 | 22 | 23 | 27 | 25 | 24 | 26 | 28 | 27 | 26 | 26 | 26 | 25 | 24 | 22 | 20 | 18 | 19 | 19 | 20 | 28 |
| 24-Aug | 21 | 21 | 24 | 27 | 23 | 19 | 62 | 20 | 19 | 33 | 31 | 26 | 32 | 36 | 47 | 25 | 22 | 42 | 48 | 37 | 34 | 46 | 43 | 39 | 62 |
| 25-Aug | 34 | 31 | 29 | 29 | 26 | 24 | 25 | 25 | 27 | 25 | 27 | 38 | 44 | 45 | 38 | 42 | 47 | 47 | 37 | 33 | 30 | 33 | 29 | 35 | 47 |
| 26-Aug | 39 | 37 | 34 | 29 | 26 | 25 | 27 | 32 | 48 | 44 | 44 | 47 | 47 | 44 | 43 | 51 | 44 | 41 | 33 | 23 | 22 | 26 | 23 | 24 | 51 |
| 27-Aug | 29 | 28 | 26 | 28 | 31 | 36 | 44 | 41 | 49 | 43 | 45 | 47 | 47 | 46 | 48 | 46 | 49 | 47 | 47 | 33 | 52 | 23 | 41 | 44 | 52 |
| 28-Aug | 47 | 45 | 49 | 48 | 40 | 40 | 51 | 49 | 47 | 37 | 38 | 33 | 46 | 49 | 48 | 34 | 39 | 40 | 28 | 81 | 7 | 9 | 11 | 8 | 81 |
| 29-Aug | 20 | 31 | 37 | 70 | 44 | 36 | 27 | 46 | 69 | 56 | 66 | 55 | 74 | 81 | 94 | 49 | 40 | 23 | 18 | 14 | 15 | 15 | 15 | 18 | 94 |
| 30-Aug | 17 | 18 | 19 | 17 | 19 | 20 | 20 | 21 | 21 | 24 | 27 | 28 | 28 | 28 | 29 | 26 | 29 | 24 | 26 | 26 | 22 | 21 | 21 | 20 | 29 |
| 31-Aug | 20 | 20 | 16 | 21 | 68 | 57 | 43 | 56 | 39 | 37 | 50 | 39 | 43 | 48 | 44 | 48 | 43 | 45 | 49 | 35 | 31 | 35 | 41 | 51 | 68 |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association

SO₂ Calibration Summary

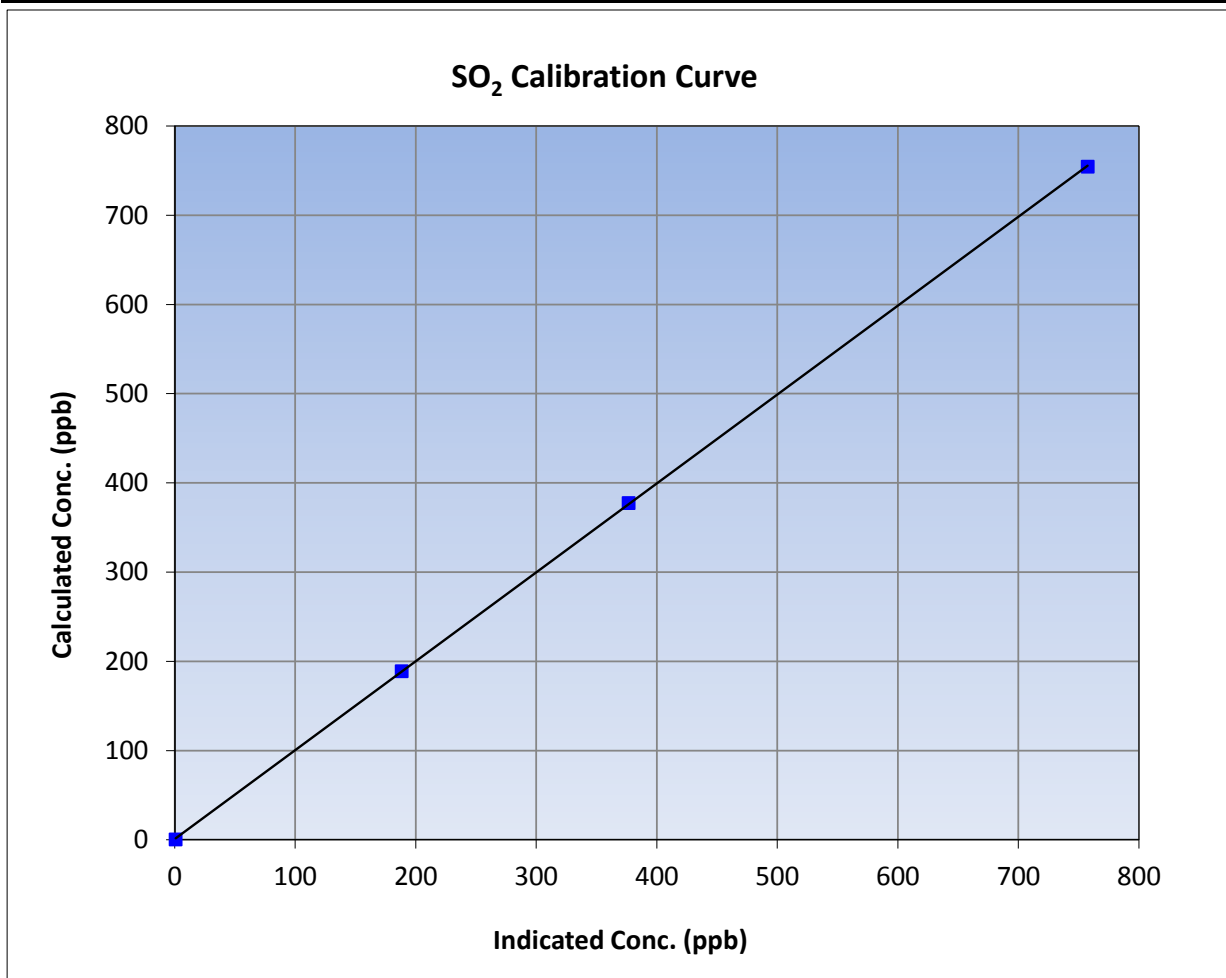
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 23, 2017 | Previous Calibration | July 18, 2017 |
| Station Name | MacKay River | Station Number | AMS 20 |
| Start Time (MST) | 9:45 | End Time (MST) | 13:35 |
| Analyzer make | Thermo 43i | Analyzer serial # | 1501301450 |

Calibration Data

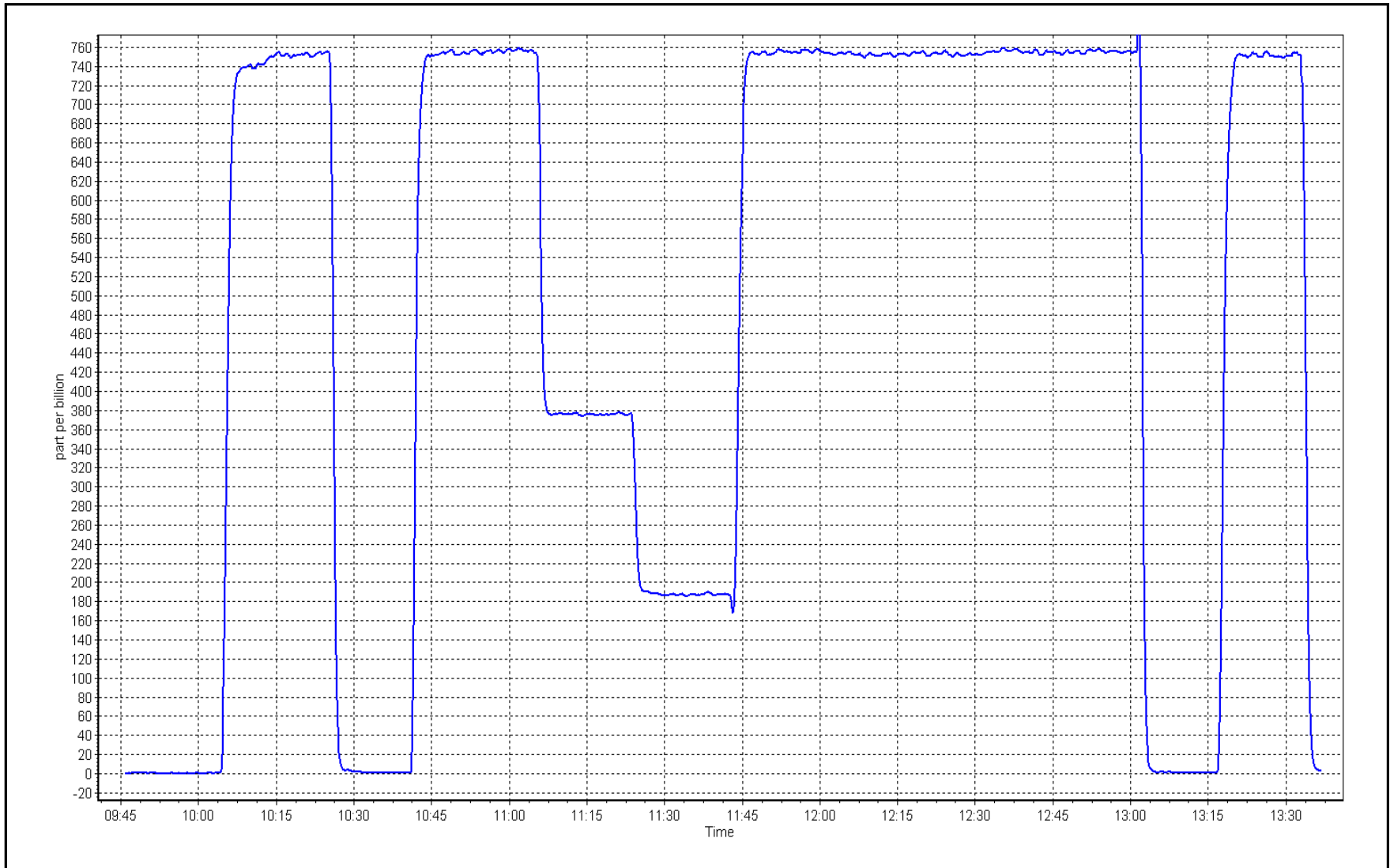
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.4 | ---- | Correlation Coefficient | ≥0.995 | |
| 754.2 | 757.0 | 0.9963 | | | |
| 377.2 | 376.2 | 1.0025 | | | |
| 188.6 | 187.8 | 1.0041 | | | |
| | | | Slope | 0.996410 | 0.90 - 1.10 |
| | | | Intercept | 0.817680 | +/-30 |



SO2 Calibration Plot

Date: August 23, 2017

Location: MacKay River





Wood Buffalo Environmental Association

H₂S Calibration Report

Version-06-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|---------------|
| Station Name: | MacKay River | Station number: | AMS 20 |
| Calibration Date: | August 14, 2017 | Last Cal Date: | July 18, 2017 |
| Start time (MST): | 11:10 | End time (MST): | 14:55 |
| Reason: | Routine | | |

Calibration Standards

| | | | | |
|-----------------------|-------------------|-----|------------------|-------------------|
| Cal Gas Concentration | <u>5.35</u> | ppm | Cal Gas Exp Date | February 13, 2018 |
| Cal Gas Cylinder # | <u>LL119508</u> | | | |
| Calibrator Make/Model | Teledyne API T700 | | Serial Number | 1220 |
| ZAG Make/Model | Teledyne API 701 | | Serial Number | 4766 |

Analyzer Information

Analyzer make: Teledyne API T101

Analyzer serial #: 196

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|----------------------|--------------|---------------|--------------|--------------|---------------|
| Analyzer Range | 0 - 100 ppb | | PMT voltage | 505 | 505 |
| Calculated slope | 0.997142 | 0.994652 | Lamp voltage | 2318 | 2317 |
| Calculated intercept | -0.159455 | 0.174856 | Pressure | 19.7 | 19.9 |
| Analyzer Background | 27.0 | 28.9 | Flow | 0.506 | 0.511 |
| Analyzer Coefficient | 0.974 | 0.963 | Intensity | 57 | 57 |

H₂S Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|-----------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5005 | 0.0 | 0.0 | 1.0 | ---- |
| as found span | 4935 | 75.6 | 80.7 | 83.4 | 0.968 |
| calibrator zero | 5005 | 0.0 | 0.0 | 0.0 | ---- |
| high point | 4935 | 75.6 | 80.7 | 81.1 | 0.995 |
| second point | 4975 | 37.9 | 40.4 | 40.3 | 1.004 |
| third point | 4995 | 19.0 | 20.3 | 20.1 | 1.009 |
| as left zero | 5005 | 0.0 | 0.0 | 0.1 | ---- |
| as left span | 4935 | 75.6 | 80.7 | 80.3 | 1.005 |

SO2 Scrubber Check

| | | | | Average Correction Factor | 1.003 |
|--------------------|-------|-------------------|-------|---------------------------|-------|
| Corrected As found | 82.40 | Previous response | 81.11 | *% change | -1.6% |

* = > +/-5% change initiates investigation

Notes:

Sample inlet filter replaced after as founds. Adjusted zero and span.

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

H₂S Calibration Summary

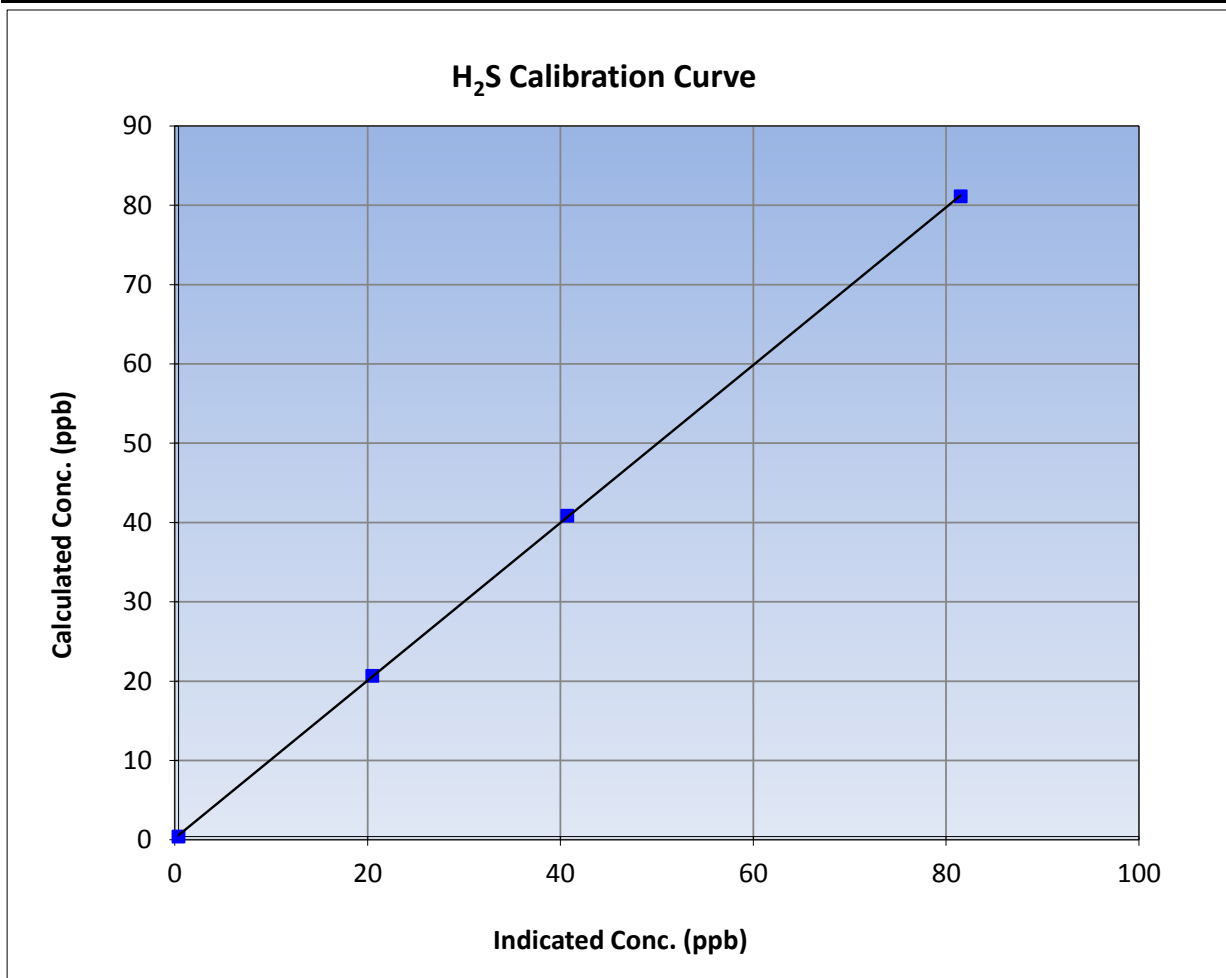
Version-03-2017

Station Information

| | | | |
|------------------|-------------------|----------------------|---------------|
| Calibration Date | August 14, 2017 | Previous Calibration | July 18, 2017 |
| Station Name | MacKay River | Station Number | AMS 20 |
| Start Time (MST) | 11:10 | End Time (MST) | 14:55 |
| Analyzer make | Teledyne API T101 | Analyzer serial # | 196 |

Calibration Data

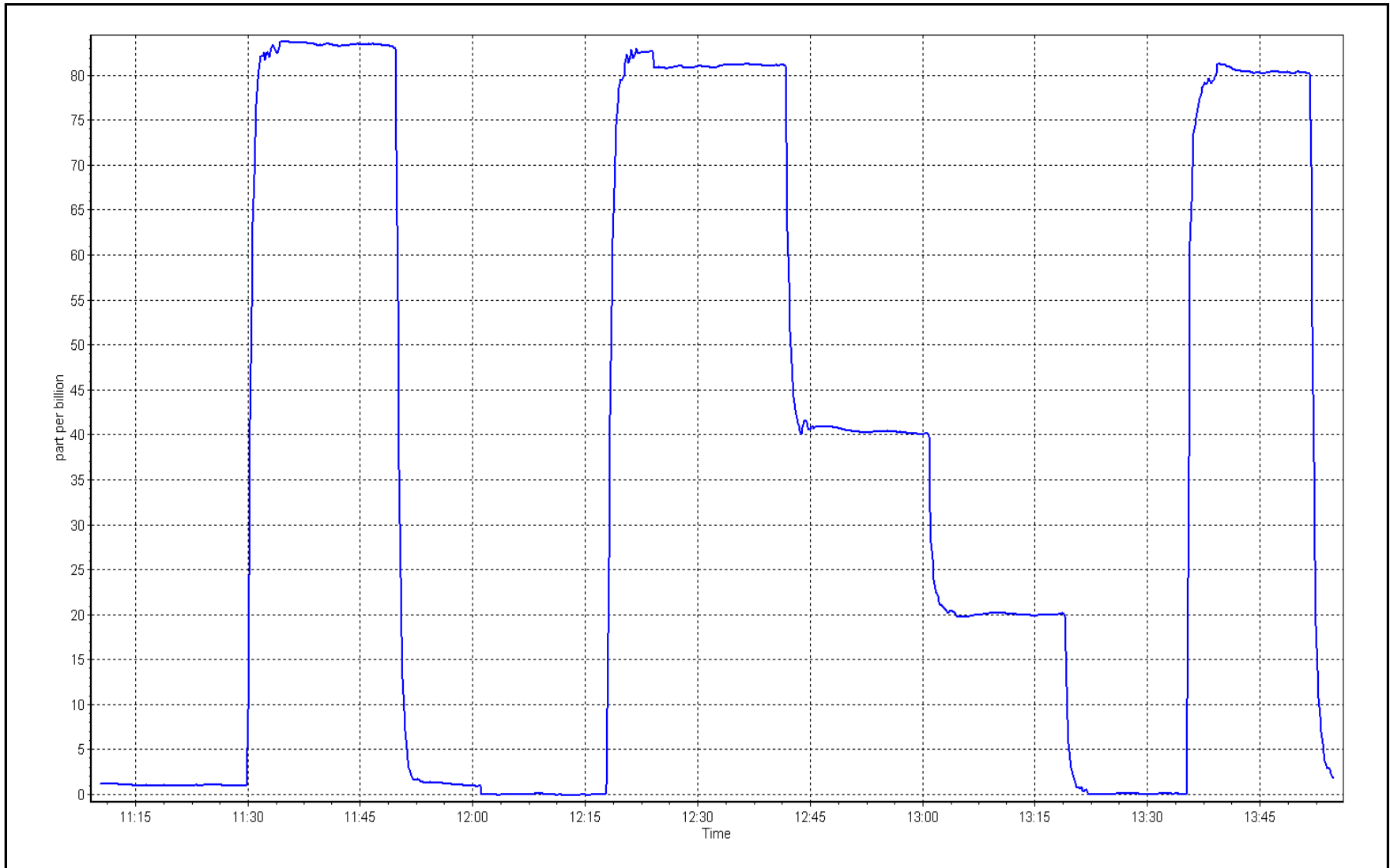
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | 0.999974 | ≥0.995 |
| 80.7 | 81.1 | 0.9953 | | | |
| 40.4 | 40.3 | 1.0037 | Slope | 0.994652 | 0.90 - 1.10 |
| 20.3 | 20.1 | 1.0086 | | | |
| | | | Intercept | 0.174856 | +/-3 |



H₂S Calibration Plot

Date: August 14, 2017

Location: MacKay River





Wood Buffalo Environmental Association

THC Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|---------------|
| Station Name: | MacKay River | Station number: | AMS 20 |
| Calibration Date: | August 23, 2017 | Last Cal Date: | July 18, 2017 |
| Start time (MST): | 9:45 | End time (MST): | 13:35 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|-----------------------|-------------------|---------------------|------------------|
| Gas Cert Reference | EY0000657 | Cal Gas Expiry Date | November 4, 2019 |
| CH4 Cal Gas Conc. | <u>513.0</u> ppm | CH4 Equiv Conc. | 1060.3 ppm |
| C3H8 Cal Gas Conc. | <u>199.0</u> ppm | Station temp. | 22 Deg C |
| Calibrator Make/Model | Teledyne API T700 | Serial Number | 1220 |
| ZAG Make/Model | Teledyne API 701 | Serial Number | 4766 |

Analyzer Information

| | | | |
|----------------------|---------------|---------------------|----------------------------|
| Analyzer make: | Thermo 51i-LT | Analyzer serial #: | 1501663727 |
| | <u>Start</u> | <u>Finish</u> | <u>Start</u> <u>Finish</u> |
| Analyzer Range | 0 - 25 ppm | Bias voltage supply | -299 -299 |
| Calculated slope | 1.003651 | Sample pressure | 8.6 8.6 |
| Calculated intercept | -0.063927 | Fuel pressure | 23.9 23.9 |
| Analyzer Background | 2.260 | Air pressure | 34.3 34.3 |
| Analyzer Coefficient | 4.396 | Flame temperature | 148.3 148.8 |

THC Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5005 | 0.0 | 0.00 | 0.04 | ---- |
| as found span | 4930 | 78.7 | 16.66 | 16.96 | 0.983 |
| calibrator zero | 5005 | 0.0 | 0.00 | 0.04 | ---- |
| high point | 4930 | 78.7 | 16.66 | 16.61 | 1.003 |
| second point | 4975 | 39.4 | 8.33 | 8.29 | 1.005 |
| third point | 4995 | 19.7 | 4.17 | 4.17 | 1.000 |
| as left zero | 5005 | 0.0 | 0.00 | 0.02 | ---- |
| as left span | 4930 | 78.7 | 16.66 | 16.71 | 0.997 |
| Average Correction Factor | | | | | 1.003 |
| Corrected As found | 16.92 | Previous response | 16.66 | *% change | -1.5% |

* = > +/-5% change initiates investigation

Notes: Sample inlet filter replaced after as founds. Replaced hydrogen cylinder after as founds. Adjusted span.

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

THC Calibration Summary

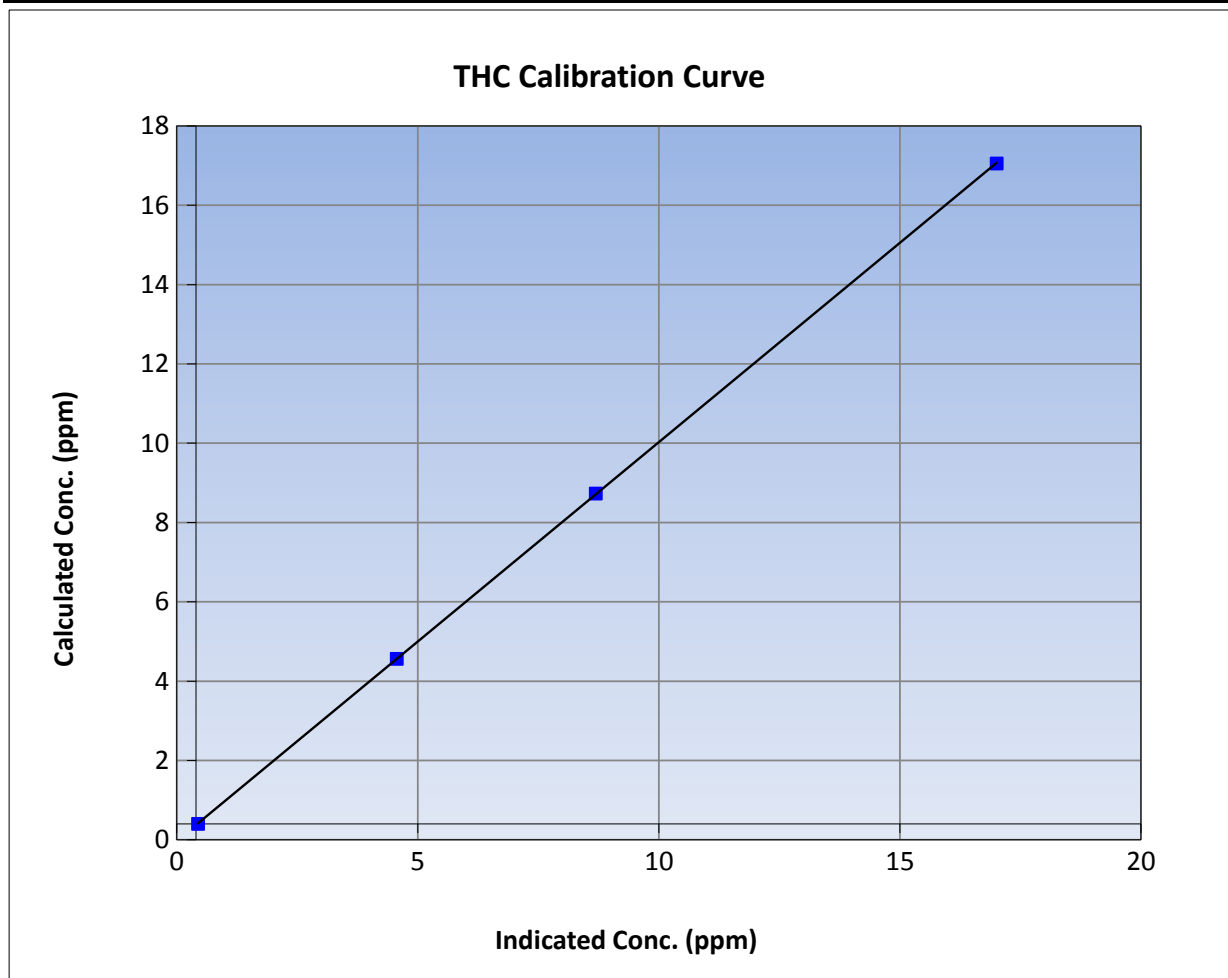
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 23, 2017 | Previous Calibration | July 18, 2017 |
| Station Name | MacKay River | Station Number | AMS 20 |
| Start Time (MST) | 9:45 | End Time (MST) | 13:35 |
| Analyzer make | Thermo 51i-LT | Analyzer serial # | 1501663727 |

Calibration Data

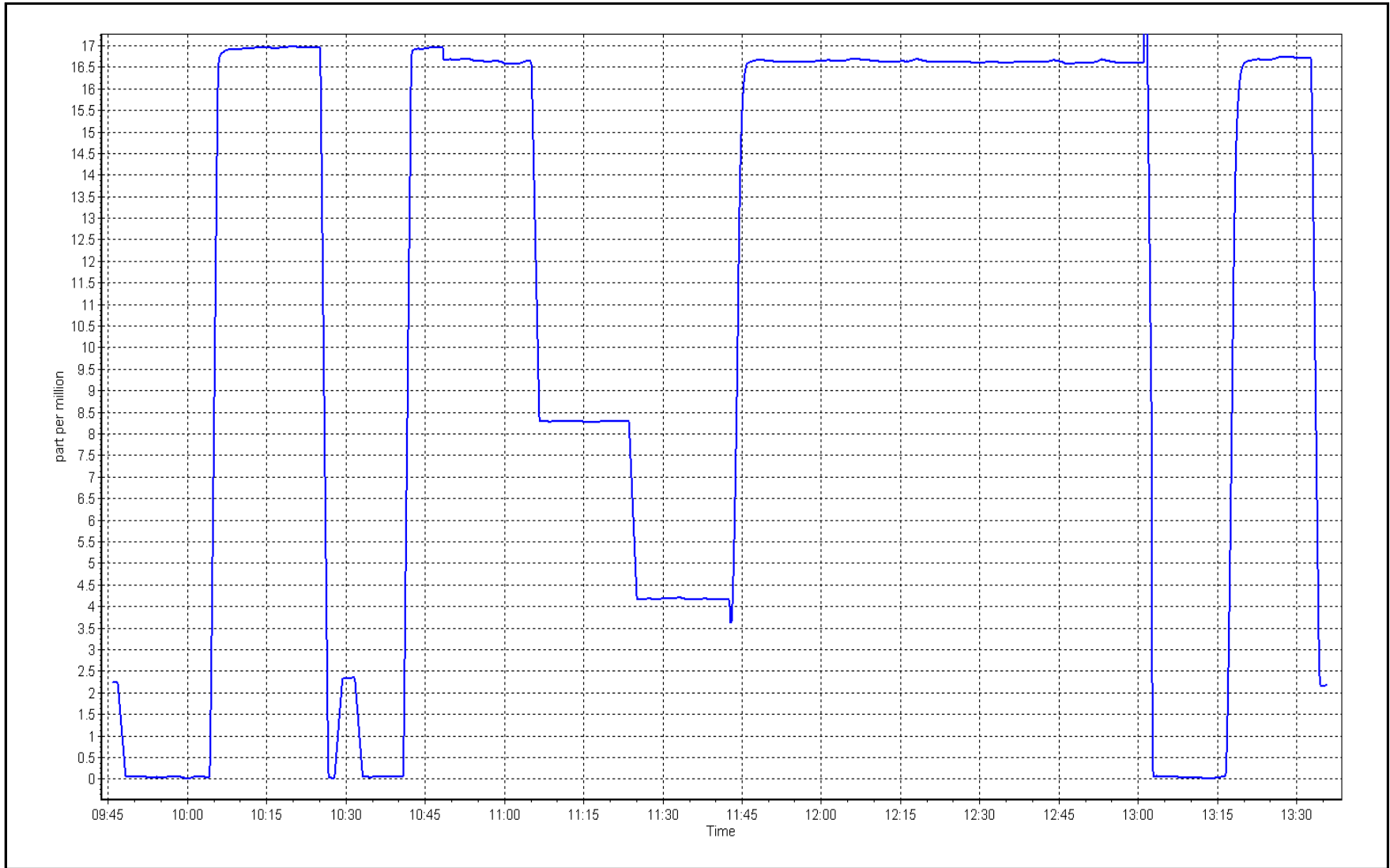
| Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (lc) | Correction factor (Cc/lc) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | 0.999995 | |
| 16.7 | 16.6 | 1.0032 | | | ≥0.995 |
| 8.3 | 8.3 | 1.0049 | Slope | 1.005517 | |
| 4.2 | 4.2 | 1.0000 | | | 0.90 - 1.10 |
| | | | Intercept | -0.026569 | +/-1.5 |



THC Calibration Plot

Date: August 23, 2017

Location: MacKay River





Wood Buffalo Environmental Association

NO_x - NO - NO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|---------------|
| Station Name: | MacKay River | Station number: | AMS 20 |
| Calibration Date: | August 23, 2017 | Last Cal Date: | July 18, 2017 |
| Start time (MST): | 9:45 | End time (MST): | 13:35 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|-------------------|-------------------|---------------------|------------------|
| NO Gas Cylinder # | EY0000657 | Cal Gas Expiry Date | November 4, 2019 |
| NOX Cal Gas Conc. | <u>50.9</u> ppb | NO Cal Gas Conc. | <u>50.9</u> ppb |
| Calibrator Model | Teledyne API T700 | Serial Number | 1220 |
| ZAG make/model | Teledyne API 701 | Serial Number | 4766 |

Analyzer Information

| | | | | |
|-----------------|--------------|--------------------|---------------------|---------------|
| Analyzer make: | Thermo 42i | Analyzer serial #: | 1505164379 | |
| | <u>Start</u> | <u>Finish</u> | <u>Start</u> | <u>Finish</u> |
| NO coefficient | 1.070 | 1.078 | NOX Range (ppb) | 0 - 1000 ppb |
| NOX coefficient | 0.999 | 0.997 | PMT Temperature | -3.0 -3.1 |
| NO2 coefficient | 0.995 | 0.995 | Reaction cell Press | 167.5 167.8 |
| NO bkgrnd | 3.1 | 3.1 | Sample Flow | 0.821 0.828 |
| NOX bkgrnd | 3.1 | 3.1 | PMT Voltage | -767.4 -767.4 |

Calibration Statistics

| | | |
|----------------------------|--------------|---------------|
| | <u>Start</u> | <u>Finish</u> |
| NO _x Cal Slope | 0.996982 | 0.999116 |
| NO _x Cal Offset | 0.774931 | 0.777124 |
| NO Cal Slope | 0.996747 | 0.998501 |
| NO Cal Offset | 1.455538 | 1.216759 |
| NO ₂ Cal Slope | 0.991741 | 0.994927 |
| NO ₂ Cal Offset | -0.065138 | -0.001353 |



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Version-03-2017

Dilution Calibration Data

| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|----------------------------------|---------------------------|-----------------------------|---|--|---|--|---------------------------------------|--|---|--|
| as found zero | 5005 | 0.0 | 0.0 | 0.0 | 0.0 | -0.2 | -0.3 | 0.0 | ---- | ---- |
| as found span | 4930 | 78.7 | 799.8 | 799.8 | 0.0 | 795.2 | 794.0 | 1.3 | 1.0058 | 1.0073 |
| calibrator zero | 5005 | 0.0 | 0.0 | 0.0 | 0.0 | -0.2 | -0.3 | 0.0 | ---- | ---- |
| high point | 4930 | 78.7 | 799.8 | 799.8 | 0.0 | 800.2 | 800.3 | -0.2 | 0.9995 | 0.9993 |
| second point | 4975 | 39.4 | 399.9 | 399.9 | 0.0 | 398.6 | 398.6 | 0.0 | 1.0034 | 1.0034 |
| third point | 4995 | 19.7 | 200.0 | 200.0 | 0.0 | 199.2 | 198.3 | 0.9 | 1.0038 | 1.0084 |
| as left zero | 5005 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | 0.1 | ---- | ---- |
| as left span | 4930 | 78.7 | 799.8 | 347.1 | 452.7 | 801.2 | 345.6 | 455.6 | 0.9982 | 1.0043 |
| Average Correction Factor | | | | | | | | | 1.0022 | 1.0037 |

| | | | | |
|--------------------|-----------------------------|----------------|-----------------|------------------------|
| Corrected As found | NO _x = 795.4 ppb | NO = 794.3 ppb | *Percent Change | NO _x = 0.8% |
| Previous Response | NO _x = 801.4 ppb | NO = 800.9 ppb | *Percent Change | NO = 0.8% |

* = > +/-5% change initiates investigation

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO drop conc (ppb) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | Converter Efficiency <i>Limit = 96-104%</i> |
|----------------------------------|------------------------------|---|--|---------------------------------------|--|---|--|---|--|
| 1st NO ref point | | 0.0 | 799.9 | 799.0 | 0.9 | 0.9998 | 1.0010 | ---- | ---- |
| 1st NO2 (400 ppb O3) | 347.1 | 451.9 | 801.4 | 347.1 | 454.2 | 0.9980 | ---- | 0.9949 | 100.5% |
| 2nd NO2 (200 ppb O3) | 566.7 | 232.3 | 800.2 | 566.7 | 233.5 | 0.9995 | ---- | 0.9949 | 100.5% |
| 3rd NO2 (100 ppb O3) | 680.1 | 118.9 | 799.6 | 680.1 | 119.5 | 1.0002 | ---- | 0.9950 | 100.5% |
| 2nd NO ref point | ---- | 0.0 | 798.6 | 797.3 | 1.3 | 1.0015 | 1.0031 | ---- | ---- |
| Average Correction Factor | | | | | | 0.9998 | 1.0020 | 0.9949 | 100.5% |

Notes: Sample inlet filter replaced after as founds. No adjustment made, took new average for the high point.

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

NO_x Calibration Summary

Version-03-2017

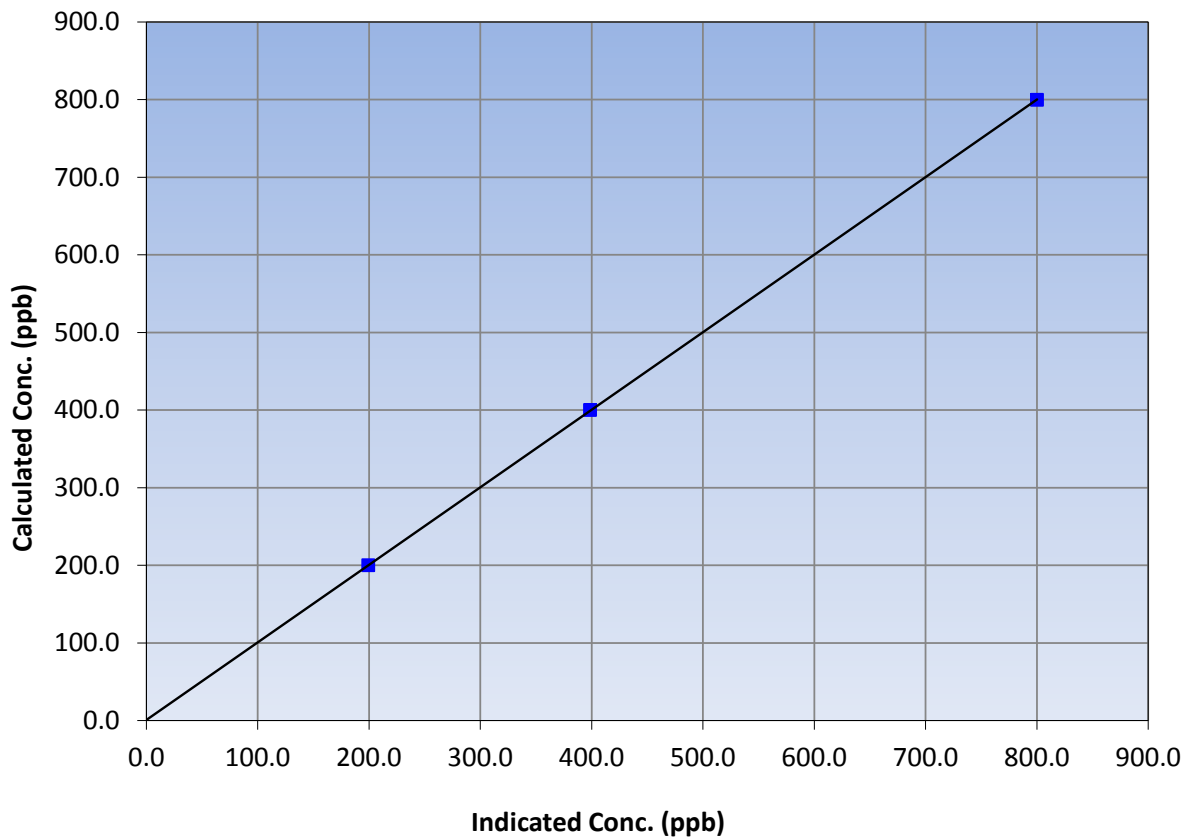
Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 23, 2017 | Previous Calibration | July 18, 2017 |
| Station Name | Mackay River | Station Number | AMS 20 |
| Start Time (MST) | 9:45 | End Time (MST) | 13:35 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1505164379 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | -0.2 | ---- | Correlation Coefficient | ≥0.995 | |
| 799.8 | 800.2 | 0.9995 | | | |
| 399.9 | 398.6 | 1.0034 | | | |
| 200.0 | 199.2 | 1.0038 | | | |
| | | | Slope | 0.999116 | 0.90 - 1.10 |
| | | | Intercept | 0.777124 | +/-20 |

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

Version-03-2017

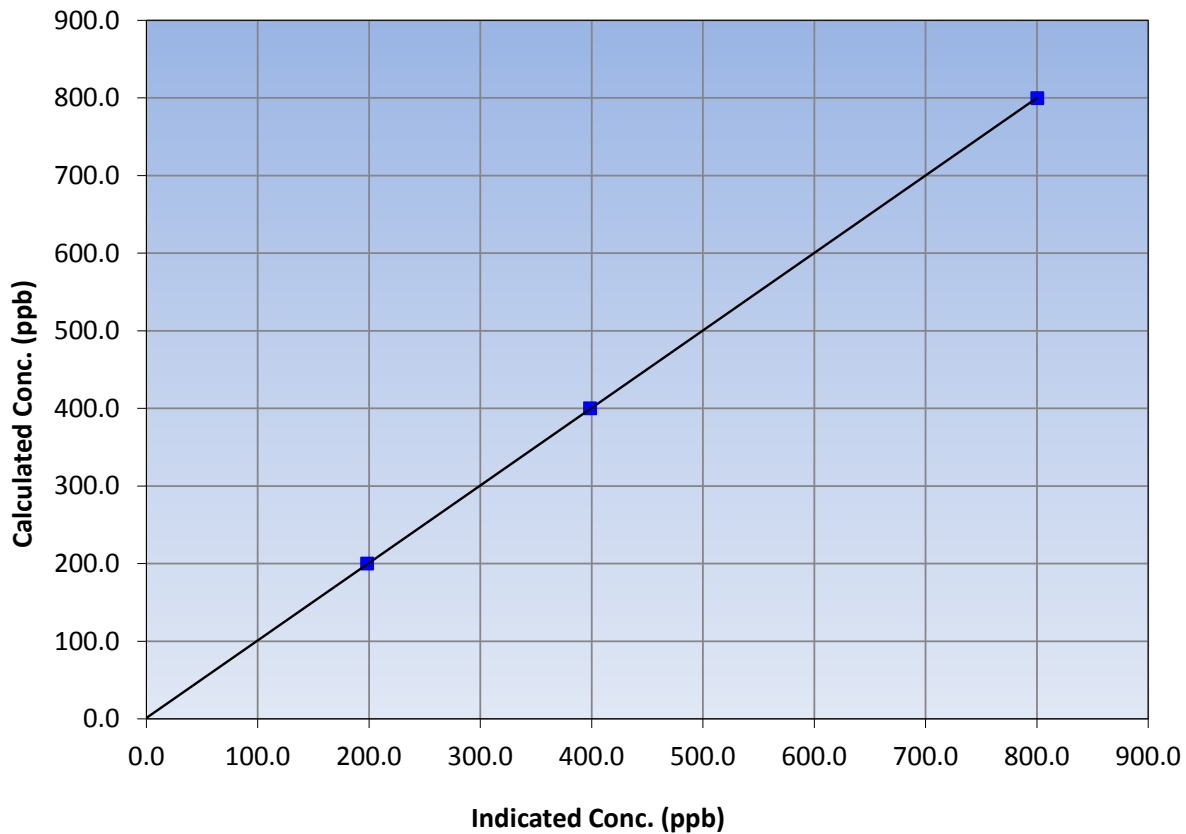
Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 23, 2017 | Previous Calibration | July 18, 2017 |
| Station Name | Mackay River | Station Number | AMS 20 |
| Start Time (MST) | 9:45 | End Time (MST) | 13:35 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1505164379 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | -0.3 | ---- | Correlation Coefficient | ≥0.995 | |
| 799.8 | 800.3 | 0.9993 | | | |
| 399.9 | 398.6 | 1.0034 | | | |
| 200.0 | 198.3 | 1.0084 | | | |
| | | | Slope | 0.998501 | 0.90 - 1.10 |
| | | | Intercept | 1.216759 | +/-20 |

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

Version-03-2017

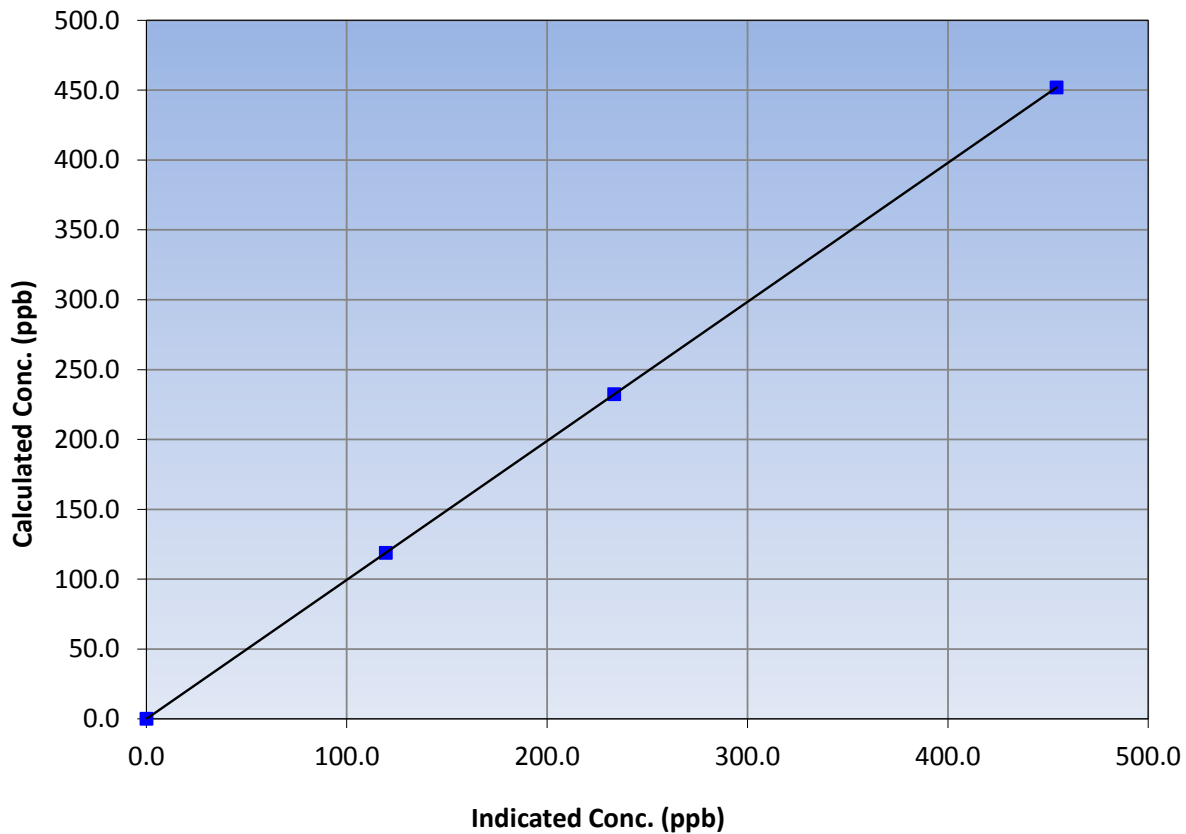
Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 23, 2017 | Previous Calibration | July 18, 2017 |
| Station Name | Mackay River | Station Number | AMS 20 |
| Start Time (MST) | 9:45 | End Time (MST) | 13:35 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1505164379 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | ≥0.995 | |
| 451.9 | 454.2 | 0.9949 | | | |
| 232.3 | 233.5 | 0.9949 | | | |
| 118.9 | 119.5 | 0.9950 | | | |
| | | | Slope | 0.994927 | 0.90 - 1.10 |
| | | | Intercept | -0.001353 | +/-20 |

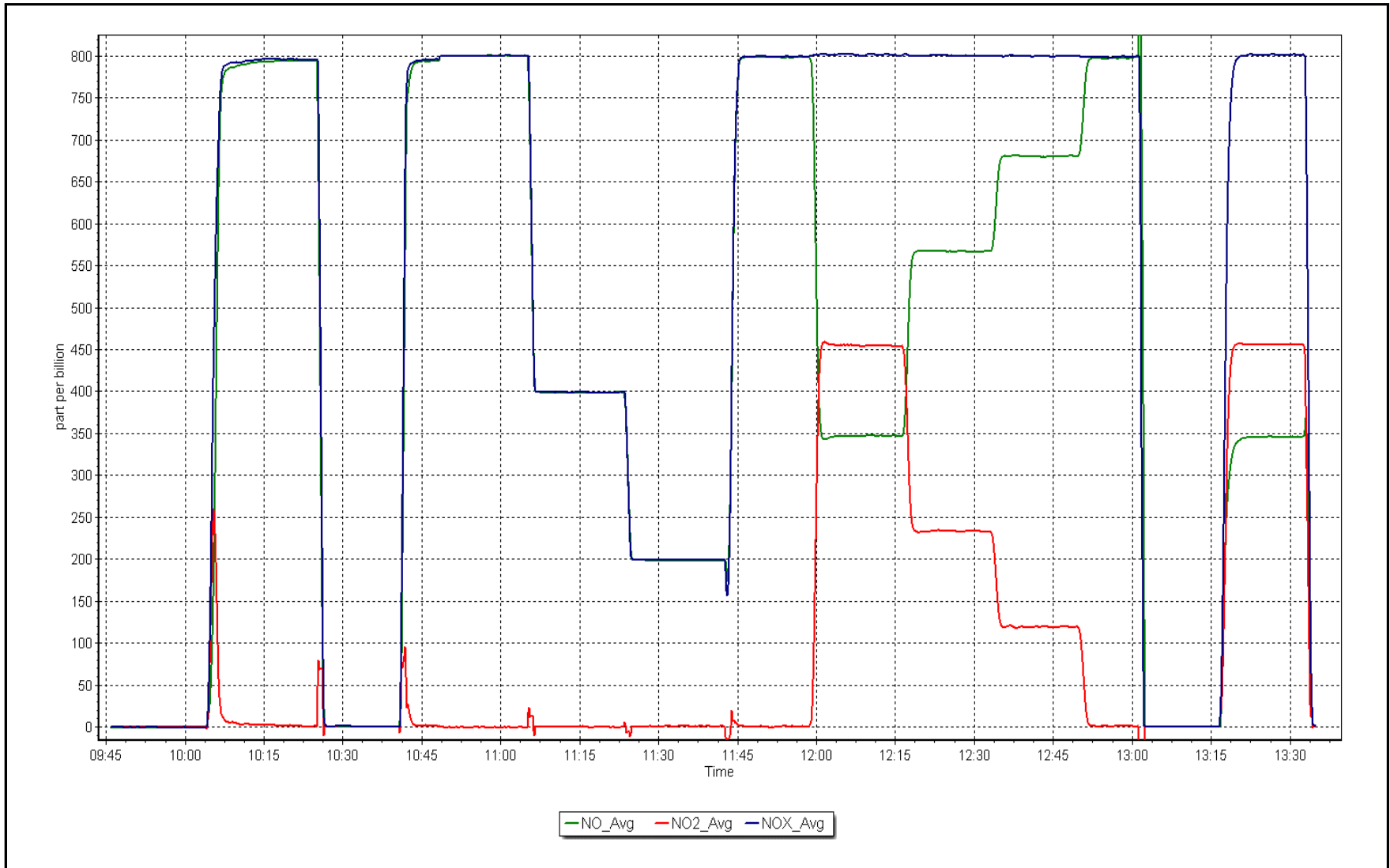
NO₂ Calibration Curve



NO_x Calibration Plot

Date: August 23, 2017

Location: MacKay River





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 21
CONKLIN COMMUNITY
AUGUST 2017**

Operations, Data Collection,
QA/QC, Data Validation and Reporting by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

September 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN (AMS 21)
AUGUST 2017

MONTHLY SUMMARY for
AMD SECTION III.B.1(c)

| Parameter | Hours of Data | Hours of Calibration | Hours without Data | Operational Time | Maximum 1-Hour Value | 1-Hour Exceedances | Maximum 24-Hour Value | 24-Hour Exceedances |
|-----------------------------------|---------------|----------------------|--------------------|------------------|----------------------|--------------------|-----------------------|---------------------|
| SO2(ppb) Average | 707 | 36 | 37 | 99.87 | 2 | 0 | 1 | 0 |
| TRS(ppb) Average | 709 | 34 | 35 | 99.87 | 1 | 0 | 0 | 0 |
| THC(ppm) Average | 707 | 36 | 37 | 99.87 | 3.7 | - | 2.4 | - |
| NMHC(ppm) Average | 707 | 36 | 37 | 99.87 | 0.207 | - | 0.034 | - |
| CH4(ppm) Average | 707 | 36 | 37 | 99.87 | 3.7 | - | 2.4 | - |
| O3 (ppb) Average | 710 | 34 | 34 | 100 | 59 | 0 | 46 | - |
| NO2 (ppb) Average | 673 | 35 | 71 | 95.16 | 14 | 0 | 4 | - |
| NO (ppb) Average | 673 | 35 | 71 | 95.16 | 25 | - | 4 | - |
| NOX (ppb) Average | 673 | 35 | 71 | 95.16 | 32 | - | 7 | - |
| PM2.5 (ug/m3) Average | 743 | 1 | 1 | 100 | 125.5 | - | 41.2 | 1 |
| Wind Speed 10 m (km/h) Average | 738 | 0 | 6 | 99.19 | 21 | - | 13 | - |
| Wind Direction 10 m (deg) Average | 738 | 0 | 6 | 99.19 | - | - | - | - |
| Temperature 2 m (C) Average | 744 | 0 | 0 | 100 | 27.4 | - | 21.0 | - |
| Relative Humidity (%) Average | 744 | 0 | 0 | 100 | 99 | - | 91.0 | - |

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN (AMS 21)
AUGUST 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

| Parameter | Number | Mean | StnDev | Total | Percentile | | | | | | | |
|-----------------------------------|--------|-------|--------|-------|------------|-----|------|--------|------|------|-------|-------|
| | | | | | Min | P10 | Q1 | Median | Q3 | P90 | Max | |
| SO2 (ppb) Average | 707 | 0.2 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| TRS (ppb) Average | 709 | 0.4 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| THC (ppm) Average | 707 | 2.07 | 0.3 | - | 1.8 | 1.9 | 1.9 | 1.9 | 2.1 | 2.5 | 3.7 | |
| NMHC(ppm) Average | 707 | 0.008 | 0.026 | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.207 |
| CH4(ppm) Average | 707 | 2.06 | 0.3 | - | 1.8 | 1.9 | 1.9 | 1.9 | 2.1 | 2.5 | 3.7 | |
| O3 (ppb) Average | 710 | 24.4 | 12 | - | 4 | 6 | 16 | 24 | 32 | 40 | 59 | |
| NO2 (ppb) Average | 673 | 2 | 2 | - | 0 | 1 | 1 | 2 | 3 | 4 | 14 | |
| NO (ppb) Average | 673 | 1.6 | 3 | - | 0 | 0 | 0 | 0 | 2 | 4 | 25 | |
| NOX (ppb) Average | 673 | 3.6 | 4 | - | 0 | 1 | 1 | 2 | 5 | 9 | 32 | |
| PM2.5 (ug/m3) Average | 743 | 8.2 | 11.5 | - | 0.9 | 1.7 | 2.9 | 5.5 | 8.3 | 18 | 125.5 | |
| Wind Speed 10 m (km/h) Average | 738 | 6.3 | 4 | - | 0 | 2 | 3 | 5 | 9 | 12 | 21 | |
| Wind Direction 10 m (deg) Average | 738 | - | - | - | - | - | - | - | - | - | - | - |
| Temperature 2 m (C) Average | 744 | 15.52 | 5.2 | - | 1.7 | 8.7 | 11.8 | 15.4 | 19.6 | 22.5 | 27.4 | |
| Relative Humidity (%) Average | 744 | 71.5 | 20 | - | 26 | 42 | 53 | 74 | 92 | 97 | 99 | |

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN (AMS 21)
AUGUST 2017

OPERATIONAL NOTES

| Parameter | Period Start | Period End | Duration (Hours) | Notes |
|----------------------------|-------------------|-------------------|---------------------|--|
| SO2, TRS, NOx, THC | 22 Aug 2017 11:00 | 22 Aug 2017 11:00 | 1 | Maintenance - sample manifold cleaned |
| NO2, NO, NOX | 20 Aug 2017 05:00 | 21 Aug 2017 11:00 | 31 | Analyzer Failure - sample pump failure |
| NO2, NO, NOX | 21 Aug 2017 12:00 | 21 Aug 2017 15:00 | 4 | Maintenance - pump replacement and recalibration |
| Wind Speed, Wind Direction | 05 Aug 2017 01:00 | 05 Aug 2017 01:00 | 1 | Flat line in sensor output signal |
| Wind Speed, Wind Direction | 05 Aug 2017 06:00 | 05 Aug 2017 06:00 | 1 | Flat line in sensor output signal |
| Wind Speed, Wind Direction | 08 Aug 2017 00:00 | 08 Aug 2017 00:00 | 1 | Flat line in sensor output signal |
| Wind Speed, Wind Direction | 08 Aug 2017 20:00 | 08 Aug 2017 20:00 | 1 | Flat line in sensor output signal |
| Wind Speed, Wind Direction | 12 Aug 2017 22:00 | 12 Aug 2017 22:00 | 1 | Flat line in sensor output signal |
| Wind Speed, Wind Direction | 22 Aug 2017 20:00 | 22 Aug 2017 20:00 | 1 | Flat line in sensor output signal |

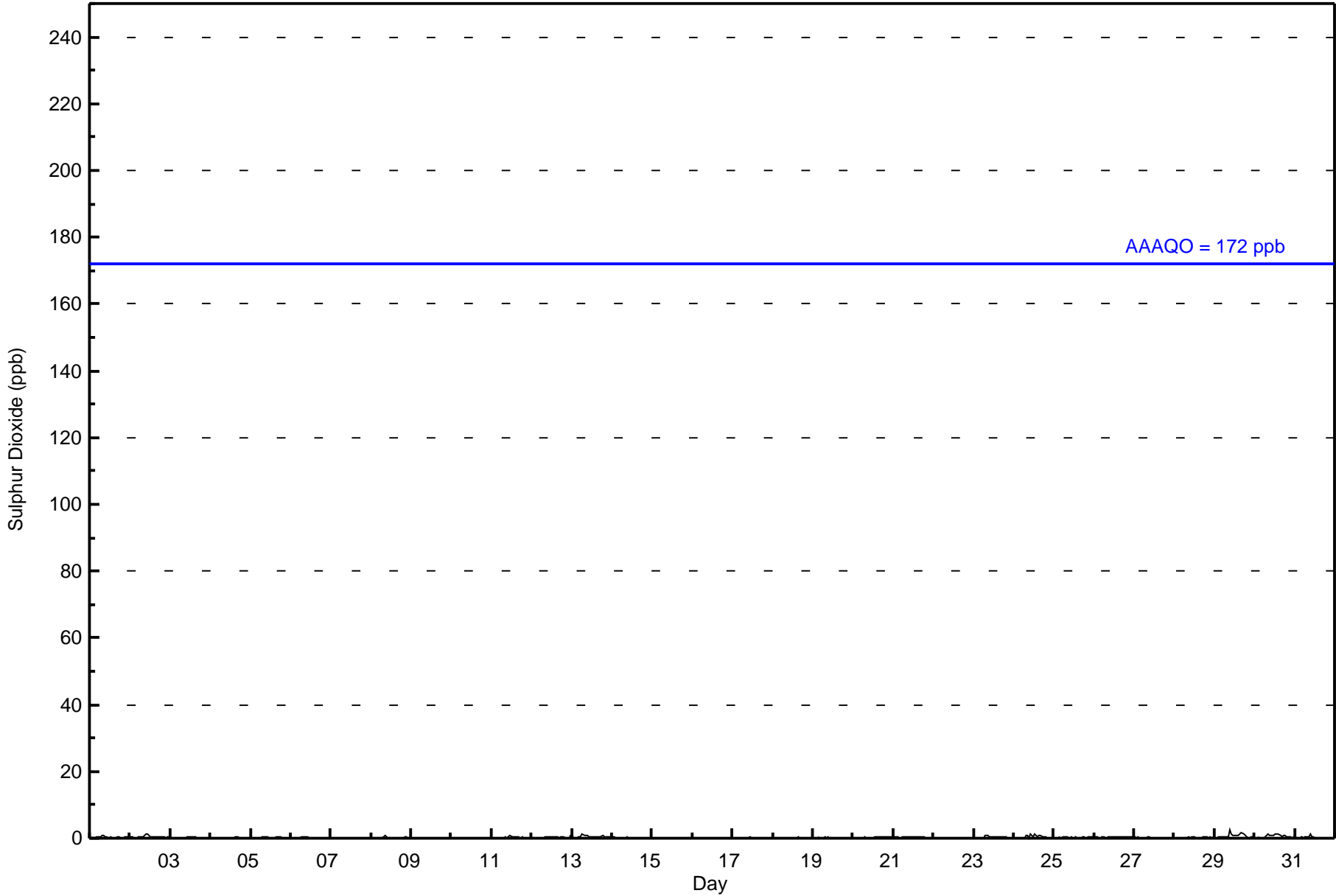


| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|---|---|---|---|---|---|---|---|--|----|----|----|----|----|----|----|----|----|--------------------------------|----|----|----|-----|---------------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|
| Maximum Value: 2 ppb on Aug 29 10:00 | | | | | | | | | | Maximum Daily Average: 0.7 ppb on Aug 29 | | | | | | | | | | Hours of Data: 707 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum Value: 0 ppb on Aug 4 02:00 | | | | | | | | | | Minimum Daily Average: 0.1 ppb on Aug 4 | | | | | | | | | | Hours of Missing Data: 37 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 0.4 ppb at hour 10 | | | | | | | | | | Minimum Diurnal Average: 0.1 ppb at hour 22 | | | | | | | | | | Hours of Calibration: 36 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 0.2 ppb | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1 | | | | | | | | | | Percent Operational Time: 99.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | C | C | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0.5 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0.7 | 2 | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0.6 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.2 | 0.2 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.2 | Diurnal Average |
| | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | Diurnal Maximum |
| Z - zerospan C - Calibration M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Conklin - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Conklin - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 10 | 707 | 100.00 | 100.00 |
| 11 - 20 | 0 | 0.00 | 100.00 |
| 21 - 60 | 0 | 0.00 | 100.00 |
| 61 - 110 | 0 | 0.00 | 100.00 |
| 111 - 172 | 0 | 0.00 | 100.00 |
| > 172 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Conklin - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 10 | 21 | 8 | 6 | 5 | 4 | 15 | 31 | 69 | 90 | 84 | 89 | 69 | 81 | 47 | 50 | 33 | 702 |
| 11 - 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21 - 60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 61 - 110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 111 - 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 21 | 8 | 6 | 5 | 4 | 15 | 31 | 69 | 90 | 84 | 89 | 69 | 81 | 47 | 50 | 33 | 702 |

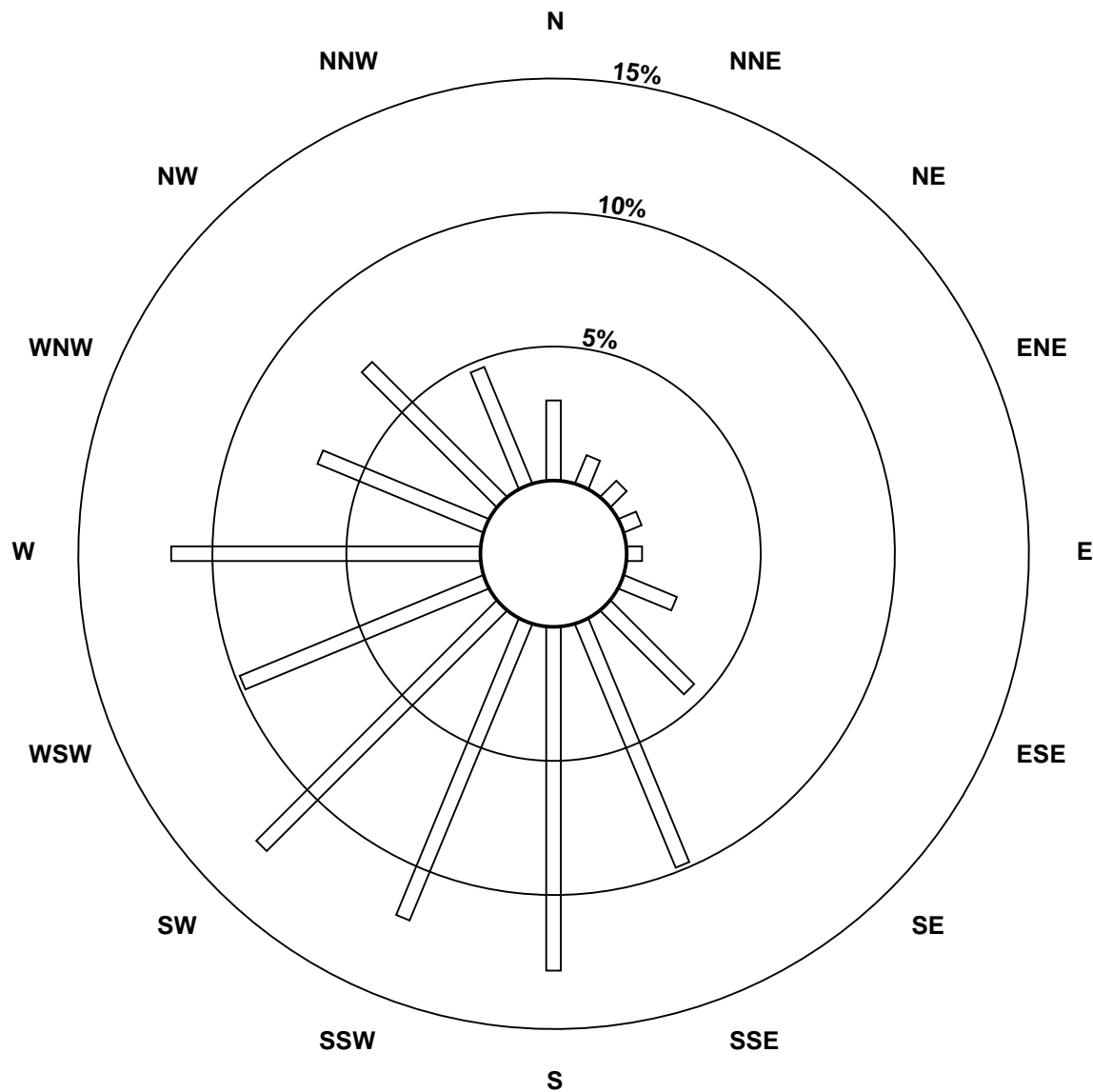
Total Number of Valid Hours: 702

Total Number of Hours: 744

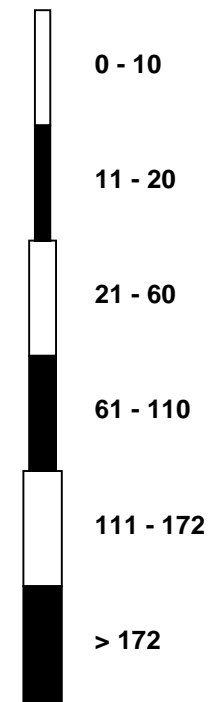


Wood Buffalo Environmental Association
Wind Rose Aug 2017

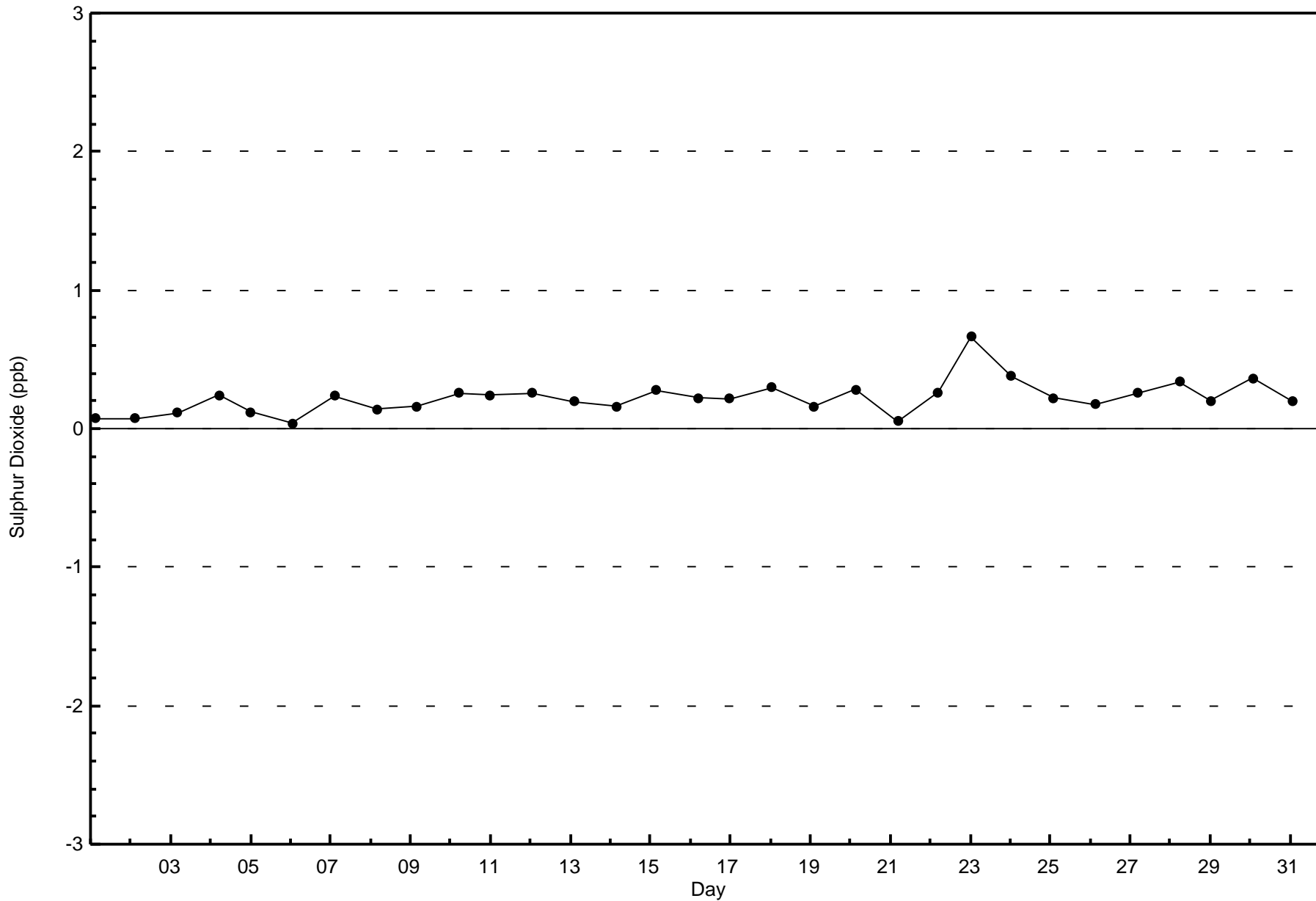
Sulphur Dioxide (SO₂) - ppb
Conklin (AMS 21)

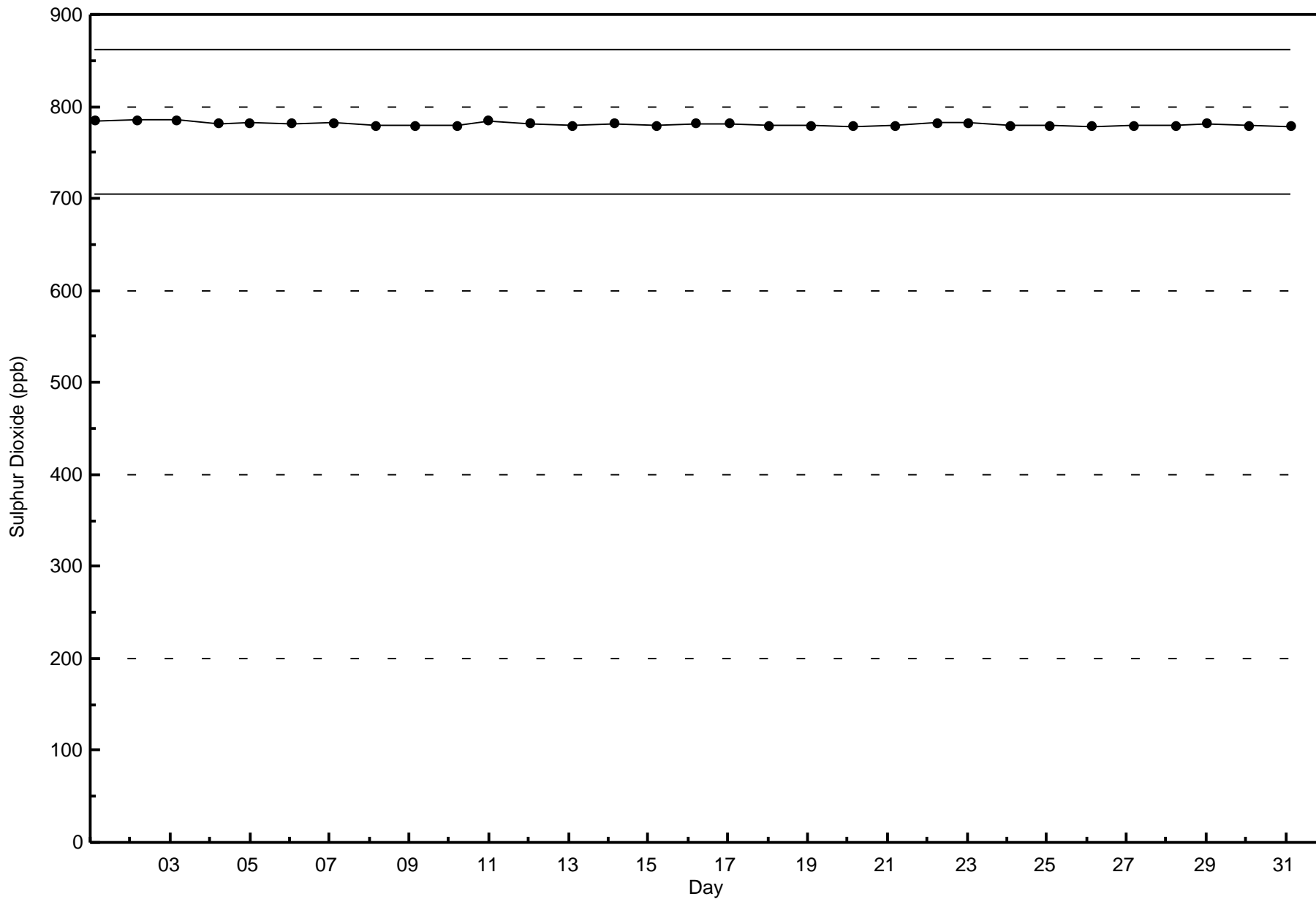


Classes (ppb)



Total Number of Valid Hours: 702







Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

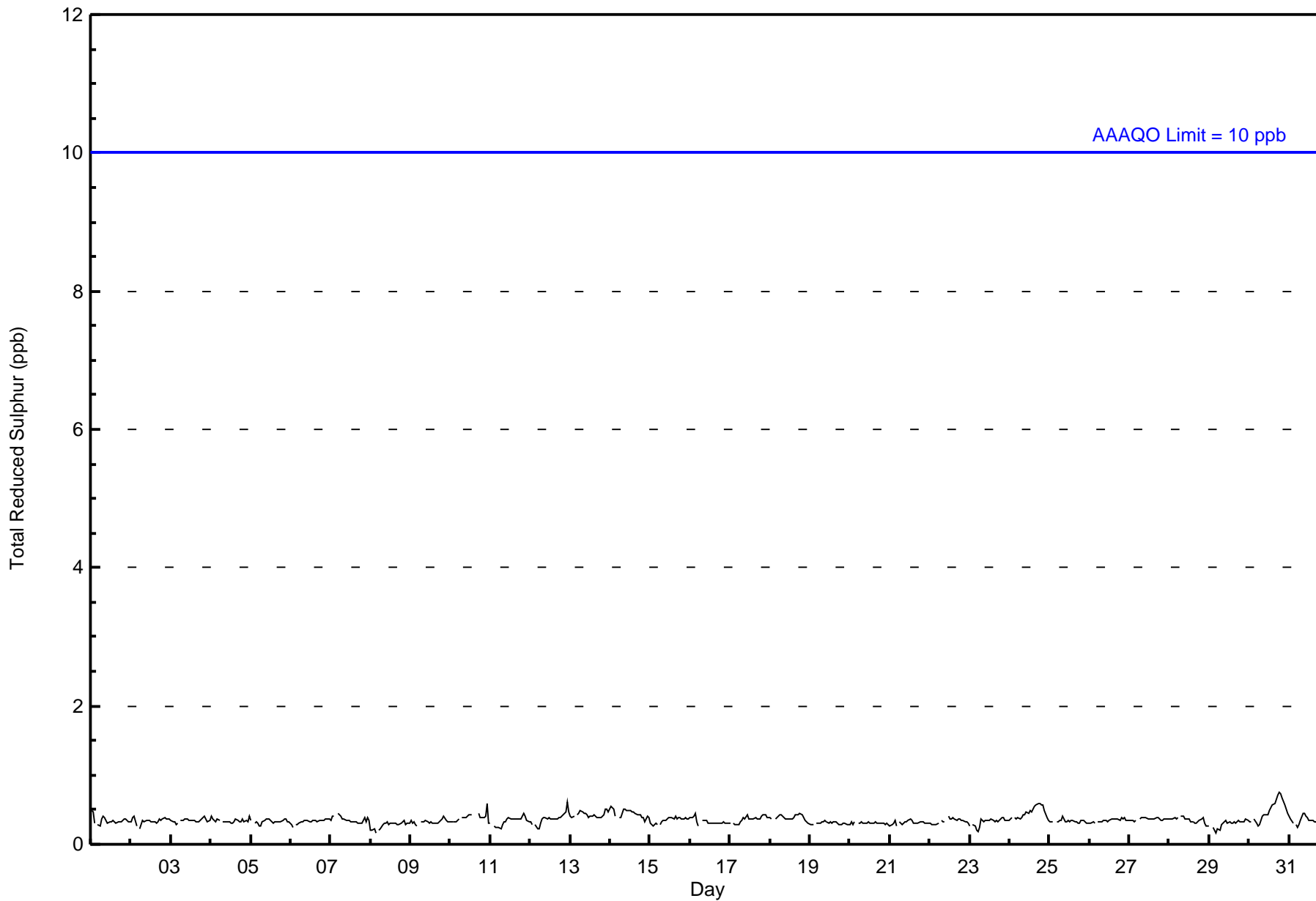
Conklin - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | Daily Average | | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|---|---|---|---|---|---|---|---|--|----|----|----|----|----|----|----|----|----|--------------------------|----|--------------------------------|----|-----|---------------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|-----------------|--|
| Maximum Value: 1 ppb on Aug 30 19:00 | | | | | | | | | | Maximum Daily Average: 0.5 ppb on Aug 30 | | | | | | | | | | Hours of Data: 709 | | Hours of Missing Data: 35 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum Value: 0 ppb on Aug 8 04:00 | | | | | | | | | | Minimum Daily Average: 0.3 ppb on Aug 8 | | | | | | | | | | Hours of Calibration: 34 | | Percent Operational Time: 99.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 0.4 ppb at hour 21 | | | | | | | | | | Minimum Diurnal Average: 0.3 ppb at hour 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 0.4 ppb | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | C | C | C | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 1 | 1 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.5 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.5 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | Diurnal Maximum | |
| Z - zerospan C - Calibration M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Conklin - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Conklin - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2 | 709 | 100.00 | 100.00 |
| 3 - 4 | 0 | 0.00 | 100.00 |
| 5 - 7 | 0 | 0.00 | 100.00 |
| 8 - 11 | 0 | 0.00 | 100.00 |
| > 11 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Conklin - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2 | 20 | 8 | 6 | 6 | 4 | 15 | 28 | 71 | 89 | 87 | 89 | 70 | 81 | 49 | 46 | 34 | 703 |
| 3 - 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 - 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 - 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 20 | 8 | 6 | 6 | 4 | 15 | 28 | 71 | 89 | 87 | 89 | 70 | 81 | 49 | 46 | 34 | 703 |

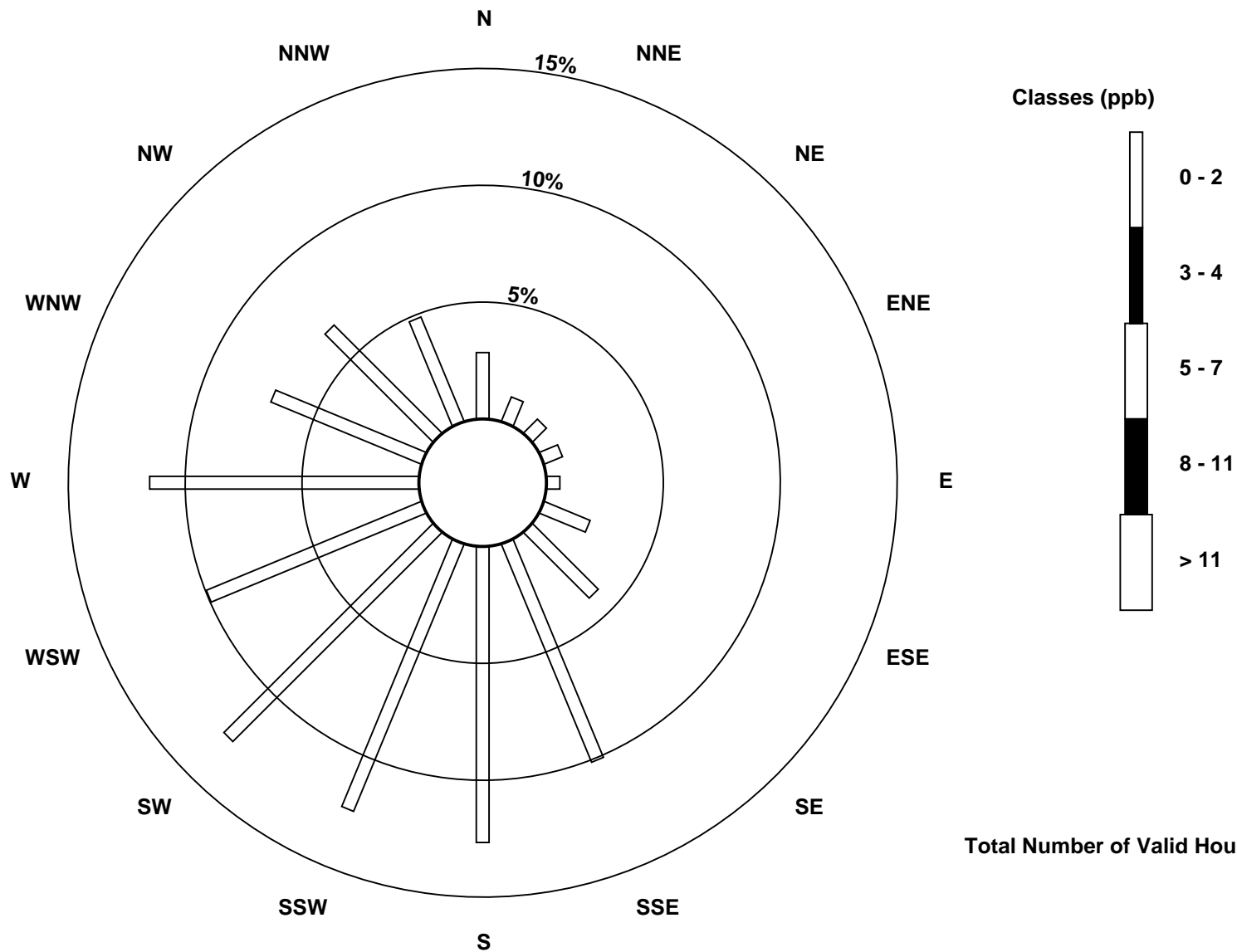
Total Number of Valid Hours: 703

Total Number of Hours: 744

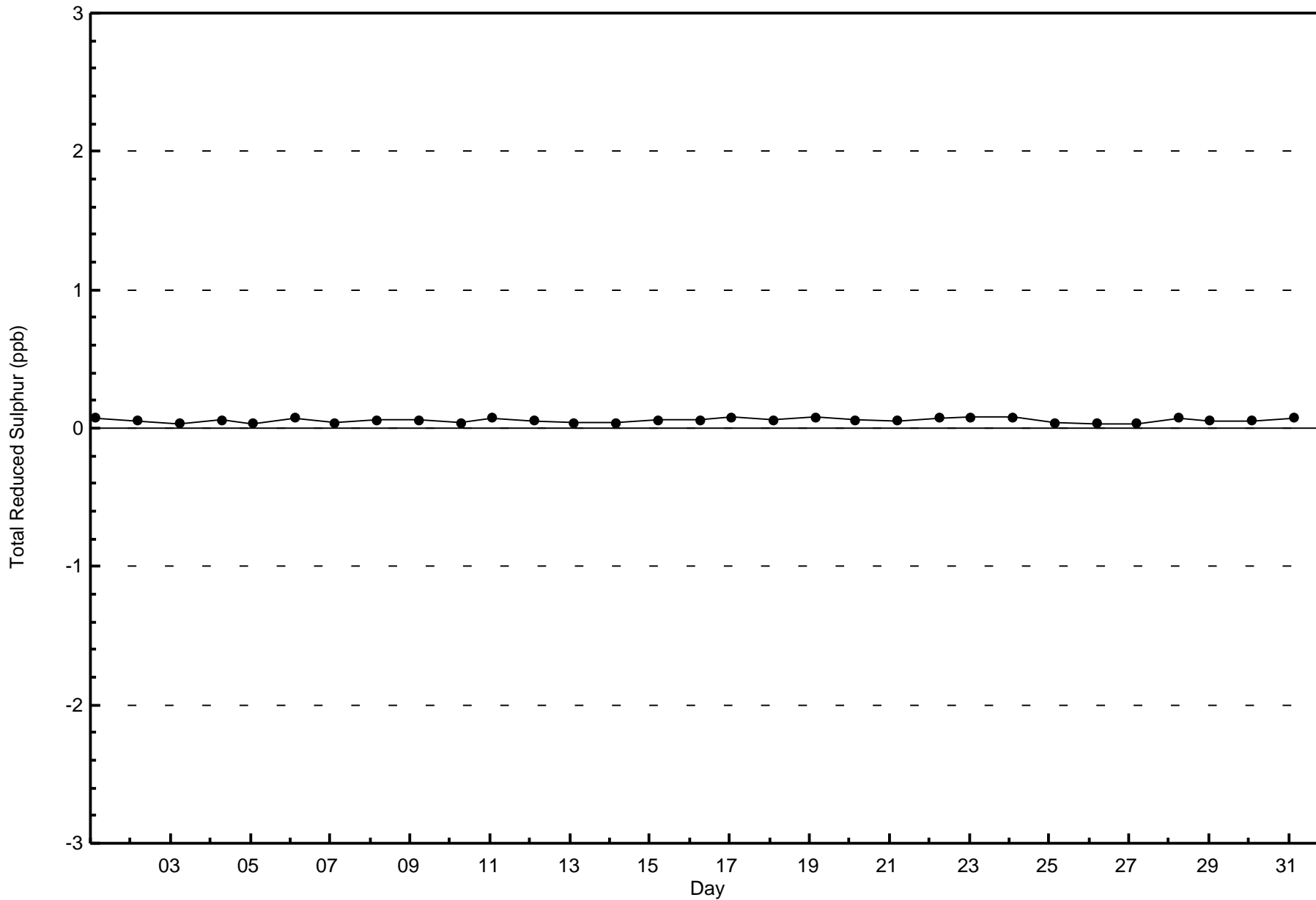


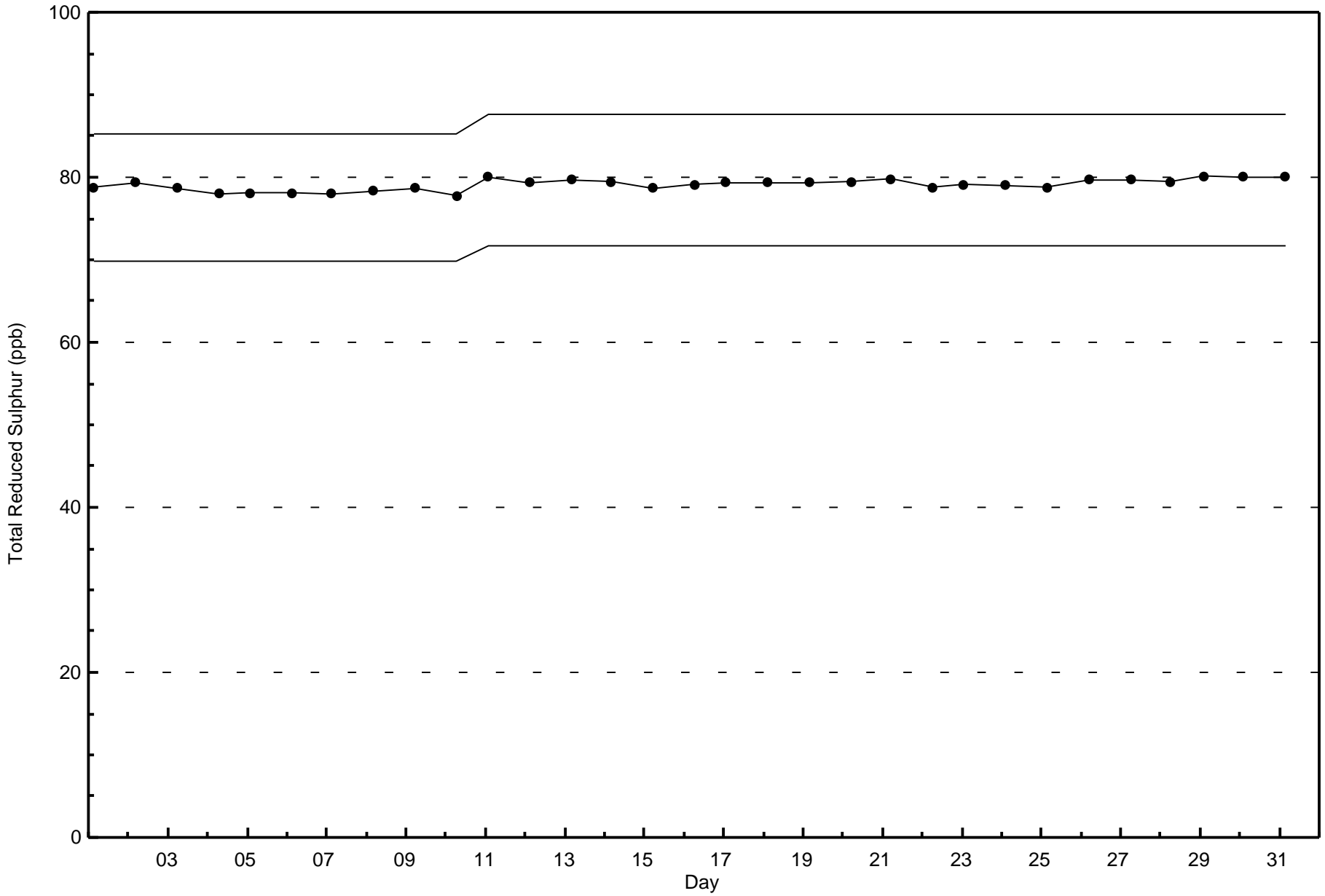
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Total Reduced Sulphur (TRS) - ppb
Conklin (AMS 21)



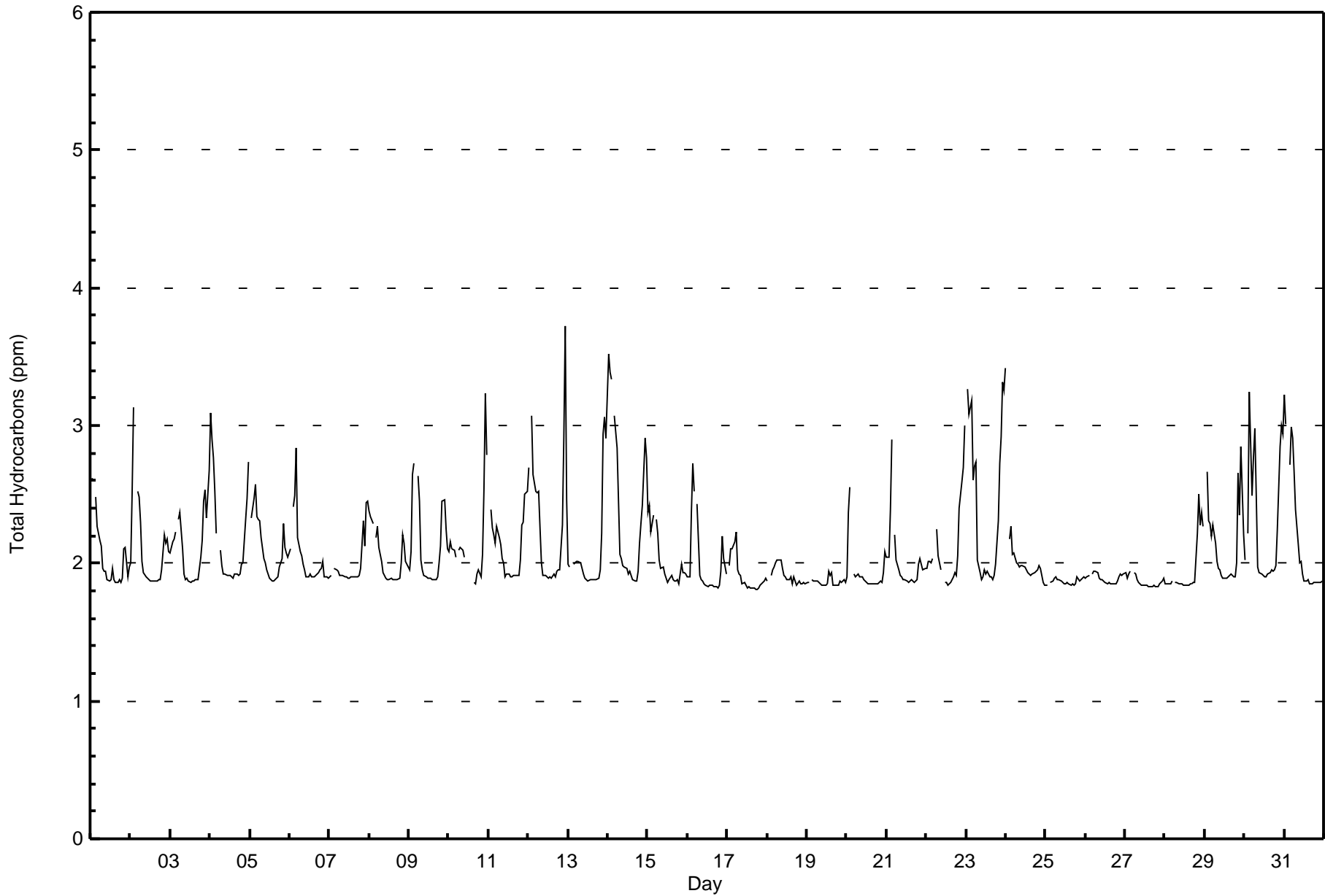
Total Number of Valid Hours: 703







| Maximum Value: 3.7 ppm on Aug 12 23:00 | | | | | | | | | | | | | | | | | | | | Maximum Daily Average: 2.4 ppm on Aug 23 | | | | | Hours in Service: 744 | | |
|--|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|-----|-----|-----|-----------------|--------------------------------|---------------|-----|
| Minimum Value: 1.8 ppm on Aug 17 19:00 | | | | | | | | | | | | | | | | | | | | Minimum Daily Average: 1.9 ppm on Aug 25 | | | | | Hours of Data: 707 | | |
| Maximum Diurnal Average: 2.4 ppm at hour 3 | | | | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 1.9 ppm at hour 17 | | | | | Hours of Missing Data: 37 | | |
| Monthly Average: 2.07 ppm | | | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 1.8 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 1.9 Q ₃ = 2.1 P ₉₀ = 2.5 P ₉₉ = 3.2 | | | | | Hours of Calibration: 36 | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 99.9 | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 2.6 | 2.6 | Z | 2.5 | 2.3 | 2.2 | 2.1 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.1 | 2.1 | 1.9 | 2.0 | 2.0 | 2.6 | |
| 2-Aug | 2.0 | 2.5 | 3.1 | Z | 2.5 | 2.5 | 2.3 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.2 | 2.1 | 2.2 | 2.1 | 2.1 | 3.1 | |
| 3-Aug | 2.1 | 2.2 | 2.2 | 2.2 | Z | 2.3 | 2.4 | 2.1 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.2 | 2.5 | 2.5 | 2.3 | 2.7 | 2.1 | 2.7 | |
| 4-Aug | 3.1 | 2.9 | 2.8 | 2.5 | 2.2 | Z | 2.3 | 2.1 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.3 | 2.5 | 2.7 | 2.2 | 3.1 | |
| 5-Aug | Z | 2.3 | 2.5 | 2.6 | 2.3 | 2.3 | 2.3 | 2.2 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.3 | 2.1 | 2.1 | 2.0 | 2.6 | |
| 6-Aug | 2.1 | Z | 2.4 | 2.5 | 2.8 | 2.2 | 2.1 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | 2.8 | |
| 7-Aug | 1.9 | 1.9 | Z | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.3 | 2.1 | 2.4 | 2.5 | 2.0 | 2.5 | |
| 8-Aug | 2.4 | 2.3 | 2.3 | Z | 2.2 | 2.3 | 2.1 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.2 | 2.2 | 2.0 | 2.0 | 2.0 | 2.4 | |
| 9-Aug | 2.0 | 2.1 | 2.6 | 2.7 | Z | 2.6 | 2.5 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.1 | 2.5 | 2.5 | 2.3 | 2.1 | 2.1 | 2.7 | |
| 10-Aug | 2.1 | 2.2 | 2.1 | 2.1 | 2.0 | Z | 2.1 | 2.1 | 2.1 | 2.0 | C | C | C | C | C | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 2.1 | 2.5 | 3.2 | 2.8 | 2.2 | 3.2 | |
| 11-Aug | Z | 2.4 | 2.3 | 2.2 | 2.1 | 2.3 | 2.2 | 2.1 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.3 | 2.3 | 2.5 | 2.5 | 2.1 | 2.5 | |
| 12-Aug | 2.7 | Z | 3.1 | 2.6 | 2.5 | 2.5 | 2.5 | 2.3 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 2.3 | 2.9 | 3.7 | 2.5 | 2.3 | 3.7 | |
| 13-Aug | 2.0 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.2 | 2.9 | 3.1 | 2.9 | 2.1 | 3.1 | |
| 14-Aug | 3.5 | 3.4 | 3.3 | Z | 3.1 | 2.8 | 2.5 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.1 | 2.3 | 2.4 | 2.9 | 2.8 | 2.4 | 3.5 | |
| 15-Aug | 2.4 | 2.4 | 2.2 | 2.3 | Z | 2.3 | 2.2 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | 2.4 | |
| 16-Aug | 1.9 | 1.9 | 2.4 | 2.7 | 2.5 | Z | 2.4 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 2.2 | 2.0 | 1.9 | 2.0 | 2.7 | |
| 17-Aug | Z | 2.0 | 2.1 | 2.1 | 2.2 | 2.2 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 2.2 | |
| 18-Aug | 1.9 | Z | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | |
| 19-Aug | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | |
| 20-Aug | 1.9 | 2.4 | 2.6 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.1 | 1.9 | 2.6 | |
| 21-Aug | 2.0 | 2.0 | 2.4 | 2.9 | Z | 2.2 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.9 | |
| 22-Aug | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | Z | 2.2 | 2.1 | 2.0 | 2.0 | M | 1.9 | 1.9 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.1 | 2.4 | 2.6 | 2.7 | 3.0 | 2.1 | 3.0 | |
| 23-Aug | Z | 3.3 | 3.1 | 3.2 | 2.6 | 2.7 | 2.7 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.3 | 2.7 | 2.9 | 3.3 | 3.2 | 2.4 | 3.3 | |
| 24-Aug | 3.4 | Z | 2.2 | 2.3 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 1.9 | 1.8 | 2.0 | 3.4 | |
| 25-Aug | 1.8 | 1.8 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | |
| 26-Aug | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | |
| 27-Aug | 1.9 | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | |
| 28-Aug | 1.9 | 1.8 | 1.8 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 2.2 | 2.5 | 2.3 | 2.4 | 2.3 | 2.0 | 2.5 |
| 29-Aug | Z | 2.7 | 2.3 | 2.3 | 2.2 | 2.3 | 2.1 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.7 | 2.3 | 2.8 | 2.2 | 2.1 | 2.8 | |
| 30-Aug | 2.0 | Z | 2.2 | 3.2 | 2.5 | 2.8 | 3.0 | 2.5 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 2.0 | 2.2 | 2.9 | 3.0 | 2.9 | 2.3 | 3.2 | |
| 31-Aug | 3.2 | 3.0 | Z | 2.7 | 3.0 | 2.9 | 2.7 | 2.4 | 2.1 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.2 | 3.2 | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | |
| Z - zerospan C - Calibration M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | | |





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Conklin - August 2017

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2.0 | 505 | 71.43 | 71.43 |
| 2.1 - 3.0 | 184 | 26.03 | 97.45 |
| 3.1 - 10.0 | 18 | 2.55 | 100.00 |
| > 10.0 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Conklin - August 2017**

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2.0 | 20 | 8 | 6 | 5 | 3 | 14 | 21 | 41 | 40 | 36 | 75 | 65 | 74 | 41 | 31 | 24 | 504 |
| 2.1 - 3.0 | 1 | 0 | 0 | 0 | 1 | 1 | 9 | 25 | 49 | 48 | 12 | 3 | 7 | 3 | 15 | 6 | 180 |
| 3.1 - 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 1 | 0 | 2 | 1 | 0 | 3 | 4 | 3 | 18 |
| > 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 21 | 8 | 6 | 5 | 4 | 15 | 31 | 69 | 90 | 84 | 89 | 69 | 81 | 47 | 50 | 33 | 702 |

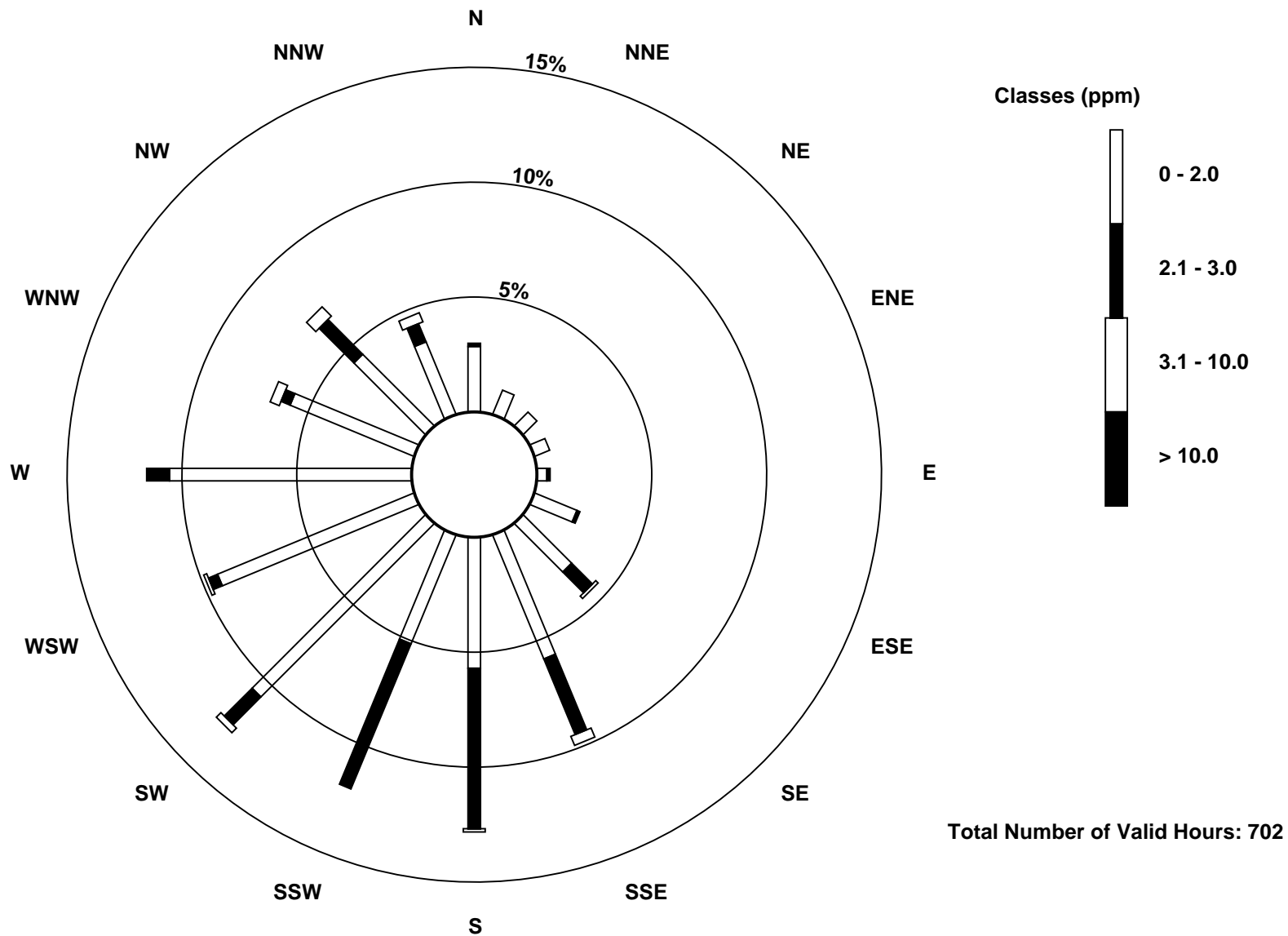
Total Number of Valid Hours: 702

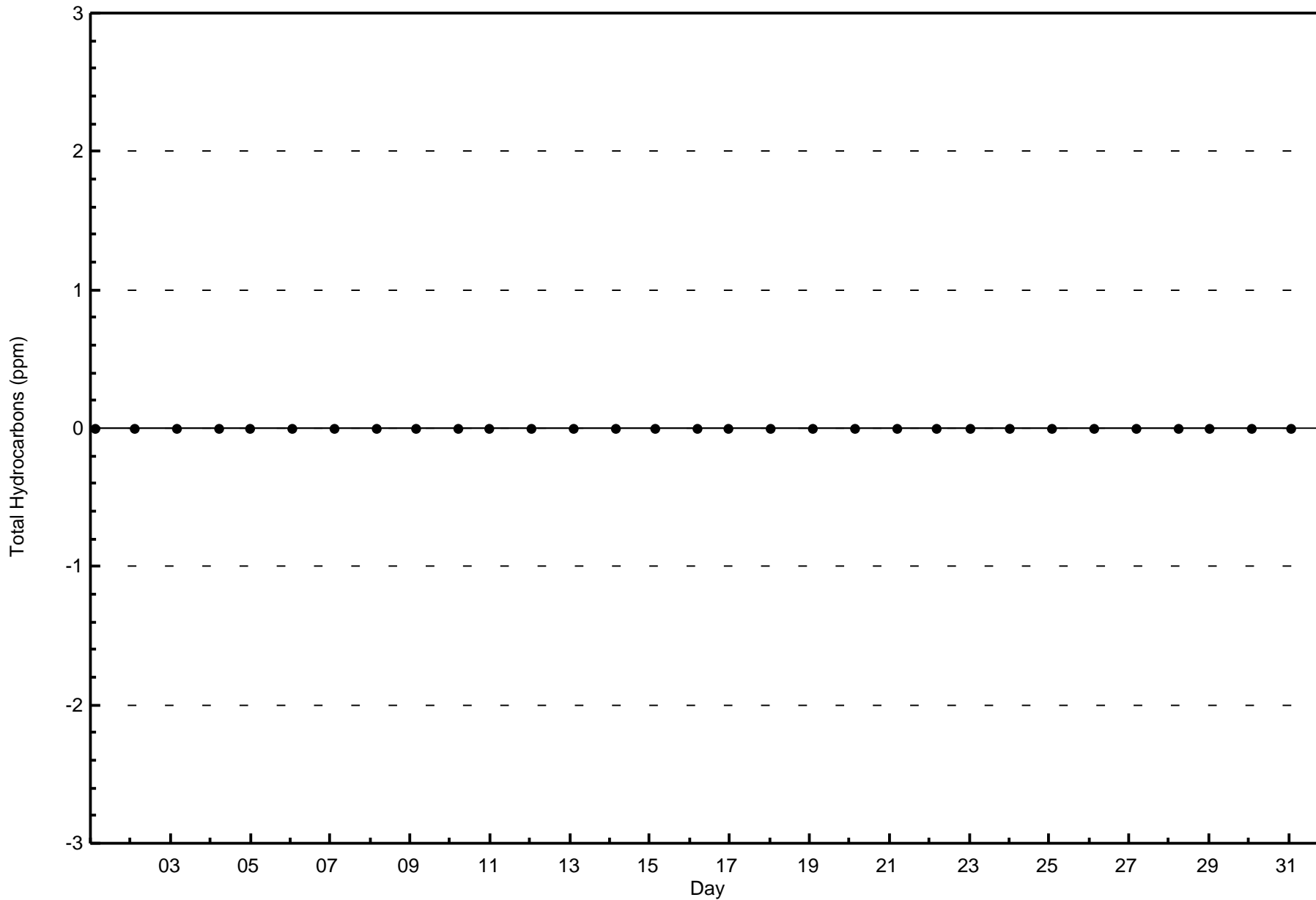
Total Number of Hours: 744

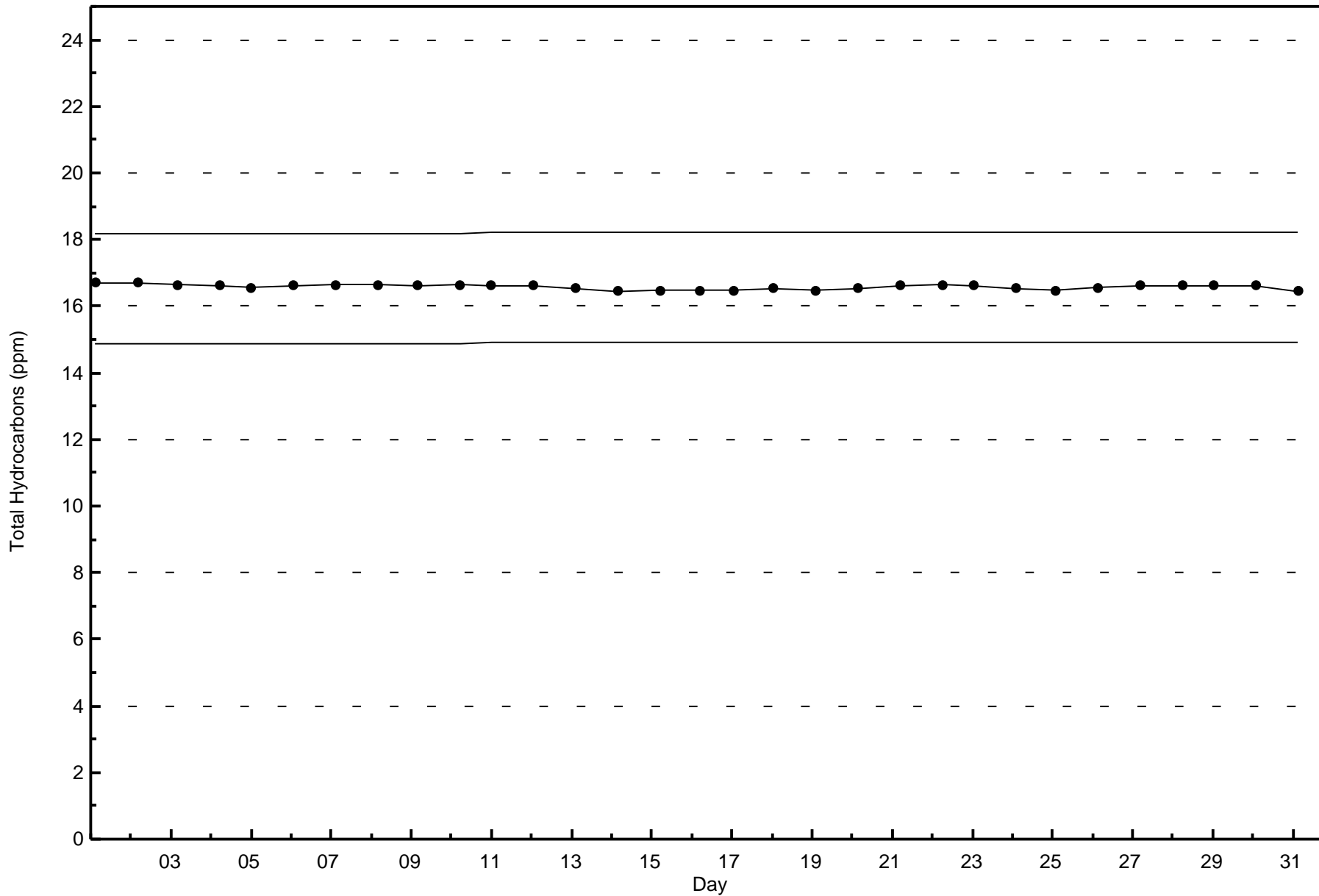


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Total Hydrocarbons (THC) - ppm
Conklin (AMS 21)

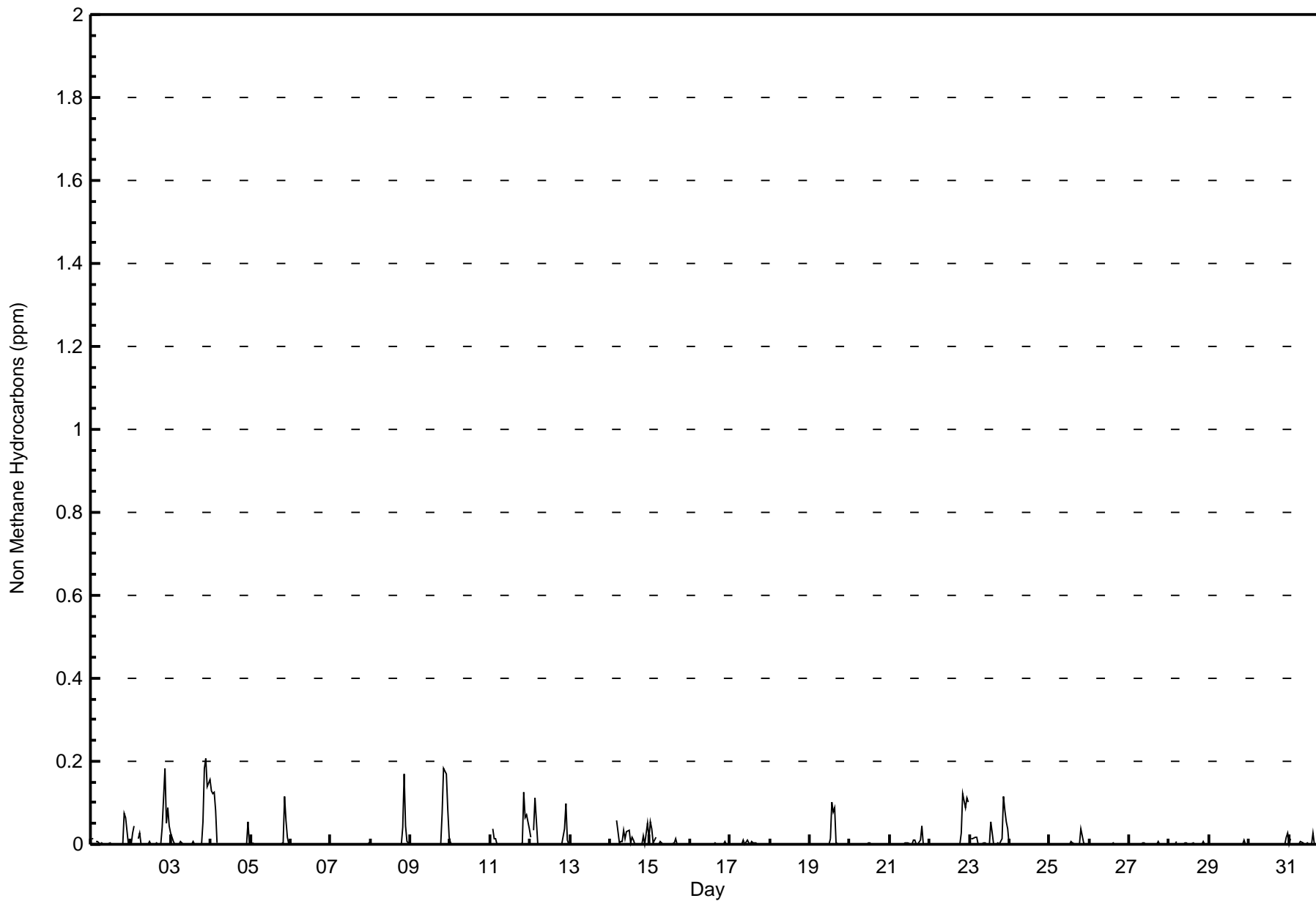








| Maximum Value: 0.207 ppm on Aug 3 22:00 | | | | | | | | | | | | | | | | | | | | Maximum Daily Average: 0.034 ppm on Aug 3 | | | | | Hours in Service: 744 | |
|---|-------------------------------|-------|-----------------|-------|-------|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--|-------|-------|-------|-------|--------------------------------|---------------|
| Minimum Value: 0.000 ppm on Aug 1 06:00 | | | | | | | | | | | | | | | | | | | | Minimum Daily Average: 0.000 ppm on Aug 18 | | | | | Hours of Data: 707 | |
| Maximum Diurnal Average: 0.043 ppm at hour 21 | | | | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 0.000 ppm at hour 17 | | | | | Hours of Missing Data: 37 | |
| Monthly Average: 0.008 ppm | | | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.1 | | | | | Hours of Calibration: 36 | |
| | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 99.9 | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0.014 | 0.014 | Z | 0.007 | 0.006 | 0.000 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.005 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.074 | 0.064 | 0.000 | 0.000 | 0.008 | 0.074 |
| 2-Aug | 0.000 | 0.028 | 0.044 | Z | 0.013 | 0.027 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.005 | 0.000 | 0.000 | 0.000 | 0.003 | 0.000 | 0.000 | 0.000 | 0.040 | 0.182 | 0.051 | 0.089 | 0.043 | 0.023 | 0.182 |
| 3-Aug | 0.028 | 0.005 | 0.000 | 0.000 | Z | 0.000 | 0.007 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.006 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.056 | 0.182 | 0.207 | 0.140 | 0.156 | 0.034 | 0.207 |
| 4-Aug | 0.129 | 0.122 | 0.125 | 0.081 | 0.003 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.055 | 0.000 | 0.022 | 0.129 |
| 5-Aug | Z | 0.002 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.004 | 0.115 | 0.057 | 0.015 | 0.000 | 0.009 | 0.115 |
| 6-Aug | 0.002 | Z | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 |
| 7-Aug | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.004 | 0.000 | 0.004 |
| 8-Aug | 0.003 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.040 | 0.170 | 0.044 | 0.006 | 0.000 | 0.011 | 0.170 |
| 9-Aug | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.074 | 0.183 | 0.171 | 0.086 | 0.017 | 0.023 | 0.183 |
| 10-Aug | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | C | C | C | C | C | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 |
| 11-Aug | Z | 0.039 | 0.013 | 0.013 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.005 | 0.126 | 0.065 | 0.072 | 0.036 | 0.016 | 0.126 |
| 12-Aug | 0.017 | Z | 0.033 | 0.112 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.038 | 0.097 | 0.010 | 0.000 | 0.013 | 0.112 |
| 13-Aug | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 | 0.001 | 0.000 | 0.001 |
| 14-Aug | 0.000 | 0.000 | 0.000 | Z | 0.057 | 0.004 | 0.006 | 0.006 | 0.034 | 0.013 | 0.030 | 0.033 | 0.002 | 0.018 | 0.012 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.019 | 0.000 | 0.052 | 0.013 | 0.013 | 0.057 |
| 15-Aug | 0.053 | 0.036 | 0.004 | 0.017 | Z | 0.000 | 0.005 | 0.003 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.005 | 0.013 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.006 | 0.053 |
| 16-Aug | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.003 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.008 | 0.000 | 0.000 | 0.000 | 0.000 | 0.008 |
| 17-Aug | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.112 | 0.000 | 0.010 | 0.002 | 0.000 | 0.007 | 0.004 | 0.003 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.012 |
| 18-Aug | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 19-Aug | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.013 | 0.100 | 0.079 | 0.088 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.012 | 0.100 |
| 20-Aug | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.005 | 0.002 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.005 |
| 21-Aug | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.004 | 0.004 | 0.000 | 0.000 | 0.010 | 0.010 | 0.001 | 0.000 | 0.010 | 0.045 | 0.000 | 0.000 | 0.000 | 0.000 | 0.004 | 0.045 |
| 22-Aug | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | M | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.028 | 0.122 | 0.089 | 0.113 | 0.102 | 0.021 | 0.122 |
| 23-Aug | Z | 0.015 | 0.014 | 0.016 | 0.018 | 0.001 | 0.000 | 0.000 | 0.002 | 0.005 | 0.000 | 0.000 | 0.000 | 0.053 | 0.000 | 0.000 | 0.000 | 0.003 | 0.001 | 0.012 | 0.117 | 0.081 | 0.054 | 0.036 | 0.019 | 0.117 |
| 24-Aug | 0.001 | Z | 0.000 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 |
| 25-Aug | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.007 | 0.004 | 0.000 | 0.000 | 0.000 | 0.000 | 0.037 | 0.003 | 0.000 | 0.000 | 0.000 | 0.002 | 0.037 |
| 26-Aug | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.003 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.003 |
| 27-Aug | 0.000 | 0.000 | 0.000 | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.003 | 0.004 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.007 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.007 |
| 28-Aug | 0.000 | 0.001 | 0.000 | 0.000 | 0.006 | Z | 0.000 | 0.000 | 0.000 | 0.005 | 0.004 | 0.000 | 0.000 | 0.001 | 0.003 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.006 | 0.000 | 0.000 | 0.000 | 0.001 | 0.006 |
| 29-Aug | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.010 | 0.000 | 0.000 | 0.000 | 0.000 | 0.010 |
| 30-Aug | 0.000 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.017 | 0.028 | 0.002 | 0.028 |
| 31-Aug | 0.000 | 0.012 | Z | 0.000 | 0.000 | 0.000 | 0.000 | 0.008 | 0.003 | 0.000 | 0.000 | 0.002 | 0.000 | 0.002 | 0.026 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.026 |
| | | | | | | | | | | | | | | | | | | | | 0.010 0.011 0.009 0.010 0.004 0.001 0.001 0.001 0.002 0.001 0.002 0.002 0.001 0.006 0.005 0.004 0.000 0.000 0.000 0.011 0.043 0.030 0.023 0.014 | | | | | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | | | 0.129 0.122 0.125 0.112 0.057 0.027 0.007 0.008 0.034 0.013 0.030 0.033 0.013 0.100 0.079 0.088 0.002 0.007 0.010 0.074 0.183 0.207 0.140 0.156 | | | | | Diurnal Maximum | |
| Z - zerospan | | | C - Calibration | | | M - Maintenance | | | | | | | | | | | | | | | | | | | | |





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Conklin - August 2017**

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 0.005 | 600 | 84.87 | 84.87 |
| 0.006 - 0.05 | 72 | 10.18 | 95.05 |
| 0.06 - 0.1 | 28 | 3.96 | 99.01 |
| > 0.1 | 7 | 0.99 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Conklin - August 2017

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-----------------------------------|-----------------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 0.005 | 21 | 8 | 6 | 5 | 4 | 15 | 29 | 58 | 77 | 54 | 79 | 60 | 65 | 40 | 47 | 30 | 598 |
| 0.006 - 0.05 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 9 | 9 | 13 | 8 | 9 | 9 | 6 | 2 | 3 | 70 |
| 0.06 - 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 12 | 2 | 0 | 6 | 1 | 1 | 0 | 27 |
| > 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 0 | 0 | 1 | 0 | 0 | 0 | 7 |
| Totals | 21 | 8 | 6 | 5 | 4 | 15 | 31 | 69 | 90 | 84 | 89 | 69 | 81 | 47 | 50 | 33 | 702 |

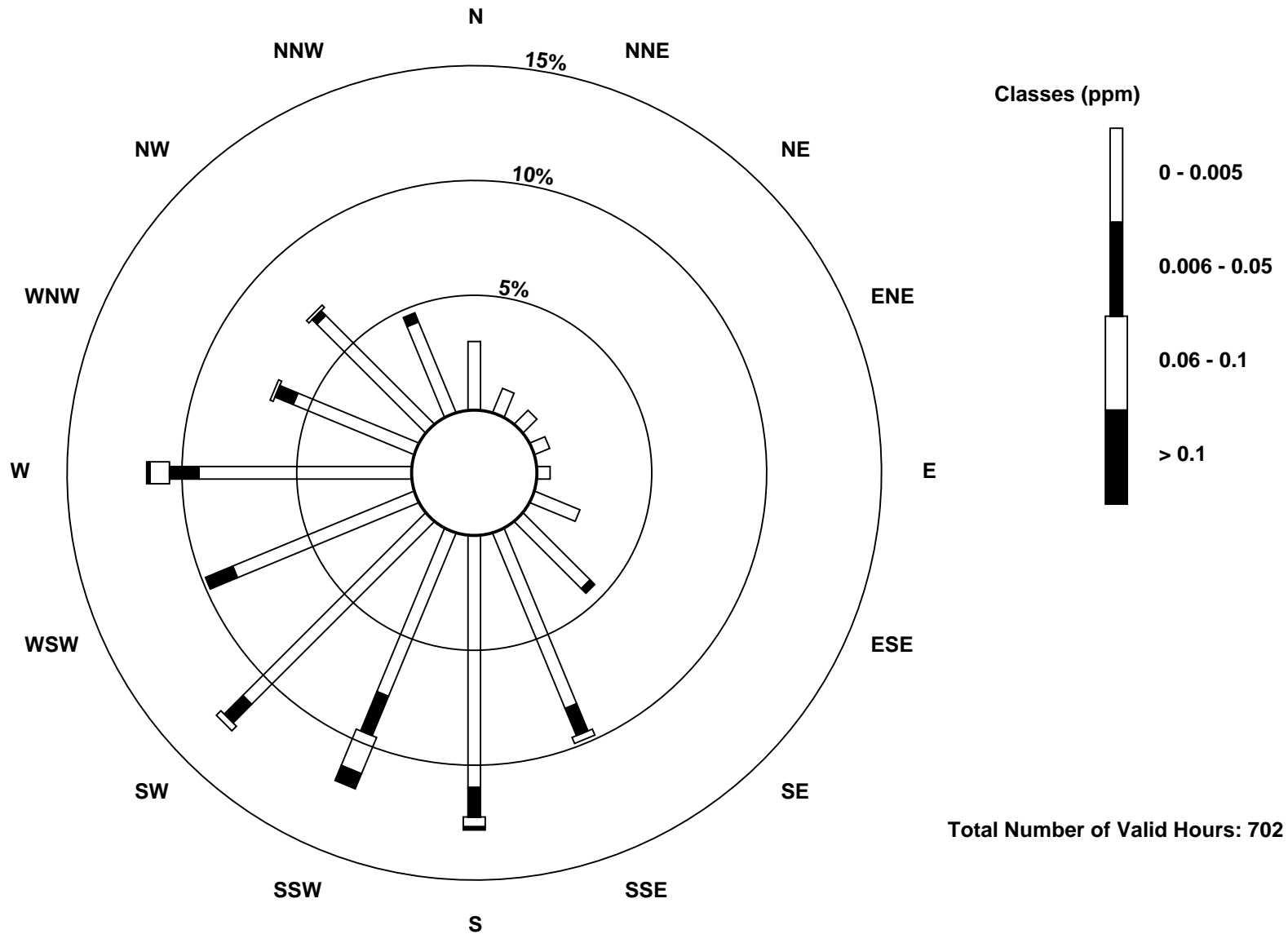
Total Number of Valid Hours: 702

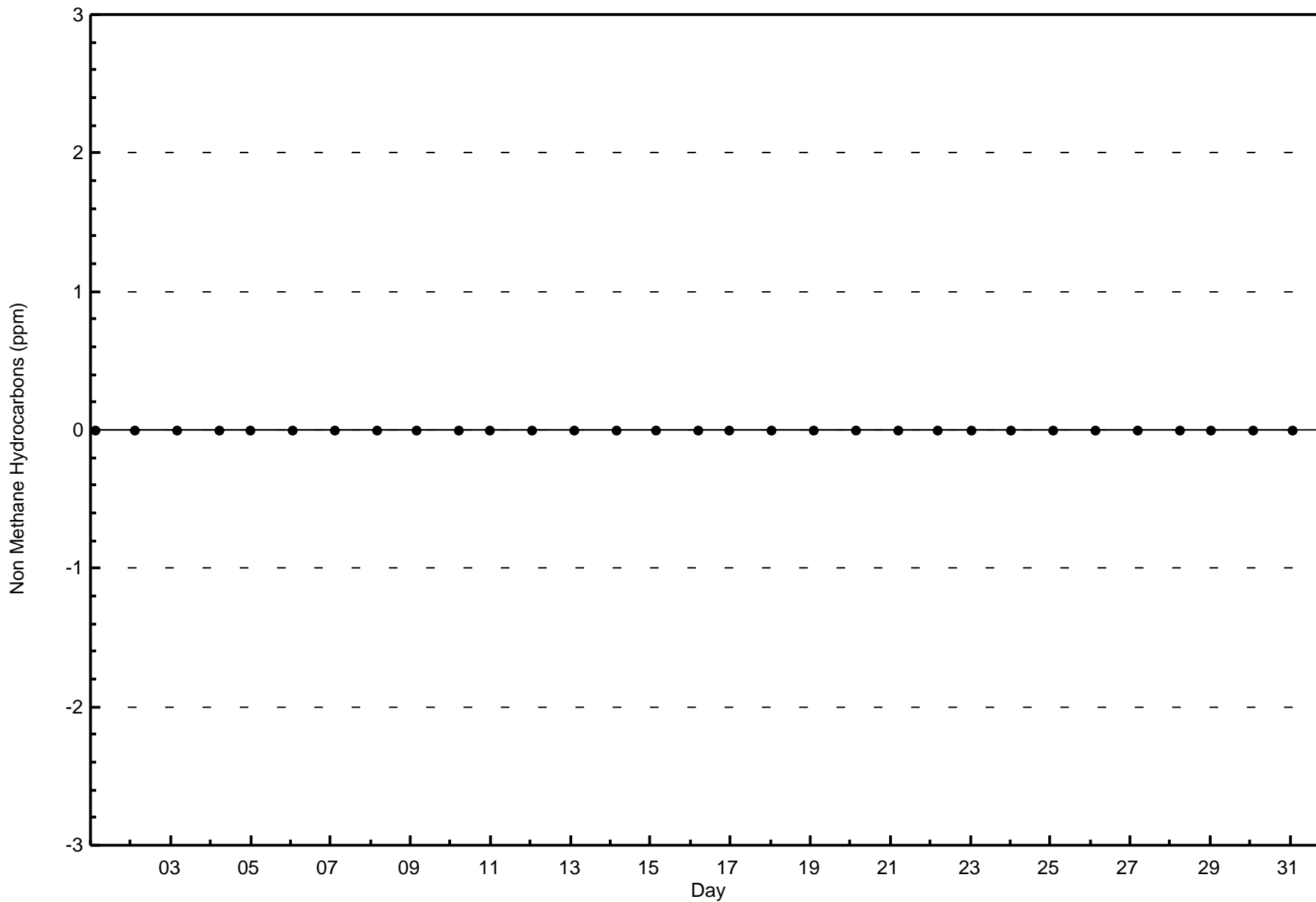
Total Number of Hours: 744

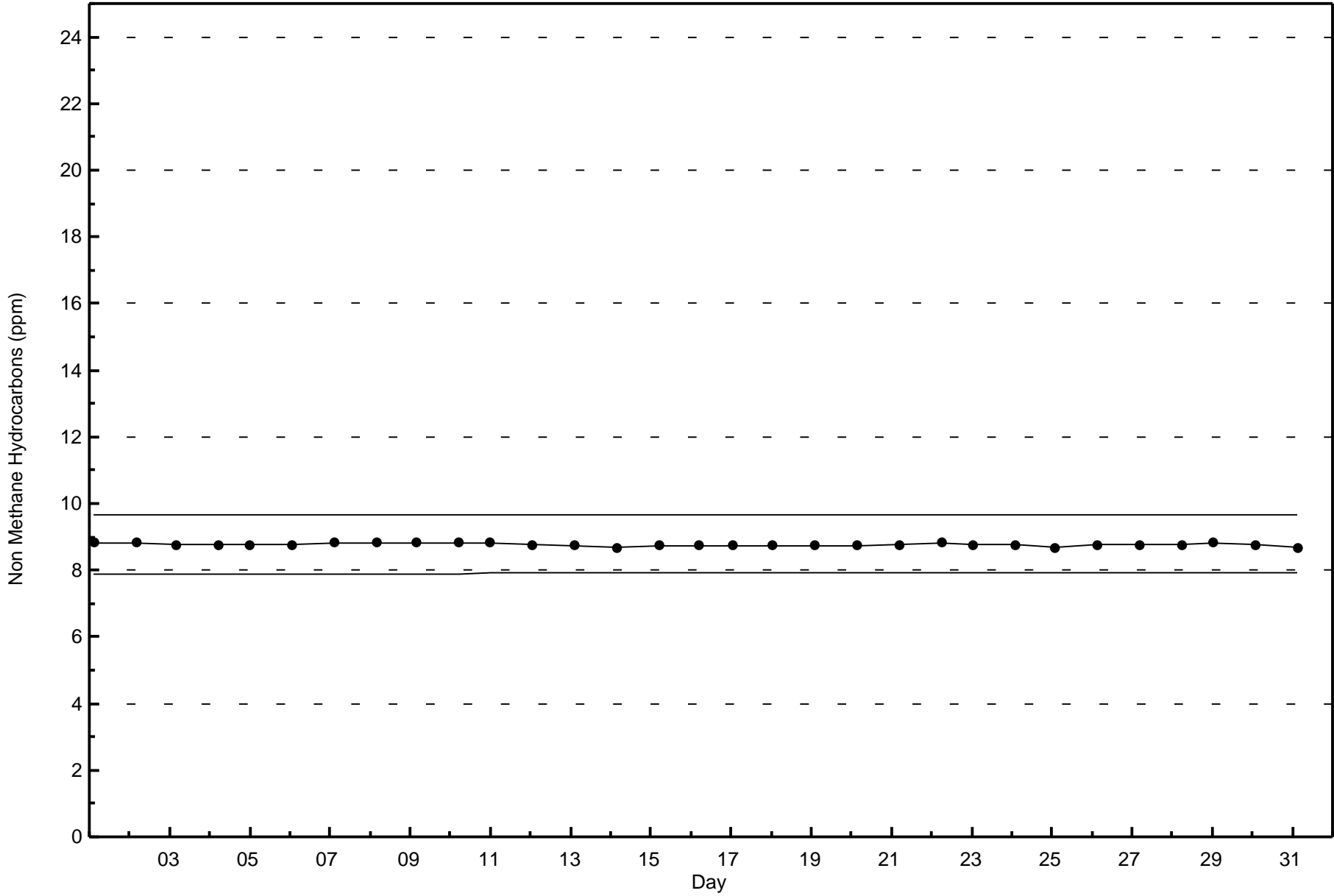


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Non Methane Hydrocarbons (NMHC) - ppm
Conklin (AMS 21)









Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH₄) - ppm

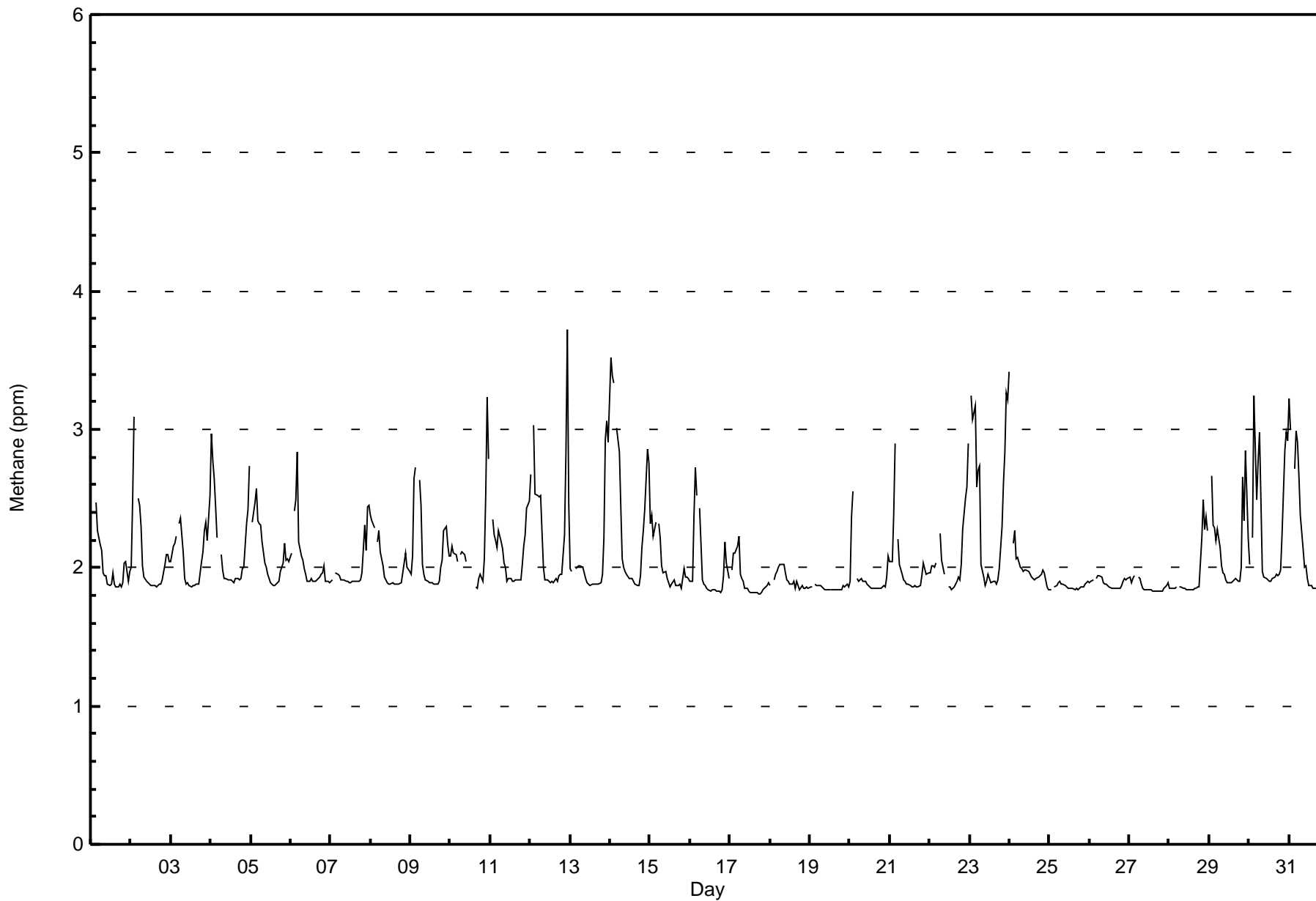
Conklin - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3.7 ppm on Aug 12 23:00 Maximum Daily Average: 2.4 ppm on Aug 23 | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 707 | | | | | | | | | | | | | | |
|---|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|-----|-----|-----|-----|-----|-----|-----------------|---------------|---------------|-----|-----|-----|-----|-----|
| Minimum Value: 1.8 ppm on Aug 17 19:00 Minimum Daily Average: 1.9 ppm on Aug 19 Maximum Diurnal Average: 2.4 ppm at hour 3 Minimum Diurnal Average: 1.9 ppm at hour 16 Monthly Average: 2.06 ppm Percentiles: P ₁ = 1.8 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 1.9 Q ₃ = 2.1 P ₉₀ = 2.5 P ₉₉ = 3.2 | | | | | | | | | | | | | | | | | Hours of Missing Data: 37 Hours of Calibration: 36 Percent Operational Time: 99.9 | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | |
| 1-Aug | 2.6 | 2.6 | Z | 2.5 | 2.3 | 2.2 | 2.1 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 1.9 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.0 | 2.1 | 2.6 |
| 2-Aug | 2.0 | 2.5 | 3.1 | Z | 2.5 | 2.5 | 2.3 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.1 | 2.1 | 2.0 | 2.1 | 2.1 | 2.1 | 2.0 | 2.1 | 3.1 |
| 3-Aug | 2.0 | 2.2 | 2.2 | 2.2 | Z | 2.3 | 2.4 | 2.1 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.1 | 2.3 | 2.3 | 2.2 | 2.5 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.5 |
| 4-Aug | 3.0 | 2.8 | 2.6 | 2.4 | 2.2 | Z | 2.3 | 2.1 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.3 | 2.4 | 2.7 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 3.0 |
| 5-Aug | Z | 2.3 | 2.5 | 2.6 | 2.3 | 2.3 | 2.3 | 2.2 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.2 | 2.1 | 2.1 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.6 |
| 6-Aug | 2.1 | Z | 2.4 | 2.5 | 2.8 | 2.2 | 2.1 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.8 |
| 7-Aug | 1.9 | 1.9 | Z | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.3 | 2.1 | 2.4 | 2.5 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.5 |
| 8-Aug | 2.4 | 2.3 | 2.3 | Z | 2.2 | 2.3 | 2.1 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.4 |
| 9-Aug | 2.0 | 2.1 | 2.6 | 2.7 | Z | 2.6 | 2.5 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.1 | 2.3 | 2.3 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.7 |
| 10-Aug | 2.1 | 2.2 | 2.1 | 2.1 | 2.0 | Z | 2.1 | 2.1 | 2.1 | 2.0 | C | C | C | C | C | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 2.1 | 2.5 | 3.2 | 2.8 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 3.2 |
| 11-Aug | Z | 2.3 | 2.2 | 2.2 | 2.1 | 2.3 | 2.2 | 2.1 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.2 | 2.2 | 2.4 | 2.5 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.5 |
| 12-Aug | 2.7 | Z | 3.0 | 2.5 | 2.5 | 2.5 | 2.5 | 2.3 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 2.2 | 2.8 | 3.7 | 2.5 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 3.7 |
| 13-Aug | 2.0 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.2 | 2.9 | 3.1 | 2.9 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 3.1 |
| 14-Aug | 3.5 | 3.4 | 3.3 | Z | 3.0 | 2.8 | 2.4 | 2.1 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.1 | 2.3 | 2.4 | 2.9 | 2.8 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 3.5 |
| 15-Aug | 2.3 | 2.4 | 2.2 | 2.3 | Z | 2.3 | 2.2 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.4 |
| 16-Aug | 1.9 | 1.9 | 2.4 | 2.7 | 2.5 | Z | 2.4 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 2.2 | 2.0 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.7 |
| 17-Aug | Z | 2.0 | 2.1 | 2.1 | 2.2 | 2.2 | 2.0 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.2 |
| 18-Aug | 1.9 | Z | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 |
| 19-Aug | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| 20-Aug | 1.9 | 2.4 | 2.6 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.6 |
| 21-Aug | 2.0 | 2.0 | 2.4 | 2.9 | Z | 2.2 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.9 |
| 22-Aug | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | Z | 2.2 | 2.1 | 2.0 | 2.0 | M | 1.9 | 1.9 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.3 | 2.5 | 2.6 | 2.9 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.9 |
| 23-Aug | Z | 3.2 | 3.1 | 3.2 | 2.6 | 2.7 | 2.7 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.3 | 2.6 | 2.8 | 3.3 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 3.3 |
| 24-Aug | 3.4 | Z | 2.2 | 2.3 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 1.9 | 1.8 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 3.4 |
| 25-Aug | 1.8 | 1.8 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| 26-Aug | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| 27-Aug | 1.9 | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| 28-Aug | 1.9 | 1.8 | 1.8 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 2.2 | 2.5 | 2.3 | 2.4 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.5 |
| 29-Aug | Z | 2.7 | 2.3 | 2.3 | 2.2 | 2.3 | 2.1 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.7 | 2.3 | 2.8 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.8 |
| 30-Aug | 2.0 | Z | 2.2 | 3.2 | 2.5 | 2.8 | 3.0 | 2.5 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 2.0 | 2.2 | 2.9 | 3.0 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 3.2 |
| 31-Aug | 3.2 | 3.0 | Z | 2.7 | 3.0 | 2.9 | 2.7 | 2.4 | 2.1 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 3.2 |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | | | |
| Z - zerospan C - Calibration M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Methane (CH₄) - ppm
Conklin - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Conklin - August 2017

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2.0 | 512 | 72.42 | 72.42 |
| 2.1 - 3.0 | 180 | 25.46 | 97.88 |
| 3.1 - 10.0 | 15 | 2.12 | 100.00 |
| > 10.0 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Methane (CH₄) - ppm
Conklin - August 2017**

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2.0 | 20 | 8 | 6 | 5 | 3 | 14 | 21 | 41 | 40 | 40 | 75 | 65 | 75 | 41 | 32 | 24 | 510 |
| 2.1 - 3.0 | 1 | 0 | 0 | 0 | 1 | 1 | 10 | 25 | 49 | 44 | 13 | 3 | 6 | 4 | 14 | 6 | 177 |
| 3.1 - 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 1 | 1 | 0 | 2 | 4 | 3 | 15 |
| > 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 21 | 8 | 6 | 5 | 4 | 15 | 31 | 69 | 90 | 84 | 89 | 69 | 81 | 47 | 50 | 33 | 702 |

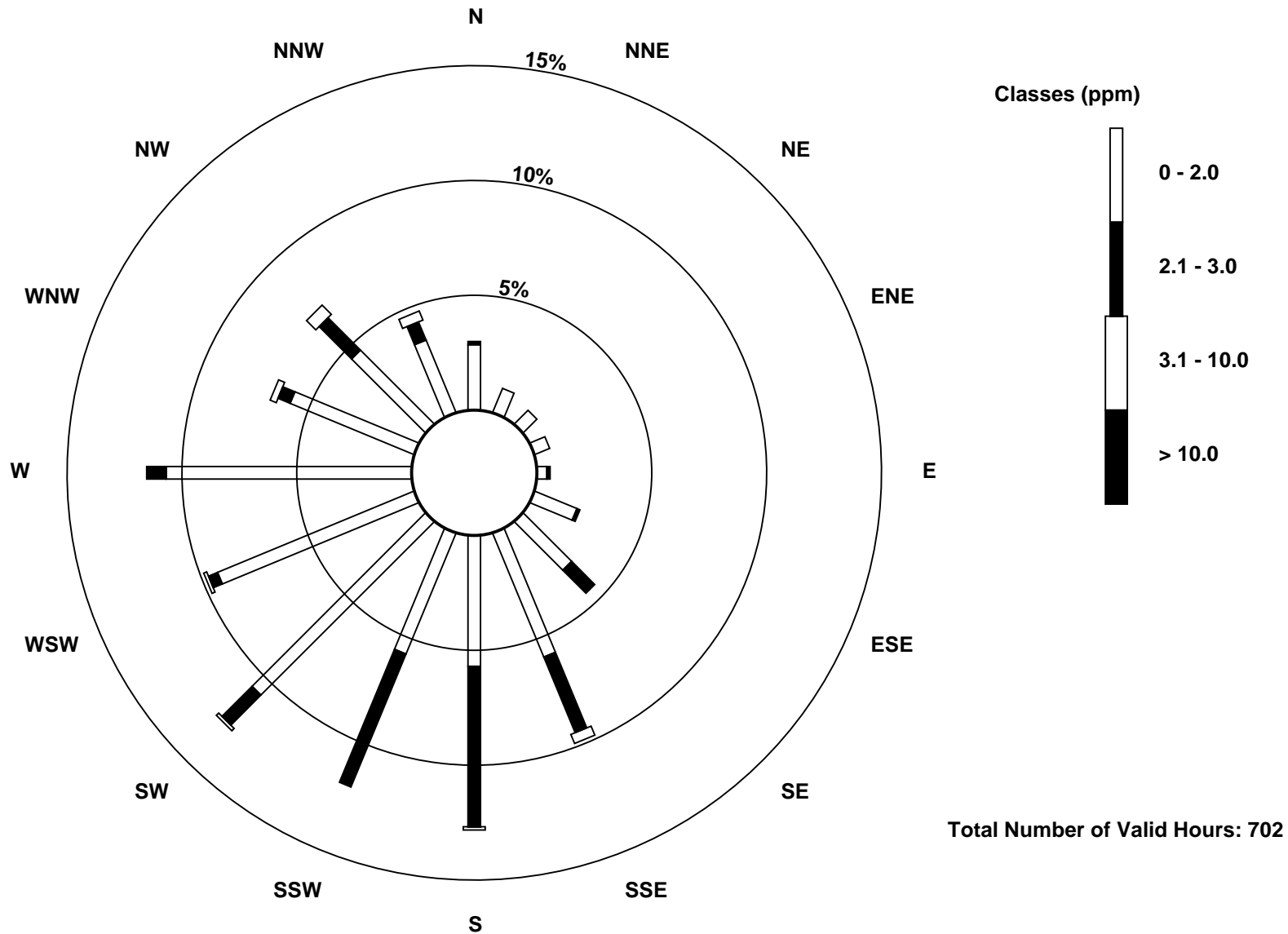
Total Number of Valid Hours: 702

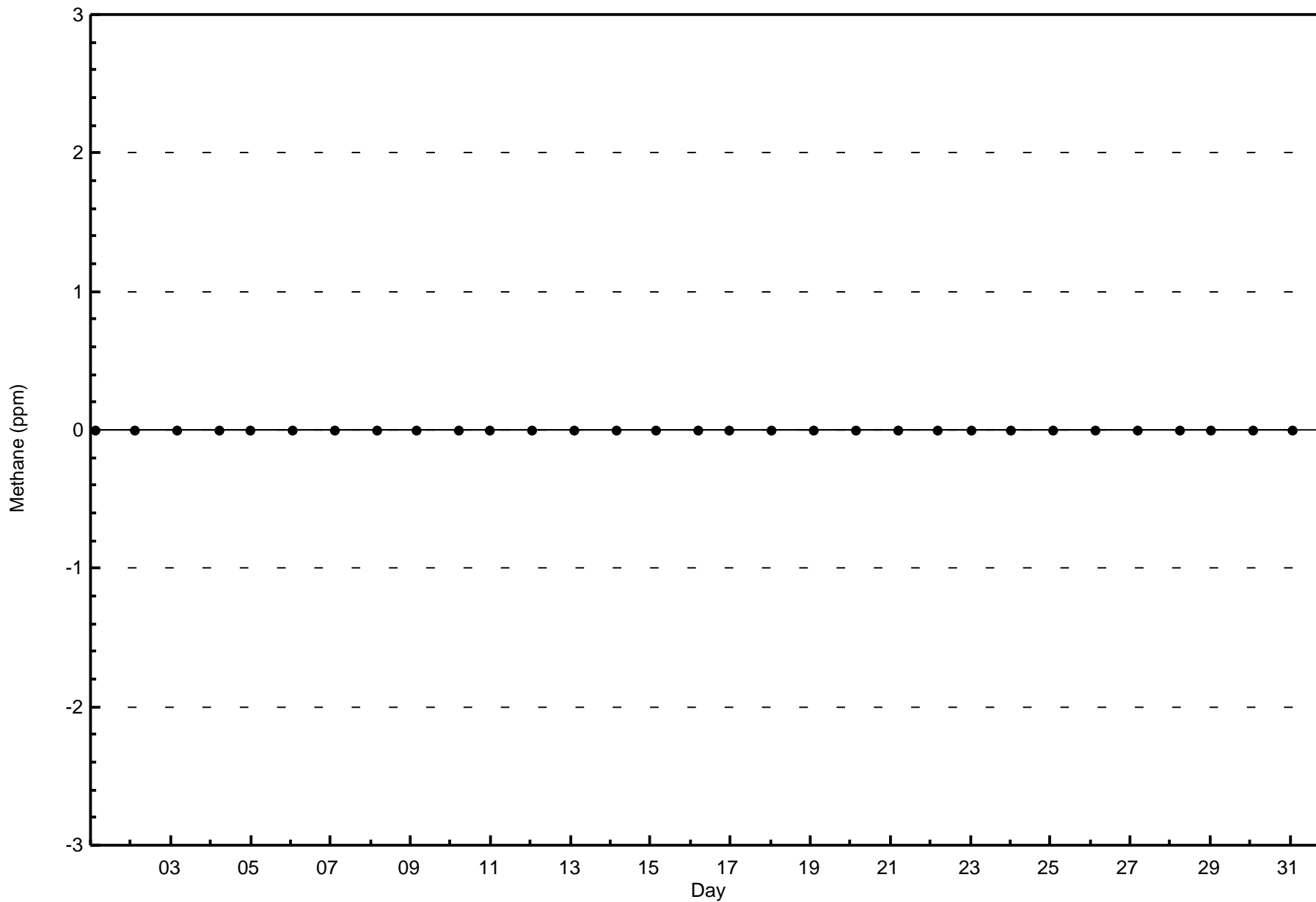
Total Number of Hours: 744

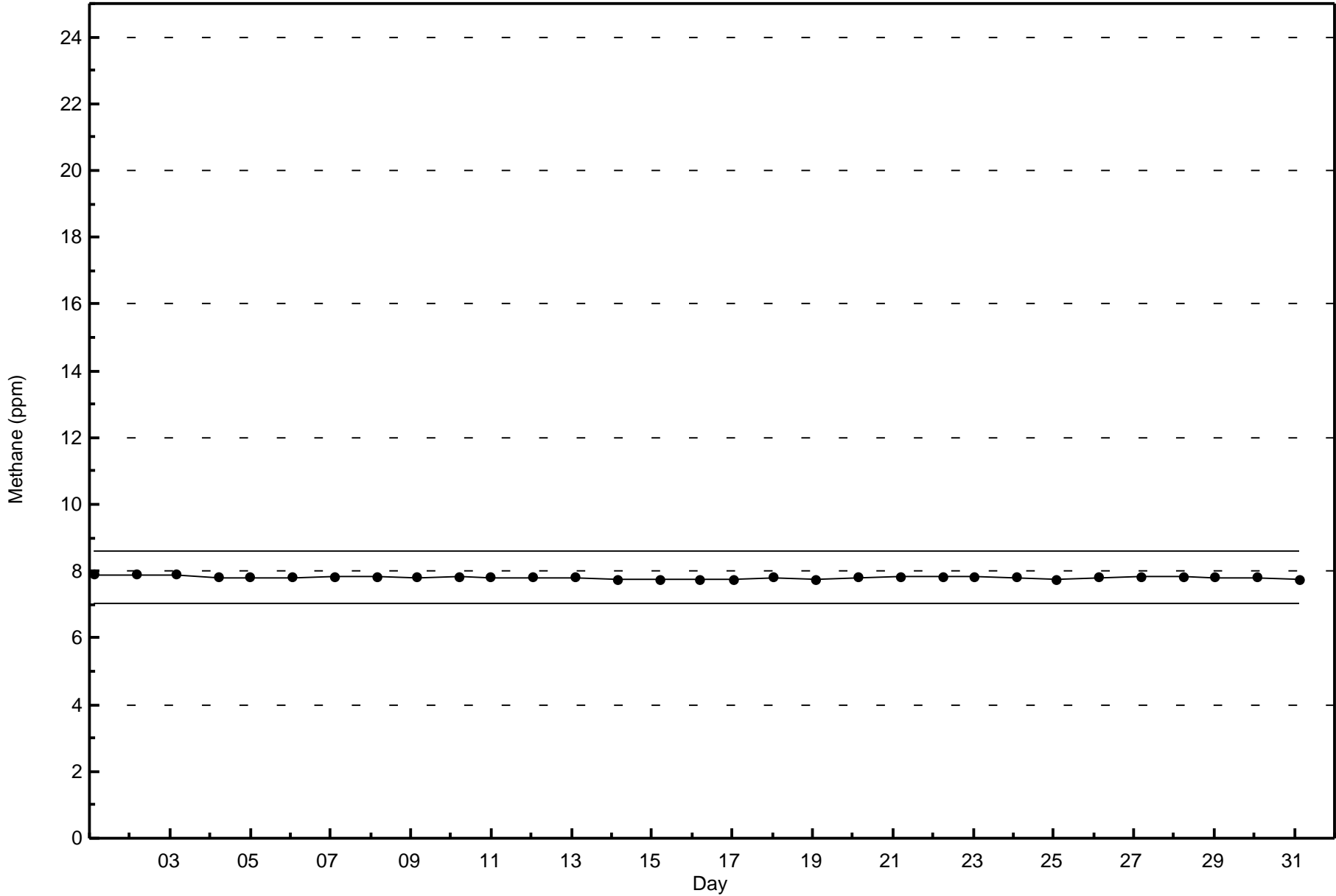


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Methane (CH₄) - ppm
Conklin (AMS 21)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

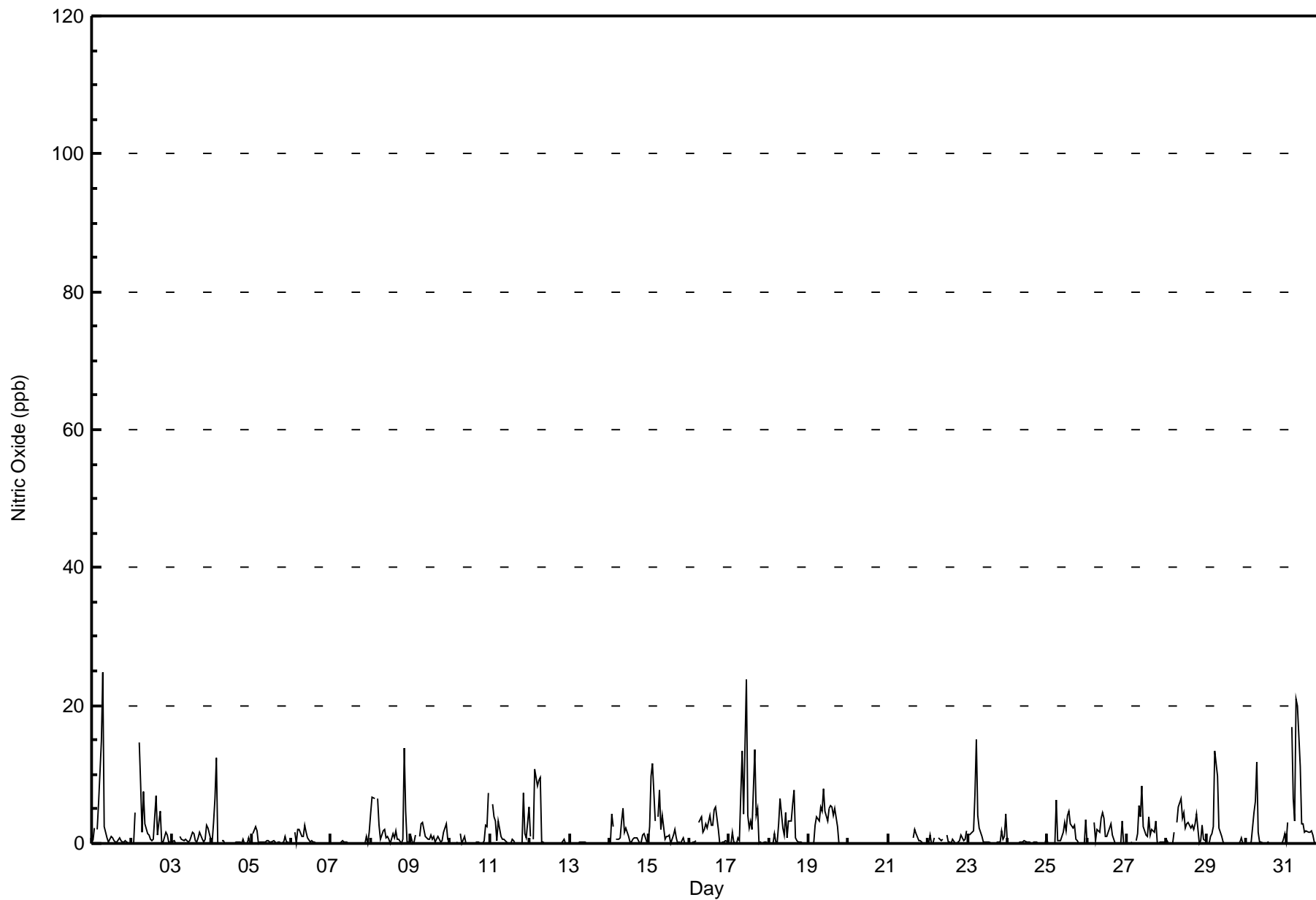
Conklin - August 2017

| Maximum Value: 25 ppb on Aug 1 07:00 | | | | | | | | | | | | | | | | | | Maximum Daily Average: 4.3 ppb on Aug 31 | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|----|-----------------|----|----|-----------------|----|----|-----------------------|----|----|----|----|----|----|----|----|---|----|----|----|----|----|---------------------------|---------------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|
| Minimum Value: 0 ppb on Aug 6 23:00 | | | | | | | | | | | | | | | | | | Minimum Daily Average: 0.0 ppb on Aug 13 | | | | | | Hours of Data: 673 | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 4.0 ppb at hour 6 | | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 0.1 ppb at hour 20 | | | | | | Hours of Missing Data: 71 | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 1.6 ppb | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 O ₃ = 2 P ₉₀ = 4 P ₉₉ = 15 | | | | | | Hours of Calibration: 35 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | Percent Operational Time: 95.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 0 | 2 | Z | 2 | 6 | 15 | 25 | 2 | 2 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.6 | 25 | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 0 | 0 | 4 | Z | 15 | 9 | 2 | 8 | 3 | 1 | 1 | 1 | 0 | 1 | 7 | 1 | 3 | 5 | 0 | 0 | 2 | 1 | 0 | 0 | 2.8 | 15 | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 0 | 0 | 0 | 0 | Z | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 1 | 3 | 2 | 1 | 0.7 | 3 | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 0 | 3 | 7 | 12 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1.1 | 12 | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | Z | 1 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0.4 | 2 | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 0 | Z | 2 | 0 | 2 | 2 | 1 | 1 | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 3 | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0.2 | 2 | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 4 | 7 | 6 | Z | 7 | 3 | 1 | 2 | 2 | 1 | 1 | 1 | 0 | 1 | 1 | 2 | 1 | 1 | 0 | 1 | 14 | 5 | 0 | 0 | 2.5 | 14 | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 1 | 0 | 0 | 1 | Z | 1 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 2 | 3 | 1 | 0 | 1.0 | 3 | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 0 | 0 | 0 | 0 | 0 | Z | 1 | 0 | 1 | 0 | C | C | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 7 | 0.9 | 7 | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | Z | 6 | 4 | 3 | 0 | 3 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 1 | 1 | 5 | 1.5 | 7 | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 1 | Z | 1 | 11 | 8 | 9 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1.8 | 11 | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 0 | 4 | 2 | Z | 1 | 1 | 1 | 3 | 5 | 2 | 2 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1.2 | 5 | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 3 | 10 | 12 | 3 | Z | 4 | 8 | 2 | 4 | 1 | 1 | 1 | 1 | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2.3 | 12 | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | Z | 3 | 4 | 2 | 2 | 3 | 2 | 4 | 3 | 3 | 5 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1.7 | 5 | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | Z | 0 | 2 | 0 | 0 | 1 | 0 | 7 | 14 | 4 | 24 | 4 | 2 | 3 | 2 | 14 | 4 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 3.8 | 24 | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 0 | Z | 0 | 1 | 0 | 0 | 3 | 7 | 2 | 1 | 4 | 1 | 3 | 3 | 6 | 8 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.8 | 8 | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 0 | 0 | Z | 0 | 3 | 4 | 3 | 5 | 5 | 8 | 5 | 3 | 5 | 5 | 5 | 4 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2.7 | 8 | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 0 | 0 | 0 | Z | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | M | M | M | M | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | -- | 2 | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 0 | 1 | 0 | 0 | 1 | Z | 1 | 1 | 0 | 1 | M | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 0.5 | 2 | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | Z | 1 | 1 | 2 | 7 | 15 | 4 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 4 | 1.9 | 15 | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 0 | 0 | Z | 0 | 0 | 6 | 0 | 0 | 0 | 2 | 3 | 2 | 4 | 5 | 3 | 2 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 1.5 | 6 | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 0 | 0 | 0 | Z | 3 | 0 | 2 | 2 | 4 | 5 | 4 | 1 | 1 | 2 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 1.4 | 5 | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 0 | 0 | 0 | 0 | Z | 0 | 1 | 6 | 4 | 8 | 2 | 1 | 1 | 4 | 1 | 2 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 1.6 | 8 | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 0 | 0 | 0 | 0 | 2 | Z | 3 | 5 | 6 | 4 | 5 | 2 | 3 | 3 | 2 | 3 | 2 | 3 | 4 | 0 | 0 | 3 | 1 | 0 | 2.3 | 6 | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | Z | 0 | 1 | 1 | 2 | 13 | 10 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1.5 | 13 | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 0 | Z | 0 | 0 | 4 | 6 | 12 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1.2 | 12 | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 0 | 3 | Z | 17 | 6 | 3 | 21 | 20 | 11 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4.3 | 21 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.4 | 1.6 | 1.9 | 2.3 | 2.7 | 4.0 | 4.0 | 3.0 | 2.6 | 1.7 | 2.3 | 0.9 | 1.1 | 1.3 | 1.4 | 1.6 | 1.2 | 0.9 | 0.3 | 0.1 | 1.1 | 0.9 | 0.4 | 0.9 | Diurnal Average |
| | | | | | | | | | | | | | | | | | | | | | | | | 4 | 10 | 12 | 17 | 15 | 15 | 25 | 20 | 14 | 8 | 24 | 4 | 5 | 5 | 7 | 14 | 5 | 5 | 4 | 1 | 14 | 5 | 2 | 7 | Diurnal Maximum |
| Z - zerospan | | | C - Calibration | | | M - Maintenance | | | AF - Analyzer Failure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Conklin - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Conklin - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 670 | 99.55 | 99.55 |
| 21 - 40 | 3 | 0.45 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 673

Total Number of Hours: 744



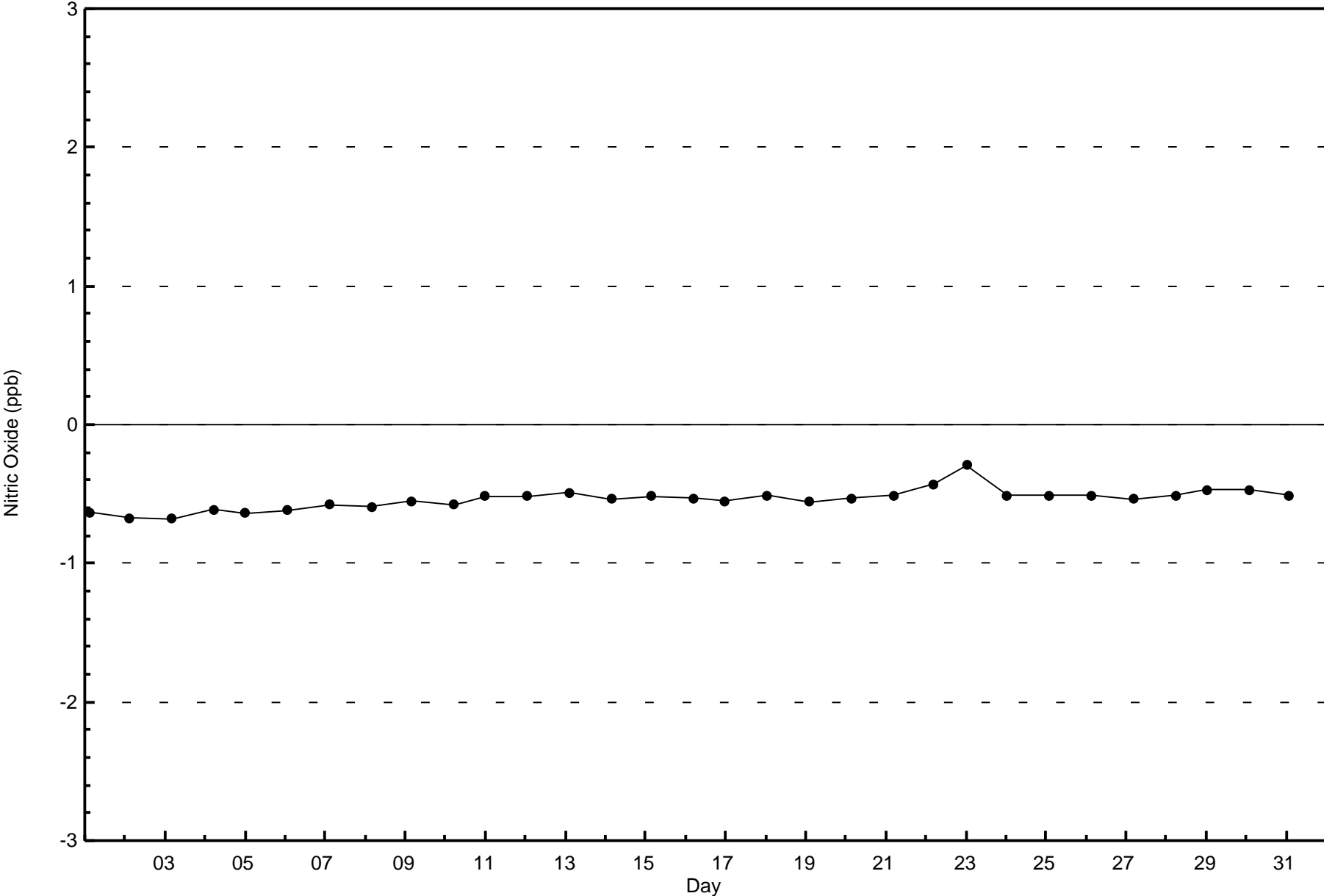
**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Conklin - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 21 | 8 | 6 | 5 | 4 | 15 | 28 | 68 | 85 | 82 | 86 | 63 | 70 | 44 | 47 | 33 | 665 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 3 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 21 | 8 | 6 | 5 | 4 | 15 | 28 | 68 | 86 | 82 | 86 | 63 | 71 | 44 | 48 | 33 | 668 |

Total Number of Valid Hours: 668

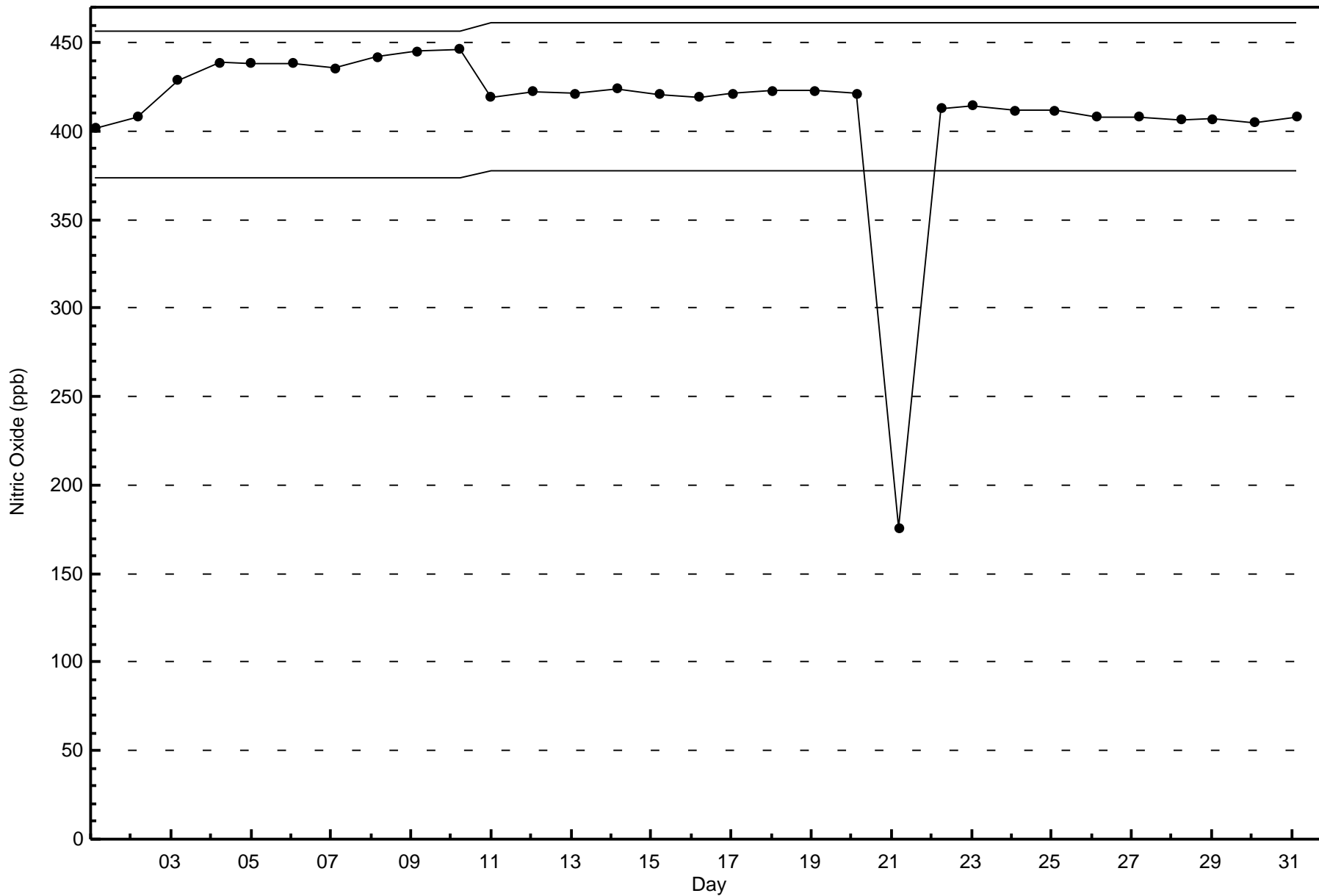
Total Number of Hours: 744





Wood Buffalo Environmental Association
Span Responses

Nitric Oxide (NO) - ppb
Conklin - August 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

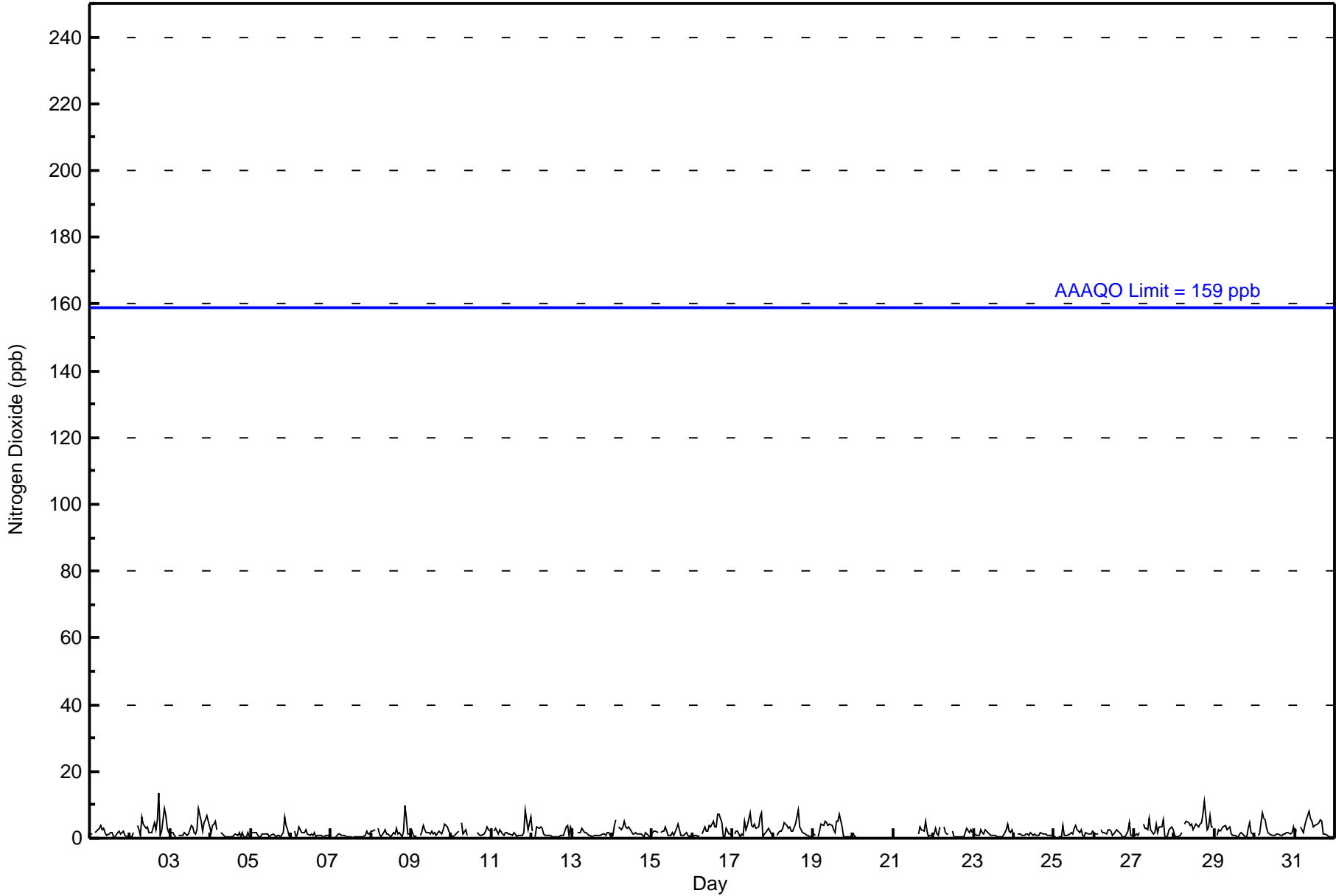
Conklin - August 2017

| Number of Exceedences (AAAQO): | | 1-hr: 0 24-hr: 0 | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|--|----|--------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|---------------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|
| Maximum Value: 14 ppb on Aug 2 18:00 | | Maximum Daily Average: 3.7 ppb on Aug 28 | | Hours of Data: 673 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum Value: 0 ppb on Aug 7 00:00 | | Minimum Daily Average: 0.7 ppb on Aug 7 | | Hours of Missing Data: 71 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 2.8 ppb at hour 21 | | Minimum Diurnal Average: 1.2 ppb at hour 1 | | Hours of Calibration: 35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 2.0 ppb | | Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 O ₃ = 3 P ₉₀ = 4 P ₉₉ = 8 | | Percent Operational Time: 95.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 1 | 1 | Z | 2 | 2 | 3 | 4 | 3 | 3 | 2 | 1 | 1 | 2 | 2 | 0 | 1 | 2 | 2 | 1 | 2 | 2 | 1 | 0 | 1 | 1.7 | 4 | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 1 | 0 | 2 | Z | 4 | 2 | 1 | 6 | 4 | 3 | 3 | 2 | 2 | 2 | 5 | 3 | 5 | 14 | 1 | 2 | 9 | 7 | 3 | 2 | 3.5 | 14 | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 2 | 2 | 1 | 1 | Z | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 4 | 3 | 2 | 1 | 3 | 9 | 5 | 2 | 5 | 5 | 7 | 3 | 2.6 | 9 | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 2 | 4 | 4 | 5 | 2 | Z | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 0 | 0 | 2 | 0 | 1.5 | 5 | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | Z | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 6 | 4 | 3 | 1 | 1.4 | 6 | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 1 | Z | 2 | 1 | 1 | 4 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1.2 | 4 | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 0 | 0 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 0.7 | 2 | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 2 | 2 | 2 | Z | 3 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 3 | 1 | 2 | 1 | 2 | 10 | 6 | 1 | 1 | 2.1 | 10 | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 2 | 1 | 1 | 1 | Z | 1 | 2 | 4 | 3 | 2 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 1 | 3 | 4 | 4 | 2 | 1 | 1.9 | 4 | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 1 | 1 | 1 | 2 | 2 | Z | 5 | 1 | 2 | 1 | C | C | C | C | C | 2 | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 2 | 1.7 | 5 | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | Z | 2 | 3 | 2 | 1 | 3 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 9 | 6 | 3 | 7 | 2.2 | 9 | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 2 | Z | 1 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 4 | 1 | 4 | 1.6 | 4 | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 2 | 1 | Z | 2 | 2 | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1.3 | 3 | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 1 | 4 | 6 | Z | 4 | 3 | 3 | 5 | 4 | 3 | 3 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 2.2 | 6 | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 2 | 2 | 2 | 2 | Z | 2 | 2 | 2 | 4 | 1 | 1 | 1 | 2 | 1 | 3 | 4 | 3 | 1 | 1 | 1 | 2 | 1 | 0 | 1 | 1.7 | 4 | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 1 | 1 | 1 | 0 | 1 | Z | 1 | 4 | 2 | 2 | 4 | 3 | 5 | 3 | 3 | 7 | 7 | 5 | 1 | 1 | 3 | 2 | 1 | 1 | 2.6 | 7 | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | Z | 1 | 2 | 2 | 1 | 1 | 1 | 5 | 2 | 4 | 8 | 4 | 3 | 4 | 3 | 4 | 6 | 8 | 1 | 1 | 2 | 3 | 2 | 1 | 3.0 | 8 | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 2 | Z | 1 | 2 | 2 | 2 | 3 | 5 | 4 | 3 | 3 | 2 | 2 | 4 | 6 | 9 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 0 | 2.6 | 9 | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 1 | 1 | Z | 0 | 2 | 4 | 4 | 5 | 5 | 4 | 4 | 4 | 3 | 2 | 5 | 5 | 7 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 2.7 | 7 | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 1 | 0 | 1 | Z | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | M | M | M | M | 1 | 4 | 3 | 2 | 5 | 2 | 1 | 1 | 1 | -- | 5 | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 1 | 3 | 1 | 1 | 3 | Z | 4 | 2 | 1 | 1 | M | 2 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 2 | 3 | 2 | 2 | 2 | 1.5 | 4 | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | Z | 1 | 1 | 1 | 3 | 2 | 1 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 4 | 2 | 2 | 2 | 1.5 | 4 | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.1 | 2 | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 1 | 1 | Z | 1 | 1 | 4 | 1 | 1 | 1 | 1 | 2 | 1 | 3 | 4 | 3 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 1.5 | 4 | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 2 | 1 | 1 | Z | 3 | 2 | 2 | 1 | 3 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 1 | 0 | 1 | 1 | 2 | 5 | 1 | 1 | 1.6 | 5 | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 1 | 1 | 1 | 2 | Z | 4 | 3 | 3 | 3 | 6 | 3 | 1 | 2 | 4 | 2 | 3 | 3 | 6 | 1 | 0 | 1 | 2 | 3 | 3 | 2.5 | 6 | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 1 | 0 | 0 | 1 | 2 | Z | 4 | 5 | 5 | 4 | 4 | 3 | 4 | 4 | 3 | 4 | 5 | 7 | 11 | 3 | 3 | 7 | 3 | 3 | 3.7 | 11 | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | Z | 1 | 3 | 2 | 2 | 4 | 4 | 3 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 3 | 5 | 2 | 1 | 1.9 | 5 | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 1 | Z | 1 | 1 | 8 | 6 | 5 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 2 | 4 | 2.1 | 8 | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 1 | 3 | Z | 3 | 2 | 2 | 4 | 6 | 8 | 6 | 5 | 3 | 4 | 4 | 5 | 6 | 5 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 3.1 | 8 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 1.2 | 1.4 | 1.6 | 1.6 | 2.2 | 2.4 | 2.3 | 2.7 | 2.5 | 2.1 | 2.1 | 1.5 | 1.7 | 1.9 | 2.0 | 2.2 | 2.4 | 2.6 | 1.3 | 1.5 | 2.8 | 2.7 | 1.7 | 1.6 | Diurnal Average |
| | | | | | | | | | | | | | | | | | | | | | | | | 2 | 4 | 6 | 5 | 8 | 6 | 5 | 6 | 8 | 6 | 8 | 4 | 5 | 4 | 6 | 9 | 7 | 14 | 11 | 5 | 10 | 7 | 7 | 7 | Diurnal Maximum |
| Z - zerospan C - Calibration M - Maintenance AF - Analyzer Failure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Conklin - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Conklin - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 673 | 100.00 | 100.00 |
| 21 - 40 | 0 | 0.00 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 673

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Conklin - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 21 | 8 | 6 | 5 | 4 | 15 | 28 | 68 | 86 | 82 | 86 | 63 | 71 | 44 | 48 | 33 | 668 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 21 | 8 | 6 | 5 | 4 | 15 | 28 | 68 | 86 | 82 | 86 | 63 | 71 | 44 | 48 | 33 | 668 |

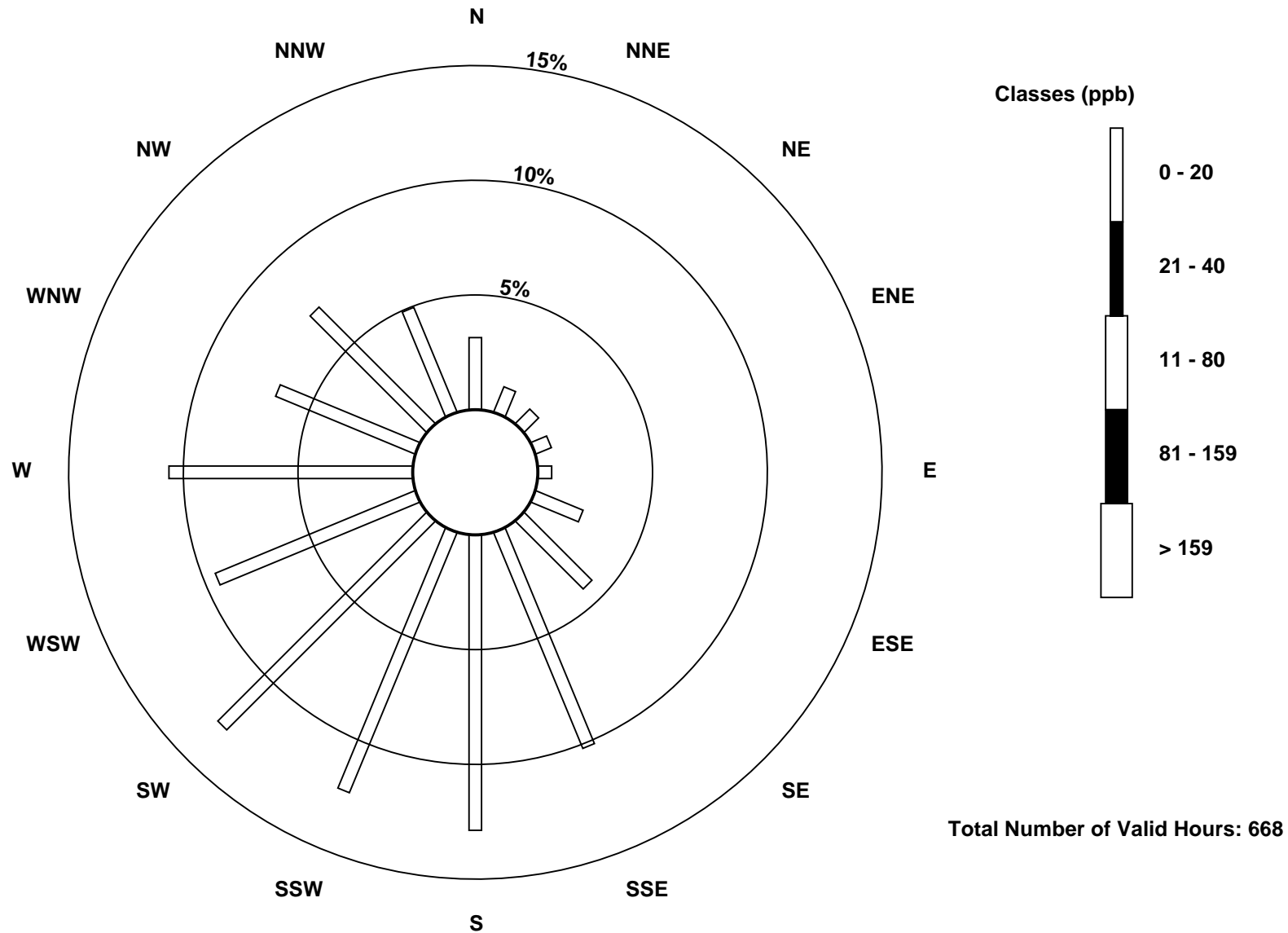
Total Number of Valid Hours: 668

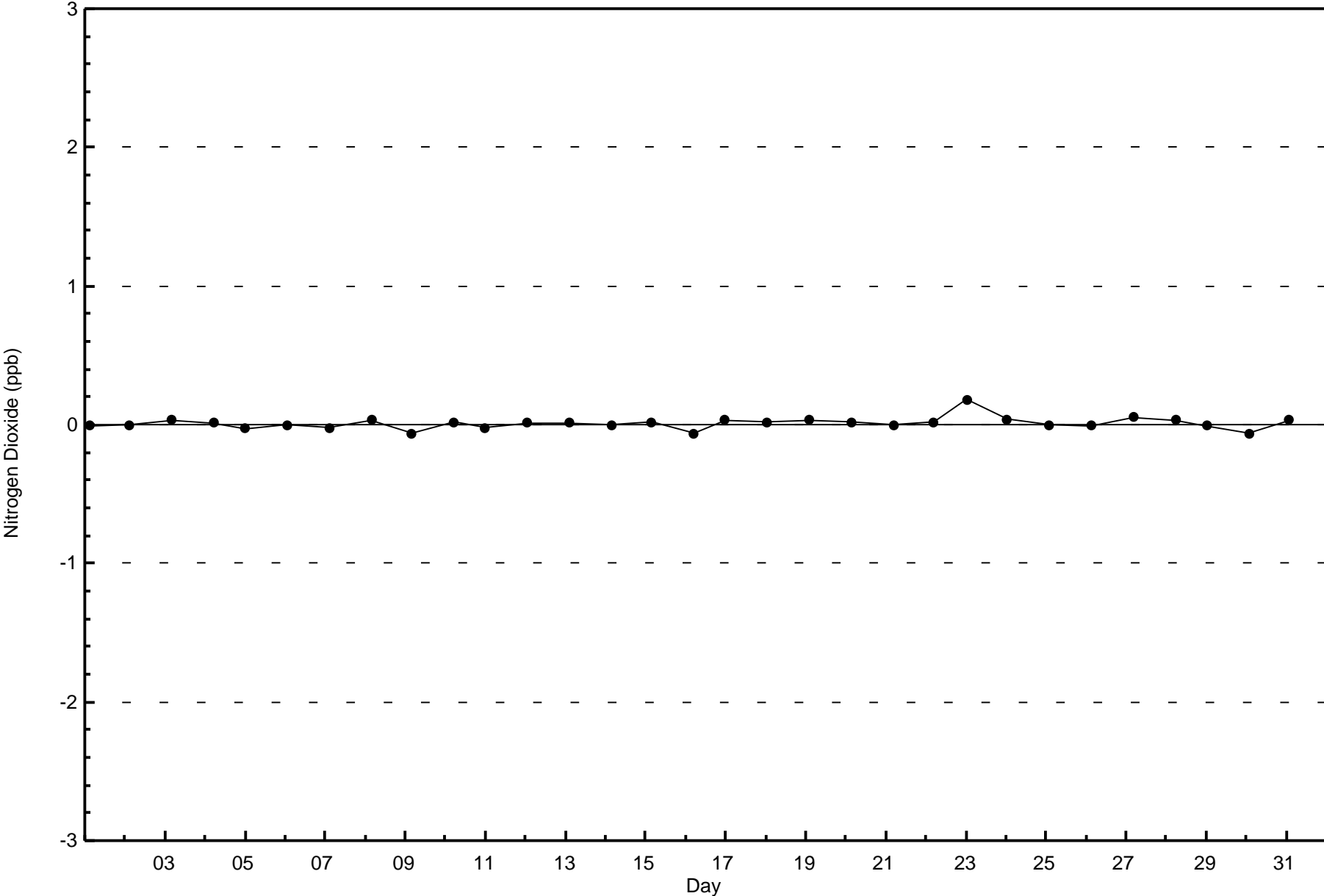
Total Number of Hours: 744

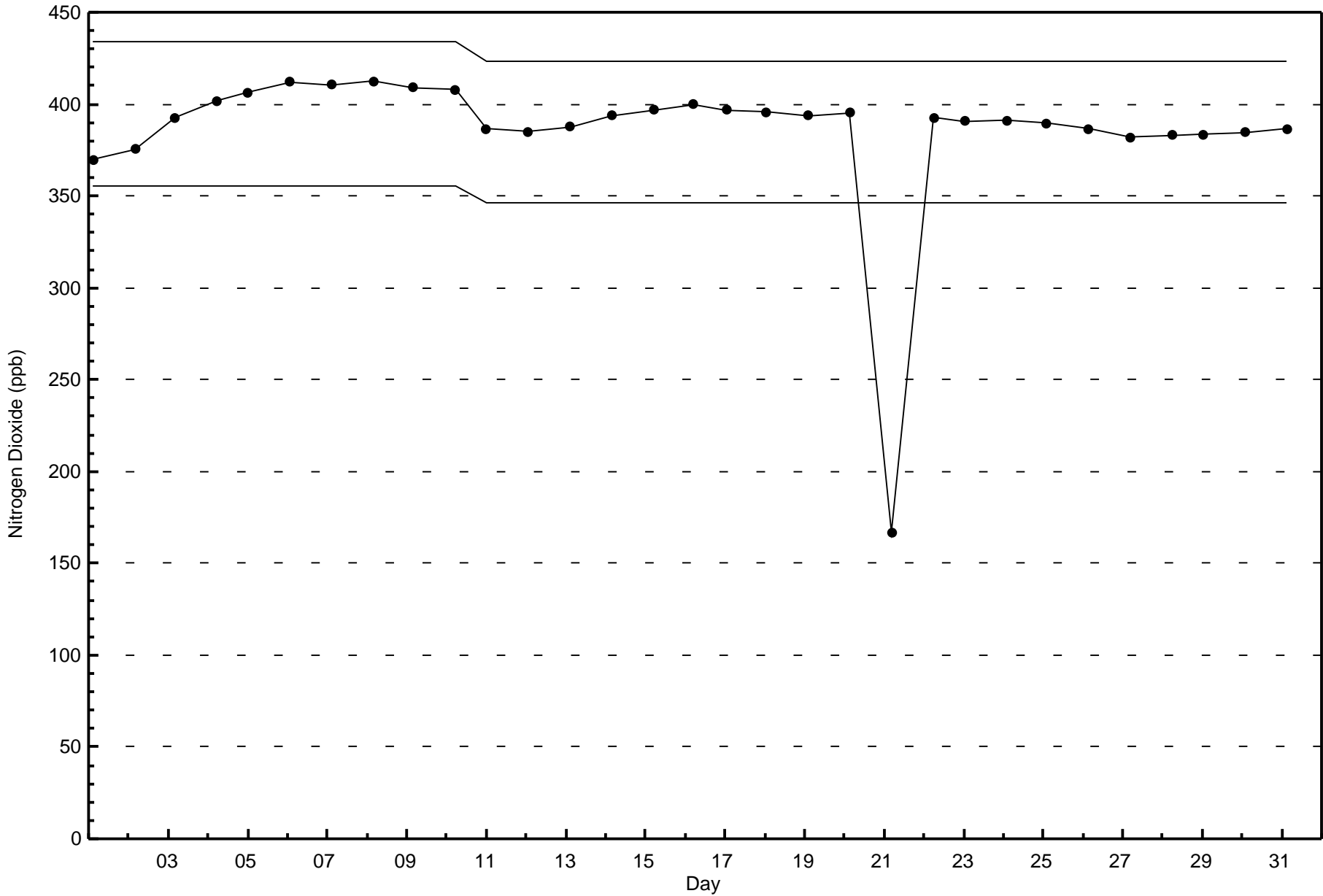


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Dioxide (NO₂) - ppb
Conklin (AMS 21)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb

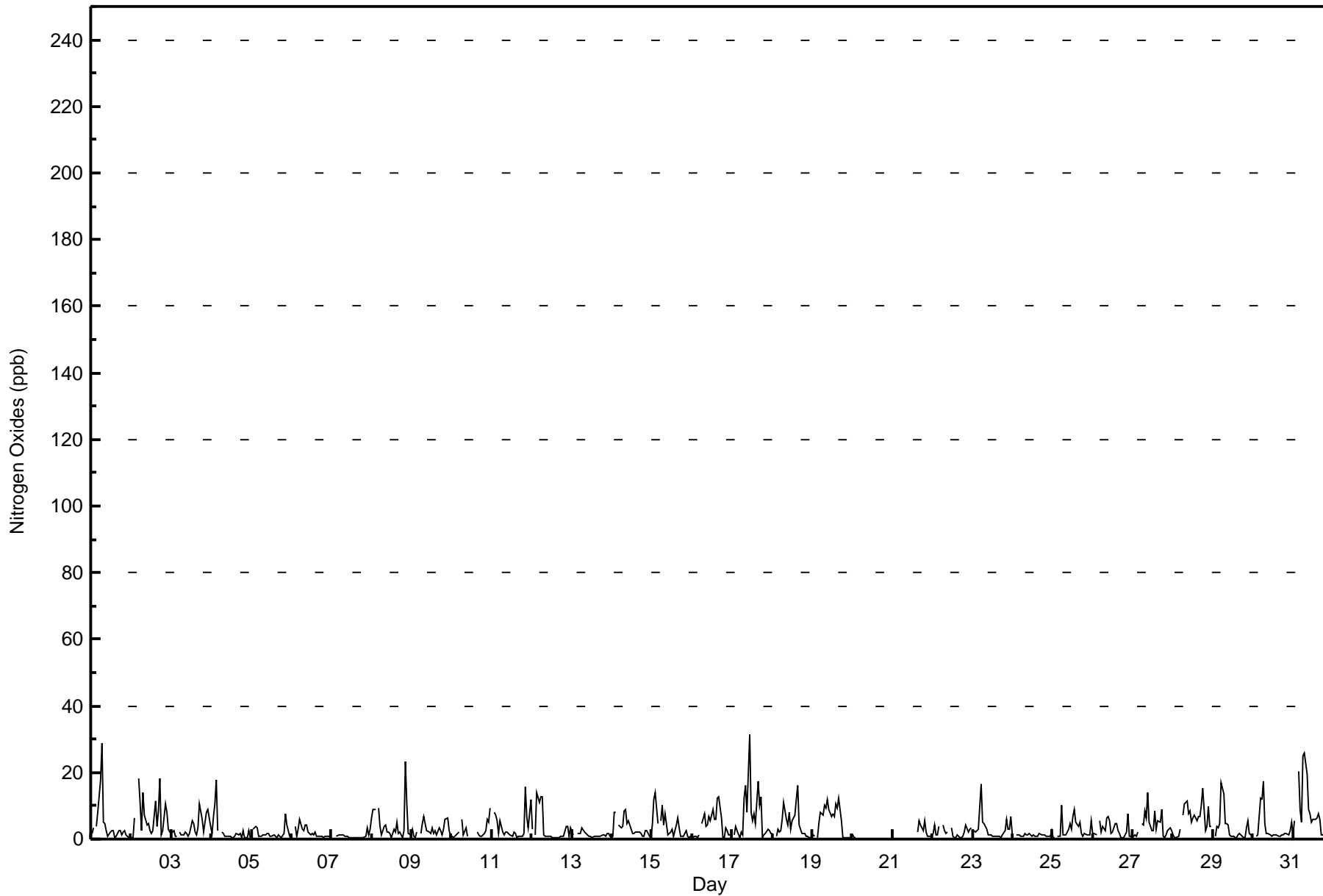
Conklin - August 2017

| Maximum Value: 31 ppb on Aug 17 11:00 | | Maximum Daily Average: 7.4 ppb on Aug 31 | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|---|----|--------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----------------|---------------|---------------|-----|-----------------|-----|-----|-----|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|
| Minimum Value: 0 ppb on Aug 7 02:00 | | Minimum Daily Average: 0.9 ppb on Aug 7 | | Hours of Data: 673 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 6.4 ppb at hour 6 | | Minimum Diurnal Average: 1.6 ppb at hour 19 | | Hours of Missing Data: 71 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 3.6 ppb | | Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 5 P ₉₀ = 9 P ₉₉ = 19 | | Hours of Calibration: 35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Percent Operational Time: 95.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 2 | 3 | Z | 4 | 8 | 18 | 29 | 5 | 5 | 3 | 1 | 2 | 2 | 2 | 0 | 1 | 2 | 3 | 1 | 2 | 2 | 1 | 0 | 1 | 4.3 | 29 | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 1 | 0 | 6 | Z | 18 | 11 | 3 | 14 | 7 | 4 | 5 | 3 | 2 | 2 | 11 | 4 | 9 | 18 | 1 | 2 | 10 | 8 | 3 | 2 | 6.3 | 18 | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 2 | 2 | 1 | 1 | Z | 2 | 1 | 1 | 2 | 2 | 1 | 2 | 5 | 5 | 2 | 1 | 4 | 11 | 6 | 2 | 5 | 8 | 9 | 4 | 3.4 | 11 | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 2 | 7 | 11 | 18 | 3 | Z | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 1 | 2 | 0 | 0 | 3 | 1 | 2.6 | 18 | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | Z | 3 | 4 | 4 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 7 | 4 | 3 | 1 | 1.9 | 7 | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 1 | Z | 4 | 1 | 3 | 6 | 3 | 3 | 4 | 4 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1.8 | 6 | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 0 | 0 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 3 | 1 | 3 | 0.9 | 3 | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 6 | 9 | 9 | Z | 9 | 4 | 1 | 4 | 4 | 2 | 2 | 2 | 1 | 3 | 2 | 5 | 2 | 2 | 1 | 3 | 23 | 11 | 2 | 1 | 4.7 | 23 | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 3 | 1 | 1 | 2 | Z | 2 | 5 | 7 | 4 | 3 | 2 | 2 | 3 | 2 | 3 | 1 | 3 | 2 | 1 | 3 | 6 | 6 | 3 | 1 | 2.9 | 7 | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 1 | 1 | 1 | 2 | 2 | Z | 6 | 1 | 4 | 1 | C | C | C | C | C | 2 | 1 | 1 | 1 | 2 | 3 | 6 | 5 | 9 | 2.6 | 9 | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | Z | 8 | 7 | 6 | 2 | 6 | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 16 | 7 | 3 | 12 | 3.7 | 16 | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 3 | Z | 1 | 14 | 11 | 13 | 13 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 4 | 4 | 1 | 4 | 3.3 | 14 | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 2 | 1 | Z | 2 | 2 | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1.3 | 3 | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 1 | 8 | 8 | Z | 4 | 3 | 4 | 8 | 9 | 5 | 6 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 3 | 3 | 1 | 1 | 3.4 | 9 | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 4 | 12 | 14 | 5 | Z | 6 | 10 | 4 | 8 | 1 | 2 | 2 | 3 | 1 | 4 | 6 | 3 | 1 | 1 | 1 | 3 | 1 | 0 | 1 | 4.0 | 14 | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 1 | 1 | 1 | 1 | 1 | Z | 4 | 7 | 4 | 4 | 7 | 6 | 9 | 6 | 6 | 12 | 13 | 7 | 1 | 0 | 3 | 2 | 1 | 1 | 4.3 | 13 | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | Z | 1 | 4 | 2 | 1 | 2 | 1 | 12 | 16 | 8 | 31 | 8 | 6 | 8 | 5 | 17 | 10 | 13 | 1 | 1 | 2 | 3 | 3 | 2 | 6.8 | 31 | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 2 | Z | 1 | 3 | 2 | 2 | 6 | 11 | 6 | 4 | 8 | 3 | 5 | 7 | 12 | 16 | 4 | 3 | 2 | 1 | 1 | 1 | 1 | 0 | 4.4 | 16 | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 1 | 1 | Z | 0 | 5 | 8 | 7 | 10 | 9 | 12 | 9 | 7 | 8 | 7 | 10 | 9 | 12 | 6 | 0 | 0 | 0 | 0 | 0 | 1 | 5.4 | 12 | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 1 | 0 | 0 | Z | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | M | M | M | M | 2 | 6 | 4 | 2 | 5 | 2 | 1 | 1 | 1 | -- | 6 | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 2 | 4 | 1 | 1 | 4 | Z | 4 | 2 | 2 | 2 | M | 3 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 2 | 4 | 2 | 3 | 4 | 2.1 | 4 | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | Z | 2 | 2 | 3 | 10 | 17 | 5 | 5 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 6 | 3 | 3 | 7 | 3.3 | 17 | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 2 | Z | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1.3 | 2 | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 0 | 0 | Z | 1 | 1 | 10 | 1 | 1 | 1 | 3 | 5 | 3 | 7 | 9 | 5 | 4 | 5 | 2 | 1 | 2 | 1 | 1 | 1 | 6 | 3.1 | 10 | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 2 | 1 | 1 | Z | 6 | 2 | 4 | 3 | 6 | 7 | 6 | 2 | 2 | 5 | 5 | 3 | 2 | 0 | 0 | 1 | 2 | 8 | 1 | 1 | 3.0 | 8 | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 1 | 1 | 1 | 2 | Z | 5 | 4 | 8 | 6 | 14 | 5 | 3 | 3 | 8 | 3 | 5 | 5 | 9 | 1 | 0 | 1 | 2 | 3 | 3 | 4.1 | 14 | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 1 | 0 | 0 | 1 | 3 | Z | 7 | 11 | 11 | 8 | 9 | 5 | 6 | 7 | 6 | 7 | 7 | 10 | 15 | 3 | 4 | 10 | 4 | 4 | 6.0 | 15 | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | Z | 1 | 4 | 3 | 5 | 17 | 14 | 5 | 5 | 4 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 3 | 6 | 2 | 1 | 3.4 | 17 | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 1 | Z | 1 | 1 | 12 | 12 | 17 | 4 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 2 | 5 | 3.2 | 17 | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 1 | 5 | Z | 20 | 9 | 5 | 25 | 26 | 19 | 9 | 8 | 5 | 6 | 6 | 6 | 7 | 6 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 7.4 | 26 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 1.7 | 3.0 | 3.5 | 3.9 | 4.9 | 6.4 | 6.4 | 5.7 | 5.1 | 3.8 | 4.4 | 2.4 | 2.9 | 3.2 | 3.4 | 3.9 | 3.6 | 3.5 | 1.6 | 1.6 | 4.0 | 3.6 | 2.1 | 2.6 | Diurnal Average |
| | | | | | | | | | | | | | | | | | | | | | | | | 6 | 12 | 14 | 20 | 18 | 18 | 29 | 26 | 19 | 14 | 31 | 8 | 9 | 9 | 12 | 17 | 13 | 18 | 15 | 5 | 23 | 11 | 9 | 12 | Diurnal Maximum |
| Z - zerospan | | | | | | | | | | | | | | | | | | | | | | | | C - Calibration | | | | M - Maintenance | | | | AF - Analyzer Failure | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Conklin - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Conklin - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 668 | 99.26 | 99.26 |
| 21 - 40 | 5 | 0.74 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 673

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Conklin - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 21 | 8 | 6 | 5 | 4 | 15 | 28 | 68 | 84 | 81 | 86 | 63 | 70 | 44 | 47 | 33 | 663 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 5 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 21 | 8 | 6 | 5 | 4 | 15 | 28 | 68 | 86 | 82 | 86 | 63 | 71 | 44 | 48 | 33 | 668 |

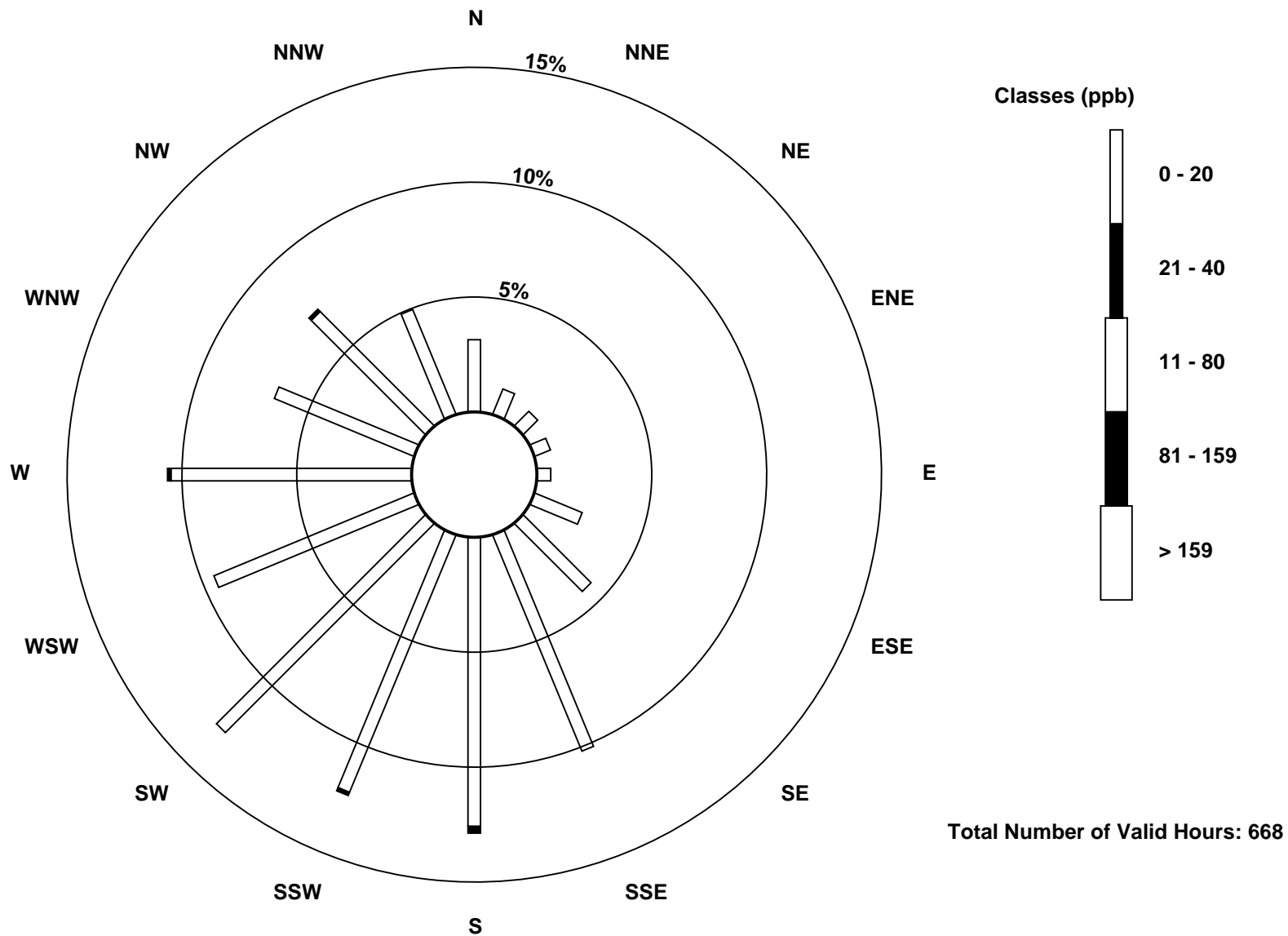
Total Number of Valid Hours: 668

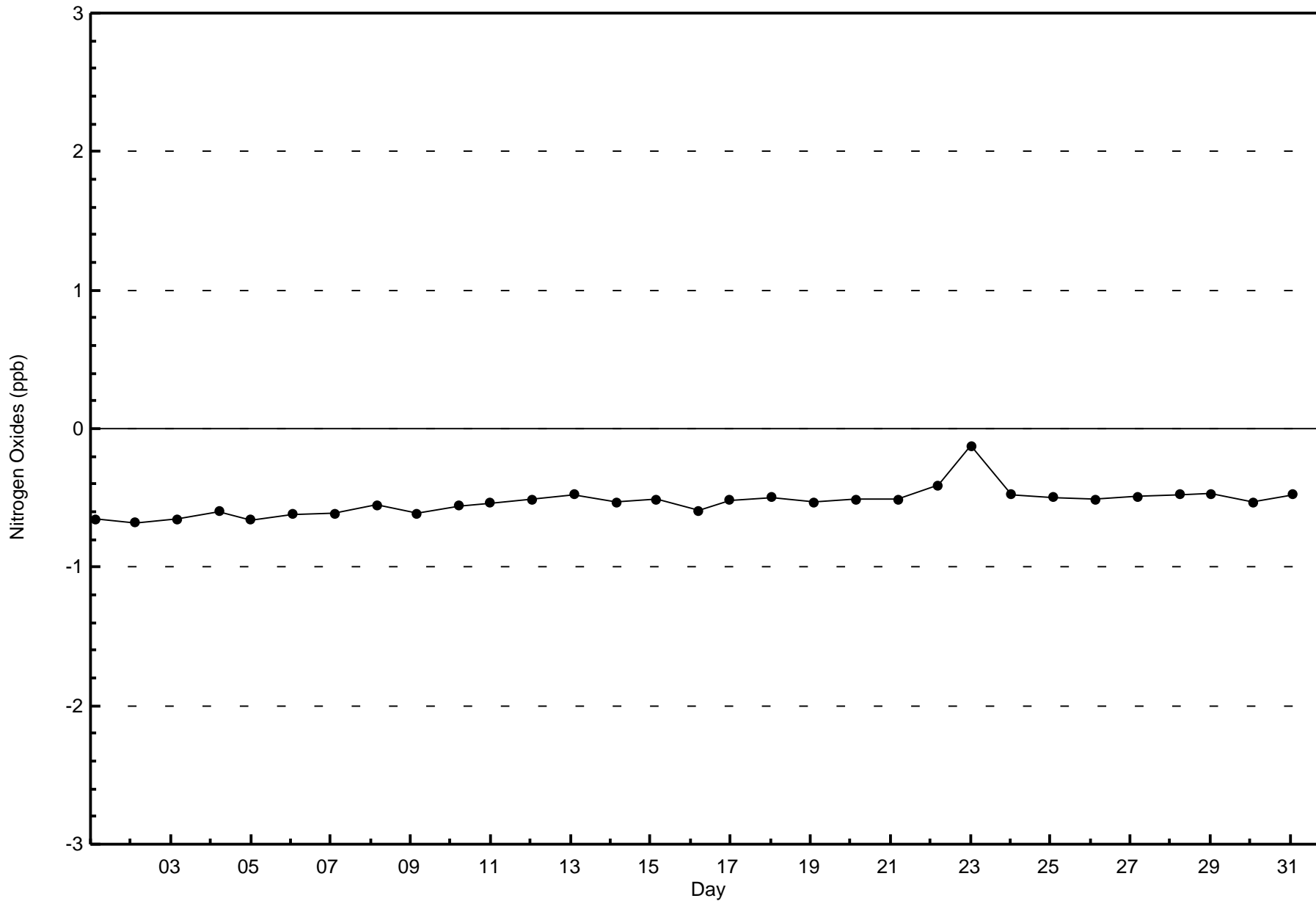
Total Number of Hours: 744

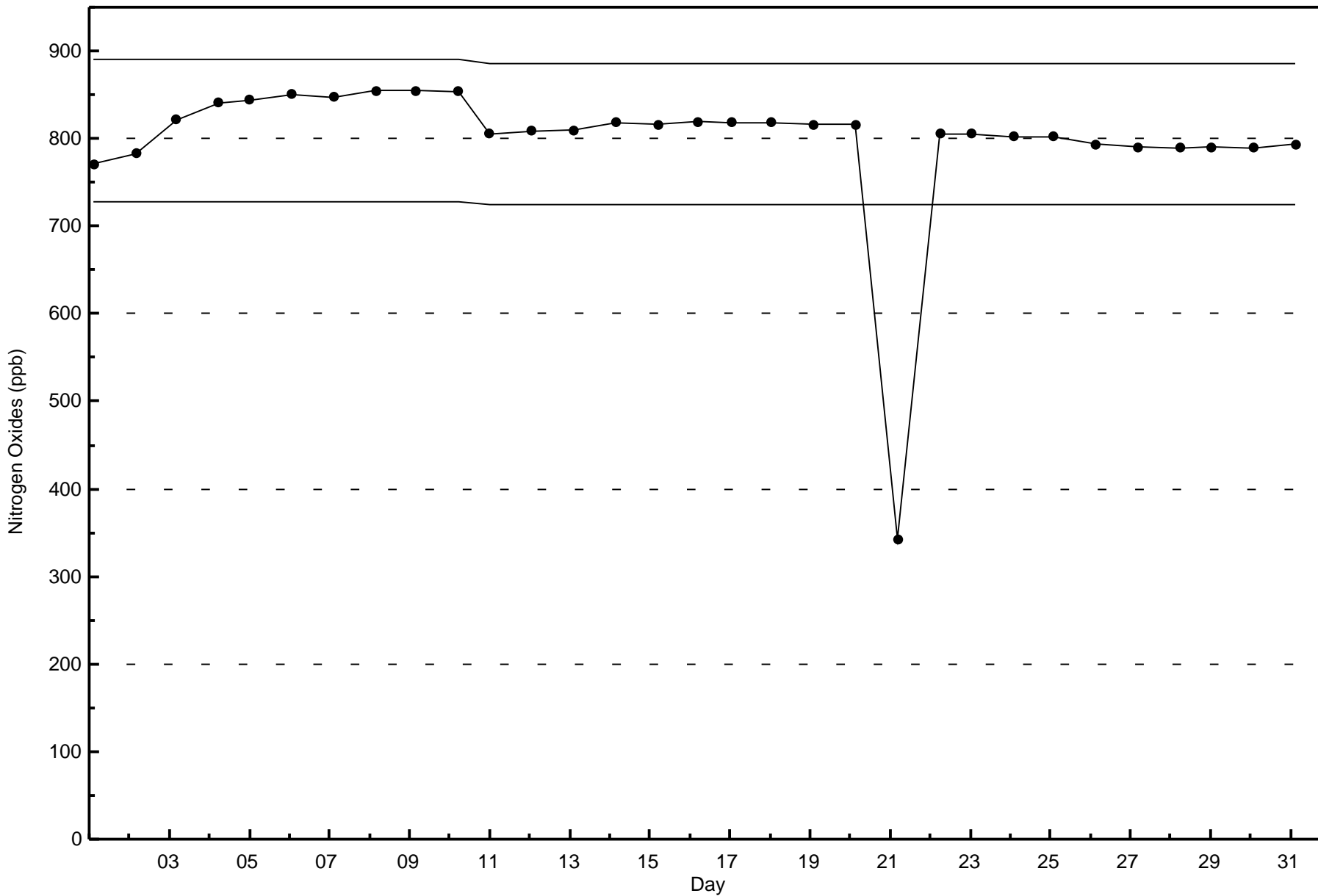


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Oxides (NO_x) - ppb
Conklin (AMS 21)









Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

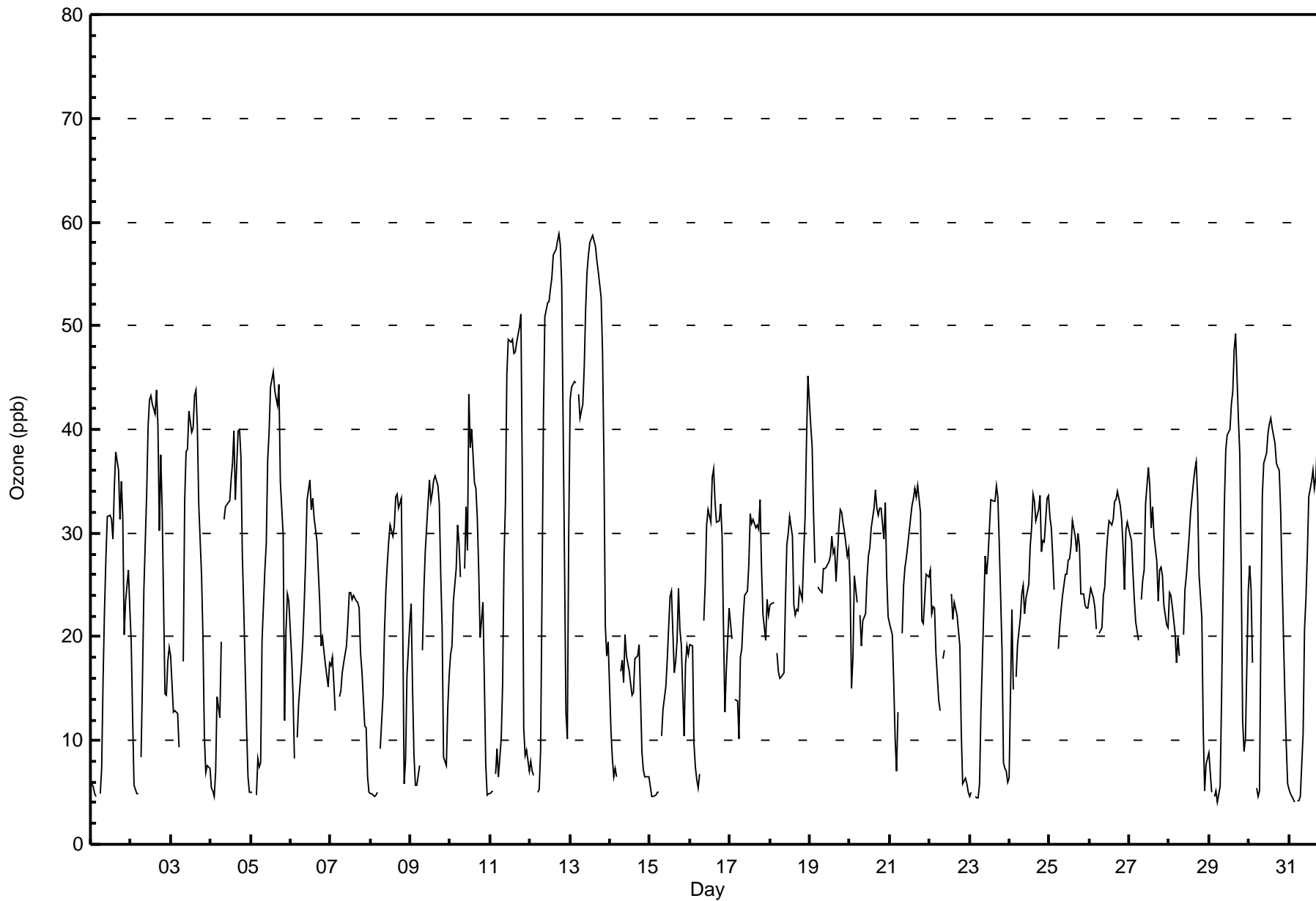
Conklin - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|----|----|---------------------------------|----|----|----|------|---------------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|--|
| Maximum Value: 59 ppb on Aug 12 18:00 | | | | | | | | | | Maximum Daily Average: 45.8 ppb on Aug 13 | | | | | | | | | | Hours of Data: 710 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum Value: 4 ppb on Aug 31 04:00 | | | | | | | | | | Minimum Daily Average: 12.8 ppb on Aug 14 | | | | | | | | | | Hours of Missing Data: 34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 34.8 ppb at hour 16 | | | | | | | | | | Minimum Diurnal Average: 11.8 ppb at hour 5 | | | | | | | | | | Hours of Calibration: 34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 24.4 ppb | | | | | | | | | | Percentiles: P ₁ = 5 P ₁₀ = 6 Q ₁ = 16 Median = 24 Q ₃ = 32 P ₉₀ = 40 P ₉₉ = 57 | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 6 | 6 | 5 | 5 | Z | 5 | 7 | 16 | 22 | 28 | 32 | 32 | 31 | 29 | 34 | 38 | 36 | 31 | 35 | 31 | 20 | 23 | 26 | 23 | 22.7 | 38 | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 20 | 12 | 6 | 5 | 5 | Z | 8 | 16 | 25 | 34 | 40 | 43 | 43 | 43 | 42 | 44 | 40 | 30 | 38 | 32 | 14 | 14 | 18 | 19 | 25.6 | 44 | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 18 | 13 | 13 | 13 | 13 | 9 | Z | 18 | 33 | 38 | 38 | 42 | 40 | 40 | 43 | 44 | 40 | 33 | 26 | 20 | 10 | 7 | 8 | 7 | 24.6 | 44 | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 5 | 5 | 5 | 7 | 14 | 12 | 20 | Z | 31 | 33 | 33 | 33 | 35 | 37 | 40 | 33 | 40 | 40 | 37 | 28 | 23 | 11 | 7 | 5 | 23.2 | 40 | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 5 | 5 | Z | 5 | 8 | 7 | 8 | 20 | 26 | 29 | 37 | 40 | 44 | 46 | 44 | 43 | 42 | 44 | 35 | 30 | 12 | 20 | 24 | 23 | 26.0 | 46 | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 18 | 14 | 8 | Z | 10 | 14 | 17 | 20 | 23 | 28 | 33 | 35 | 32 | 33 | 31 | 30 | 29 | 23 | 19 | 20 | 19 | 17 | 15 | 18 | 22.1 | 35 | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 17 | 18 | 16 | 13 | Z | 14 | 15 | 16 | 18 | 19 | 21 | 24 | 24 | 24 | 24 | 24 | 23 | 23 | 18 | 17 | 11 | 11 | 7 | 5 | 17.5 | 24 | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 5 | 5 | 5 | 5 | 5 | Z | 9 | 14 | 20 | 24 | 27 | 29 | 31 | 30 | 31 | 34 | 34 | 32 | 33 | 21 | 6 | 8 | 16 | 21 | 19.4 | 34 | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 23 | 15 | 8 | 6 | 6 | 8 | Z | 19 | 24 | 28 | 33 | 35 | 33 | 34 | 35 | 36 | 35 | 33 | 26 | 21 | 8 | 8 | 13 | 16 | 21.8 | 36 | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 18 | 19 | 23 | 27 | 31 | 29 | 26 | Z | 27 | 33 | 28 | 43 | 38 | 40 | 35 | 34 | 32 | 26 | 20 | 23 | 16 | 8 | 5 | 5 | 25.5 | 43 | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 5 | 5 | Z | 7 | 9 | 6 | 10 | 15 | 28 | 33 | 45 | 49 | 48 | 49 | 47 | 47 | 48 | 50 | 51 | 35 | 11 | 9 | 9 | 7 | 27.2 | 51 | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 8 | 7 | 7 | Z | 5 | 5 | 9 | 24 | 41 | 51 | 52 | 52 | 54 | 55 | 57 | 57 | 58 | 59 | 58 | 54 | 27 | 13 | 10 | 30 | 34.5 | 59 | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 43 | 44 | 45 | 44 | Z | 43 | 41 | 42 | 46 | 51 | 55 | 57 | 58 | 59 | 58 | 58 | 56 | 55 | 53 | 48 | 37 | 21 | 18 | 20 | 45.8 | 59 | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 11 | 8 | 6 | 7 | 7 | Z | 17 | 18 | 16 | 20 | 18 | 17 | 15 | 14 | 15 | 18 | 18 | 19 | 14 | 9 | 7 | 6 | 6 | 6 | 12.8 | 20 | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 6 | 5 | 5 | 5 | 5 | 5 | Z | 11 | 13 | 15 | 18 | 21 | 24 | 24 | 16 | 18 | 20 | 25 | 21 | 19 | 10 | 17 | 19 | 18 | 14.7 | 25 | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 19 | 19 | 10 | 7 | 6 | 5 | 7 | Z | 22 | 25 | 31 | 32 | 31 | 35 | 36 | 33 | 31 | 31 | 33 | 30 | 21 | 13 | 17 | 23 | 22.5 | 36 | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 21 | 20 | Z | 14 | 14 | 10 | 18 | 19 | 22 | 24 | 24 | 27 | 32 | 31 | 31 | 31 | 31 | 30 | 33 | 27 | 22 | 20 | 24 | 22 | 23.8 | 33 | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 23 | 23 | 23 | Z | 19 | 17 | 16 | 16 | 17 | 23 | 29 | 30 | 32 | 30 | 23 | 22 | 23 | 23 | 25 | 24 | 28 | 32 | 39 | 45 | 25.2 | 45 | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 40 | 38 | 32 | 27 | Z | 25 | 24 | 24 | 27 | 27 | 27 | 27 | 28 | 30 | 28 | 29 | 25 | 30 | 32 | 32 | 31 | 30 | 28 | 28 | 29.1 | 40 | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 25 | 15 | 18 | 26 | 23 | Z | 22 | 19 | 21 | 22 | 26 | 28 | 29 | 30 | 32 | 34 | 32 | 32 | 32 | 32 | 29 | 33 | 26 | 22 | 26.5 | 34 | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 21 | 20 | 16 | 10 | 7 | 13 | Z | 20 | 25 | 27 | 28 | 29 | 31 | 33 | 33 | 34 | 33 | 35 | 32 | 22 | 21 | 24 | 26 | 26 | 24.6 | 35 | | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 26 | 22 | 23 | 23 | 18 | 14 | 13 | Z | 18 | 19 | C | C | C | 24 | 22 | 23 | 22 | 21 | 19 | 11 | 6 | 6 | 6 | 5 | 17.1 | 26 | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 5 | 5 | Z | 5 | 4 | 4 | 6 | 13 | 23 | 28 | 26 | 28 | 30 | 33 | 33 | 33 | 35 | 34 | 29 | 19 | 8 | 7 | 7 | 6 | 18.3 | 35 | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 6 | 23 | 15 | Z | 16 | 19 | 22 | 24 | 25 | 22 | 24 | 25 | 29 | 31 | 34 | 33 | 31 | 32 | 34 | 28 | 29 | 29 | 33 | 34 | 26.0 | 34 | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 32 | 30 | 28 | 24 | Z | 19 | 21 | 23 | 24 | 26 | 26 | 27 | 28 | 29 | 31 | 30 | 28 | 30 | 29 | 24 | 24 | 23 | 23 | 23 | 26.1 | 32 | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 24 | 25 | 24 | 23 | 21 | Z | 20 | 21 | 24 | 25 | 28 | 30 | 31 | 31 | 31 | 33 | 33 | 34 | 33 | 31 | 29 | 25 | 30 | 31 | 27.6 | 34 | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 30 | 29 | 26 | 24 | 21 | 20 | Z | 24 | 26 | 26 | 33 | 36 | 35 | 30 | 33 | 30 | 27 | 24 | 26 | 27 | 26 | 23 | 21 | 21 | 26.8 | 36 | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 24 | 24 | 23 | 20 | 18 | 20 | 18 | Z | 20 | 25 | 26 | 28 | 30 | 32 | 35 | 36 | 37 | 33 | 26 | 22 | 11 | 5 | 8 | 8 | 23.0 | 37 | | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 9 | 5 | Z | 5 | 5 | 4 | 6 | 14 | 24 | 33 | 38 | 39 | 40 | 42 | 44 | 48 | 49 | 41 | 38 | 26 | 12 | 9 | 10 | 24 | 24.5 | 49 | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 27 | 25 | 17 | Z | 5 | 5 | 5 | 21 | 34 | 37 | 38 | 40 | 41 | 41 | 40 | 39 | 37 | 36 | 36 | 32 | 26 | 15 | 10 | 6 | 26.6 | 41 | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 5 | 5 | 4 | 4 | Z | 4 | 4 | 5 | 11 | 21 | 24 | 28 | 34 | 35 | 36 | 34 | 35 | 38 | 35 | 34 | 35 | 38 | 39 | 39 | 23.8 | 39 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 17.6 | 16.4 | 15.8 | 13.8 | 11.8 | 13.0 | 15.0 | 18.9 | 24.3 | 28.1 | 31.2 | 33.5 | 34.3 | 34.6 | 34.7 | 34.8 | 34.3 | 33.2 | 31.5 | 26.7 | 19.1 | 17.0 | 17.7 | 19.0 | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | | | | | | | 43 | 44 | 45 | 44 | 31 | 43 | 41 | 42 | 46 | 51 | 55 | 57 | 58 | 59 | 58 | 58 | 58 | 59 | 58 | 54 | 37 | 38 | 39 | 45 | Diurnal Maximum | |
| Z - zerospan C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Ozone (O₃) - ppb
Conklin - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ozone (O₃) - ppb
Conklin - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 262 | 36.90 | 36.90 |
| 21 - 50 | 426 | 60.00 | 96.90 |
| 51 - 82 | 22 | 3.10 | 100.00 |
| > 83 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 710

Total Number of Hours: 744



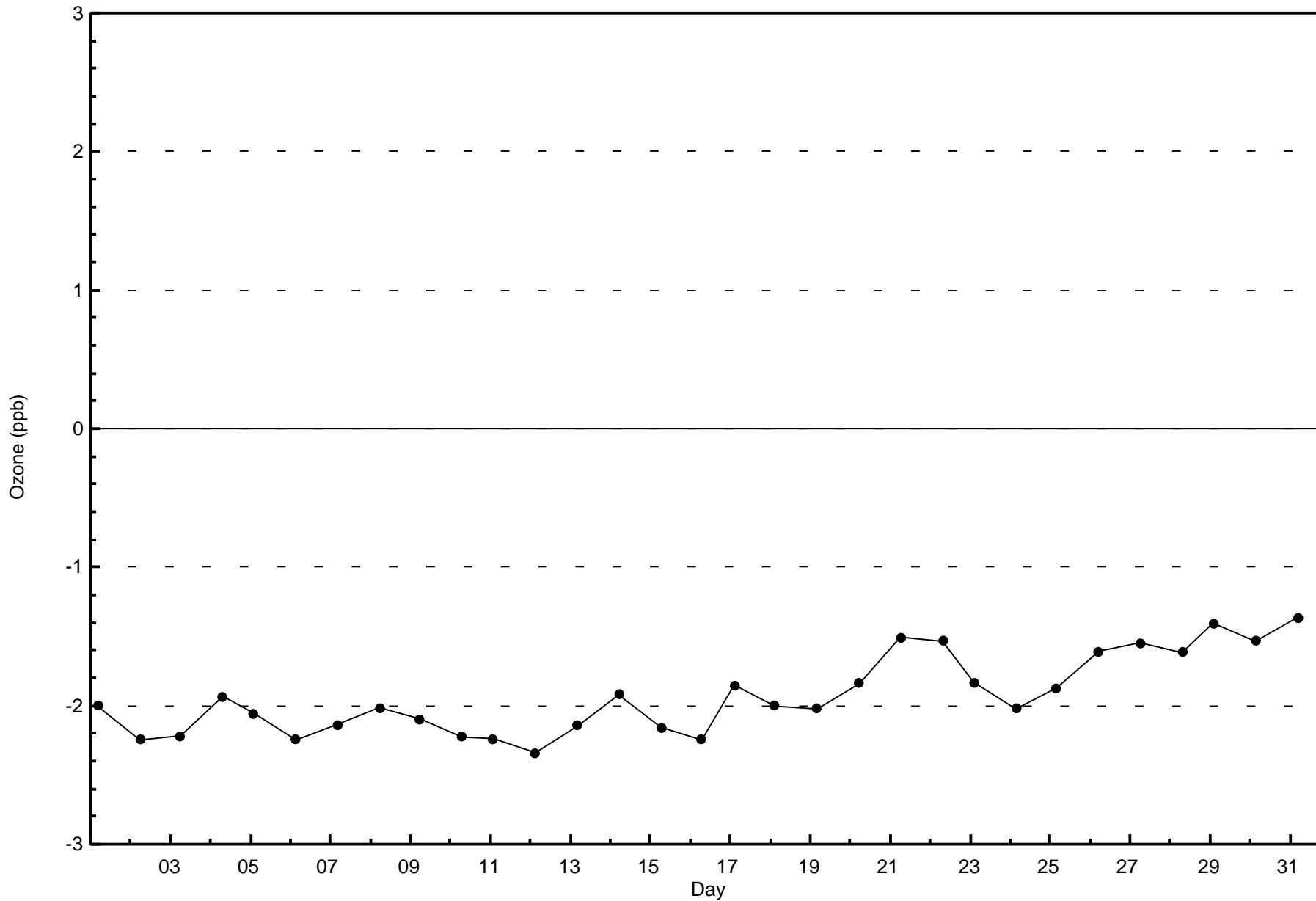
Wood Buffalo Environmental Association
Frequency Distribution

Ozone (O₃) - ppb
Conklin - August 2017

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 9 | 3 | 2 | 0 | 0 | 1 | 12 | 22 | 50 | 56 | 25 | 10 | 12 | 13 | 23 | 19 | 257 |
| 21 - 50 | 11 | 5 | 3 | 6 | 3 | 14 | 18 | 36 | 30 | 29 | 66 | 58 | 69 | 35 | 26 | 16 | 425 |
| 51 - 82 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 10 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 |
| > 83 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 20 | 8 | 5 | 6 | 3 | 15 | 31 | 68 | 91 | 85 | 91 | 68 | 81 | 48 | 49 | 35 | 704 |

Total Number of Valid Hours: 704

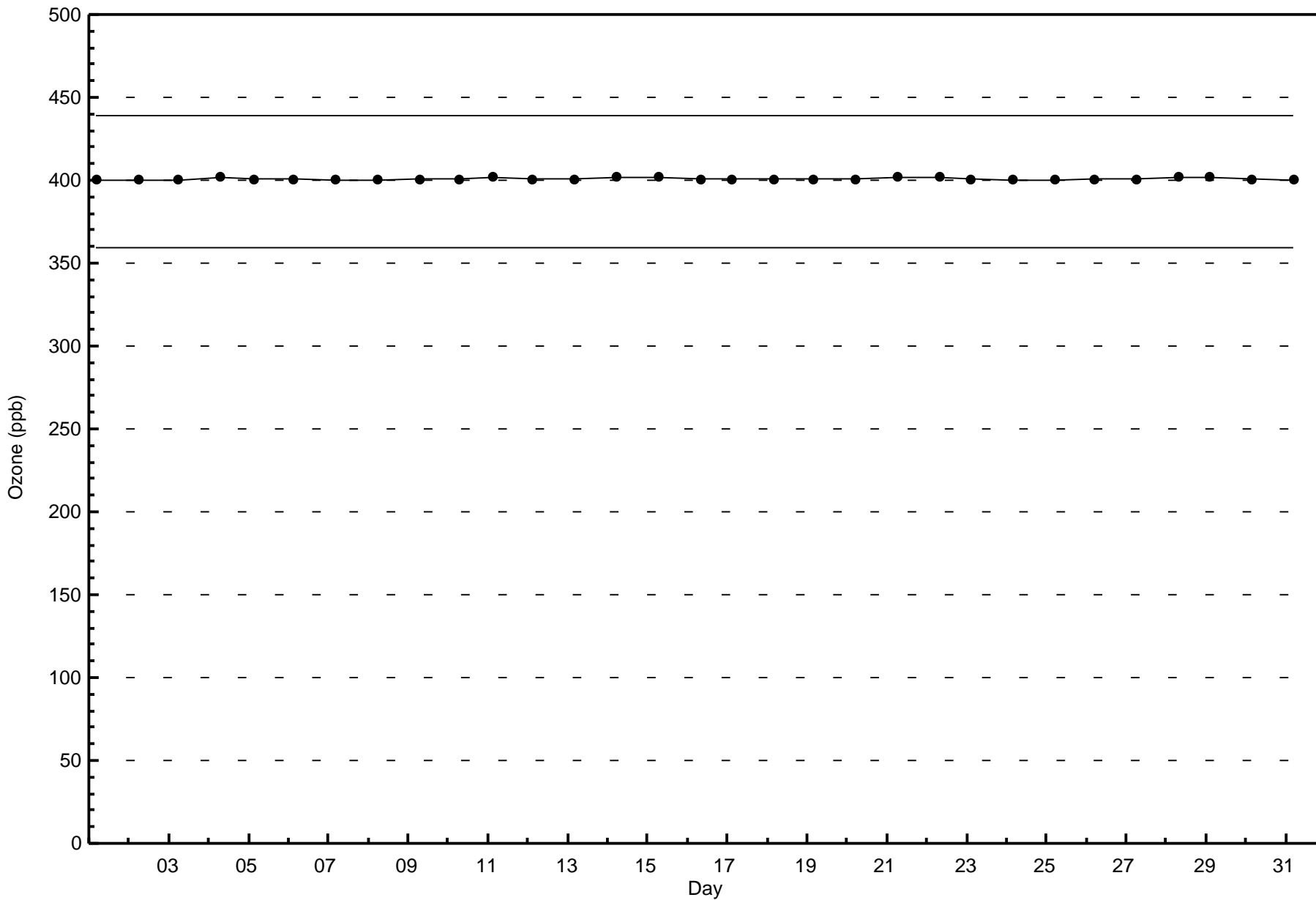
Total Number of Hours: 744





Wood Buffalo Environmental Association
Span Responses

Ozone (O₃) - ppb
Conklin - August 2017





| Number of Exceedences (AAAQO): 24-hr: 1 Maximum Value: 125.5 µg/m ³ on Aug 14 09:00 | | Maximum Daily Average: 41.2 µg/m ³ on Aug 14 | | Hours in Service: 744 Hours of Data: 743 | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|---|------|--|------|------|------|-------|-------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|---------------|---------------|
| Minimum Value: 0.9 µg/m ³ on Aug 20 22:00 Maximum Diurnal Average: 13.7 µg/m ³ at hour 21 Monthly Average: 8.20 µg/m ³ | | Minimum Daily Average: 1.4 µg/m ³ on Aug 20 Minimum Diurnal Average: 6.8 µg/m ³ at hour 15 Percentiles: P ₁ = 1.0 P ₁₀ = 1.7 Q ₁ = 2.9 Median = 5.5 Q ₃ = 8.3 P ₉₀ = 18.0 P ₉₉ = 68.9 | | Hours of Missing Data: 1 Hours of Calibration: 1 Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 5.6 | 5.9 | 6.3 | 6.2 | 6.7 | 9.8 | 16.1 | 10.0 | 8.4 | 6.8 | 5.1 | 4.9 | 4.9 | 5.5 | 4.1 | 3.5 | 4.3 | 7.4 | 7.8 | 7.8 | 8.9 | 8.5 | 7.3 | 6.1 | 7.0 | 16.1 |
| 2-Aug | 6.0 | 5.5 | 5.0 | 5.5 | 4.8 | 5.0 | 5.8 | 6.5 | 4.0 | 4.4 | 7.3 | 8.1 | 7.1 | 7.0 | 7.1 | 7.8 | 10.0 | 13.2 | 19.5 | 16.6 | 36.1 | 18.3 | 15.3 | 13.6 | 10.0 | 36.1 |
| 3-Aug | 12.2 | 11.7 | 10.8 | 10.5 | 10.9 | 10.8 | 10.6 | 8.9 | 4.7 | 3.9 | 3.5 | 5.1 | 4.9 | 6.0 | 6.0 | 5.7 | 8.7 | 18.6 | 9.2 | 22.2 | 35.9 | 29.8 | 13.9 | 12.5 | 11.5 | 35.9 |
| 4-Aug | 11.0 | 11.4 | 11.7 | 11.8 | 12.0 | 11.6 | 10.0 | 7.4 | 6.4 | 6.2 | 5.8 | 6.0 | 6.6 | 6.0 | 4.2 | 5.4 | 4.1 | 3.9 | 4.6 | 6.2 | 6.8 | 6.8 | 7.1 | 6.0 | 7.5 | 12.0 |
| 5-Aug | 6.6 | 7.0 | 6.9 | 7.4 | 8.5 | 7.4 | 8.1 | 7.4 | 3.8 | 3.9 | 3.7 | 3.2 | 2.8 | 2.0 | 2.0 | 2.2 | 2.9 | 2.5 | 2.8 | 5.1 | 9.2 | 5.5 | 4.6 | 4.4 | 5.0 | 9.2 |
| 6-Aug | 5.0 | 5.2 | 5.2 | 5.7 | 5.5 | 6.7 | 7.9 | 7.4 | 6.2 | 6.9 | 5.9 | 5.1 | 5.8 | 7.3 | 8.6 | 11.9 | 11.5 | 10.4 | 10.1 | 11.1 | 9.7 | 4.2 | 2.5 | 1.6 | 7.0 | 11.9 |
| 7-Aug | 1.5 | 1.9 | 1.9 | 2.0 | 2.5 | 2.8 | 2.7 | 2.5 | 2.4 | 2.7 | 3.1 | 2.9 | 3.2 | 3.2 | 4.0 | 4.9 | 5.2 | 5.2 | 5.6 | 5.8 | 5.7 | 5.9 | 5.5 | 5.7 | 3.7 | 5.9 |
| 8-Aug | 5.6 | 6.1 | 6.5 | 7.2 | 7.3 | 6.6 | 6.9 | 5.8 | 5.6 | 4.9 | 4.3 | 3.3 | 3.0 | 3.0 | 2.6 | 2.2 | 2.3 | 2.9 | 3.8 | 8.4 | 17.0 | 8.5 | 4.9 | 5.3 | 5.6 | 17.0 |
| 9-Aug | 5.9 | 5.0 | 4.5 | 4.8 | 5.3 | 7.3 | 5.8 | 4.5 | 3.6 | 3.5 | 3.5 | 3.0 | 3.0 | 3.1 | 3.6 | 3.2 | 4.3 | 10.1 | 15.4 | 30.8 | 25.9 | 28.0 | 7.6 | 9.1 | 8.4 | 30.8 |
| 10-Aug | 9.0 | 8.7 | 8.2 | 8.1 | 7.6 | 7.3 | 7.6 | 6.5 | 7.5 | 6.3 | 6.5 | C | 8.6 | 6.4 | 5.5 | 4.0 | 3.0 | 3.5 | 5.6 | 3.6 | 2.5 | 2.2 | 1.8 | 1.7 | 5.7 | 9.0 |
| 11-Aug | 2.0 | 2.4 | 2.4 | 2.4 | 2.1 | 2.1 | 1.7 | 1.5 | 2.5 | 3.8 | 5.2 | 6.0 | 5.8 | 5.5 | 5.9 | 6.7 | 7.2 | 7.4 | 7.9 | 15.0 | 22.2 | 14.6 | 9.5 | 9.8 | 6.3 | 22.2 |
| 12-Aug | 9.3 | 8.2 | 8.3 | 11.9 | 8.7 | 8.3 | 8.8 | 7.7 | 5.4 | 5.4 | 5.2 | 5.1 | 4.6 | 4.4 | 4.0 | 4.0 | 4.7 | 5.0 | 4.6 | 5.5 | 20.6 | 14.1 | 8.1 | 8.6 | 7.5 | 20.6 |
| 13-Aug | 9.1 | 8.7 | 8.2 | 7.8 | 7.6 | 7.4 | 7.0 | 6.3 | 5.8 | 6.2 | 6.3 | 5.4 | 5.5 | 5.0 | 5.0 | 5.5 | 6.0 | 5.9 | 8.5 | 9.7 | 7.6 | 7.7 | 6.0 | 6.8 | 6.8 | 9.7 |
| 14-Aug | 5.7 | 6.1 | 5.8 | 5.7 | 6.1 | 8.8 | 7.9 | 115.1 | 125.5 | 103.4 | 96.3 | 90.5 | 80.9 | 74.6 | 49.2 | 25.2 | 21.9 | 21.4 | 21.7 | 21.8 | 23.0 | 22.6 | 23.7 | 25.4 | 41.2 | 125.5 |
| 15-Aug | 25.3 | 24.0 | 24.2 | 24.0 | 21.3 | 19.6 | 22.0 | 9.8 | 2.4 | 1.3 | 1.3 | 1.4 | 7.1 | 12.0 | 10.7 | 7.5 | 4.5 | 4.5 | 4.1 | 4.1 | 3.9 | 8.0 | 5.6 | 5.0 | 10.6 | 25.3 |
| 16-Aug | 6.5 | 6.9 | 5.8 | 5.1 | 5.1 | 4.9 | 4.9 | 4.0 | 2.5 | 1.8 | 1.9 | 1.7 | 2.9 | 6.2 | 4.3 | 2.6 | 2.2 | 2.3 | 4.0 | 13.4 | 16.2 | 14.6 | 16.4 | 24.1 | 6.7 | 24.1 |
| 17-Aug | 27.2 | 25.6 | 24.3 | 22.6 | 20.0 | 17.0 | 13.0 | 8.1 | 5.1 | 4.1 | 3.8 | 2.5 | 1.7 | 2.0 | 1.8 | 1.9 | 2.1 | 1.9 | 2.8 | 7.8 | 6.5 | 4.3 | 2.5 | 2.4 | 8.8 | 27.2 |
| 18-Aug | 2.7 | 3.1 | 3.1 | 3.6 | 5.1 | 5.9 | 6.9 | 8.1 | 9.2 | 10.5 | 10.1 | 11.8 | 12.0 | 16.5 | 21.8 | 58.2 | 61.1 | 50.0 | 43.6 | 41.5 | 28.4 | 22.9 | 14.1 | 2.7 | 18.9 | 61.1 |
| 19-Aug | 1.8 | 3.0 | 3.8 | 3.5 | 2.1 | 1.6 | 1.8 | 1.6 | 1.2 | 1.3 | 1.4 | 1.1 | 1.2 | 1.2 | 1.5 | 1.4 | 1.6 | 1.5 | 1.2 | 1.2 | 1.1 | 1.0 | 0.9 | 1.0 | 1.6 | 3.8 |
| 20-Aug | 1.0 | 0.9 | 1.4 | 2.0 | 1.5 | 1.9 | 1.5 | 2.2 | 2.2 | 1.7 | 1.6 | 1.3 | 1.2 | 1.5 | 1.5 | 1.4 | 1.2 | 1.1 | 1.1 | 1.1 | 1.0 | 0.9 | 1.0 | 1.3 | 1.4 | 2.2 |
| 21-Aug | 1.7 | 1.6 | 1.6 | 1.5 | 1.6 | 1.6 | 1.7 | 1.5 | 1.3 | 1.5 | 1.4 | 2.1 | 1.8 | 1.8 | 1.7 | 1.7 | 1.8 | 2.9 | 10.6 | 19.9 | 8.3 | 4.8 | 4.8 | 5.1 | 3.5 | 19.9 |
| 22-Aug | 5.3 | 5.7 | 6.0 | 6.7 | 6.8 | 7.0 | 6.6 | 6.9 | 5.7 | 4.7 | 3.3 | 3.4 | 4.2 | 3.4 | 2.9 | 3.4 | 3.2 | 4.0 | 4.1 | 7.6 | 11.7 | 14.8 | 24.1 | 13.7 | 6.9 | 24.1 |
| 23-Aug | 10.0 | 4.1 | 3.1 | 3.2 | 3.6 | 4.0 | 3.3 | 3.0 | 3.4 | 3.8 | 4.0 | 4.7 | 4.7 | 3.3 | 3.6 | 3.7 | 3.6 | 4.3 | 6.0 | 14.4 | 25.7 | 14.0 | 7.3 | 7.1 | 6.2 | 25.7 |
| 24-Aug | 5.3 | 6.8 | 6.7 | 6.8 | 7.1 | 7.0 | 7.1 | 6.8 | 6.8 | 7.3 | 7.5 | 7.0 | 7.3 | 7.0 | 6.8 | 7.7 | 8.9 | 8.6 | 9.5 | 9.9 | 10.4 | 9.0 | 2.5 | 2.0 | 7.2 | 10.4 |
| 25-Aug | 2.0 | 2.1 | 2.2 | 2.3 | 2.1 | 2.3 | 2.1 | 1.7 | 1.7 | 1.3 | 1.4 | 1.1 | 1.8 | 2.1 | 1.5 | 1.9 | 5.2 | 3.3 | 3.0 | 5.8 | 3.7 | 2.4 | 2.2 | 2.4 | 2.4 | 5.8 |
| 26-Aug | 2.5 | 3.1 | 5.9 | 2.6 | 3.1 | 3.7 | 3.8 | 3.4 | 3.3 | 3.1 | 2.9 | 2.5 | 2.4 | 2.6 | 3.0 | 3.6 | 4.0 | 3.9 | 4.9 | 6.8 | 7.4 | 6.2 | 5.9 | 6.1 | 4.0 | 7.4 |
| 27-Aug | 6.8 | 5.5 | 5.9 | 6.1 | 5.8 | 5.4 | 4.7 | 4.3 | 3.3 | 3.0 | 1.9 | 1.9 | 2.1 | 2.3 | 2.0 | 2.1 | 2.1 | 2.5 | 2.1 | 1.7 | 2.5 | 2.6 | 2.2 | 2.6 | 3.4 | 6.8 |
| 28-Aug | 2.2 | 1.7 | 1.6 | 1.5 | 1.5 | 1.4 | 2.5 | 2.8 | 3.9 | 2.4 | 2.8 | 2.1 | 2.6 | 2.6 | 2.4 | 3.2 | 3.4 | 3.7 | 5.9 | 4.3 | 12.3 | 13.6 | 4.0 | 4.9 | 3.7 | 13.6 |
| 29-Aug | 5.7 | 5.4 | 5.0 | 4.7 | 5.0 | 6.5 | 6.4 | 5.1 | 4.3 | 3.7 | 2.7 | 2.5 | 2.4 | 2.7 | 2.6 | 3.1 | 4.4 | 4.5 | 4.0 | 6.7 | 24.8 | 22.2 | 10.4 | 7.3 | 6.3 | 24.8 |
| 30-Aug | 4.2 | 5.6 | 5.1 | 5.5 | 10.5 | 8.1 | 14.2 | 9.7 | 16.7 | 20.6 | 18.2 | 13.8 | 12.4 | 13.0 | 14.4 | 16.2 | 18.4 | 20.8 | 22.4 | 29.6 | 25.7 | 23.6 | 29.3 | 31.4 | 16.2 | 31.4 |
| 31-Aug | 19.7 | 21.4 | 20.0 | 19.5 | 18.1 | 16.7 | 18.5 | 20.4 | 23.5 | 23.7 | 16.2 | 8.8 | 6.8 | 18.9 | 16.2 | 11.8 | 8.1 | 6.5 | 7.7 | 7.0 | 2.2 | 1.7 | 1.6 | 1.8 | 13.2 | 23.7 |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| 7.2 7.1 7.0 7.0 7.0 7.0 7.3 9.6 9.3 8.5 7.9 7.3 7.1 7.7 6.8 7.2 7.5 7.9 8.4 11.3 13.7 11.1 8.2 7.6 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| 27.2 25.6 24.3 24.0 21.3 19.6 22.0 115.1 125.5 103.4 96.3 90.5 80.9 74.6 49.2 58.2 61.1 50.0 43.6 41.5 36.1 29.8 29.3 31.4 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³ | | | | | | | | | | | | | | | | | | | | | | | | | | |

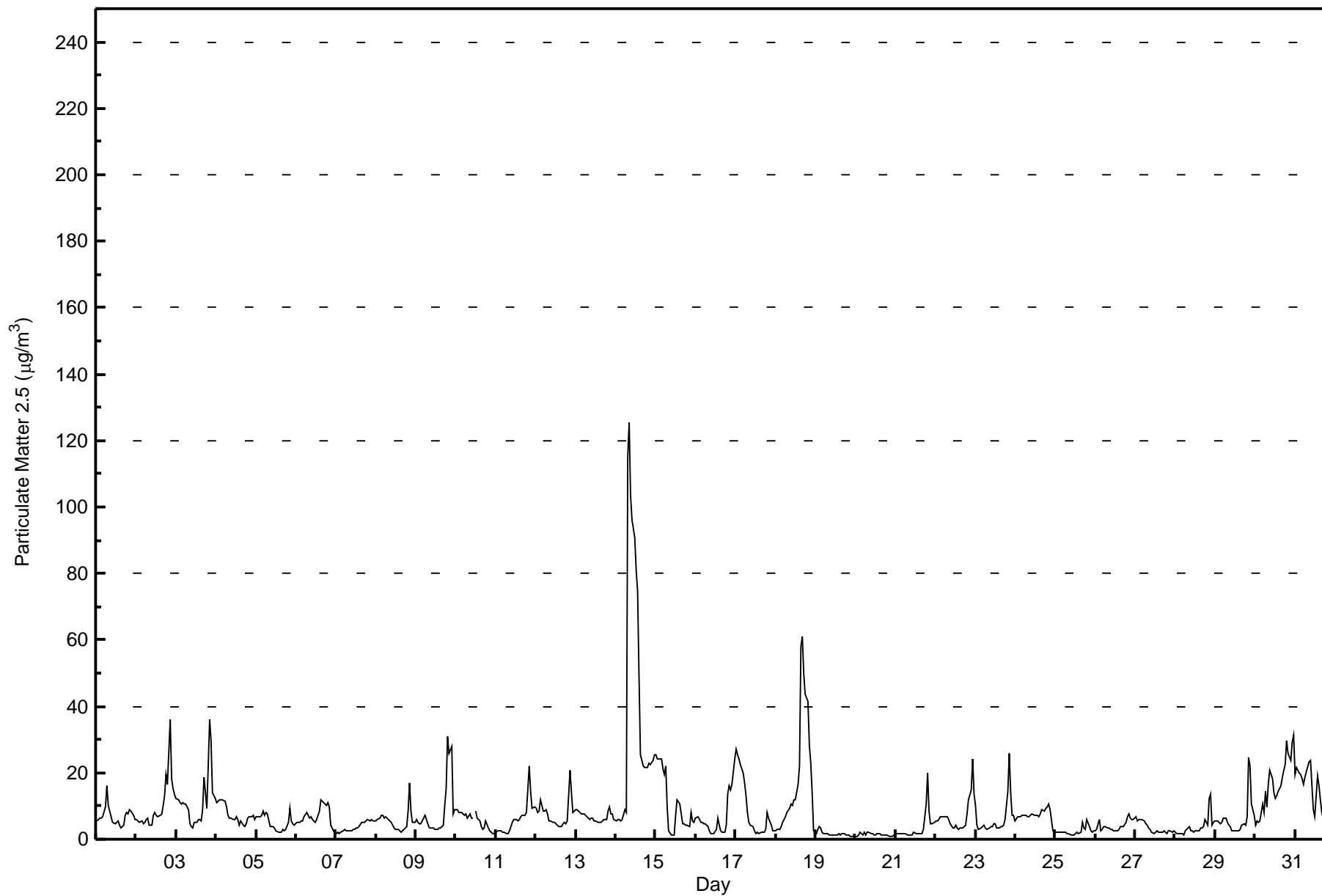


Wood Buffalo Environmental Association

Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$

Conklin - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Conklin - August 2017

| Concentration Ranges ($\mu\text{g}/\text{m}^3$) | Number of Hours | % | Cumulative % |
|---|------------------------|----------|---------------------|
| 1 - 5 | 369 | 49.66 | 49.66 |
| 6 - 15 | 280 | 37.69 | 87.35 |
| 16 - 25 | 60 | 8.08 | 95.42 |
| 26 - 80 | 21 | 2.83 | 98.25 |
| > 81.0 | 6 | 0.81 | 99.06 |

Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Conklin - August 2017

| Concentration Ranges (μg/m ³) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|--|----------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 1 - 5 | 12 | 6 | 5 | 4 | 2 | 8 | 14 | 28 | 48 | 23 | 50 | 44 | 60 | 30 | 17 | 18 | 369 |
| 6 - 15 | 9 | 2 | 1 | 2 | 2 | 7 | 13 | 36 | 36 | 50 | 32 | 15 | 14 | 15 | 24 | 16 | 274 |
| 16 - 25 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 10 | 9 | 8 | 9 | 6 | 2 | 4 | 8 | 1 | 60 |
| 26 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 9 | 4 | 1 | 2 | 0 | 1 | 0 | 21 |
| > 81.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 1 | 1 | 0 | 0 | 6 |
| Totals | 21 | 8 | 6 | 6 | 4 | 15 | 30 | 75 | 96 | 90 | 96 | 69 | 79 | 50 | 50 | 35 | 730 |

Total Number of Valid Hours: 737

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

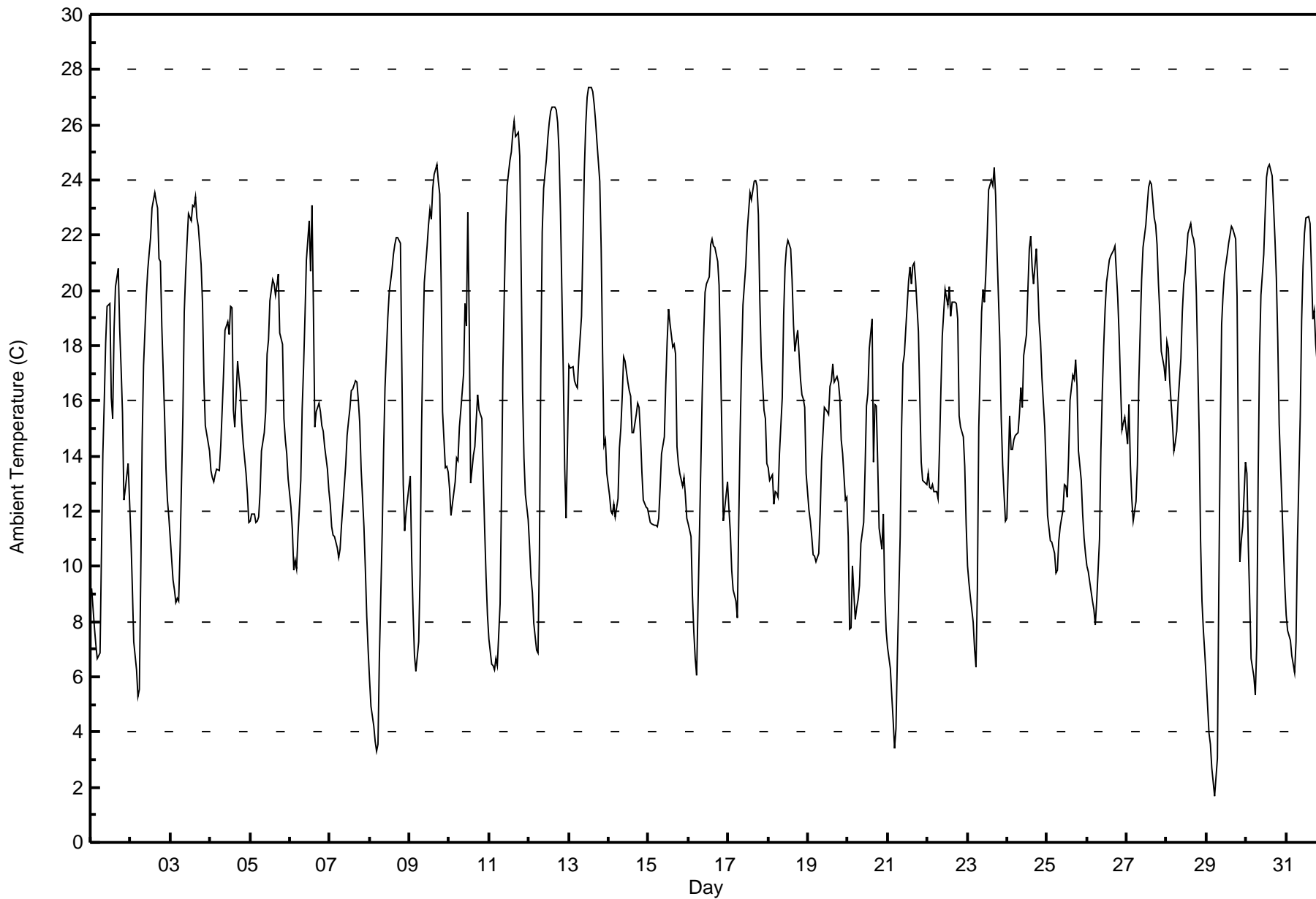
Conklin - August 2017

| Maximum Value: 27.4 C on Aug 13 13:00 Maximum Daily Average: 21.0 C on Aug 13 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: | 744 | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------------------|-------|------|---------------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Minimum Value: 1.7 C on Aug 29 06:00 Minimum Daily Average: 11.9 C on Aug 20 | | | | | | | | | | | | | | | | | | | | | | Hours of Data: | 744 | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 20.9 C at hour 14 Minimum Diurnal Average: 9.3 C at hour 5 | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 15.52 C Percentiles: P ₁ = 3.5 P ₁₀ = 8.7 Q ₁ = 11.8 Median = 15.4 Q ₃ = 19.6 P ₉₀ = 22.5 P ₉₉ = 26.6 | | | | | | | | | | | | | | | | | | | | | | Hours of Calibration: | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: | 100.0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 9.2 | 8.5 | 7.8 | 7.2 | 6.7 | 6.9 | 10.5 | 14.1 | 16.0 | 18.1 | 19.4 | 19.5 | 16.1 | 15.4 | 18.6 | 20.1 | 20.8 | 18.6 | 17.2 | 15.5 | 12.4 | 12.8 | 13.8 | 12.4 | 14.1 | 20.8 | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 11.1 | 9.2 | 7.3 | 6.3 | 5.3 | 5.6 | 9.7 | 14.6 | 17.3 | 19.8 | 20.8 | 21.4 | 21.9 | 23.0 | 23.5 | 23.3 | 23.0 | 21.2 | 21.0 | 18.7 | 15.4 | 13.5 | 12.4 | 11.8 | 15.7 | 23.5 | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 11.0 | 9.5 | 9.1 | 8.7 | 8.9 | 8.7 | 10.6 | 15.4 | 19.2 | 20.6 | 21.8 | 22.8 | 22.5 | 23.1 | 23.0 | 23.4 | 22.6 | 22.3 | 21.0 | 19.5 | 16.7 | 15.1 | 14.8 | 14.2 | 16.9 | 23.4 | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 13.5 | 13.2 | 13.1 | 13.3 | 13.6 | 13.5 | 14.4 | 15.7 | 17.0 | 18.6 | 18.9 | 18.4 | 19.4 | 19.4 | 15.6 | 15.1 | 17.4 | 16.8 | 16.3 | 15.2 | 14.5 | 13.4 | 12.6 | 11.6 | 15.4 | 19.4 | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 11.7 | 11.9 | 11.9 | 11.6 | 11.6 | 11.8 | 12.7 | 14.2 | 14.8 | 15.6 | 17.7 | 18.2 | 19.6 | 20.4 | 20.2 | 19.8 | 20.2 | 20.6 | 18.4 | 18.1 | 15.4 | 14.6 | 14.1 | 13.2 | 15.8 | 20.6 | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 12.2 | 11.3 | 9.8 | 10.2 | 9.9 | 11.2 | 13.1 | 15.7 | 17.2 | 19.0 | 21.1 | 22.5 | 20.7 | 23.1 | 19.3 | 15.0 | 15.6 | 15.9 | 15.6 | 15.1 | 14.9 | 14.3 | 13.5 | 12.8 | 15.4 | 23.1 | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 12.2 | 11.4 | 11.1 | 11.1 | 10.7 | 10.3 | 10.6 | 11.5 | 12.2 | 13.7 | 14.7 | 15.3 | 15.7 | 16.4 | 16.4 | 16.7 | 16.7 | 16.0 | 15.2 | 13.5 | 11.5 | 9.9 | 8.2 | 7.0 | 12.8 | 16.7 | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 5.9 | 5.0 | 4.2 | 3.6 | 3.3 | 3.5 | 6.7 | 11.2 | 14.2 | 16.5 | 17.8 | 19.0 | 19.9 | 20.7 | 21.3 | 21.7 | 21.9 | 21.9 | 21.7 | 17.2 | 13.0 | 11.3 | 11.9 | 12.9 | 13.6 | 21.9 | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 13.3 | 10.3 | 8.3 | 6.7 | 6.2 | 7.3 | 9.7 | 14.9 | 18.1 | 20.3 | 21.6 | 22.4 | 22.9 | 22.6 | 23.7 | 24.2 | 24.5 | 23.9 | 23.5 | 20.3 | 15.6 | 13.6 | 13.6 | 13.4 | 16.7 | 24.5 | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 12.8 | 11.9 | 12.3 | 13.1 | 13.9 | 13.8 | 15.1 | 15.7 | 17.0 | 19.5 | 18.7 | 22.9 | 18.8 | 13.0 | 14.0 | 14.3 | 15.3 | 16.2 | 15.6 | 15.3 | 13.3 | 11.3 | 9.6 | 8.3 | 14.7 | 22.9 | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 7.4 | 6.5 | 6.4 | 6.2 | 6.7 | 6.4 | 8.7 | 12.6 | 17.2 | 19.9 | 22.4 | 23.8 | 24.7 | 25.0 | 25.7 | 26.2 | 25.6 | 25.7 | 24.9 | 20.8 | 16.4 | 13.9 | 12.6 | 11.7 | 16.6 | 26.2 | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 10.7 | 9.6 | 9.0 | 7.9 | 7.0 | 6.8 | 10.5 | 17.2 | 22.1 | 23.7 | 24.8 | 25.5 | 26.1 | 26.5 | 26.6 | 26.7 | 26.5 | 26.1 | 25.0 | 22.9 | 17.1 | 13.6 | 11.8 | 14.5 | 18.3 | 26.7 | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 17.3 | 17.2 | 17.3 | 16.7 | 16.6 | 16.5 | 17.5 | 19.1 | 21.7 | 24.3 | 26.0 | 27.0 | 27.4 | 27.3 | 27.2 | 26.8 | 26.2 | 25.4 | 23.9 | 21.5 | 17.8 | 14.4 | 14.6 | 13.4 | 21.0 | 27.4 | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 12.6 | 12.0 | 11.9 | 12.2 | 11.8 | 12.5 | 14.3 | 15.0 | 16.2 | 17.6 | 17.4 | 16.7 | 16.4 | 16.2 | 14.8 | 14.9 | 15.5 | 15.9 | 15.8 | 14.8 | 13.4 | 12.4 | 12.2 | 12.1 | 14.4 | 17.6 | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 11.8 | 11.6 | 11.5 | 11.5 | 11.5 | 11.4 | 11.8 | 12.8 | 14.1 | 14.7 | 16.6 | 18.2 | 19.3 | 18.8 | 17.9 | 18.1 | 17.7 | 14.3 | 13.7 | 13.4 | 12.9 | 13.2 | 12.5 | 11.7 | 14.2 | 19.3 | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 11.5 | 11.1 | 9.0 | 7.6 | 6.7 | 6.0 | 8.6 | 13.7 | 16.3 | 18.3 | 19.9 | 20.2 | 20.5 | 21.7 | 21.9 | 21.6 | 21.6 | 21.1 | 20.2 | 17.7 | 14.7 | 11.7 | 12.1 | 13.0 | 15.3 | 21.9 | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 12.1 | 11.2 | 9.8 | 9.2 | 8.7 | 8.2 | 11.6 | 14.8 | 17.4 | 19.5 | 20.9 | 22.1 | 22.8 | 23.6 | 23.3 | 24.0 | 24.0 | 23.8 | 22.7 | 19.7 | 17.6 | 15.6 | 15.4 | 13.7 | 17.2 | 24.0 | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 13.6 | 13.1 | 13.3 | 12.3 | 12.7 | 12.7 | 12.5 | 14.1 | 16.1 | 19.1 | 20.8 | 21.5 | 21.8 | 21.5 | 20.4 | 18.7 | 17.8 | 18.2 | 18.6 | 16.8 | 16.2 | 16.1 | 15.8 | 13.4 | 16.5 | 21.8 | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 12.0 | 11.6 | 11.1 | 10.4 | 10.4 | 10.1 | 10.5 | 11.9 | 13.8 | 14.8 | 15.8 | 15.6 | 15.5 | 16.5 | 16.7 | 17.3 | 16.7 | 16.9 | 16.7 | 16.1 | 14.6 | 14.1 | 12.4 | 12.5 | 13.9 | 17.3 | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 11.1 | 7.7 | 7.8 | 10.0 | 8.1 | 8.5 | 8.8 | 9.3 | 10.8 | 11.6 | 13.5 | 15.8 | 16.3 | 17.9 | 19.0 | 13.8 | 15.9 | 15.8 | 13.7 | 11.4 | 10.6 | 11.9 | 9.1 | 7.7 | 11.9 | 19.0 | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 7.1 | 6.3 | 5.4 | 4.4 | 3.4 | 4.1 | 6.7 | 11.1 | 15.0 | 17.3 | 17.7 | 18.6 | 20.3 | 20.8 | 20.2 | 20.9 | 21.0 | 20.3 | 18.5 | 16.1 | 13.8 | 13.1 | 13.1 | 13.0 | 13.7 | 21.0 | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 13.4 | 12.9 | 12.8 | 13.0 | 12.7 | 12.7 | 12.5 | 14.2 | 16.4 | 18.3 | 20.1 | 19.7 | 19.5 | 20.2 | 19.1 | 19.6 | 19.6 | 19.5 | 18.9 | 15.5 | 15.1 | 14.7 | 13.6 | 11.6 | 16.1 | 20.2 | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 10.0 | 9.4 | 8.9 | 8.0 | 7.0 | 6.3 | 9.2 | 15.1 | 19.2 | 20.0 | 19.6 | 20.6 | 22.0 | 23.7 | 24.0 | 23.8 | 24.5 | 23.4 | 21.4 | 18.2 | 15.4 | 13.7 | 12.6 | 11.6 | 16.1 | 24.5 | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 11.7 | 15.4 | 14.2 | 14.3 | 14.6 | 14.8 | 14.9 | 15.5 | 16.5 | 15.7 | 17.6 | 18.4 | 20.1 | 21.5 | 22.0 | 20.8 | 20.2 | 21.5 | 20.4 | 18.9 | 18.2 | 16.8 | 15.0 | 13.5 | 17.2 | 22.0 | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 11.8 | 11.4 | 10.9 | 10.9 | 10.5 | 9.7 | 9.8 | 11.0 | 11.4 | 12.1 | 13.0 | 12.9 | 12.5 | 14.0 | 16.0 | 16.9 | 16.8 | 17.5 | 16.5 | 14.2 | 13.1 | 11.9 | 11.0 | 10.5 | 12.8 | 17.5 | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 10.0 | 9.8 | 9.1 | 8.7 | 8.4 | 7.9 | 8.8 | 11.0 | 14.2 | 16.3 | 18.0 | 19.3 | 20.3 | 21.1 | 21.3 | 21.3 | 21.5 | 21.6 | 19.7 | 18.3 | 16.6 | 14.9 | 15.2 | 15.4 | 15.4 | 21.6 | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 14.4 | 15.9 | 13.7 | 12.5 | 11.6 | 12.3 | 13.7 | 16.7 | 18.6 | 20.4 | 21.6 | 22.4 | 23.1 | 23.7 | 24.0 | 23.9 | 22.7 | 22.4 | 21.6 | 20.2 | 19.2 | 17.8 | 17.2 | 16.7 | 18.6 | 24.0 | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 18.1 | 17.9 | 16.7 | 15.1 | 14.2 | 14.5 | 14.9 | 16.0 | 17.5 | 19.2 | 20.2 | 20.7 | 21.4 | 22.1 | 22.4 | 22.0 | 21.9 | 21.5 | 19.8 | 14.8 | 10.9 | 8.7 | 7.7 | 6.9 | 16.9 | 22.4 | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 5.9 | 4.0 | 3.5 | 2.7 | 2.2 | 1.7 | 3.1 | 9.2 | 14.7 | 18.8 | 19.8 | 20.6 | 21.3 | 21.7 | 22.0 | 22.3 | 22.2 | 21.9 | 19.8 | 13.8 | 10.1 | 10.9 | 11.4 | 13.8 | 13.2 | 22.3 | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 13.4 | 10.8 | 8.8 | 6.6 | 6.0 | 5.4 | 7.1 | 13.1 | 17.6 | 19.8 | 21.3 | 22.8 | 24.1 | 24.5 | 24.6 | 24.2 | 23.0 | 21.8 | 20.4 | 18.2 | 15.1 | 12.2 | 10.7 | 9.3 | 15.9 | 24.6 | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 8.3 | 7.7 | 7.3 | 6.8 | 6.5 | 6.2 | 7.3 | 10.8 | 15.4 | 18.9 | 20.9 | 22.1 | 22.6 | 22.7 | 22.4 | 20.7 | 19.0 | 19.2 | 18.0 | 16.7 | 16.2 | 16.0 | 15.9 | 15.5 | 15.1 | 22.7 | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | 11.5 | 10.8 | 10.1 | 9.6 | 9.3 | 9.3 | 10.8 | 13.8 | 16.3 | 18.1 | 19.4 | 20.2 | 20.5 | 20.9 | 20.9 | 20.6 | 20.6 | 20.2 | 19.2 | 17.0 | 14.8 | 13.5 | 12.8 | 12.2 |
| | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | 18.1 | 17.9 | 17.3 | 16.7 | 16.6 | 16.5 | 17.5 | 19.1 | 22.1 | 24.3 | 26.0 | 27.0 | 27.4 | 27.3 | 27.2 | 26.8 | 26.5 | 26.1 | 25.0 | 22.9 | 19.2 | 17.8 | 17.2 | 16.7 |



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Conklin - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Conklin - August 2017

| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 111 | 14.92 | 14.92 |
| 10 - 20 | 459 | 61.69 | 76.61 |
| > 20 | 174 | 23.39 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

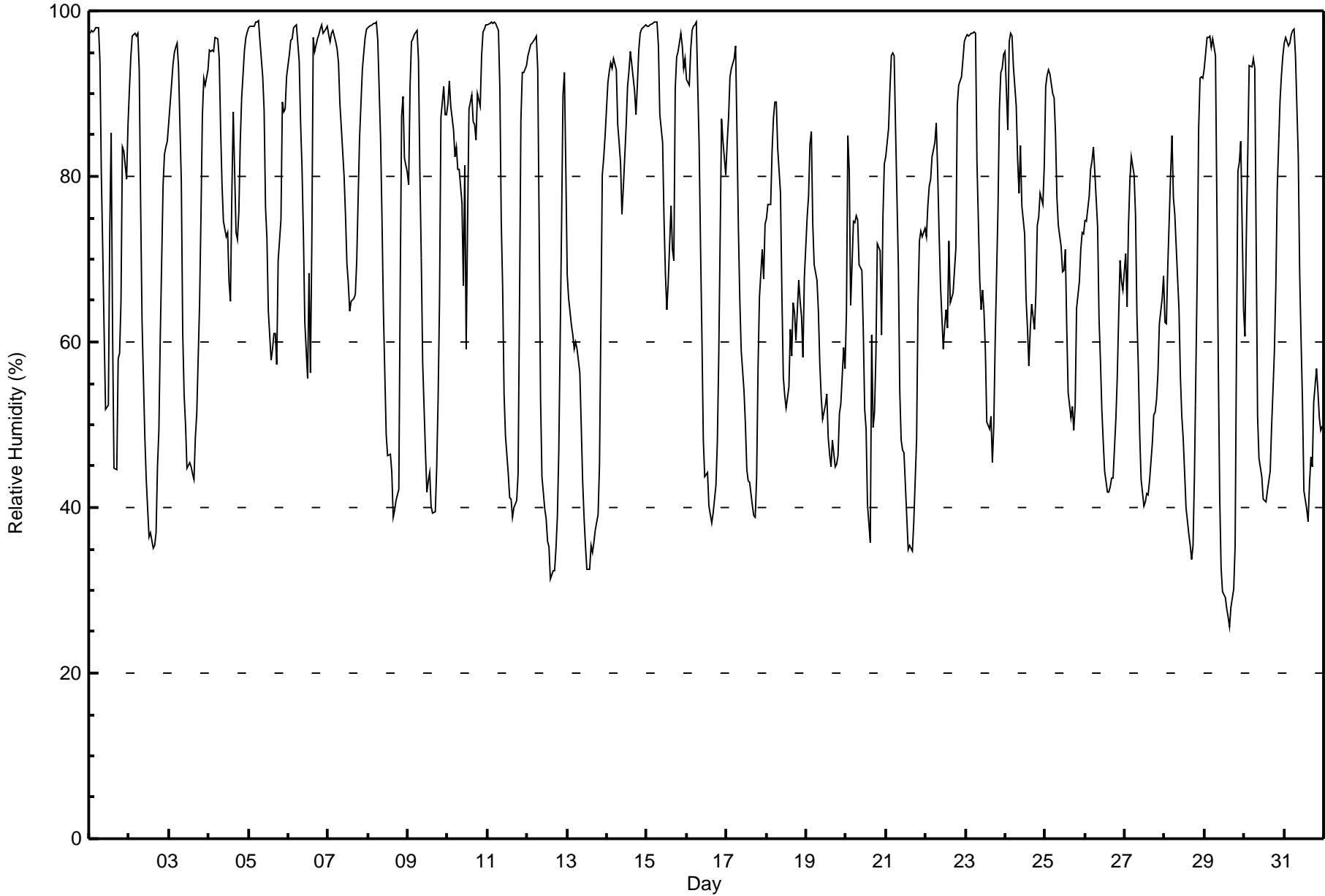
Conklin - August 2017

| Maximum Value: 99 % on Aug 5 07:00 | | | | | | | | | | | | | | | | | | Maximum Daily Average: 90.8 % on Aug 14 | | | | | | | | | | | | | | | | | | Hours in Service: 744 | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|------|------|------|------|------|------|---------------|---------------|------|------|------|------|------|------|------|------|------|---------------------------------|------|------|------|------|------|-----------------|-----------------|--|
| Minimum Value: 26 % on Aug 29 16:00 | | | | | | | | | | | | | | | | | | Minimum Daily Average: 52.5 % on Aug 13 | | | | | | | | | | | | | | | | | | Hours of Data: 744 | | | | | | | | |
| Maximum Diurnal Average: 91.3 % at hour 5 | | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 51.2 % at hour 14 | | | | | | | | | | | | | | | | | | Hours of Missing Data: 0 | | | | | | | | |
| Monthly Average: 71.5 % | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 31 P ₁₀ = 42 Q ₁ = 53 Median = 74 Q ₃ = 92 P ₉₀ = 97 P ₉₉ = 99 | | | | | | | | | | | | | | | | | | Hours of Calibration: 0 | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 97 | 98 | 98 | 98 | 98 | 98 | 94 | 80 | 71 | 61 | 52 | 52 | 73 | 85 | 61 | 45 | 45 | 58 | 59 | 65 | 83 | 83 | 80 | 86 | 75.8 | 98 | | | | | | | | | | | | | | | | | | |
| 2-Aug | 91 | 94 | 97 | 97 | 97 | 97 | 93 | 77 | 63 | 49 | 43 | 40 | 36 | 37 | 35 | 35 | 37 | 45 | 49 | 61 | 79 | 83 | 84 | 84 | 66.8 | 97 | | | | | | | | | | | | | | | | | | |
| 3-Aug | 86 | 91 | 93 | 95 | 96 | 96 | 93 | 79 | 61 | 53 | 50 | 45 | 45 | 44 | 43 | 48 | 51 | 65 | 75 | 87 | 92 | 91 | 93 | 71.7 | 96 | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 95 | 95 | 95 | 95 | 97 | 97 | 94 | 86 | 79 | 74 | 73 | 73 | 67 | 65 | 78 | 88 | 73 | 72 | 76 | 84 | 90 | 95 | 97 | 97 | 84.8 | 97 | | | | | | | | | | | | | | | | | | |
| 5-Aug | 98 | 98 | 98 | 98 | 99 | 99 | 99 | 97 | 92 | 88 | 76 | 73 | 64 | 58 | 59 | 61 | 61 | 57 | 70 | 75 | 89 | 88 | 88 | 92 | 82.3 | 99 | | | | | | | | | | | | | | | | | | |
| 6-Aug | 95 | 96 | 97 | 98 | 98 | 98 | 94 | 86 | 81 | 73 | 62 | 56 | 68 | 56 | 72 | 97 | 95 | 97 | 97 | 98 | 98 | 97 | 98 | 98 | 87.7 | 98 | | | | | | | | | | | | | | | | | | |
| 7-Aug | 97 | 96 | 97 | 98 | 96 | 95 | 94 | 89 | 86 | 80 | 75 | 69 | 67 | 64 | 65 | 65 | 66 | 70 | 77 | 85 | 93 | 95 | 97 | 98 | 83.9 | 98 | | | | | | | | | | | | | | | | | | |
| 8-Aug | 98 | 98 | 98 | 98 | 98 | 99 | 97 | 85 | 75 | 64 | 56 | 49 | 46 | 46 | 44 | 39 | 40 | 41 | 42 | 67 | 87 | 90 | 82 | 81 | 71.7 | 99 | | | | | | | | | | | | | | | | | | |
| 9-Aug | 79 | 91 | 96 | 97 | 97 | 98 | 94 | 81 | 70 | 57 | 47 | 42 | 43 | 44 | 40 | 39 | 40 | 45 | 53 | 65 | 87 | 91 | 88 | 87 | 69.6 | 98 | | | | | | | | | | | | | | | | | | |
| 10-Aug | 89 | 92 | 89 | 86 | 82 | 84 | 81 | 81 | 77 | 67 | 81 | 59 | 74 | 88 | 90 | 87 | 86 | 84 | 90 | 89 | 95 | 98 | 98 | 98 | 85.1 | 98 | | | | | | | | | | | | | | | | | | |
| 11-Aug | 98 | 98 | 99 | 99 | 99 | 99 | 98 | 91 | 75 | 66 | 54 | 49 | 44 | 41 | 41 | 39 | 40 | 41 | 44 | 64 | 87 | 93 | 93 | 93 | 72.6 | 99 | | | | | | | | | | | | | | | | | | |
| 12-Aug | 95 | 95 | 96 | 96 | 97 | 97 | 93 | 74 | 53 | 44 | 40 | 39 | 36 | 35 | 31 | 32 | 32 | 35 | 39 | 47 | 74 | 90 | 93 | 81 | 64.3 | 97 | | | | | | | | | | | | | | | | | | |
| 13-Aug | 68 | 65 | 62 | 61 | 59 | 60 | 59 | 56 | 50 | 43 | 39 | 35 | 32 | 33 | 35 | 35 | 36 | 37 | 39 | 45 | 62 | 80 | 82 | 85 | 52.5 | 85 | | | | | | | | | | | | | | | | | | |
| 14-Aug | 91 | 93 | 94 | 93 | 94 | 93 | 86 | 84 | 82 | 75 | 79 | 86 | 91 | 93 | 95 | 94 | 90 | 87 | 91 | 95 | 97 | 98 | 98 | 98 | 90.8 | 98 | | | | | | | | | | | | | | | | | | |
| 15-Aug | 98 | 98 | 98 | 98 | 99 | 99 | 99 | 96 | 87 | 84 | 75 | 68 | 64 | 67 | 76 | 71 | 70 | 91 | 94 | 95 | 97 | 96 | 93 | 94 | 87.9 | 99 | | | | | | | | | | | | | | | | | | |
| 16-Aug | 92 | 91 | 95 | 98 | 98 | 98 | 99 | 84 | 72 | 61 | 48 | 44 | 44 | 40 | 39 | 38 | 39 | 43 | 48 | 58 | 73 | 87 | 84 | 80 | 68.9 | 99 | | | | | | | | | | | | | | | | | | |
| 17-Aug | 84 | 87 | 92 | 93 | 94 | 96 | 85 | 74 | 65 | 59 | 54 | 50 | 45 | 43 | 43 | 40 | 39 | 39 | 44 | 57 | 65 | 71 | 68 | 74 | 65.0 | 96 | | | | | | | | | | | | | | | | | | |
| 18-Aug | 75 | 77 | 77 | 83 | 87 | 89 | 89 | 83 | 78 | 66 | 56 | 53 | 52 | 55 | 61 | 58 | 65 | 64 | 60 | 67 | 65 | 63 | 58 | 68 | 68.7 | 89 | | | | | | | | | | | | | | | | | | |
| 19-Aug | 75 | 78 | 84 | 85 | 74 | 69 | 67 | 64 | 58 | 53 | 51 | 52 | 54 | 48 | 46 | 45 | 48 | 45 | 45 | 46 | 51 | 52 | 59 | 57 | 58.7 | 85 | | | | | | | | | | | | | | | | | | |
| 20-Aug | 64 | 85 | 81 | 64 | 75 | 74 | 75 | 75 | 69 | 69 | 61 | 52 | 49 | 40 | 36 | 61 | 50 | 51 | 58 | 72 | 71 | 61 | 75 | 82 | 64.6 | 85 | | | | | | | | | | | | | | | | | | |
| 21-Aug | 82 | 86 | 91 | 95 | 95 | 95 | 86 | 69 | 54 | 48 | 47 | 47 | 39 | 35 | 35 | 35 | 35 | 38 | 48 | 65 | 72 | 73 | 73 | 74 | 63.1 | 95 | | | | | | | | | | | | | | | | | | |
| 22-Aug | 73 | 76 | 79 | 80 | 82 | 84 | 87 | 81 | 73 | 67 | 59 | 62 | 64 | 62 | 72 | 65 | 66 | 69 | 71 | 89 | 91 | 92 | 94 | 96 | 76.4 | 96 | | | | | | | | | | | | | | | | | | |
| 23-Aug | 97 | 97 | 97 | 97 | 97 | 97 | 97 | 82 | 67 | 64 | 66 | 64 | 59 | 50 | 50 | 51 | 45 | 50 | 60 | 76 | 88 | 93 | 93 | 95 | 76.4 | 97 | | | | | | | | | | | | | | | | | | |
| 24-Aug | 95 | 86 | 96 | 97 | 97 | 93 | 88 | 82 | 78 | 84 | 76 | 73 | 65 | 62 | 57 | 62 | 65 | 62 | 66 | 74 | 75 | 78 | 77 | 81 | 77.9 | 97 | | | | | | | | | | | | | | | | | | |
| 25-Aug | 91 | 92 | 93 | 92 | 90 | 89 | 85 | 77 | 74 | 72 | 69 | 69 | 71 | 62 | 54 | 51 | 52 | 49 | 52 | 64 | 67 | 71 | 73 | 73 | 72.2 | 93 | | | | | | | | | | | | | | | | | | |
| 26-Aug | 75 | 75 | 78 | 81 | 82 | 84 | 80 | 74 | 63 | 58 | 52 | 48 | 44 | 42 | 42 | 43 | 44 | 44 | 51 | 56 | 63 | 70 | 67 | 66 | 61.6 | 84 | | | | | | | | | | | | | | | | | | |
| 27-Aug | 71 | 64 | 74 | 79 | 82 | 80 | 76 | 63 | 57 | 49 | 43 | 40 | 41 | 42 | 42 | 43 | 48 | 51 | 51 | 53 | 56 | 62 | 65 | 68 | 58.4 | 82 | | | | | | | | | | | | | | | | | | |
| 28-Aug | 62 | 62 | 69 | 80 | 85 | 78 | 75 | 72 | 64 | 56 | 51 | 48 | 44 | 40 | 37 | 35 | 34 | 35 | 44 | 69 | 86 | 92 | 92 | 92 | 62.6 | 92 | | | | | | | | | | | | | | | | | | |
| 29-Aug | 93 | 97 | 97 | 97 | 96 | 97 | 95 | 76 | 57 | 41 | 33 | 30 | 29 | 28 | 27 | 26 | 28 | 30 | 35 | 60 | 81 | 82 | 84 | 64 | 61.7 | 97 | | | | | | | | | | | | | | | | | | |
| 30-Aug | 61 | 73 | 83 | 93 | 93 | 94 | 93 | 72 | 51 | 46 | 44 | 41 | 41 | 41 | 42 | 44 | 50 | 54 | 59 | 67 | 78 | 89 | 92 | 95 | 66.5 | 95 | | | | | | | | | | | | | | | | | | |
| 31-Aug | 96 | 97 | 96 | 96 | 97 | 98 | 98 | 95 | 82 | 68 | 60 | 53 | 42 | 40 | 38 | 43 | 46 | 45 | 53 | 57 | 54 | 51 | 49 | 50 | 66.8 | 98 | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | 85.8 | 87.8 | 89.9 | 90.9 | 91.3 | 91.0 | 88.5 | 79.4 | 69.8 | 62.5 | 57.2 | 53.5 | 52.8 | 51.2 | 51.3 | 51.9 | 52.0 | 54.2 | 59.1 | 69.0 | 78.8 | 82.4 | 82.7 | 83.3 | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | 98 | 98 | 99 | 99 | 99 | 99 | 99 | 97 | 92 | 88 | 81 | 86 | 91 | 93 | 95 | 97 | 95 | 97 | 97 | 97 | 98 | 98 | 98 | 98 | 98 | Diurnal Maximum | |



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Conklin - August 2017





| | | |
|--|--|--------------------------------|
| Maximum Speed: 21 km/h on Aug 25 11:00 | Maximum Daily Speed Average: 12.2 km/h on Aug 25 | Hours in Service: 744 |
| Minimum Speed Value: 0 km/h on Aug 31 08:00 | Minimum Daily Speed Average: 2.1 km/h on Aug 6 | Hours of Data: 738 |
| Maximum Diurnal Speed Average: 4.8 km/h at hour 12 | Minimum Diurnal Speed Average: 2.8 km/h at hour 7 | Hours of Missing Data: 6 |
| Monthly Average Velocity: 3.4 km/h 227.1 deg | Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 5 Q ₃ = 9 P ₉₀ = 12 P ₉₉ = 19 | Percent Operational Time: 99.2 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|------|------|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | NW1 | WNW1 | SSW2 | SW1 | SW1 | SSW1 | NW2 | NNW3 | NW3 | NW3 | NNE3 | W5 | NNW9 | NNW4 | N6 | NNW5 | NNW2 | NW4 | W5 | WSW4 | NW1 | W3 | NW4 | NNW3 | NW2.4 | NNW9 |
| 2-Aug | NNW3 | NNW1 | WSW1 | SSW2 | S2 | SSW3 | S2 | WNW2 | NW3 | NNW3 | NW4 | WNW3 | WNW3 | WSW4 | SW7 | WSW8 | W4 | WSW6 | SW4 | SSW5 | SSW5 | SSW5 | SSW5 | SSW5 | WSW2.6 | WSW8 |
| 3-Aug | SSW6 | SSW5 | S3 | S3 | SSE4 | SE3 | SSE4 | SE4 | SW7 | SW9 | S9 | SSW9 | SW6 | WSW5 | W2 | S2 | SW5 | WSW3 | WNW2 | SW1 | W1 | SSW2 | SSW2 | SSW1 | SSW3.4 | S9 |
| 4-Aug | WNW1 | W1 | W0 | SSE3 | NNW5 | NNW3 | N5 | NE4 | ENE5 | NNE8 | N16 | NNW14 | N15 | NNE10 | S6 | NE2 | ESE6 | ENE5 | E2 | N1 | N2 | NW1 | SW1 | NW2 | N3.1 | N16 |
| 5-Aug | AF | SW1 | SW1 | NNW2 | NW2 | AF | NW1 | S5 | S6 | SSE6 | S7 | S9 | S8 | SSW10 | SSW8 | S10 | S7 | S7 | SE3 | SSW3 | SSW3 | SSW4 | SSW5 | S5 | S4.5 | S10 |
| 6-Aug | S5 | S5 | S4 | SSE4 | SSE4 | S4 | SSW7 | SW8 | WSW7 | WSW10 | SW10 | SW8 | SW5 | WSW7 | N8 | ESE5 | WSW1 | NW2 | NW3 | NNW4 | N3 | NNE8 | N7 | N8 | WSW2.1 | SW10 |
| 7-Aug | NNE7 | N7 | NNW3 | NNW3 | N6 | N5 | N6 | N7 | N6 | NE7 | NNE8 | NE8 | NE7 | ENE4 | N7 | N5 | NNW6 | NNW5 | NNW4 | NNW4 | NNW3 | NNW3 | SW0 | AF | N4.8 | NE8 |
| 8-Aug | SSW2 | SW2 | SSW1 | SSW2 | SSW2 | SSW2 | SSW3 | SE1 | NNW4 | WNW3 | W5 | SW4 | SW2 | W4 | WNW4 | NW6 | NNW4 | NW4 | NW2 | AF | SSW2 | SSW6 | SSW6 | SSW7 | WSW2.1 | SSW7 |
| 9-Aug | SW7 | ESE2 | SE3 | S2 | SSE3 | SSE3 | SSW2 | SSW6 | WSW6 | WSW4 | SW4 | SW3 | NW5 | NNW5 | NW7 | NNW4 | WSW5 | SW3 | SSE2 | S2 | S2 | SSW4 | SSW5 | S5 | SW2.3 | NW7 |
| 10-Aug | S4 | SSE4 | S5 | S5 | SSW8 | SSW7 | NW2 | E1 | S4 | ESE7 | S5 | SSW6 | ENE7 | SW8 | SSW7 | SSW8 | NW3 | NNW4 | S4 | S5 | SSE3 | S3 | NW1 | SSW2 | S3.2 | SSW8 |
| 11-Aug | S2 | S3 | S2 | S4 | S4 | SSW2 | S4 | SSE3 | SSW2 | NNE1 | SE3 | ESE6 | SE7 | ESE7 | ESE5 | SE8 | SSE8 | SSE7 | S6 | SSW2 | SSW3 | SSW4 | SSW4 | S4 | SSE3.6 | SSE8 |
| 12-Aug | SSE4 | SSE4 | SE4 | SSE3 | S3 | S2 | S2 | SSE2 | S7 | S14 | S15 | S14 | S14 | S15 | S15 | S15 | S15 | S13 | S13 | SSE9 | SSE3 | AF | WNW1 | SSE7 | S8.2 | S15 |
| 13-Aug | SSE9 | S9 | S10 | S9 | S12 | SSE12 | SSE12 | SSE13 | SSE15 | SE15 | SSE17 | SSE20 | SSE20 | SSE19 | SSE20 | SSE20 | SSE18 | SSE17 | SSE12 | SSE7 | S1 | WNW1 | S0 | NW2 | SSE11.8 | SSE20 |
| 14-Aug | NW2 | NW3 | NNW2 | WNW1 | SW1 | S1 | NW2 | W5 | WSW5 | WNW5 | W4 | WSW4 | SW4 | WSW2 | W6 | WNW4 | W4 | SW4 | SE2 | S3 | SW2 | S4 | SSE4 | SSE4 | WSW2.1 | W6 |
| 15-Aug | S1 | W1 | SSW1 | NNW2 | WNW1 | NW2 | WSW1 | WNW4 | NW4 | NNW8 | NW7 | NNW7 | NW10 | N9 | NW1 | W5 | NE2 | N4 | NNW6 | WSW2 | SW1 | NW3 | WNW3 | WNW2 | NW3.1 | NW10 |
| 16-Aug | WNW3 | W4 | S3 | SW1 | SSE3 | SSE3 | SSE3 | S4 | SW3 | WSW5 | W8 | W8 | WSW7 | WSW11 | WSW14 | W8 | WNW8 | WNW5 | W7 | WSW7 | SW5 | SSW5 | SSW6 | SW9 | WSW4.7 | WSW14 |
| 17-Aug | SSW6 | SSW5 | SSE5 | S5 | SSE4 | S3 | SSW7 | WSW6 | W7 | W9 | W9 | WNW9 | WNW9 | WNW9 | WNW9 | WNW9 | WNW9 | WNW7 | W5 | SW6 | SW6 | SW6 | SW6 | SW6 | WSW5.0 | WNW9 |
| 18-Aug | SW6 | SW8 | SW9 | SSW7 | SW9 | SSW9 | SSW8 | SSW10 | SSW8 | SSW7 | SSW11 | SW11 | SSW10 | SW7 | NW8 | NW7 | SW4 | SSW5 | SW5 | SW6 | SW10 | WSW10 | W12 | WNW6 | SW6.9 | W12 |
| 19-Aug | SW8 | SW11 | SW11 | WSW12 | WSW13 | W13 | WNW11 | W10 | WNW11 | W13 | WNW13 | WNW13 | WNW11 | W15 | W14 | W14 | W9 | W12 | W11 | WSW10 | WNW6 | W7 | W6 | WSW9 | W10.3 | W15 |
| 20-Aug | WSW5 | SE3 | SW3 | WSW7 | SSW7 | SW8 | SW8 | SW7 | WSW7 | WSW5 | WSW11 | WSW13 | W10 | W14 | WNW12 | NW10 | W12 | W6 | NW9 | WSW9 | WSW8 | W10 | SSW5 | S5 | WSW6.9 | W14 |
| 21-Aug | S5 | S4 | SE5 | SE4 | SSE4 | SE5 | SSE6 | S5 | W7 | WNW6 | W7 | W7 | WNW9 | W10 | W10 | WSW8 | W6 | WSW7 | SW5 | SW4 | SSW5 | SSW6 | SSW6 | SSW6 | SW4.2 | W10 |
| 22-Aug | SW6 | S4 | SSW4 | SSW5 | SSW3 | SSW4 | SSE4 | S4 | SW2 | NNE2 | WNW6 | W4 | SSW5 | SW3 | SE3 | SE4 | SE4 | ESE3 | SE3 | AF | S2 | SSW2 | SSW1 | SSW2 | S2.4 | SW6 |
| 23-Aug | S2 | SSE4 | SSE4 | SSE3 | S2 | S3 | SSE4 | S3 | SSE6 | S9 | SSE8 | SSE11 | SE8 | SE14 | SSE13 | SE10 | SSE13 | SSE11 | SSE7 | SSE4 | SSW1 | S2 | SW1 | NNW2 | SSE5.6 | SE14 |
| 24-Aug | NW2 | WSW6 | S3 | SSE3 | S1 | SE10 | ESE5 | SE9 | SSE7 | SE5 | ESE10 | SE6 | ESE4 | E2 | SSE12 | S12 | S8 | S9 | S9 | W6 | W6 | WNW6 | W9 | W10 | S3.6 | SSE12 |
| 25-Aug | W6 | WSW8 | SW7 | SW10 | SW10 | SW8 | SW9 | SW12 | SW16 | WSW19 | WSW21 | WSW21 | W19 | W17 | W16 | WSW19 | WSW18 | WSW17 | WSW12 | SW6 | SW8 | SW8 | SW8 | SW8 | WSW12.2 | WSW21 |
| 26-Aug | SW9 | SW9 | SW10 | SW10 | SW10 | SW9 | SW11 | SW9 | WSW12 | WSW12 | WSW15 | WSW15 | WSW16 | W13 | WSW16 | WSW14 | WSW12 | WSW13 | WSW7 | SW6 | SW6 | SSW6 | SW9 | SW12 | WSW10.6 | WSW16 |
| 27-Aug | SW12 | WSW10 | SW9 | SW7 | SW9 | SW8 | SW8 | WSW13 | W13 | W12 | W14 | W16 | W14 | WNW11 | W13 | W9 | W8 | W6 | WSW8 | W9 | WSW8 | SW6 | SW6 | SW6 | WSW9.2 | W16 |
| 28-Aug | W10 | W9 | W7 | WSW6 | WSW6 | W7 | W7 | NW6 | NW6 | WNW6 | W8 | W9 | WNW9 | WNW10 | W10 | NW10 | WNW8 | WNW6 | W3 | NW2 | SSW1 | SSW2 | S2 | S3 | W5.7 | NW10 |
| 29-Aug | SW2 | NW1 | SSW1 | SSW2 | S3 | SW2 | SSW2 | S3 | NNW1 | SSE3 | SE6 | SSE3 | E4 | SE5 | ESE5 | ESE6 | ESE7 | E6 | ENE3 | N0 | SW1 | SSW2 | W1 | SSE5 | SE2.2 | ESE7 |
| 30-Aug | SSE6 | SSE3 | S1 | WNW2 | SSW1 | NW1 | SSW2 | SE5 | SE8 | SSE13 | SE12 | SSE15 | SE15 | SSE16 | SSE15 | SSE14 | SSE13 | SSE13 | SSE10 | S5 | SSE2 | NW1 | SSW1 | SSW1 | SSE6.8 | SSE16 |
| 31-Aug | NW2 | SSW2 | S3 | S2 | WSW1 | WSW0 | S1 | S0 | WNW2 | NW5 | NW7 | NW8 | NW9 | NW10 | WNW9 | WNW8 | W7 | WSW9 | SW7 | WSW8 | W9 | W11 | W10 | W12 | W5.1 | W12 |

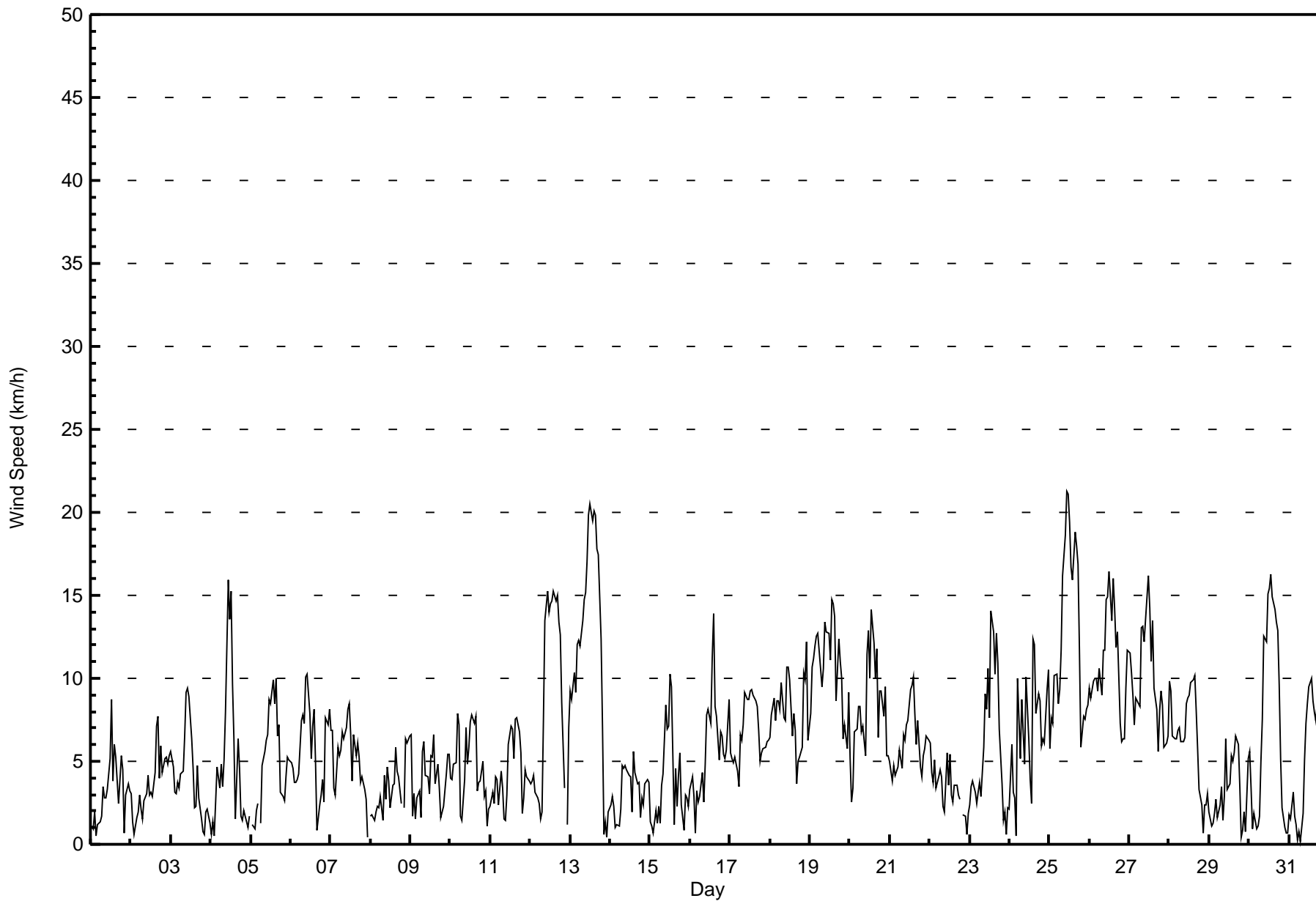
| | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-------|--------|--------|--------|--------|--------|--------|-------|-------|-------|-------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----------------|
| SW3.2 | SW2.8 | SSW3.1 | SSW3.2 | SSW3.3 | SSW3.2 | SSW2.8 | SSW3.0 | SW3.5 | SW3.4 | SW4.2 | SW4.8 | WSW3.4 | WSW4.1 | WSW4.2 | SW3.8 | SW3.8 | SW3.6 | SW3.2 | SW3.4 | SW2.9 | SW3.3 | SW3.2 | SW3.5 | Diurnal Average |
| SW12 | SW11 | SW11 | WSW12 | WSW13 | W13 | SSE12 | SSE13 | SW16 | WSW19 | WSW21 | WSW21 | SSE20 | SSE19 | SSE20 | SSE20 | WSW18 | SSE17 | S13 | WSW10 | SW10 | W11 | W12 | W12 | Diurnal Maximum |

AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Conklin - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Conklin - August 2017**

| Wind Speed Ranges (km/h) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 5 | 369 | 50.00 | 50.00 |
| 6 - 11 | 279 | 37.80 | 87.80 |
| 12 - 19 | 84 | 11.38 | 99.19 |
| 20 - 28 | 6 | 0.81 | 100.00 |
| 29 - 38 | 0 | 0.00 | 100.00 |
| > 38 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 738

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Conklin - August 2017**

| Wind Speed Ranges (km/h) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-----------------------------|----------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 5 | 8 | 3 | 3 | 5 | 3 | 8 | 18 | 36 | 67 | 60 | 34 | 19 | 19 | 22 | 35 | 29 | 369 |
| 6 - 11 | 11 | 5 | 3 | 1 | 1 | 7 | 9 | 16 | 18 | 31 | 58 | 31 | 43 | 25 | 15 | 5 | 279 |
| 12 - 19 | 2 | 0 | 0 | 0 | 0 | 0 | 4 | 19 | 11 | 1 | 4 | 19 | 20 | 3 | 0 | 1 | 84 |
| 20 - 28 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 6 |
| 29 - 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 21 | 8 | 6 | 6 | 4 | 15 | 31 | 75 | 96 | 92 | 96 | 71 | 82 | 50 | 50 | 35 | 738 |

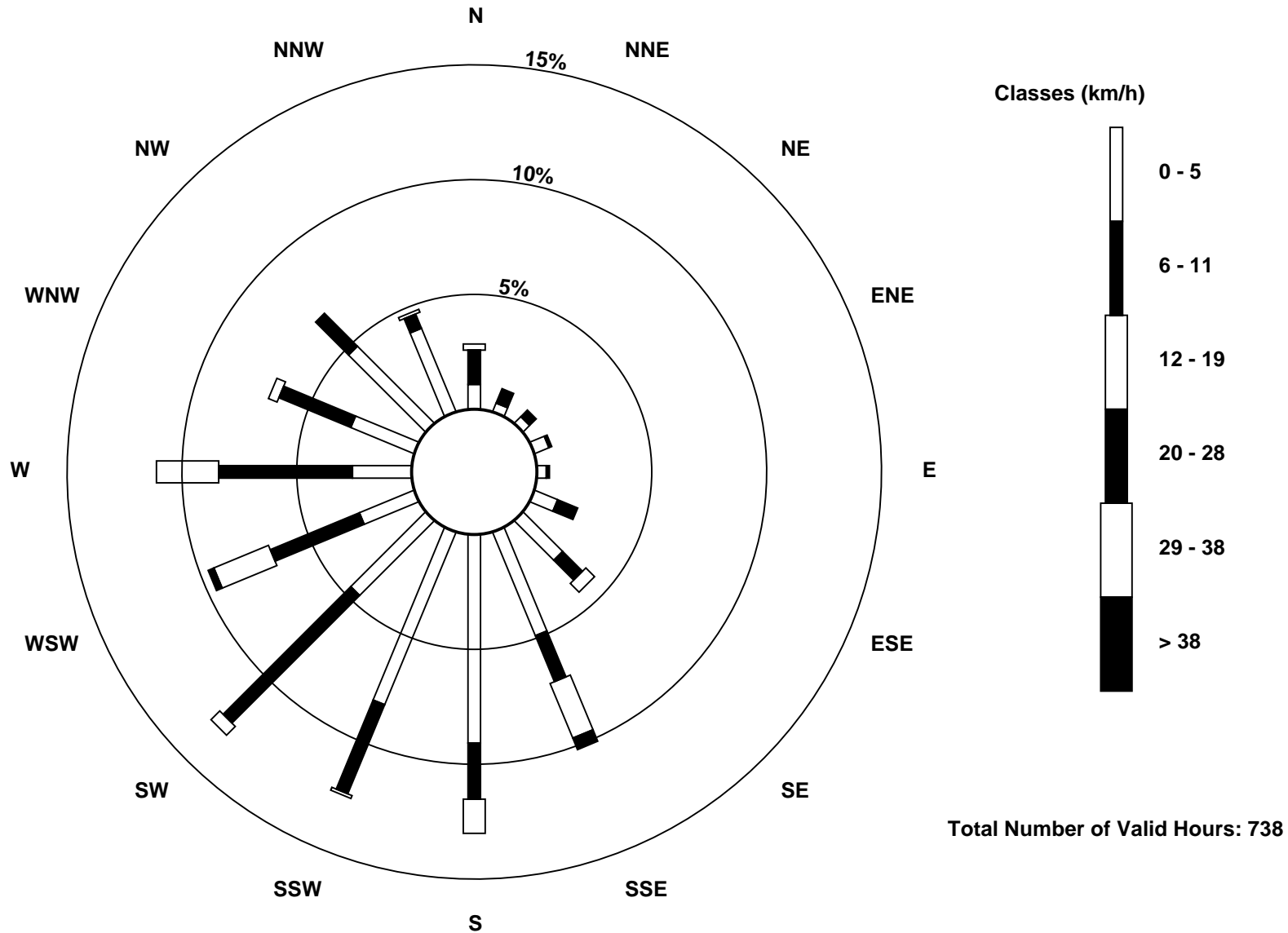
Total Number of Valid Hours: 738

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Wind Speed (WS) - km/h
Conklin (AMS 21)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Conklin - August 2017

| | |
|--|--|
| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Aug 25 12:00 | Hours in Service: 744 Hours of Data: 738 Hours of Missing Data: 6 Hours of Calibration: 0 Percent Operational Time: 99.2 |
| Minimum Value: 0 km/h on Aug 12 04:00 | |
| Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 7 | |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
|--------|-------------------------------|---|---|---|---|----|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 3 | 2 | 3 | 5 | 1 | 3 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 1 | 5 |
| 2-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 3 |
| 3-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 |
| 4-Aug | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 4 |
| 5-Aug | AF | 1 | 1 | 2 | 2 | AF | 1 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 4 |
| 6-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 7 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 7 |
| 7-Aug | 2 | 3 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | AF | 3 |
| 8-Aug | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | AF | 1 | 2 | 1 | 2 | 3 |
| 9-Aug | 2 | 1 | 1 | 1 | 0 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 3 |
| 10-Aug | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 5 | 4 | 3 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 5 |
| 11-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 3 |
| 12-Aug | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 3 | 1 | AF | 1 | 3 | 5 |
| 13-Aug | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 5 | 5 | 6 | 6 | 5 | 5 | 5 | 5 | 4 | 2 | 2 | 1 | 1 | 2 | 6 |
| 14-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 |
| 15-Aug | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 5 | 3 | 2 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 5 |
| 16-Aug | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 5 | 5 | 4 | 3 | 3 | 2 | 1 | 2 | 1 | 1 | 2 | 5 |
| 17-Aug | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 2 | 1 | 1 | 1 | 2 | 2 | 4 |
| 18-Aug | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 3 | 3 | 4 | 4 | 1 | 2 | 2 | 2 | 3 | 4 | 6 | 4 | 6 |
| 19-Aug | 3 | 3 | 3 | 3 | 4 | 4 | 5 | 4 | 5 | 5 | 5 | 6 | 5 | 7 | 7 | 6 | 3 | 5 | 4 | 3 | 4 | 2 | 3 | 3 | 7 |
| 20-Aug | 3 | 1 | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 4 | 5 | 6 | 6 | 5 | 5 | 4 | 5 | 2 | 3 | 3 | 2 | 1 | 6 |
| 21-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 2 | 2 | 4 | 5 | 4 | 4 | 3 | 3 | 2 | 1 | 1 | 1 | 2 | 1 | 5 |
| 22-Aug | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 3 | 1 | 2 | 2 | 2 | 2 | 1 | 1 | AF | 1 | 1 | 1 | 1 | 3 |
| 23-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 4 | 3 | 5 | 4 | 3 | 4 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 5 |
| 24-Aug | 1 | 4 | 1 | 1 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 4 | 4 | 3 | 2 | 4 | 4 | 2 | 2 | 3 | 4 | 5 | 5 |
| 25-Aug | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 5 | 6 | 6 | 7 | 8 | 7 | 6 | 7 | 6 | 7 | 5 | 4 | 2 | 2 | 2 | 2 | 2 | 8 |
| 26-Aug | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 4 | 3 | 5 | 4 | 6 | 5 | 5 | 5 | 5 | 5 | 2 | 2 | 2 | 2 | 3 | 3 | 6 |
| 27-Aug | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 5 | 5 | 5 | 6 | 6 | 6 | 5 | 5 | 5 | 4 | 2 | 3 | 2 | 2 | 1 | 1 | 2 | 6 |
| 28-Aug | 4 | 4 | 3 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 1 | 2 | 1 | 1 | 1 | 1 | 5 |
| 29-Aug | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 3 |
| 30-Aug | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 4 | 4 | 4 | 5 | 4 | 4 | 3 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 5 |
| 31-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 4 | 4 | 4 | 4 | 3 | 3 | 2 | 2 | 3 | 4 | 4 | 5 | 5 |
| | 4 | 4 | 3 | 3 | 4 | 4 | 5 | 5 | 6 | 6 | 7 | 8 | 7 | 7 | 7 | 6 | 7 | 5 | 5 | 3 | 4 | 4 | 6 | 5 | |
| | Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | |

AF - Analyzer Failure



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Conklin - August 2017

| | |
|---|--------------------------------|
| Direction of Maximum Speed: 245 deg on Aug 25 11:00 | Hours in Service: 744 |
| Direction of Maximum Daily Speed Average: 243.7 deg on Aug 25 | Hours of Data: 738 |
| Direction of Minimum Speed: 186 deg on Aug 31 08:00 | Hours of Missing Data: 6 |
| Direction of Minimum Daily Speed Average: 2.1 deg on Aug 6 | Percent Operational Time: 99.2 |
| Monthly Average Direction: 243.0 deg | |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average |
|--------|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 305 | 287 | 204 | 224 | 218 | 208 | 307 | 329 | 307 | 310 | 26 | 275 | 348 | 335 | 6 | 340 | 333 | 308 | 262 | 254 | 308 | 273 | 306 | 328 | 312.4 |
| 2-Aug | 342 | 346 | 241 | 197 | 186 | 193 | 174 | 291 | 308 | 328 | 310 | 288 | 300 | 285 | 250 | 232 | 250 | 272 | 244 | 233 | 199 | 202 | 196 | 200 | 244.3 |
| 3-Aug | 199 | 192 | 176 | 170 | 156 | 140 | 151 | 140 | 214 | 218 | 177 | 202 | 223 | 250 | 268 | 182 | 222 | 253 | 300 | 230 | 270 | 207 | 208 | 208 | 199.5 |
| 4-Aug | 284 | 277 | 281 | 151 | 332 | 328 | 6 | 50 | 75 | 20 | 351 | 345 | 0 | 21 | 184 | 54 | 119 | 71 | 79 | 354 | 11 | 326 | 226 | 320 | 10.3 |
| 5-Aug | AF | 217 | 214 | 328 | 325 | AF | 307 | 170 | 174 | 166 | 177 | 179 | 186 | 213 | 199 | 181 | 189 | 173 | 144 | 197 | 203 | 199 | 199 | 188 | 188.5 |
| 6-Aug | 178 | 180 | 175 | 154 | 150 | 189 | 210 | 225 | 249 | 245 | 228 | 236 | 217 | 241 | 356 | 106 | 255 | 318 | 305 | 334 | 10 | 21 | 0 | 4 | 241.6 |
| 7-Aug | 12 | 3 | 348 | 344 | 355 | 358 | 6 | 11 | 2 | 38 | 21 | 38 | 44 | 75 | 11 | 356 | 339 | 331 | 327 | 332 | 338 | 335 | 225 | AF | 6.1 |
| 8-Aug | 207 | 215 | 206 | 213 | 196 | 194 | 196 | 135 | 340 | 295 | 270 | 231 | 218 | 273 | 282 | 316 | 339 | 305 | 305 | AF | 198 | 205 | 193 | 208 | 245.3 |
| 9-Aug | 218 | 113 | 139 | 169 | 149 | 154 | 195 | 211 | 237 | 237 | 228 | 220 | 309 | 336 | 319 | 327 | 242 | 225 | 157 | 171 | 174 | 197 | 196 | 188 | 221.5 |
| 10-Aug | 183 | 163 | 176 | 190 | 205 | 200 | 309 | 88 | 191 | 121 | 171 | 212 | 77 | 228 | 193 | 194 | 306 | 330 | 183 | 183 | 167 | 175 | 311 | 198 | 187.5 |
| 11-Aug | 187 | 172 | 182 | 178 | 180 | 199 | 189 | 161 | 193 | 29 | 141 | 117 | 129 | 115 | 105 | 140 | 159 | 153 | 175 | 192 | 204 | 201 | 197 | 190 | 159.2 |
| 12-Aug | 159 | 150 | 144 | 168 | 173 | 187 | 188 | 148 | 180 | 183 | 178 | 184 | 172 | 178 | 190 | 186 | 187 | 186 | 176 | 168 | 160 | AF | 296 | 163 | 178.2 |
| 13-Aug | 165 | 171 | 173 | 179 | 170 | 160 | 153 | 148 | 148 | 143 | 148 | 153 | 164 | 164 | 151 | 155 | 153 | 155 | 158 | 153 | 175 | 291 | 180 | 310 | 157.5 |
| 14-Aug | 326 | 318 | 331 | 289 | 215 | 191 | 318 | 262 | 257 | 297 | 259 | 244 | 236 | 249 | 272 | 289 | 277 | 230 | 127 | 173 | 217 | 188 | 158 | 148 | 251.8 |
| 15-Aug | 183 | 264 | 211 | 339 | 285 | 322 | 247 | 299 | 312 | 329 | 325 | 342 | 324 | 353 | 323 | 265 | 38 | 349 | 330 | 254 | 214 | 307 | 296 | 303 | 320.8 |
| 16-Aug | 296 | 269 | 171 | 226 | 150 | 148 | 150 | 187 | 236 | 251 | 260 | 260 | 255 | 247 | 254 | 276 | 299 | 301 | 261 | 247 | 229 | 204 | 197 | 227 | 246.0 |
| 17-Aug | 213 | 193 | 163 | 179 | 152 | 177 | 210 | 246 | 268 | 264 | 275 | 300 | 293 | 290 | 294 | 302 | 293 | 292 | 266 | 228 | 228 | 222 | 233 | 224 | 254.8 |
| 18-Aug | 218 | 219 | 219 | 201 | 221 | 204 | 200 | 210 | 211 | 198 | 209 | 221 | 213 | 226 | 305 | 312 | 216 | 207 | 224 | 218 | 236 | 249 | 276 | 293 | 227.4 |
| 19-Aug | 230 | 229 | 234 | 240 | 254 | 264 | 284 | 279 | 289 | 269 | 285 | 286 | 298 | 276 | 271 | 277 | 273 | 264 | 260 | 257 | 286 | 268 | 277 | 251 | 267.3 |
| 20-Aug | 237 | 146 | 226 | 237 | 206 | 219 | 222 | 225 | 246 | 238 | 246 | 256 | 274 | 272 | 292 | 306 | 266 | 276 | 307 | 238 | 241 | 266 | 195 | 178 | 252.0 |
| 21-Aug | 189 | 171 | 145 | 143 | 158 | 129 | 153 | 185 | 260 | 284 | 264 | 260 | 286 | 276 | 267 | 254 | 272 | 245 | 232 | 216 | 203 | 200 | 207 | 200 | 230.8 |
| 22-Aug | 215 | 173 | 193 | 197 | 198 | 201 | 164 | 186 | 224 | 24 | 286 | 260 | 204 | 220 | 124 | 133 | 128 | 118 | 136 | AF | 185 | 195 | 203 | 213 | 191.0 |
| 23-Aug | 187 | 147 | 151 | 157 | 188 | 170 | 154 | 174 | 165 | 180 | 162 | 148 | 131 | 141 | 155 | 140 | 149 | 165 | 149 | 158 | 204 | 169 | 224 | 328 | 155.6 |
| 24-Aug | 326 | 247 | 171 | 150 | 176 | 131 | 115 | 124 | 154 | 140 | 122 | 133 | 117 | 100 | 153 | 191 | 187 | 173 | 179 | 273 | 266 | 297 | 270 | 274 | 176.0 |
| 25-Aug | 275 | 258 | 233 | 231 | 231 | 219 | 226 | 225 | 227 | 238 | 245 | 249 | 260 | 263 | 264 | 253 | 253 | 252 | 249 | 236 | 232 | 222 | 225 | 220 | 243.7 |
| 26-Aug | 230 | 225 | 223 | 227 | 231 | 219 | 225 | 231 | 248 | 251 | 245 | 243 | 253 | 265 | 251 | 252 | 252 | 250 | 247 | 230 | 219 | 213 | 228 | 231 | 239.7 |
| 27-Aug | 235 | 241 | 227 | 220 | 215 | 225 | 223 | 251 | 262 | 281 | 274 | 264 | 272 | 291 | 268 | 271 | 271 | 265 | 258 | 260 | 245 | 218 | 217 | 216 | 252.8 |
| 28-Aug | 261 | 272 | 274 | 245 | 237 | 270 | 280 | 306 | 304 | 299 | 270 | 279 | 290 | 299 | 281 | 313 | 288 | 290 | 276 | 313 | 207 | 199 | 169 | 177 | 278.7 |
| 29-Aug | 217 | 316 | 197 | 197 | 188 | 214 | 196 | 172 | 340 | 149 | 129 | 152 | 100 | 133 | 108 | 120 | 121 | 101 | 63 | 8 | 227 | 195 | 260 | 162 | 139.5 |
| 30-Aug | 165 | 157 | 182 | 293 | 205 | 312 | 195 | 141 | 136 | 151 | 137 | 153 | 143 | 159 | 155 | 164 | 160 | 164 | 164 | 175 | 154 | 323 | 213 | 200 | 156.4 |
| 31-Aug | 320 | 196 | 172 | 173 | 256 | 257 | 184 | 186 | 302 | 310 | 308 | 309 | 309 | 306 | 292 | 303 | 268 | 245 | 235 | 247 | 266 | 268 | 275 | 270 | 277.8 |

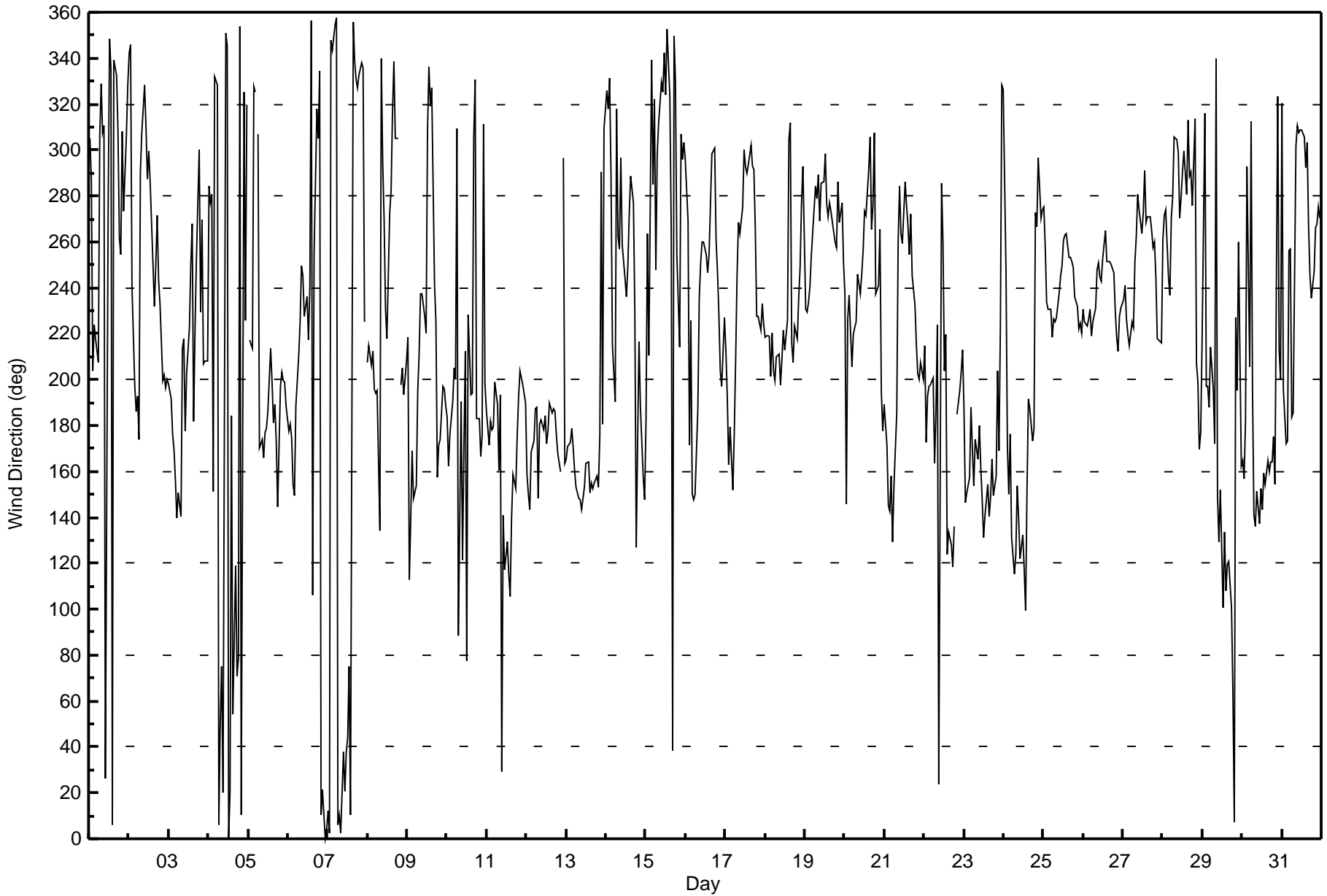
222.6 216.9 201.6 207.0 208.4 203.0 208.5 211.2 233.6 234.9 234.4 234.8 248.8 246.2 241.3 235.7 227.7 226.2 224.8 229.5 231.8 234.3 234.6 227.5
 Diurnal Average

AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Conklin - August 2017





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Conklin - August 2017

| | |
|---|--------------------------------|
| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | Hours in Service: 744 |
| Maximum Value: 99 deg on Aug 8 13:00 | Hours of Data: 738 |
| Minimum Value: 8 deg on Aug 12 03:00 | Hours of Missing Data: 6 |
| Percentiles: P ₁ = 11 P ₁₀ = 18 Q ₁ = 22 Median = 31 Q ₃ = 45 P ₉₀ = 68 P ₉₉ = 91 | Hours of Calibration: 0 |
| | Percent Operational Time: 99.2 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
|--------|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 53 | 59 | 58 | 50 | 48 | 44 | 67 | 49 | 57 | 86 | 77 | 70 | 44 | 34 | 39 | 45 | 73 | 36 | 28 | 39 | 90 | 77 | 66 | 39 | 90 |
| 2-Aug | 35 | 81 | 57 | 35 | 23 | 12 | 28 | 81 | 68 | 62 | 57 | 75 | 70 | 81 | 74 | 47 | 28 | 29 | 17 | 24 | 8 | 10 | 12 | 12 | 81 |
| 3-Aug | 12 | 15 | 29 | 22 | 17 | 16 | 17 | 29 | 29 | 26 | 36 | 41 | 53 | 49 | 79 | 65 | 24 | 17 | 28 | 56 | 45 | 18 | 15 | 41 | 79 |
| 4-Aug | 76 | 70 | 87 | 62 | 34 | 45 | 37 | 50 | 50 | 44 | 20 | 21 | 23 | 47 | 43 | 71 | 37 | 47 | 92 | 79 | 75 | 36 | 52 | 22 | 92 |
| 5-Aug | AF | 57 | 41 | 49 | 46 | AF | 43 | 35 | 22 | 28 | 41 | 30 | 35 | 32 | 28 | 23 | 38 | 33 | 26 | 24 | 23 | 22 | 19 | 17 | 57 |
| 6-Aug | 12 | 13 | 15 | 20 | 25 | 32 | 22 | 27 | 22 | 24 | 33 | 41 | 45 | 33 | 52 | 63 | 98 | 60 | 42 | 27 | 73 | 28 | 25 | 21 | 98 |
| 7-Aug | 25 | 22 | 26 | 31 | 24 | 18 | 22 | 27 | 27 | 33 | 34 | 34 | 48 | 59 | 26 | 33 | 23 | 18 | 17 | 15 | 18 | 23 | 72 | AF | 72 |
| 8-Aug | 29 | 13 | 45 | 19 | 20 | 12 | 21 | 80 | 43 | 72 | 66 | 88 | 99 | 78 | 66 | 42 | 57 | 43 | 40 | AF | 25 | 12 | 17 | 26 | 99 |
| 9-Aug | 30 | 60 | 20 | 77 | 18 | 36 | 63 | 33 | 32 | 56 | 62 | 81 | 55 | 53 | 49 | 78 | 50 | 30 | 75 | 29 | 21 | 11 | 13 | 13 | 81 |
| 10-Aug | 16 | 23 | 22 | 45 | 21 | 24 | 82 | 82 | 56 | 25 | 36 | 36 | 59 | 48 | 36 | 21 | 55 | 28 | 32 | 27 | 43 | 37 | 67 | 26 | 82 |
| 11-Aug | 19 | 28 | 28 | 23 | 24 | 21 | 18 | 26 | 83 | 84 | 73 | 47 | 39 | 45 | 53 | 45 | 31 | 27 | 25 | 62 | 44 | 10 | 9 | 19 | 84 |
| 12-Aug | 14 | 10 | 8 | 13 | 16 | 18 | 34 | 53 | 37 | 21 | 23 | 26 | 29 | 24 | 25 | 25 | 23 | 20 | 20 | 15 | 24 | AF | 26 | 19 | 53 |
| 13-Aug | 15 | 17 | 17 | 17 | 17 | 16 | 16 | 17 | 19 | 21 | 22 | 20 | 21 | 24 | 21 | 20 | 20 | 18 | 18 | 15 | 81 | 43 | 98 | 80 | 98 |
| 14-Aug | 12 | 20 | 20 | 51 | 63 | 72 | 45 | 43 | 48 | 42 | 35 | 21 | 32 | 54 | 33 | 42 | 38 | 23 | 62 | 22 | 55 | 32 | 14 | 24 | 72 |
| 15-Aug | 67 | 51 | 87 | 25 | 66 | 30 | 63 | 37 | 59 | 29 | 33 | 32 | 36 | 24 | 73 | 38 | 84 | 72 | 23 | 52 | 74 | 44 | 45 | 53 | 87 |
| 16-Aug | 50 | 44 | 37 | 96 | 19 | 20 | 22 | 29 | 76 | 48 | 39 | 37 | 36 | 32 | 30 | 42 | 44 | 47 | 25 | 16 | 26 | 13 | 18 | 20 | 96 |
| 17-Aug | 27 | 31 | 19 | 15 | 16 | 32 | 12 | 43 | 39 | 34 | 42 | 43 | 43 | 47 | 43 | 44 | 45 | 42 | 27 | 17 | 15 | 16 | 30 | 22 | 47 |
| 18-Aug | 20 | 21 | 24 | 19 | 21 | 19 | 19 | 18 | 21 | 22 | 19 | 23 | 24 | 31 | 42 | 44 | 42 | 23 | 27 | 28 | 20 | 23 | 38 | 48 | 48 |
| 19-Aug | 20 | 24 | 21 | 16 | 22 | 27 | 40 | 40 | 43 | 35 | 40 | 43 | 44 | 39 | 36 | 40 | 36 | 25 | 20 | 19 | 43 | 28 | 39 | 20 | 44 |
| 20-Aug | 41 | 47 | 64 | 43 | 24 | 23 | 23 | 26 | 30 | 37 | 19 | 29 | 34 | 36 | 44 | 43 | 33 | 40 | 44 | 21 | 25 | 22 | 25 | 29 | 64 |
| 21-Aug | 16 | 25 | 19 | 18 | 15 | 19 | 19 | 46 | 35 | 46 | 29 | 37 | 44 | 43 | 36 | 40 | 44 | 25 | 18 | 18 | 13 | 16 | 21 | 20 | 46 |
| 22-Aug | 21 | 31 | 34 | 24 | 31 | 35 | 28 | 33 | 68 | 82 | 54 | 54 | 20 | 66 | 80 | 62 | 34 | 36 | 35 | AF | 41 | 60 | 80 | 51 | 82 |
| 23-Aug | 27 | 35 | 17 | 27 | 25 | 25 | 21 | 61 | 37 | 20 | 21 | 21 | 30 | 23 | 24 | 28 | 22 | 19 | 13 | 16 | 50 | 60 | 68 | 51 | 68 |
| 24-Aug | 34 | 48 | 40 | 64 | 98 | 23 | 72 | 29 | 45 | 41 | 22 | 33 | 70 | 96 | 23 | 22 | 22 | 28 | 28 | 29 | 30 | 45 | 38 | 38 | 98 |
| 25-Aug | 38 | 22 | 23 | 22 | 24 | 25 | 30 | 25 | 24 | 23 | 23 | 25 | 27 | 29 | 36 | 24 | 26 | 24 | 19 | 21 | 21 | 20 | 21 | 20 | 38 |
| 26-Aug | 20 | 21 | 23 | 22 | 22 | 25 | 24 | 25 | 25 | 27 | 25 | 24 | 25 | 37 | 26 | 26 | 29 | 23 | 18 | 21 | 22 | 21 | 22 | 21 | 37 |
| 27-Aug | 20 | 25 | 19 | 20 | 21 | 20 | 20 | 23 | 28 | 43 | 38 | 33 | 41 | 44 | 34 | 44 | 31 | 28 | 23 | 21 | 22 | 18 | 18 | 19 | 44 |
| 28-Aug | 31 | 34 | 37 | 23 | 22 | 34 | 46 | 51 | 50 | 46 | 44 | 44 | 46 | 44 | 45 | 41 | 41 | 47 | 27 | 37 | 68 | 15 | 31 | 27 | 68 |
| 29-Aug | 59 | 81 | 70 | 42 | 38 | 61 | 24 | 34 | 86 | 64 | 37 | 79 | 82 | 54 | 72 | 55 | 29 | 40 | 48 | 93 | 42 | 16 | 52 | 31 | 93 |
| 30-Aug | 15 | 29 | 72 | 35 | 38 | 88 | 56 | 32 | 31 | 22 | 26 | 21 | 24 | 23 | 22 | 21 | 20 | 17 | 18 | 28 | 88 | 72 | 60 | 80 | 88 |
| 31-Aug | 44 | 67 | 23 | 69 | 72 | 88 | 86 | 93 | 76 | 39 | 45 | 47 | 43 | 45 | 42 | 47 | 42 | 20 | 18 | 24 | 23 | 30 | 37 | 34 | 93 |
| | 76 | 81 | 87 | 96 | 98 | 88 | 86 | 93 | 86 | 86 | 77 | 88 | 99 | 96 | 80 | 78 | 98 | 72 | 92 | 93 | 90 | 77 | 98 | 80 | |

Diurnal Maximum

AF - Analyzer Failure



Wood Buffalo Environmental Association

SO₂ Calibration Summary

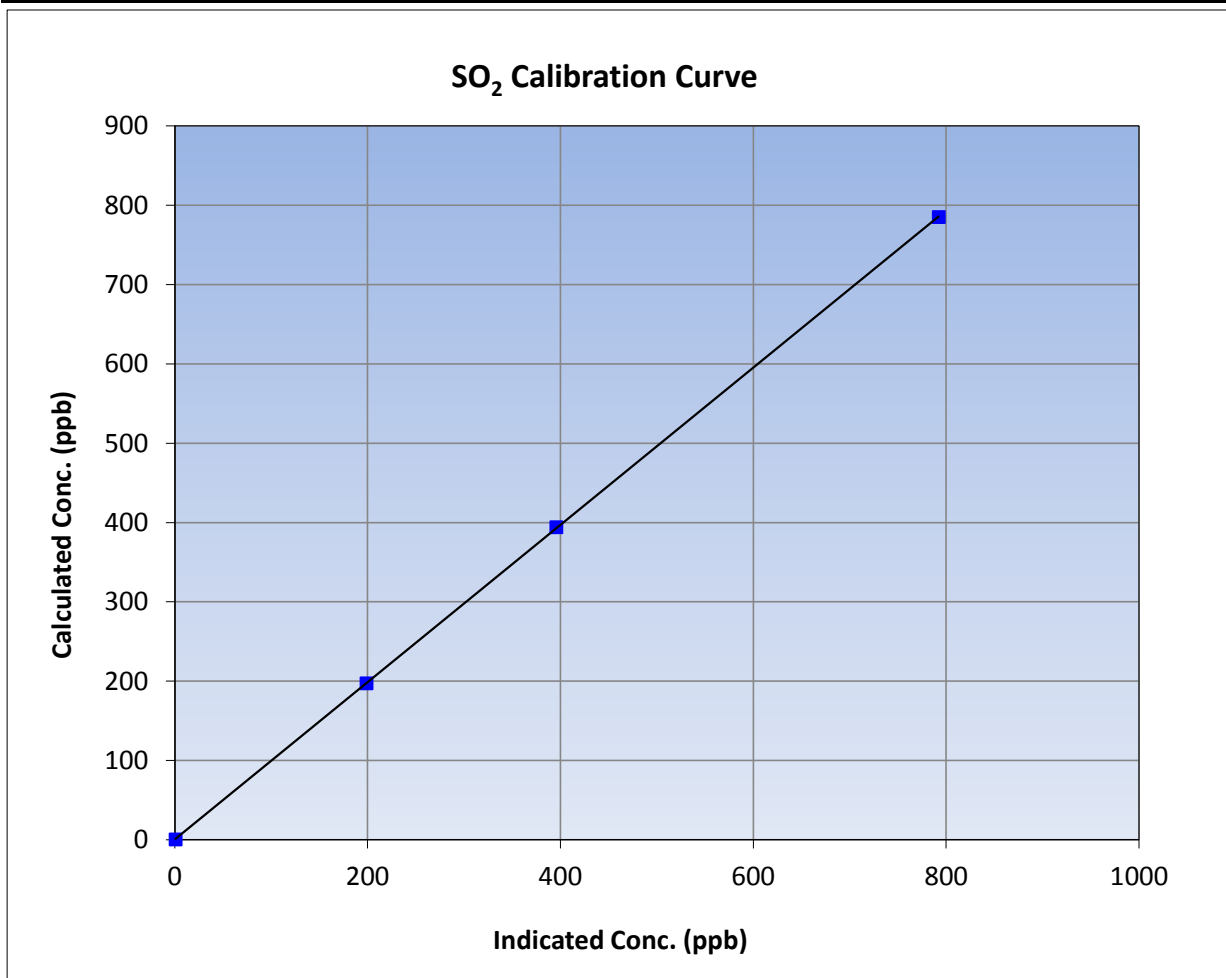
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|--------------|
| Calibration Date | August 10, 2017 | Previous Calibration | July 6, 2017 |
| Station Name | Conklin | Station Number | AMS 21 |
| Start Time (MST) | 10:17 | End Time (MST) | 14:20 |
| Analyzer make | Thermo 43i | Analyzer serial # | 1428701363 |

Calibration Data

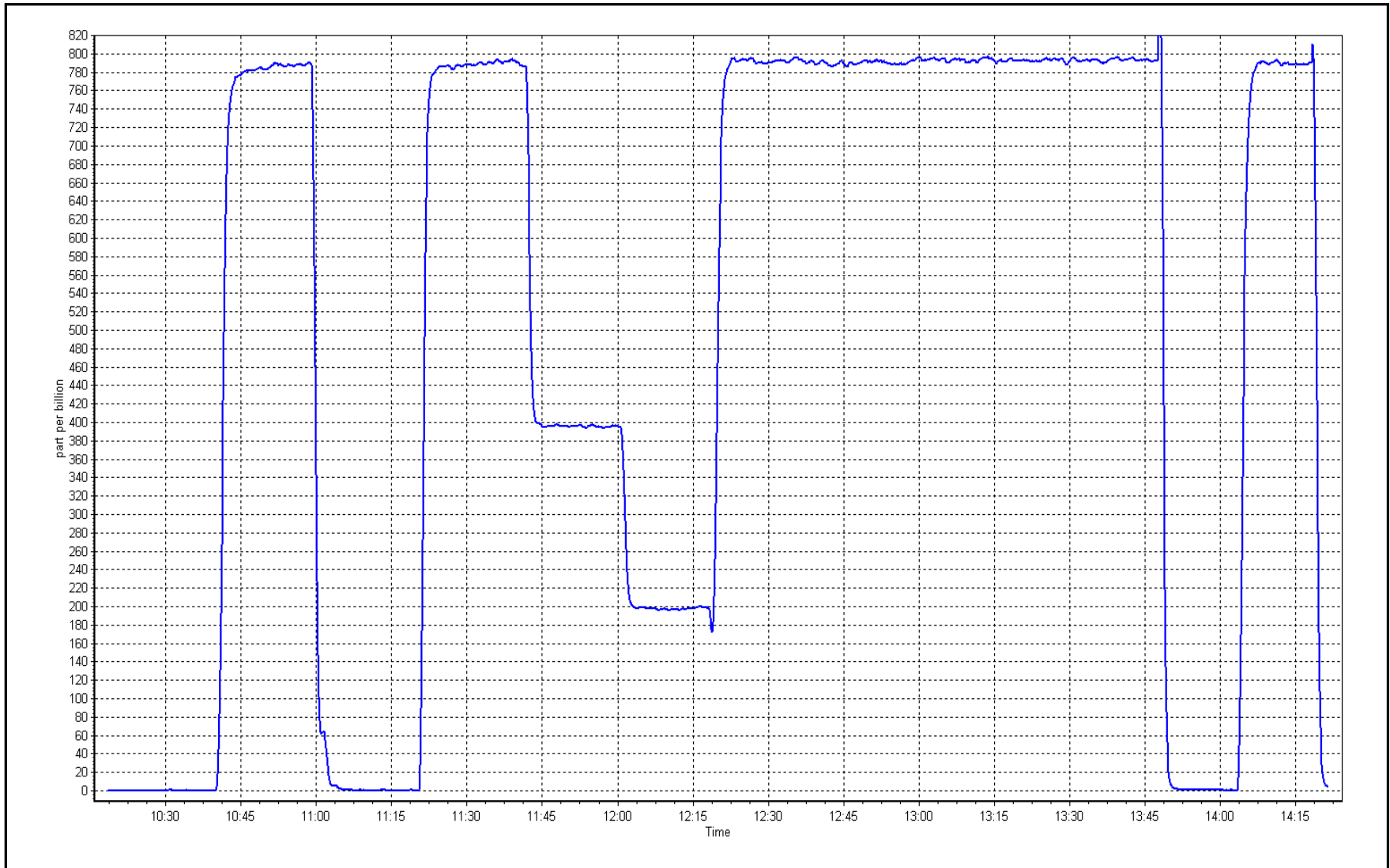
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-------------|
| 0.0 | 0.4 | ---- | Correlation Coefficient | ≥0.995 |
| 784.8 | 791.9 | 0.9910 | | |
| 393.7 | 395.4 | 0.9957 | Slope | 0.90 - 1.10 |
| 197.0 | 198.4 | 0.9930 | | |
| | | | Intercept | +/-30 |



SO2 Calibration Plot

Date: August 10, 2017

Location: Conklin





Wood Buffalo Environmental Association

TRS Calibration Report

Version-03-2017

Station Information

Station Name: Conklin
Calibration Date: August 10, 2017
Start time (MST): 14:18
Reason: Routine
Station number: AMS 21
Last Cal Date: July 12, 2017
End time (MST): 16:40

Calibration Standards

Cal Gas Concentration: 5.14 ppm
Cal Gas Cylinder #: DR0000397
Calibrator Make/Model: Teledyne API T700
ZAG Make/Model: Teledyne API 701
Cal Gas Exp Date: December 7, 2019
Serial Number: 2658
Serial Number: 5611

Analyzer Information

Analyzer make: Thermo 43i-TLE
Analyzer serial #: 1236656116

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|----------------------|--------------|---------------|--------------|--------------|---------------|
| Analyzer Range | 0 - 100 ppb | | PMT voltage | -732 | -731 |
| Calculated slope | 0.995753 | 0.987625 | Lamp voltage | 1030 | 1032 |
| Calculated intercept | -0.033380 | 0.006024 | Pressure | 665.7 | 663.0 |
| Analyzer Background | 1.4 | 1.4 | Flow | 0.430 | 0.430 |
| Analyzer Coefficient | 0.963 | 0.976 | Intensity | 93 | 92 |

TRS Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|-----------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5005 | 0.0 | 0.0 | 0.0 | ---- |
| as found span | 4935 | 78.0 | 80.0 | 79.2 | 1.010 |
| calibrator zero | 5005 | 0.0 | 0.0 | 0.0 | ---- |
| high point | 4935 | 78.0 | 80.0 | 81.0 | 0.987 |
| second point | 4975 | 39.1 | 40.1 | 40.5 | 0.990 |
| third point | 4990 | 19.6 | 20.1 | 20.4 | 0.986 |
| as left zero | 5005 | 0.0 | 0.0 | 0.2 | ---- |
| as left span | 4935 | 78.0 | 80.0 | 80.5 | 0.993 |

SO2 Scrubber Check

| | | | | |
|---------------------------|--|--|--|-------|
| Average Correction Factor | | | | 0.988 |
|---------------------------|--|--|--|-------|

| | | | | | |
|--------------------|-------|-------------------|-------|----------|------|
| Corrected As found | 79.20 | Previous response | 80.35 | % change | 1.5% |
|--------------------|-------|-------------------|-------|----------|------|

* = > +/-5% change initiates investigation

Notes:

Sample inlet filter replaced after as founds. Adjusted span.

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

TRS Calibration Summary

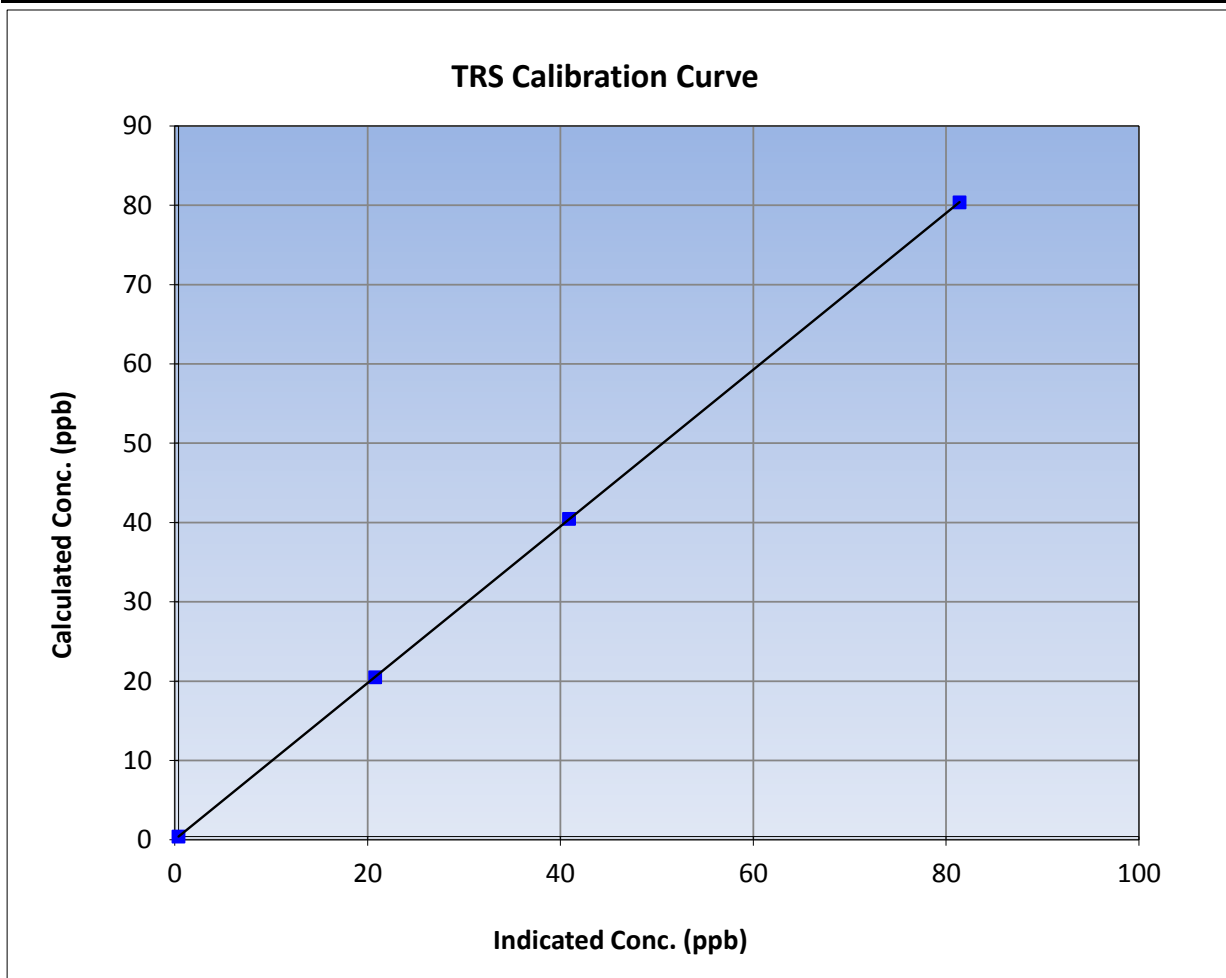
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 10, 2017 | Previous Calibration | July 12, 2017 |
| Station Name | Conklin | Station Number | AMS 21 |
| Start Time (MST) | 14:18 | End Time (MST) | 16:40 |
| Analyzer make | Thermo 43i-TLE | Analyzer serial # | 1236656116 |

Calibration Data

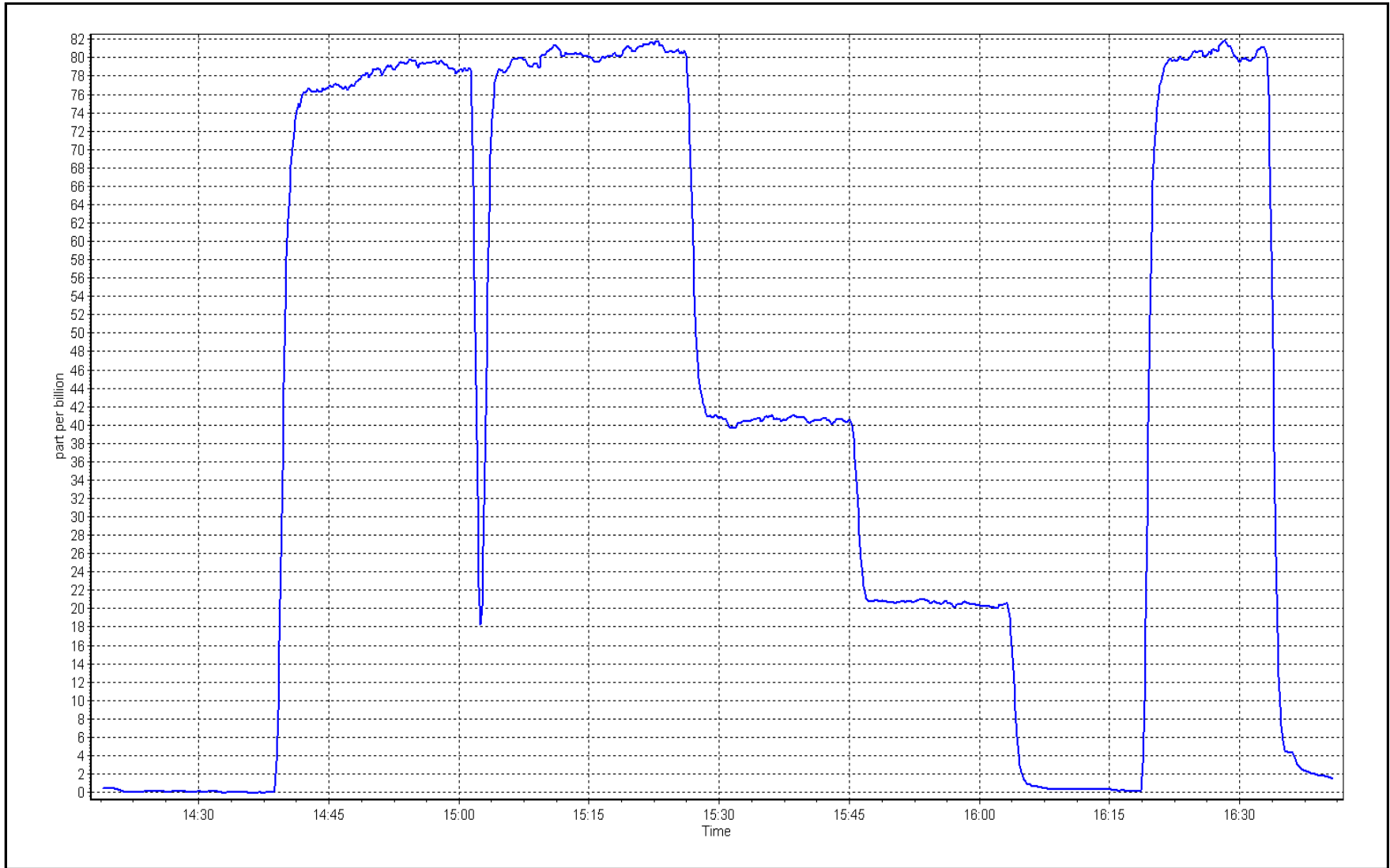
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | 0.999998 | ≥0.995 |
| 80.0 | 81.0 | 0.9874 | | | |
| 40.1 | 40.5 | 0.9897 | Slope | 0.987625 | 0.90 - 1.10 |
| 20.1 | 20.4 | 0.9858 | | | |
| | | | Intercept | 0.006024 | +/-3 |



TRS Calibration Plot

Date: August 10, 2017

Location: Conklin





Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|---------------|
| Station Name: | Conklin | Station number: | AMS 21 |
| Calibration Date: | August 10, 2017 | Last Cal Date: | July 22, 2017 |
| Start time (MST): | 10:17 | End time (MST): | 14:20 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|--------------------|-------------------|---------------------|------------------|
| Gas Cert Reference | EY0000359 | Cal Gas Expiry Date | February 9, 2018 |
| CH4 Cal Gas Conc. | <u>512.0</u> ppm | CH4 Equiv Conc. | 1084.0 ppm |
| C3H8 Cal Gas Conc. | <u>208.0</u> ppm | Station temp. | 22 Deg C |
| Calibrator Model | Teledyne API T700 | Serial Number | 2658 |
| ZAG make/model | Teledyne API 701 | Serial Number | 5611 |

Analyzer Information

Analyzer make: Thermo 55i

Analyzer serial #: 1152430011

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|--------------------|--------------|---------------|------------------|--------------|---------------|
| THC Range (ppm) | 0 - 50 ppm | | Column Temp | 75.1 | 75.1 |
| NMHC Range (ppm) | 0 - 25 ppm | | Detector Temp | 175.0 | 175.0 |
| CH4 SP Ratio | 1.70E-04 | 1.70E-04 | Flame Temp | 405.0 | 405.0 |
| CH4 Retention time | 12.0 | 12.0 | Carrier Pressure | 37.0 | 37.0 |
| NMHC SP Ratio | 4.10E-05 | 4.10E-05 | Fuel Pressure | 49.7 | 49.7 |
| NMHC Peak Area | 213276 | 213276 | Air Pressure | 34.3 | 34.3 |

Calibration Statistics

| | <u>Start</u> | <u>Finish</u> |
|-----------------|--------------|---------------|
| THC Cal Slope | 0.999387 | 0.995687 |
| THC Cal Offset | 0.023213 | 0.046264 |
| CH4 Cal Slope | 0.998515 | 0.997446 |
| CH4 Cal Offset | 0.037468 | 0.033615 |
| NMHC Cal Slope | 1.000104 | 0.994020 |
| NMHC Cal Offset | -0.014546 | 0.012565 |

Notes: Sample inlet filter replaced after as founds. No adjustments made.

Calibration Performed By:

Asad Hidayat



Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Version-02-2017

THC Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i> |
|----------------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|--|
| as found zero | 5005 | 0.0 | 0.00 | 0.00 | ---- |
| as found span | 4934 | 76.5 | 16.55 | 16.59 | 0.998 |
| calibrator zero | 5005 | 0.0 | 0.00 | 0.00 | ---- |
| high point | 4934 | 76.5 | 16.55 | 16.61 | 0.997 |
| second point | 4975 | 38.4 | 8.30 | 8.25 | 1.006 |
| third point | 4992 | 19.3 | 4.17 | 4.11 | 1.015 |
| as left zero | 5005 | 0.0 | 0.00 | 0.00 | ---- |
| as left span | 4934 | 76.5 | 16.55 | 16.58 | 0.998 |
| Average Correction Factor | | | | | 1.006 |
| Corrected As found | 16.59 | Prev response | 16.54 | *% change | -0.3% |

NMHC Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i> |
|----------------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|--|
| as found zero | 5005 | 0 | 0.00 | 0.00 | ---- |
| as found span | 4934 | 76.5 | 8.73 | 8.78 | 0.995 |
| calibrator zero | 5005 | 0 | 0.00 | 0.00 | ---- |
| high point | 4934 | 76.5 | 8.73 | 8.78 | 0.995 |
| second point | 4975 | 38.4 | 4.38 | 4.38 | 0.999 |
| third point | 4992 | 19.3 | 2.20 | 2.19 | 1.004 |
| as left zero | 5005 | 0 | 0.00 | 0.00 | ---- |
| as left span | 4934 | 76.5 | 8.73 | 8.77 | 0.996 |
| Average Correction Factor | | | | | 0.999 |
| Corrected As found | 8.78 | Prev response | 8.75 | *% change | -0.3% |

CH4 Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i> |
|----------------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|--|
| as found zero | 5005 | 0.0 | 0.00 | 0.00 | ---- |
| as found span | 4934 | 76.5 | 7.82 | 7.82 | 1.000 |
| calibrator zero | 5005 | 0.0 | 0.00 | 0.00 | ---- |
| high point | 4934 | 76.5 | 7.82 | 7.83 | 0.999 |
| second point | 4975 | 38.4 | 3.92 | 3.87 | 1.014 |
| third point | 4992 | 19.3 | 1.97 | 1.92 | 1.027 |
| as left zero | 5005 | 0.0 | 0.00 | 0.00 | ---- |
| as left span | 4934 | 76.5 | 7.82 | 7.81 | 1.001 |
| Average Correction Factor | | | | | 1.013 |
| Corrected As found | 7.82 | Prev response | 7.79 | *% change | -0.3% |

* = > +/-5% change initiates investigation



Wood Buffalo Environmental Association

THC Calibration Summary

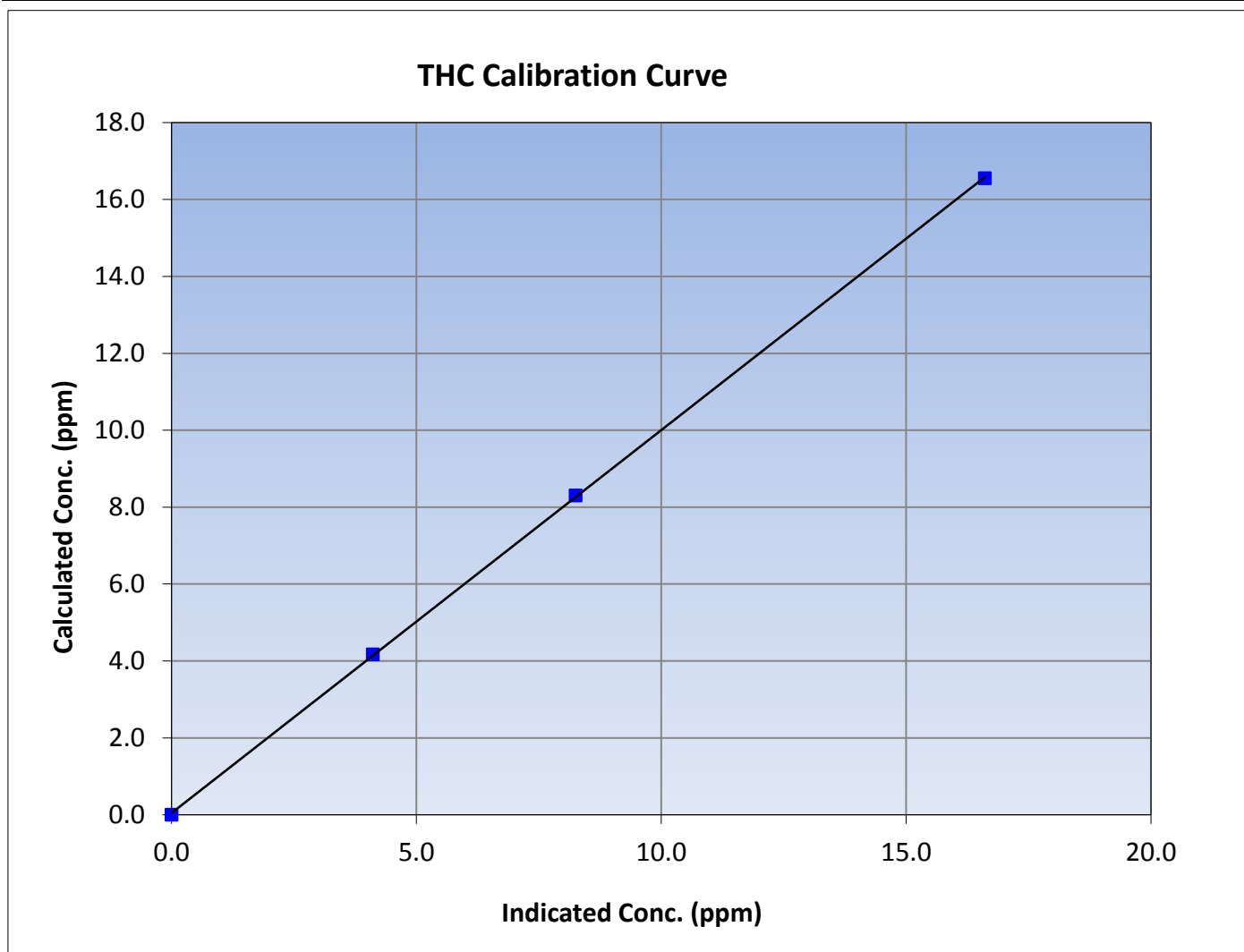
Version-02-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 10, 2017 | Previous Calibration | July 22, 2017 |
| Station Name | Conklin | Station Number | AMS 21 |
| Start Time (MST) | 10:17 | End Time (MST) | 14:20 |
| Analyzer make | Thermo 55i | Analyzer serial # | 1152430011 |

Calibration Data

| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> | | | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|---------------|-------|----------|-------------|
| 0.00 | 0.00 | ---- | Correlation Coefficient | 0.999961 | ≥ 0.995 | | | |
| 16.55 | 16.61 | 0.9967 | | | | | | |
| 8.30 | 8.25 | 1.0064 | | | | Slope | 0.995687 | 0.90 - 1.10 |
| 4.17 | 4.11 | 1.0150 | | | | | | |
| | | | Intercept | 0.046264 | ± 0.5 | | | |





Wood Buffalo Environmental Association

CH₄ Calibration Summary

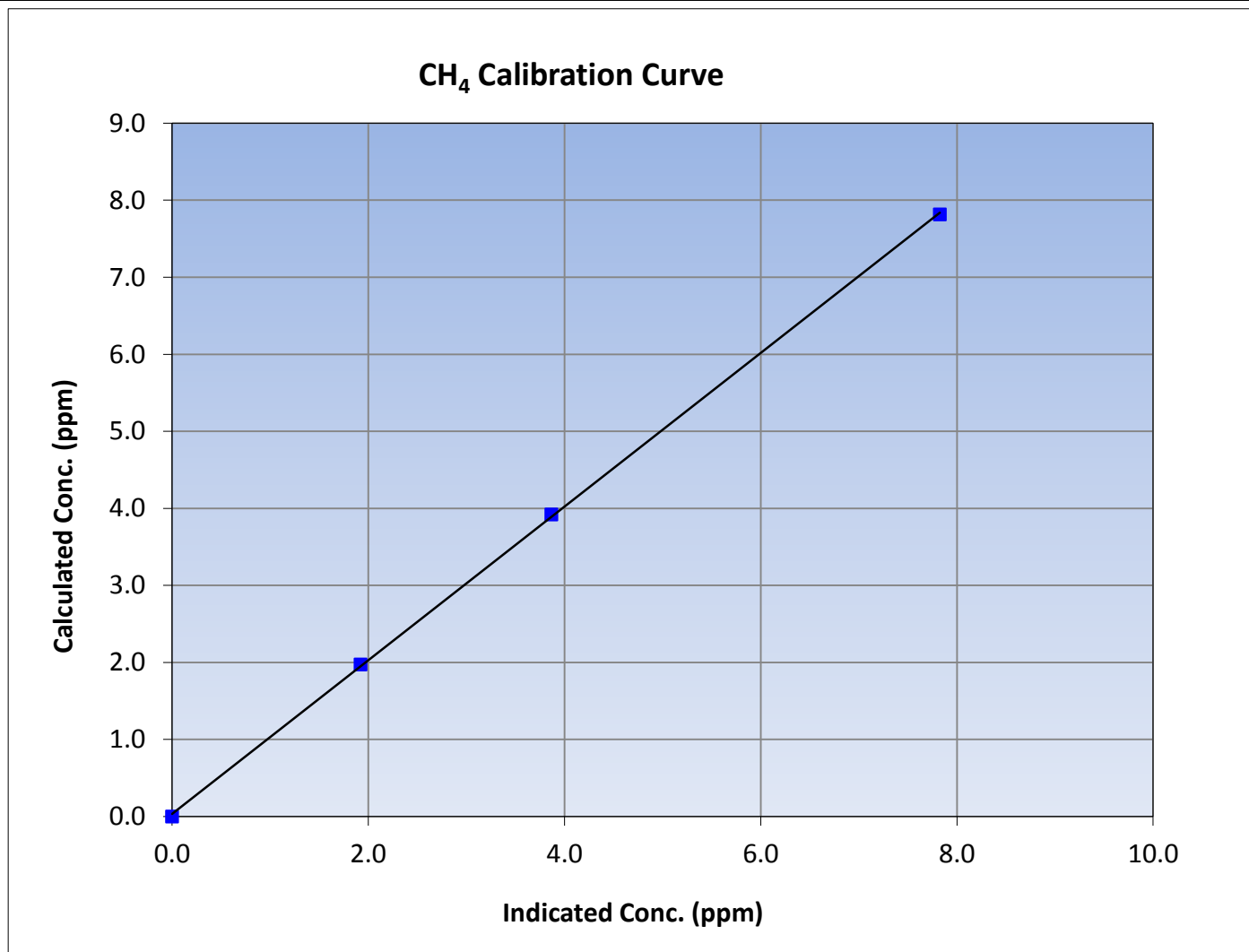
Version-02-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 10, 2017 | Previous Calibration | July 22, 2017 |
| Station Name | Conklin | Station Number | AMS 21 |
| Start Time (MST) | 10:17 | End Time (MST) | 14:20 |
| Analyzer make | Thermo 55i | Analyzer serial # | 1152430011 |

Calibration Data

| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|---------------|
| 0.00 | 0.00 | ---- | Correlation Coefficient | 0.999906 | ≥ 0.995 |
| 7.82 | 7.83 | 0.9990 | | | |
| 3.92 | 3.87 | 1.0144 | | | |
| 1.97 | 1.92 | 1.0270 | | | |
| | | | Slope | 0.997446 | 0.90 - 1.10 |
| | | | Intercept | 0.033615 | +/-0.5 |





Wood Buffalo Environmental Association

NMHC Calibration Summary

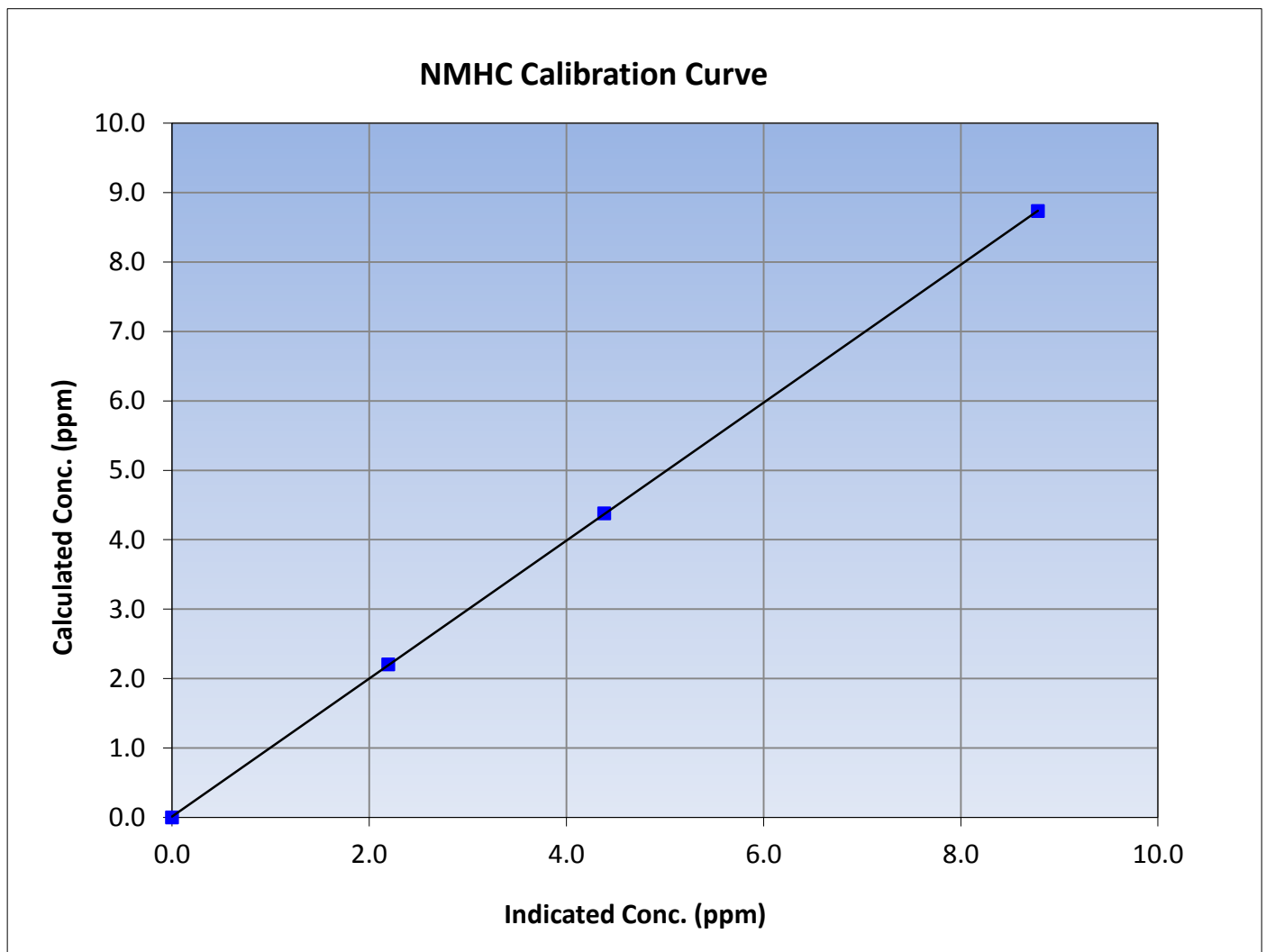
Version-02-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 10, 2017 | Previous Calibration | July 22, 2017 |
| Station Name | Conklin | Station Number | AMS 21 |
| Start Time (MST) | 10:17 | End Time (MST) | 14:20 |
| Analyzer make | Thermo 55i | Analyzer serial # | 1152430011 |

Calibration Data

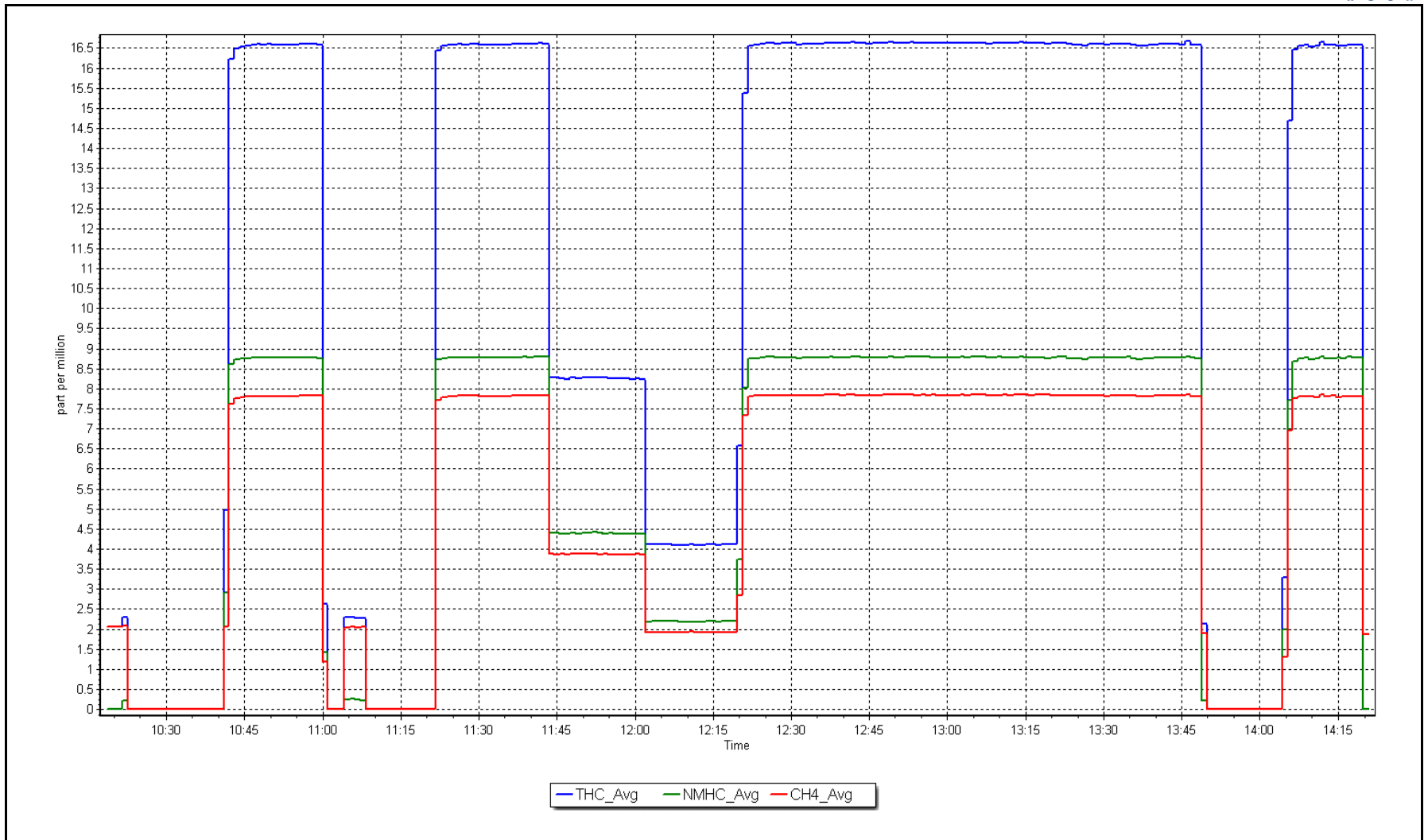
| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> | | | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|---------------|-------|----------|-------------|
| 0.00 | 0.00 | ---- | Correlation Coefficient | 0.999990 | ≥ 0.995 | | | |
| 8.73 | 8.78 | 0.9946 | | | | | | |
| 4.38 | 4.38 | 0.9994 | | | | Slope | 0.994020 | 0.90 - 1.10 |
| 2.20 | 2.19 | 1.0041 | | | | | | |
| | | | Intercept | 0.012565 | ± 0.5 | | | |



NMHC Calibration Plot

Date: August 10, 2017

Location: Conklin





Wood Buffalo Environmental Association

O₃ Calibration Summary

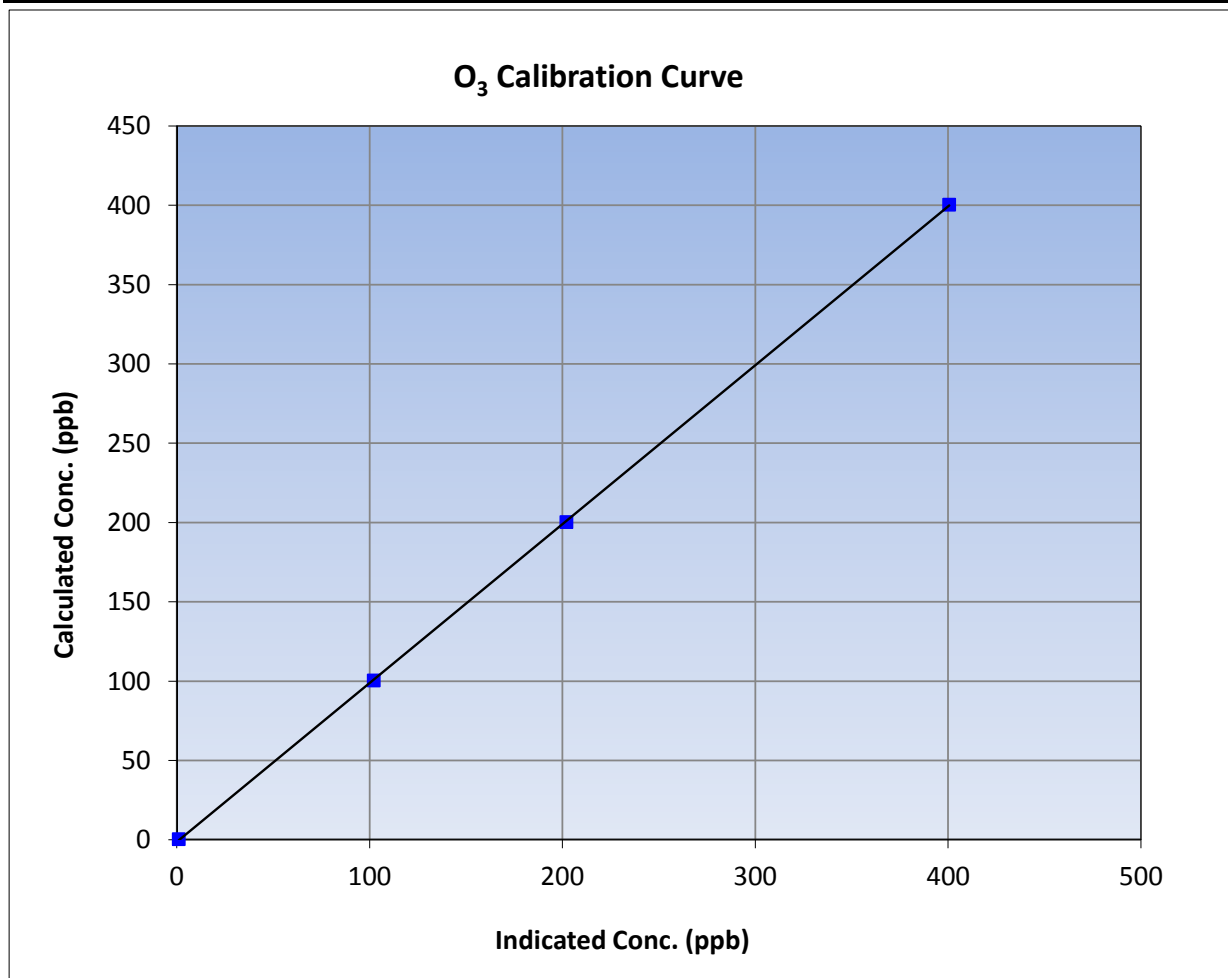
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 22, 2017 | Previous Calibration | July 12, 2017 |
| Station Name | Conklin | Station Number | AMS 21 |
| Start Time (MST) | 9:45 | End Time (MST) | 12:20 |
| Analyzer make | Thermo 49i | Analyzer serial # | 1501663734 |

Calibration Data

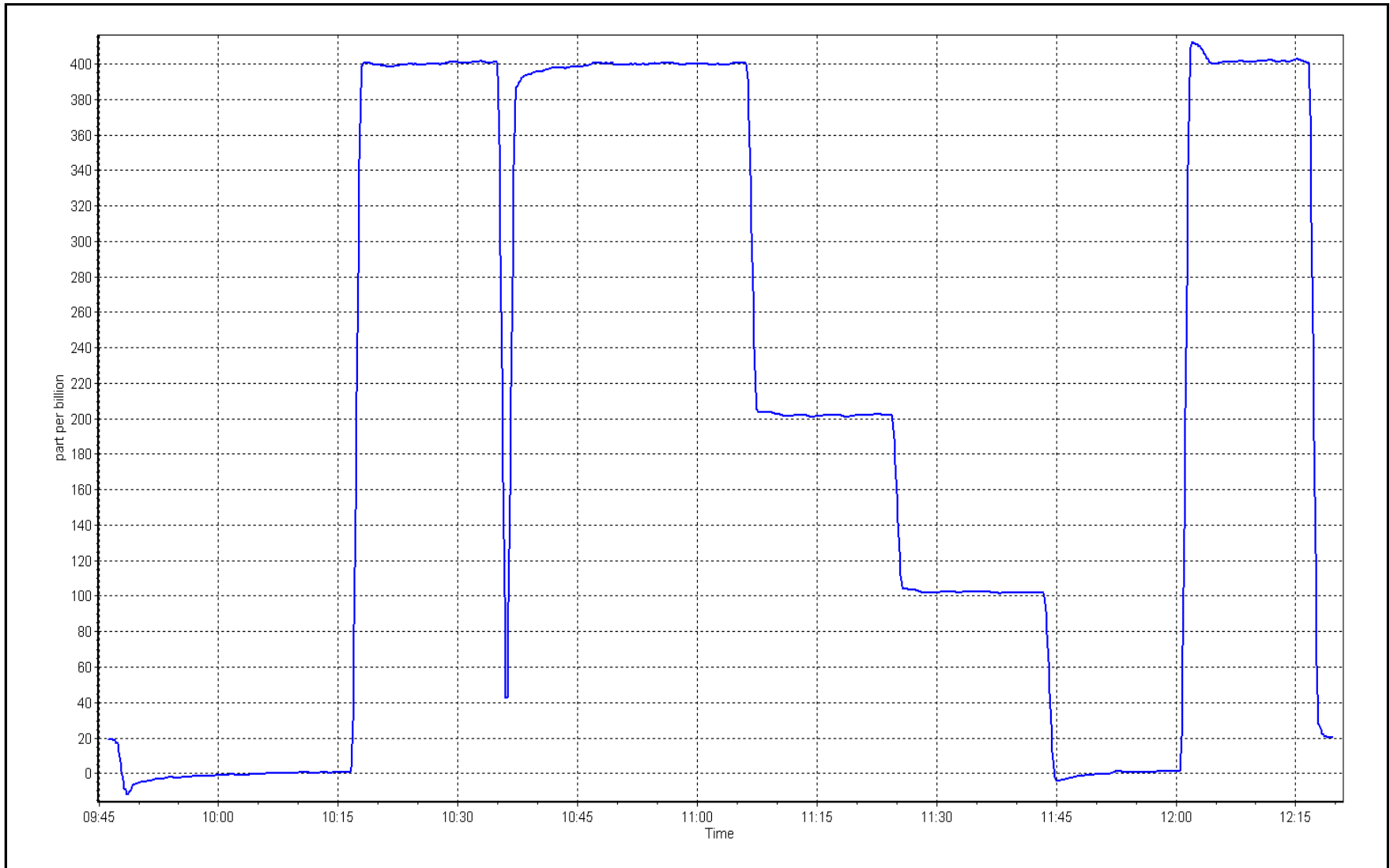
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|--------------------|
| 0.0 | 0.6 | ---- | Correlation Coefficient | 0.999981 | ≥0.995 |
| 400.0 | 400.2 | 0.9995 | Slope | 1.001727 | 0.90 - 1.10 |
| 200.0 | 201.7 | 0.9916 | Intercept | -1.379088 | +/- 10 |
| 100.0 | 101.8 | 0.9823 | | | |



O₃ Calibration Plot

Date: August 22, 2017

Location: Conklin





Wood Buffalo Environmental Association

NO_x - NO - NO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|--------------|
| Station Name: | Conklin | Station number: | AMS 21 |
| Calibration Date: | August 10, 2017 | Last Cal Date: | July 1, 2017 |
| Start time (MST): | 10:17 | End time (MST): | 14:20 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|-------------------|-------------------|---------------------|------------------|
| NO Gas Cylinder # | EY0000359 | Cal Gas Expiry Date | February 9, 2018 |
| NOX Cal Gas Conc. | <u>52.4</u> ppb | NO Cal Gas Conc. | <u>52.4</u> ppb |
| Calibrator Model | Teledyne API T700 | Serial Number | 2658 |
| ZAG make/model | Teledyne API 701 | Serial Number | 5611 |

Analyzer Information

| | | | | | |
|-----------------------------|--------------|--------------------|---------------------|---------------|--------|
| Analyzer make: | Thermo 42i | Analyzer serial #: | 1501663731 | | |
| | <u>Start</u> | <u>Finish</u> | <u>Start</u> | <u>Finish</u> | |
| NO coefficient | 1.013 | 0.944 | NOX Range (ppb) | 0 - 1000 ppb | |
| NOX coefficient | 0.998 | 0.996 | PMT Temperature | -3.1 | -2.9 |
| NO ₂ coefficient | 1.000 | 1.000 | Reaction cell Press | 126.8 | 127.1 |
| NO bkgrnd | 10.3 | 9.7 | Sample Flow | 0.801 | 0.797 |
| NOX bkgrnd | 10.4 | 9.7 | PMT Voltage | -892.4 | -892.4 |

Calibration Statistics

| | | |
|----------------------------|--------------|---------------|
| | <u>Start</u> | <u>Finish</u> |
| NO _x Cal Slope | 0.999297 | 0.999262 |
| NO _x Cal Offset | -1.651009 | 0.234863 |
| NO Cal Slope | 0.999061 | 0.996843 |
| NO Cal Offset | -1.393165 | 0.533968 |
| NO ₂ Cal Slope | 0.990373 | 1.019383 |
| NO ₂ Cal Offset | -1.530642 | -1.458621 |



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Version-03-2017

Dilution Calibration Data

| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|---------------------------|---------------------------|-----------------------------|---|--|---|--|---------------------------------------|--|---|--|
| as found zero | 5005 | 0.0 | 0.0 | 0.0 | 0.0 | -0.5 | -0.6 | 0.1 | ---- | ---- |
| as found span | 4934 | 76.5 | 800.0 | 800.0 | 0.0 | 857.2 | 857.5 | -0.2 | 0.9333 | 0.9330 |
| calibrator zero | 5005 | 0.0 | 0.0 | 0.0 | 0.0 | -0.4 | -0.4 | 0.0 | ---- | ---- |
| high point | 4934 | 76.5 | 800.0 | 800.0 | 0.0 | 800.2 | 802.0 | -1.8 | 0.9998 | 0.9976 |
| second point | 4975 | 38.3 | 400.3 | 400.3 | 0.0 | 400.8 | 401.3 | -0.6 | 0.9988 | 0.9976 |
| third point | 4990 | 19.2 | 200.8 | 200.8 | 0.0 | 200.7 | 200.6 | 0.2 | 1.0007 | 1.0012 |
| as left zero | 5005 | 0.0 | 0.0 | 0.0 | 0.0 | -0.4 | -0.4 | 0.0 | ---- | ---- |
| as left span | 4934 | 76.5 | 800.0 | 405.0 | 395.0 | 808.6 | 404.8 | 403.8 | 0.9894 | 1.0005 |
| Average Correction Factor | | | | | | | | | 0.9998 | 0.9988 |

Corrected As found NO_x = 857.7 ppb NO = 858.1 ppb *Percent Change NO_x = -6.5%
 Previous Response NO_x = 802.3 ppb NO = 802.2 ppb *Percent Change NO = -6.5%
 * = > +/-5% change initiates investigation

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO drop conc (ppb) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | Converter Efficiency <i>Limit = 96-104%</i> |
|---------------------------|------------------------------|---|--|---------------------------------------|--|---|--|---|--|
| 1st NO ref point | | 0.0 | 807.2 | 807.1 | 0.1 | 0.9911 | 0.9913 | ---- | ---- |
| 1st NO2 (400 ppb O3) | 405.0 | 402.1 | 799.7 | 405.0 | 394.8 | 1.0004 | ---- | 1.0185 | 98.2% |
| 2nd NO2 (200 ppb O3) | 606.6 | 200.5 | 806.5 | 606.6 | 199.9 | 0.9920 | ---- | 1.0030 | 99.7% |
| 3rd NO2 (100 ppb O3) | 709.0 | 98.1 | 807.5 | 709.0 | 98.4 | 0.9908 | ---- | 0.9970 | 100.3% |
| 2nd NO ref point | ---- | 0.0 | 807.2 | 807.1 | 0.1 | 0.9911 | 0.9913 | ---- | ---- |
| Average Correction Factor | | | | | | 0.9936 | 0.9913 | 1.0061 | 99.4% |

Notes: Sample inlet filter replaced after as founds. Adjusted span. Used 2nd high GPT point for referene since NO point had drifted throughout GPT cal.

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

NO_x Calibration Summary

Version-03-2017

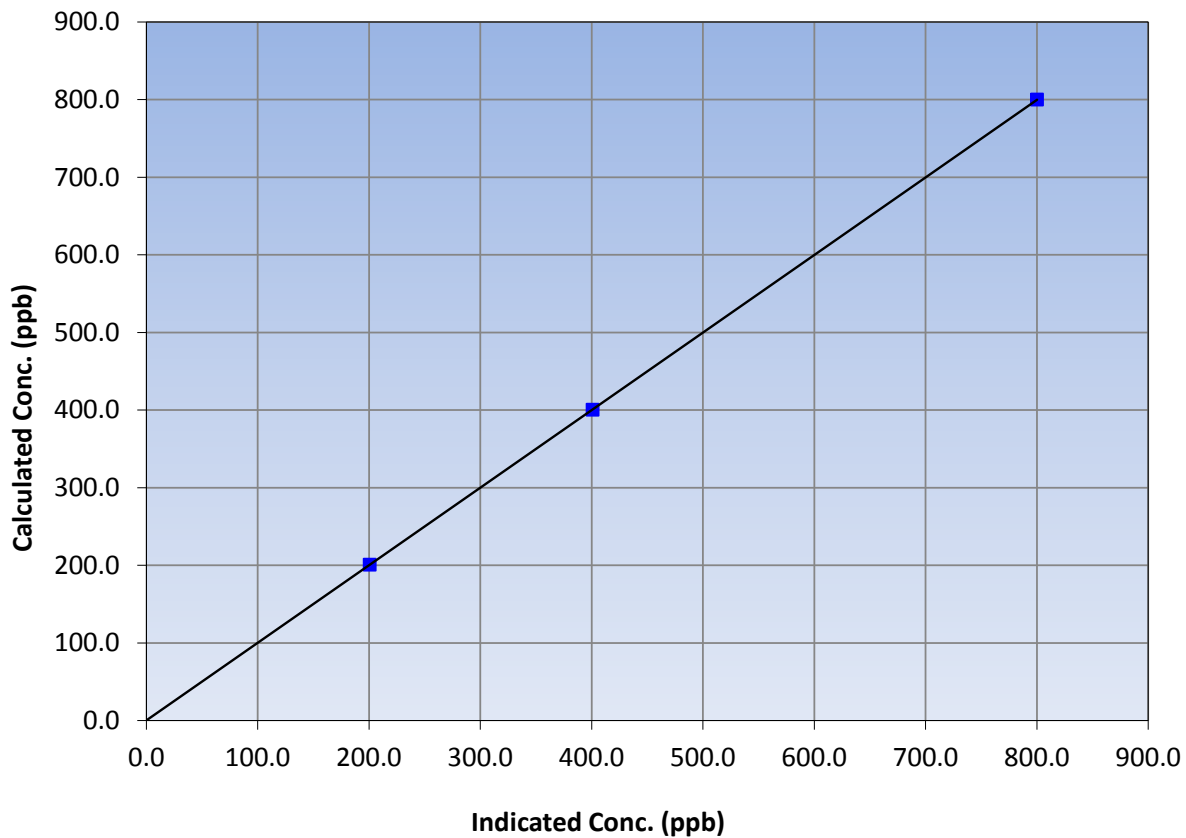
Station Information

| | | | |
|------------------|-----------------|----------------------|--------------|
| Calibration Date | August 10, 2017 | Previous Calibration | July 1, 2017 |
| Station Name | Conklin | Station Number | AMS 21 |
| Start Time (MST) | 10:17 | End Time (MST) | 14:20 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1501663731 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | -0.4 | ---- | Correlation Coefficient | ≥0.995 | |
| 800.0 | 800.2 | 0.9998 | | | |
| 400.3 | 400.8 | 0.9988 | | | |
| 200.8 | 200.7 | 1.0007 | | | |
| | | | Slope | 0.999262 | 0.90 - 1.10 |
| | | | Intercept | 0.234863 | +/-20 |

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

Version-03-2017

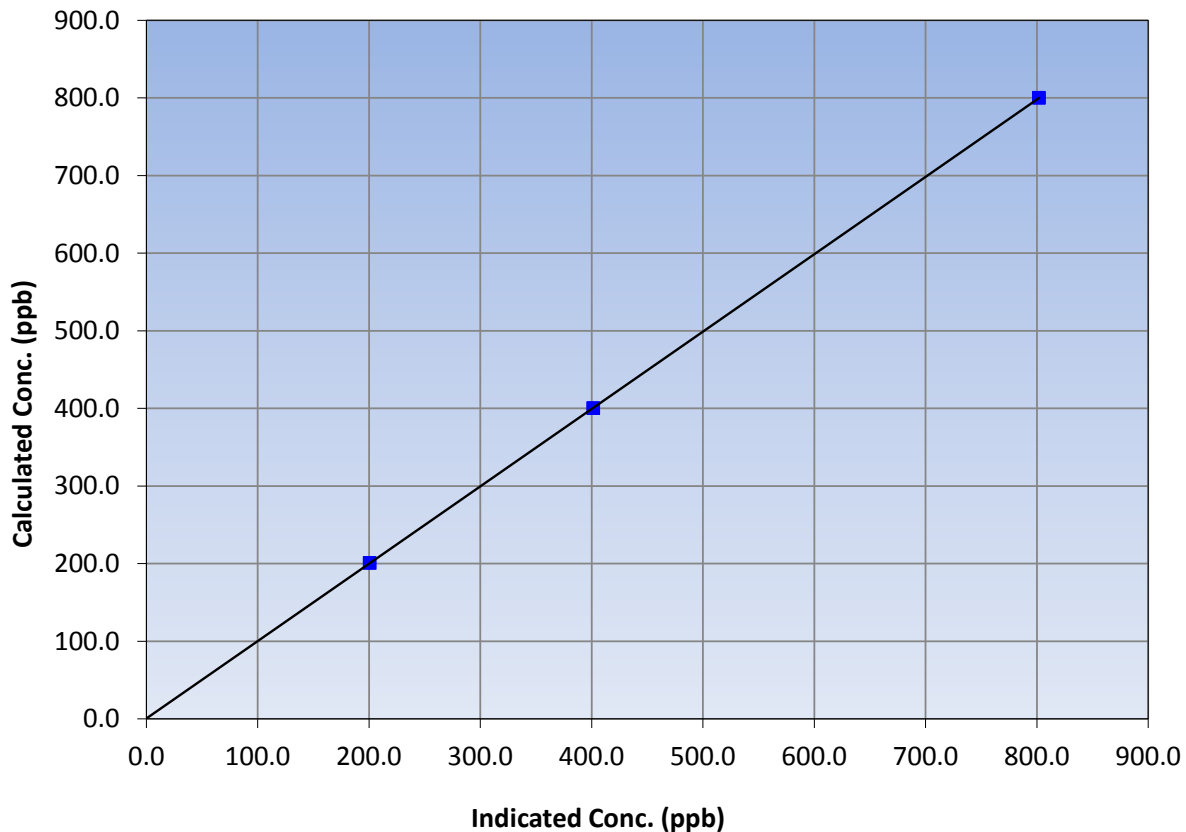
Station Information

| | | | |
|------------------|-----------------|----------------------|--------------|
| Calibration Date | August 10, 2017 | Previous Calibration | July 1, 2017 |
| Station Name | Conklin | Station Number | AMS 21 |
| Start Time (MST) | 10:17 | End Time (MST) | 14:20 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1501663731 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-------------|
| 0.0 | -0.4 | ---- | Correlation Coefficient | ≥0.995 |
| 800.0 | 802.0 | 0.9976 | | |
| 400.3 | 401.3 | 0.9976 | Slope | 0.90 - 1.10 |
| 200.8 | 200.6 | 1.0012 | | |
| | | | Intercept | +/-20 |

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

Version-03-2017

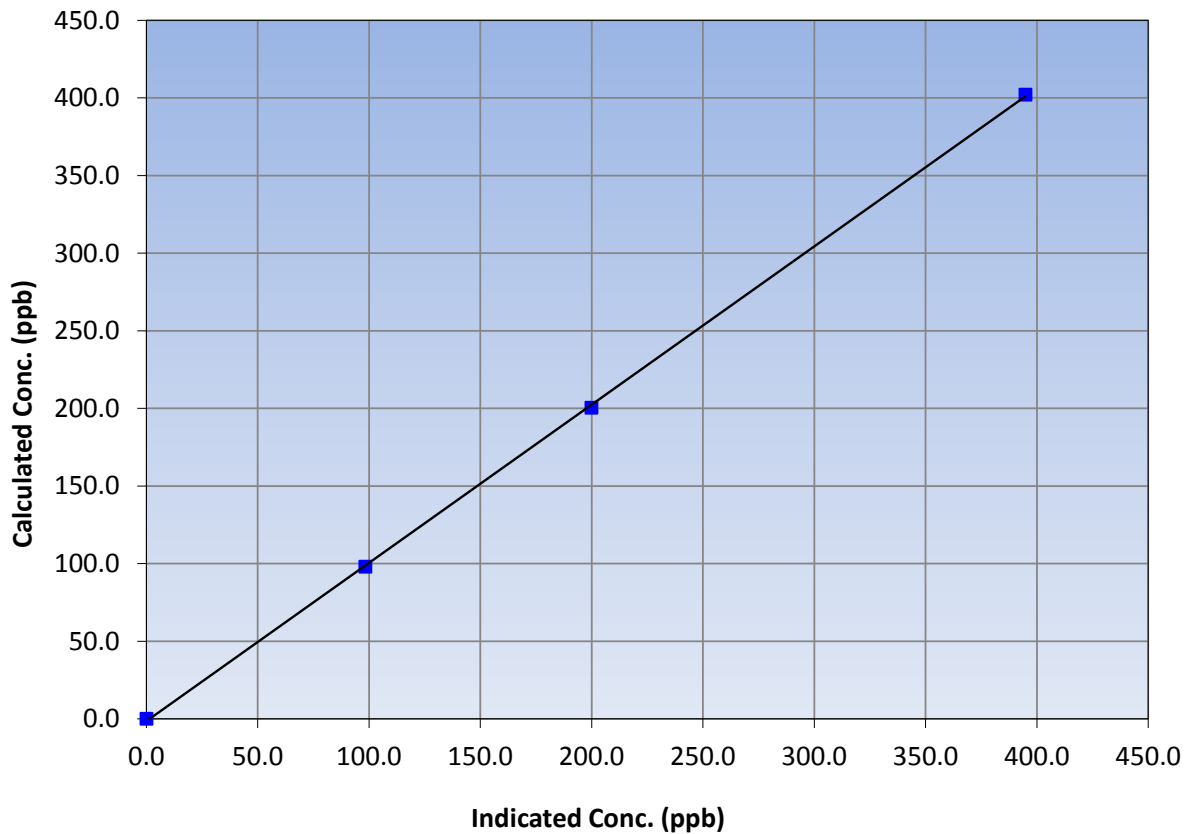
Station Information

| | | | |
|------------------|-----------------|----------------------|--------------|
| Calibration Date | August 10, 2017 | Previous Calibration | July 1, 2017 |
| Station Name | Conklin | Station Number | AMS 21 |
| Start Time (MST) | 10:17 | End Time (MST) | 14:20 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1501663731 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | ≥0.995 | |
| 402.1 | 394.8 | 1.0185 | | | |
| 200.5 | 199.9 | 1.0030 | | | |
| 98.1 | 98.4 | 0.9970 | | | |
| | | | Slope | 1.019383 | 0.90 - 1.10 |
| | | | Intercept | -1.458621 | +/-20 |

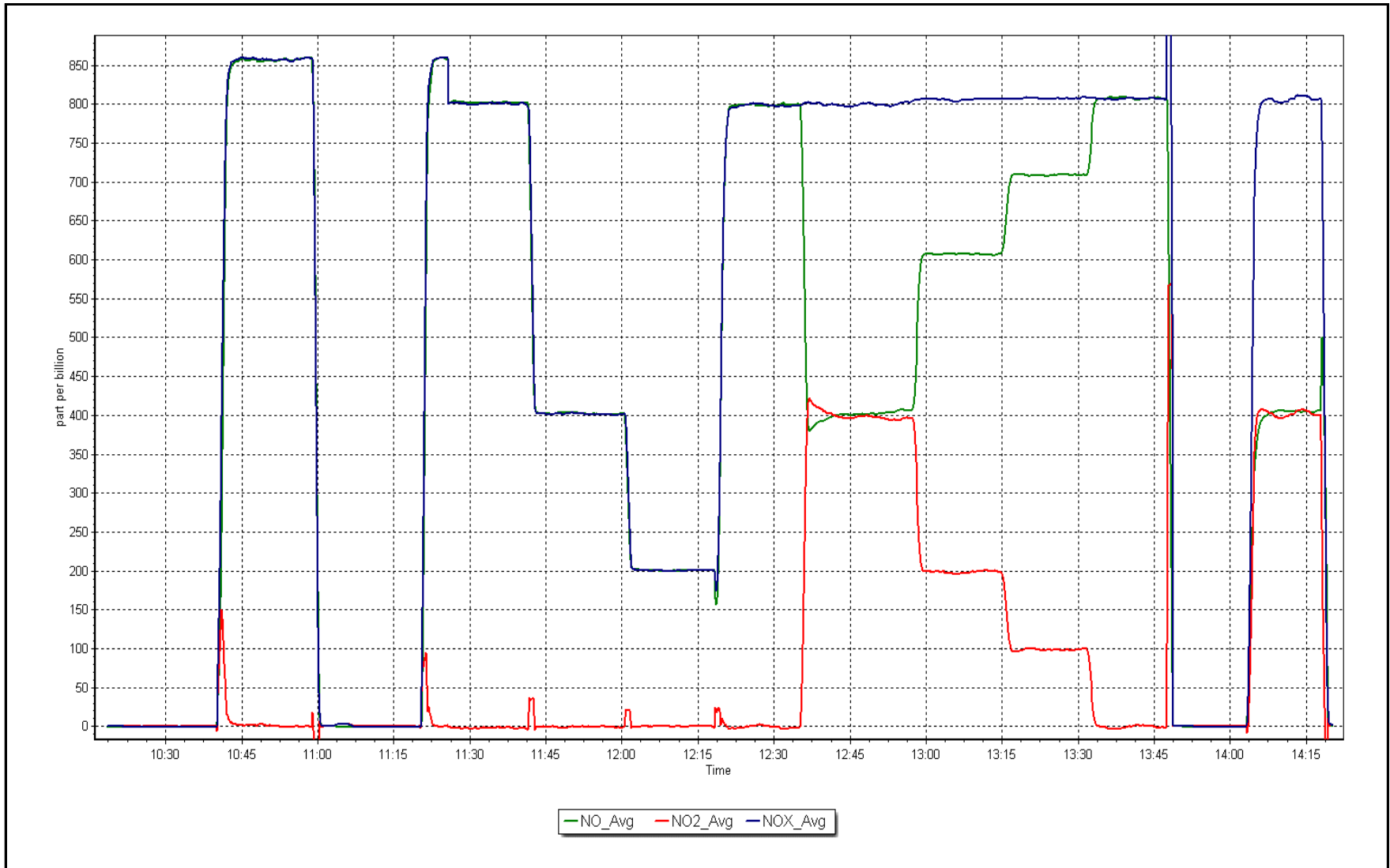
NO₂ Calibration Curve



NO_x Calibration Plot

Date: August 10, 2017

Location: Conklin





Wood Buffalo Environmental Association

NO_x - NO - NO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|--|-----------------|-----------------|
| Station Name: | Conklin | Station number: | AMS 21 |
| Calibration Date: | August 21, 2017 | Last Cal Date: | August 10, 2017 |
| Start time (MST): | 10:48 | End time (MST): | 14:15 |
| Reason: | Maintenance Weaken sample vacuum caused daily span to be outside of 10% range. | | |

Calibration Standards

| | | | |
|-------------------|-------------------|---------------------|------------------|
| NO Gas Cylinder # | EY0000359 | Cal Gas Expiry Date | February 9, 2018 |
| NOX Cal Gas Conc. | <u>52.4</u> ppb | NO Cal Gas Conc. | <u>52.4</u> ppb |
| Calibrator Model | Teledyne API T700 | Serial Number | 2658 |
| ZAG make/model | Teledyne API 701 | Serial Number | 5611 |

Analyzer Information

| | | | | | |
|---------------------------|--------------|---------------|-------------------------------|--------------|---------------|
| Analyzer make: Thermo 42i | | | Analyzer serial #: 1501663731 | | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| NO coefficient | 0.944 | 0.930 | NOX Range (ppb) | 0 - 1000 ppb | |
| NOX coefficient | 0.996 | 0.996 | PMT Temperature | -2.9 | -2.9 |
| NO2 coefficient | 1.000 | 1.000 | Reaction cell Press | 405.7 | 159.0 |
| NO bkgrnd | 9.7 | 9.5 | Sample Flow | 0.221 | 0.650 |
| NOX bkgrnd | 9.7 | 9.5 | PMT Voltage | -892.4 | -892.4 |

Calibration Statistics

| | | |
|----------------------------|--------------|---------------|
| | <u>Start</u> | <u>Finish</u> |
| NO _x Cal Slope | 0.999262 | 0.998053 |
| NO _x Cal Offset | 0.234863 | -0.439233 |
| NO Cal Slope | 0.996843 | 0.995897 |
| NO Cal Offset | 0.533968 | -0.279317 |
| NO ₂ Cal Slope | 1.019383 | 0.998780 |
| NO ₂ Cal Offset | -1.458621 | -1.132708 |



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Version-03-2017

Dilution Calibration Data

| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|----------------------------------|---------------------------|-----------------------------|---|--|---|--|---------------------------------------|--|---|--|
| as found zero | 5005 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | |
| as found span | 4934 | 76.5 | 800.0 | 800.0 | 0.0 | | | | | |
| calibrator zero | 5005 | 0.0 | 0.0 | 0.0 | 0.0 | -0.5 | -0.5 | 0.0 | ---- | ---- |
| high point | 4934 | 76.5 | 800.0 | 800.0 | 0.0 | 801.2 | 802.9 | -1.7 | 0.9986 | 0.9964 |
| second point | 4975 | 38.3 | 400.3 | 400.3 | 0.0 | 403.1 | 403.6 | -0.5 | 0.9931 | 0.9919 |
| third point | 4990 | 19.2 | 200.8 | 200.8 | 0.0 | 201.9 | 202.1 | -0.2 | 0.9948 | 0.9938 |
| as left zero | 5005 | 0.0 | 0.0 | 0.0 | 0.0 | -0.4 | -0.3 | 0.1 | ---- | ---- |
| as left span | 4934 | 76.5 | 800.0 | 404.8 | 395.2 | 811.7 | 403.0 | 408.7 | 0.9856 | 1.0045 |
| Average Correction Factor | | | | | | | | | 0.9955 | 0.9940 |

Corrected As found NO_x = NA ppb NO = NA ppb *Percent Change NO_x = NA

Previous Response NO_x = 800.4 ppb NO = 802.0 ppb *Percent Change NO = NA

** = > +/-5% change initiates investigation*

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO drop conc (ppb) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | Converter Efficiency <i>Limit = 96-104%</i> |
|----------------------------------|------------------------------|---|--|---------------------------------------|--|---|--|---|--|
| 1st NO ref point | | 0.0 | 808.6 | 808.7 | 0.0 | 0.9894 | 0.9893 | ---- | ---- |
| 1st NO2 (400 ppb O3) | 404.8 | 403.9 | 809.7 | 404.8 | 404.9 | 0.9881 | ---- | 0.9975 | 100.2% |
| 2nd NO2 (200 ppb O3) | 605.3 | 203.4 | 810.8 | 605.3 | 205.5 | 0.9867 | ---- | 0.9898 | 101.0% |
| 3rd NO2 (100 ppb O3) | 708.9 | 99.8 | 811.0 | 708.9 | 102.1 | 0.9865 | ---- | 0.9775 | 102.3% |
| 2nd NO ref point | ---- | 0.0 | 811.4 | 812.1 | -0.7 | 0.9860 | 0.9851 | ---- | ---- |
| Average Correction Factor | | | | | | 0.9868 | 0.9872 | 0.9883 | 101.2% |

Notes: Forget to do the as founds prior to replacing the pump because mistakenly treated this as a dead pump issue. Last nights daily span for Nox was about 58% low, chamber pressure had increased significantly. Sample pump replaced prior to calibration. Adjusted span only.

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

NO_x Calibration Summary

Version-03-2017

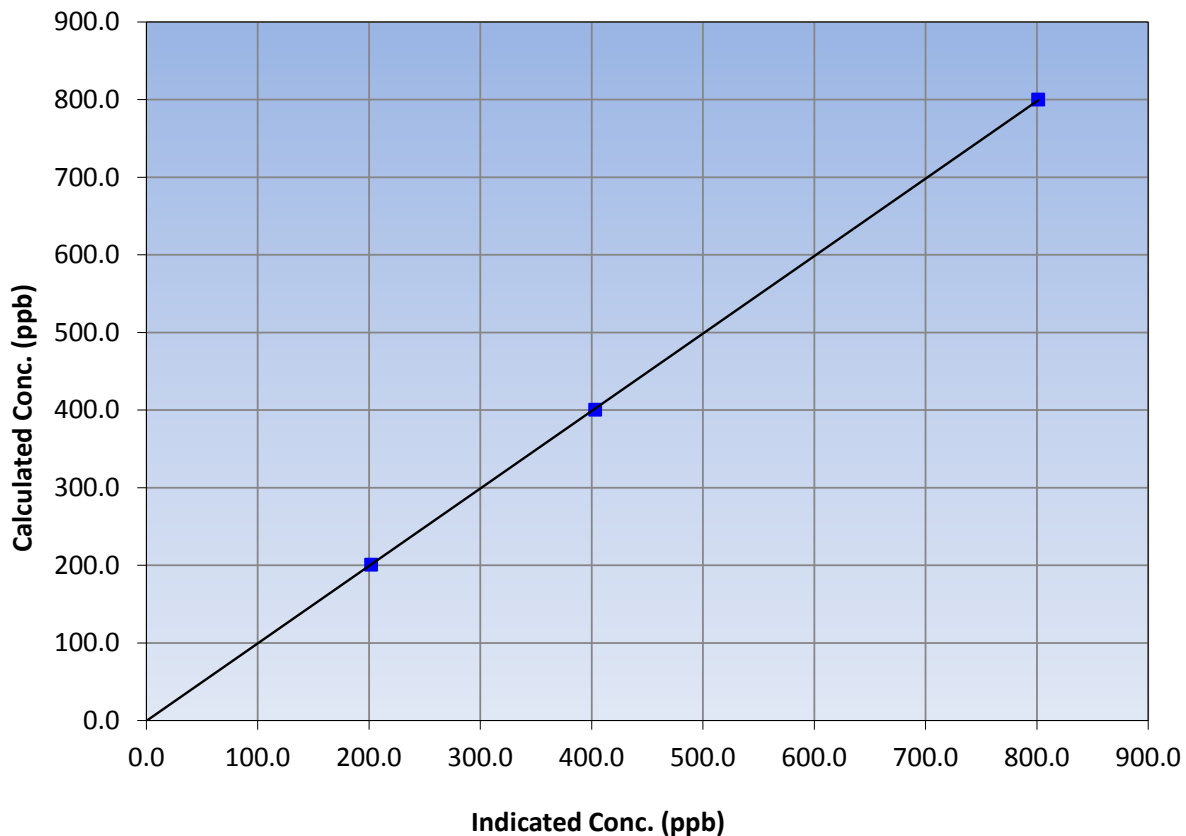
Station Information

| | | | |
|------------------|-----------------|----------------------|-----------------|
| Calibration Date | August 21, 2017 | Previous Calibration | August 10, 2017 |
| Station Name | Conklin | Station Number | AMS 21 |
| Start Time (MST) | 10:48 | End Time (MST) | 14:15 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1501663731 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | -0.5 | ---- | Correlation Coefficient | ≥0.995 | |
| 800.0 | 801.2 | 0.9986 | | | |
| 400.3 | 403.1 | 0.9931 | | | |
| 200.8 | 201.9 | 0.9948 | | | |
| | | | Slope | 0.998053 | 0.90 - 1.10 |
| | | | Intercept | -0.439233 | +/-20 |

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

Version-03-2017

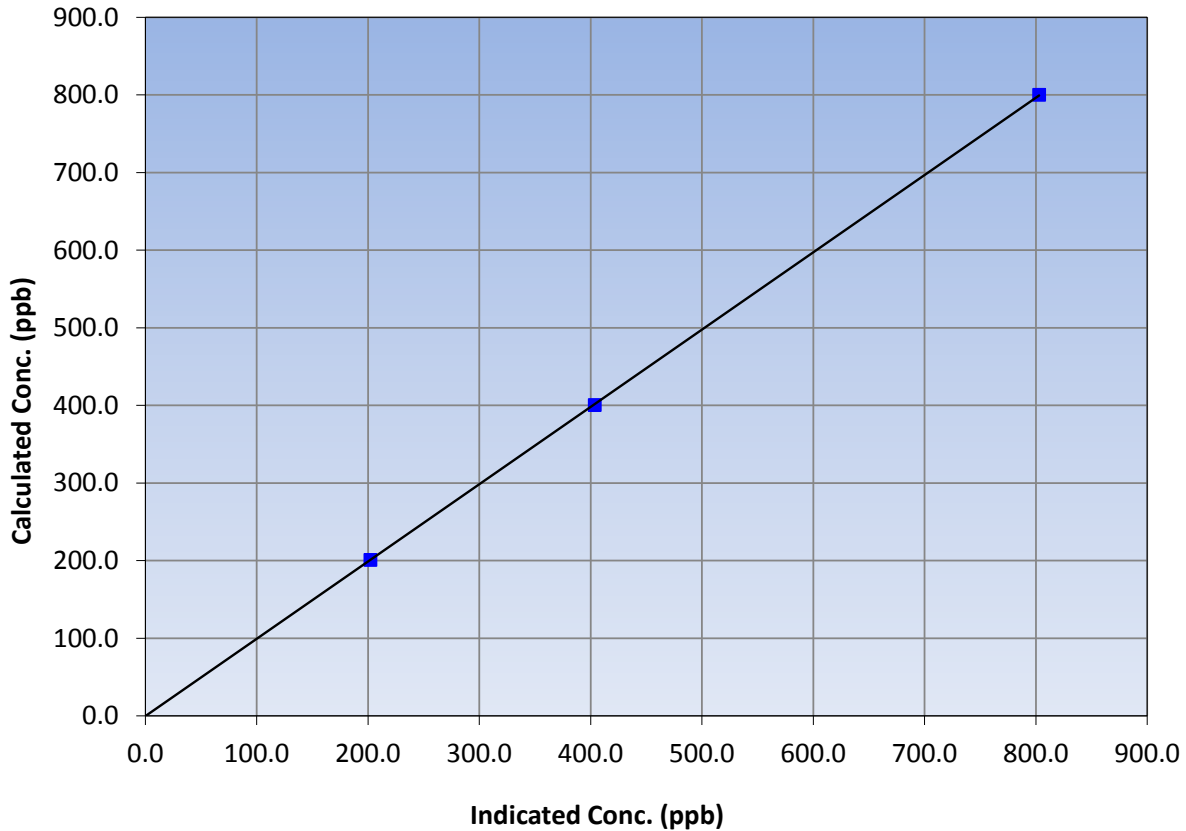
Station Information

| | | | |
|------------------|-----------------|----------------------|-----------------|
| Calibration Date | August 21, 2017 | Previous Calibration | August 10, 2017 |
| Station Name | Conklin | Station Number | AMS 21 |
| Start Time (MST) | 10:48 | End Time (MST) | 14:15 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1501663731 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | -0.5 | ---- | Correlation Coefficient | 0.999992 | ≥0.995 |
| 800.0 | 802.9 | 0.9964 | | | |
| 400.3 | 403.6 | 0.9919 | Slope | 0.995897 | 0.90 - 1.10 |
| 200.8 | 202.1 | 0.9938 | | | |
| | | | Intercept | -0.279317 | +/-20 |

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

Version-03-2017

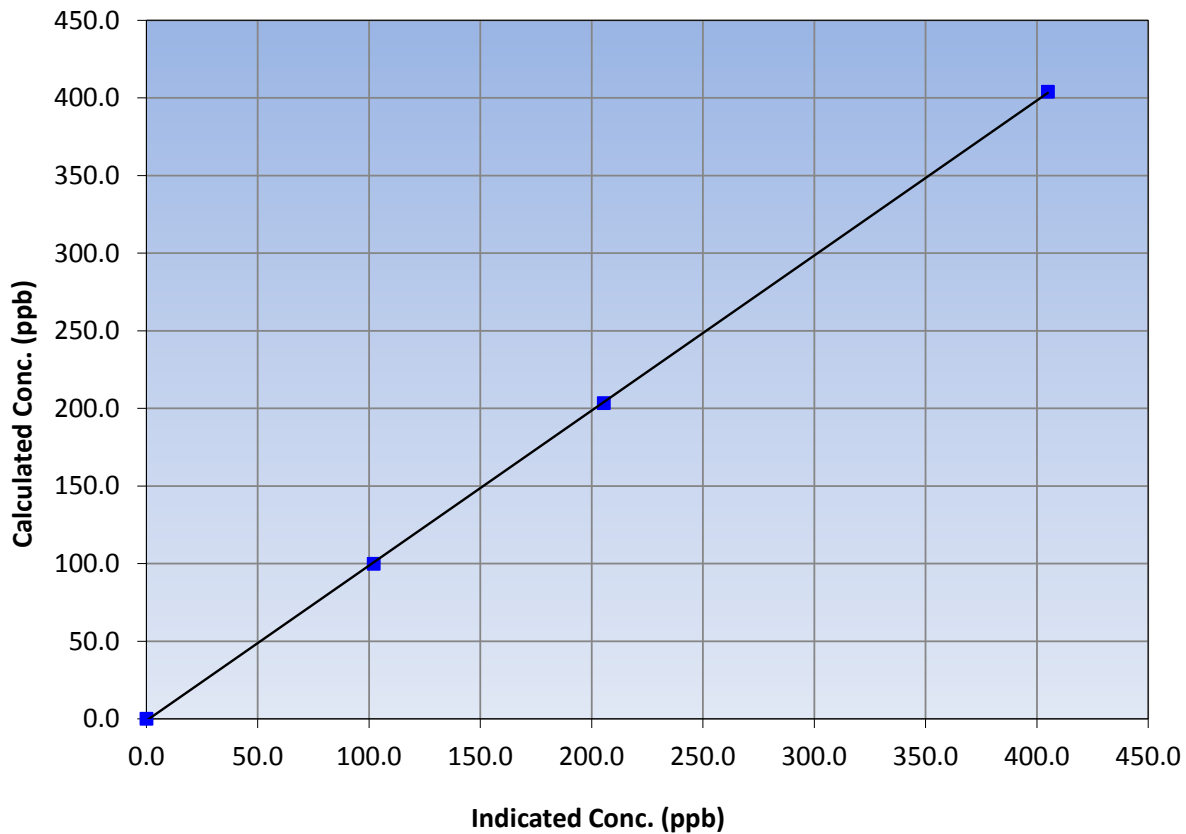
Station Information

| | | | |
|------------------|-----------------|----------------------|-----------------|
| Calibration Date | August 21, 2017 | Previous Calibration | August 10, 2017 |
| Station Name | Conklin | Station Number | AMS 21 |
| Start Time (MST) | 10:48 | End Time (MST) | 14:15 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1501663731 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | ≥0.995 | |
| 403.9 | 404.9 | 0.9975 | | | |
| 203.4 | 205.5 | 0.9898 | | | |
| 99.8 | 102.1 | 0.9775 | | | |
| | | | Slope | 0.998780 | 0.90 - 1.10 |
| | | | Intercept | -1.132708 | +/-20 |

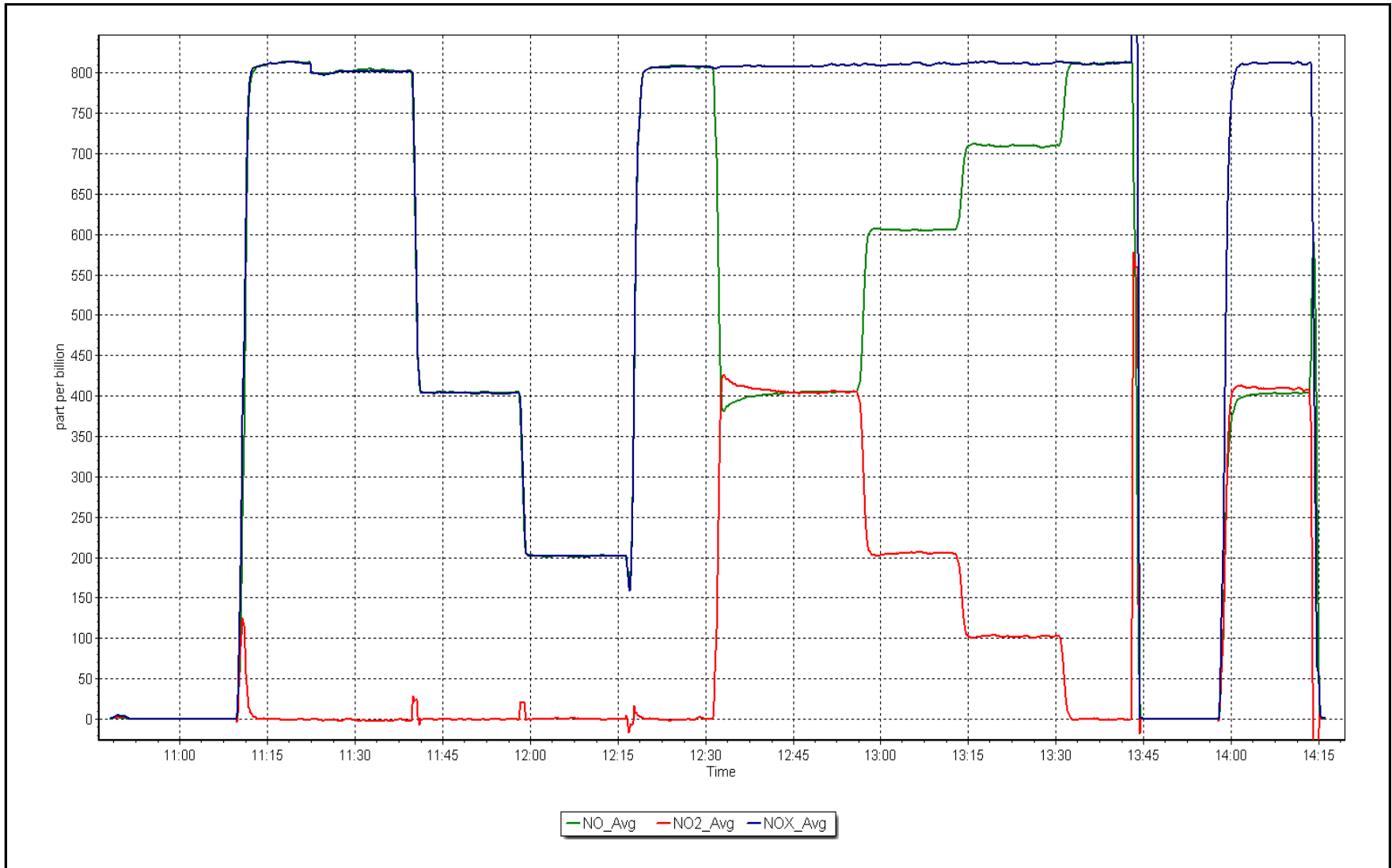
NO₂ Calibration Curve



NO_x Calibration Plot

Date: August 21, 2017

Location: Conklin





Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-02-2017

Station Information

| | | | |
|------------------------|-----------------|-----------------|---------------|
| Station Name: | Conklin | Station number: | AMS 21 |
| Calibration Date: | August 10, 2017 | Last Cal Date: | July 27, 2017 |
| Start time (MST): | 11:16 | End time (MST): | 11:53 |
| Sharp Model: | 5030 | S/N: | 7494 |
| Particulate Fraction: | PM2.5 | C14 Source S/N: | CM-0404 |
| Flow Meter Make/Model: | Delta Cal | S/N: | 1019 |
| Temp/RH standard: | NA | S/N: | NA |

Monthly Calibration Test

| <u>Parameter</u> | <u>As found</u> | <u>Measured</u> | <u>As left</u> | <u>Adjusted</u> | (Limits) |
|-----------------------------|-----------------|-------------------------------------|----------------|-------------------------------------|-----------------|
| T1 (°C) | 23 | 22.6 | 23 | <input type="checkbox"/> | +/- 2 °C |
| P3 (hPa) | 951 | 951.9 | 951 | <input type="checkbox"/> | +/- 13 hPa |
| flow (LPH) | 1000 | 1012 | 1000 | <input type="checkbox"/> | +/- 50 LPH |
| Nephelometer zero | -0.2 | ----- | -0.2 | <input type="checkbox"/> | +/- 0.5 ug/m3 |
| Instrument Clock: | Verified | <input checked="" type="checkbox"/> | | | |
| Cyclone cleaning : | PM10 Cyclone | <input checked="" type="checkbox"/> | PM2.5 Cyclone | <input checked="" type="checkbox"/> | |
| Date Filter Tape Installed: | | | | | |

Quarterly Calibration Test

Leak Test: Date of check: July 27, 2017 Last Cal Date: May 16, 2017
 Flow w/o adaptor: 16.93 Flow w/ adaptor: 16.86

(Limit) 0.4 LPM

| <u>Adjusted</u> | <u>Current Test</u> | <u>Previous Test</u> | <u>% Change</u> |
|-----------------------------------|--|---|-----------------|
| <input type="checkbox"/> | Foil S/N: <u>2598</u> | Foil S/N: <u>2598</u> | |
| Foil Calibration | Foil Mass: <u>1265</u> | Foil Mass: <u>1265</u> | |
| | Calibration Date: <u>July 27, 2017</u> | Calibration Date: <u>October 12, 2016</u> | |
| (Limit) +/- 5% of previous | Correction Factor: <u>6929</u> | Correction Factor: <u>7119</u> | -2.67% |

Annual Calibration Test

| <u>Parameter</u> | <u>As found</u> | <u>Measured</u> | <u>As left</u> | <u>Adjusted</u> | (Limits) |
|-----------------------------|-----------------|-----------------|----------------|--------------------------|-----------------|
| T2 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| T3 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| T4 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| RH (%) | | | | <input type="checkbox"/> | +/- 10% |
| Date Sample Tube Cleaned: | | | | | |
| Date Pump Rebuilt/Replaced: | | | | | |

Notes: Cyclone head cleaned. No adjustments made.

Calibration by: Asad Hidayat



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

**CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT**

**AMS 22
JANVIER
AUGUST 2017**

Operations, Data Collection,
QA/QC, Data Validation and Reporting by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

September 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - JANVIER (AMS 22)
AUGUST 2017

MONTHLY SUMMARY for
AMD SECTION III.B.1(c)

| Parameter | Hours of Data | Hours of Calibration | Hours without Data | Operational Time | Maximum 1-Hour Value | 1-Hour Exceedances | Maximum 24-Hour Value | 24-Hour Exceedances |
|-----------------------------------|---------------|----------------------|--------------------|------------------|----------------------|--------------------|-----------------------|---------------------|
| SO2(ppb) Average | 707 | 37 | 37 | 100 | 4 | 0 | 1 | 0 |
| TRS(ppb) Average | 703 | 35 | 41 | 99.19 | 1 | 0 | 0 | 0 |
| THC(ppm) Average | 707 | 37 | 37 | 100 | 2.8 | - | 2.2 | - |
| NMHC(ppm) Average | 707 | 37 | 37 | 100 | 0.083 | - | 0.007 | - |
| CH4(ppm) Average | 707 | 37 | 37 | 100 | 2.8 | - | 2.1 | - |
| O3 (ppb) Average | 709 | 35 | 35 | 100 | 58 | 0 | 42 | - |
| NO2 (ppb) Average | 658 | 38 | 86 | 93.55 | 2 | 0 | 1 | - |
| NO (ppb) Average | 658 | 38 | 86 | 93.55 | 3 | - | 1 | - |
| NOX (ppb) Average | 658 | 38 | 86 | 93.55 | 4 | - | 2 | - |
| PM2.5 (ug/m3) Average | 732 | 3 | 12 | 98.79 | 102.6 | - | 30.8 | 1 |
| Wind Speed 10 m (km/h) Average | 693 | 0 | 51 | 93.15 | 17 | - | 10 | - |
| Wind Direction 10 m (deg) Average | 693 | 0 | 51 | 93.15 | - | - | - | - |
| Temperature 2 m (C) Average | 744 | 0 | 0 | 100 | 27.5 | - | 20.2 | - |
| Relative Humidity (%) Average | 744 | 0 | 0 | 100 | 99 | - | 92.0 | - |

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - JANVIER (AMS 22)
AUGUST 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

| Parameter | Number | Mean | StnDev | Total | Percentile | | | | | | | |
|-----------------------------------|--------|-------|--------|-------|------------|------|------|--------|------|------|------|-------|
| | | | | | Min | P10 | Q1 | Median | Q3 | P90 | Max | |
| SO2 (ppb) Average | 707 | 0.1 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| TRS (ppb) Average | 703 | 0.2 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| THC (ppm) Average | 707 | 1.97 | 0.1 | - | 1.9 | 1.9 | 1.9 | 1.9 | 2 | 2.1 | 2.1 | 2.8 |
| NMHC(ppm) Average | 707 | 0.002 | 0.006 | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.083 |
| CH4(ppm) Average | 707 | 1.97 | 0.1 | - | 1.9 | 1.9 | 1.9 | 1.9 | 2 | 2.1 | 2.1 | 2.8 |
| O3 (ppb) Average | 709 | 25.8 | 10 | - | 7 | 14 | 18 | 24 | 33 | 40 | 40 | 58 |
| NO2 (ppb) Average | 658 | 0.5 | 0 | - | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 |
| NO (ppb) Average | 658 | 0.3 | 0 | - | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 3 |
| NOX (ppb) Average | 658 | 0.8 | 0 | - | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 4 |
| PM2.5 (ug/m3) Average | 732 | 7.62 | 9.2 | - | 0.4 | 1.6 | 2.8 | 5.4 | 9.1 | 16 | 16 | 102.6 |
| Wind Speed 10 m (km/h) Average | 693 | 5.3 | 3 | - | 0 | 2 | 3 | 5 | 7 | 9 | 9 | 17 |
| Wind Direction 10 m (deg) Average | 693 | - | - | - | - | - | - | - | - | - | - | - |
| Temperature 2 m (C) Average | 744 | 15.85 | 4.8 | - | 4.8 | 10.1 | 12.4 | 15.2 | 19.3 | 22.4 | 22.4 | 27.5 |
| Relative Humidity (%) Average | 744 | 73.6 | 19 | - | 28 | 43 | 59 | 78 | 90 | 97 | 97 | 99 |

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - JANVIER (AMS 22)
AUGUST 2017

OPERATIONAL NOTES

| Parameter | Period Start | Period End | Duration (Hours) | Notes |
|----------------------------|-------------------|-------------------|------------------|---|
| TRS | 16 Aug 2017 11:00 | 16 Aug 2017 15:00 | 5 | Maintenance - to address low span and recalibration |
| TRS | 25 Aug 2017 14:00 | 25 Aug 2017 14:00 | 1 | Maintenance - reinitiated daily QA check |
| NO2, NO, NOX | 10 Aug 2017 16:00 | 12 Aug 2017 10:00 | 43 | Maintenance - repair leak and calibration |
| NO2, NO, NOX | 14 Aug 2017 15:00 | 14 Aug 2017 15:00 | 1 | DAS collection error - data not recorded |
| NO2, NO, NOX | 17 Aug 2017 14:00 | 17 Aug 2017 14:00 | 1 | DAS collection error - data not recorded |
| NO2, NO, NOX | 18 Aug 2017 02:00 | 18 Aug 2017 02:00 | 1 | DAS collection error - data not recorded |
| NO2, NO, NOX | 22 Aug 2017 06:00 | 22 Aug 2017 06:00 | 1 | DAS collection error - data not recorded |
| NO2, NO, NOX | 23 Aug 2017 13:00 | 23 Aug 2017 13:00 | 1 | DAS collection error - data not recorded |
| PM2.5 | 02 Aug 2017 06:00 | 02 Aug 2017 14:00 | 9 | Analyzer Failure - pump stalled |
| Wind Speed, Wind Direction | 12 Aug 2017 10:00 | 14 Aug 2017 12:00 | 51 | DAS collection error - data not recorded |



Summary of Hour Averages

Janvier - August 2017

| | | | | |
|---|--|----------|---------------------------|-------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 4 ppb on Aug 29 11:00 | Maximum Daily Average: 0.7 ppb on Aug 29 | | Hours of Data: | 707 |
| Minimum Value: 0 ppb on Aug 2 03:00 | Minimum Daily Average: 0.0 ppb on Aug 21 | | Hours of Missing Data: | 37 |
| Maximum Diurnal Average: 0.3 ppb at hour 11 | Minimum Diurnal Average: 0.1 ppb at hour 24 | | Hours of Calibration: | 37 |
| Monthly Average: 0.1 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1 | | Percent Operational Time: | 100.0 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 2-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 2 |
| 3-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 4-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 5-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 6-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 7-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 8-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 9-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 10-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | C | C | C | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -- | 0 | |
| 11-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 12-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 |
| 13-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 14-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 15-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 17-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 18-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 19-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 20-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 21-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 22-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 23-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 24-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 25-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 26-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 27-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 29-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 4 | 2 | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 4 |
| 30-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 31-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |

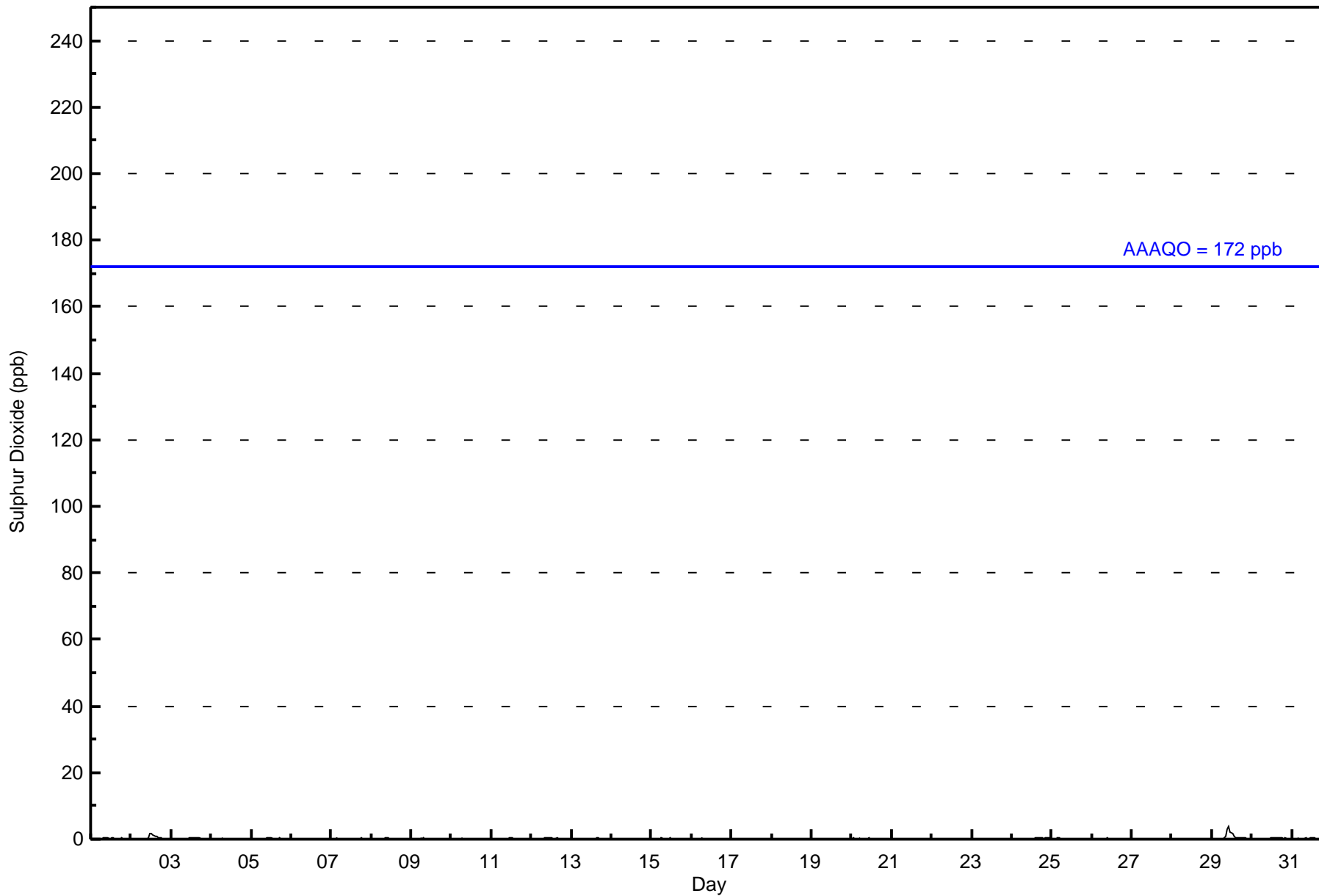
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|
| 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | Diurnal Average |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 4 | 2 | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Diurnal Maximum |

Z - zerospan C - Calibration
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Janvier - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Janvier - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 10 | 707 | 100.00 | 100.00 |
| 11 - 20 | 0 | 0.00 | 100.00 |
| 21 - 60 | 0 | 0.00 | 100.00 |
| 61 - 110 | 0 | 0.00 | 100.00 |
| 111 - 172 | 0 | 0.00 | 100.00 |
| > 172 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Janvier - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 10 | 17 | 24 | 9 | 19 | 19 | 36 | 64 | 61 | 110 | 127 | 71 | 60 | 23 | 8 | 6 | 4 | 658 |
| 11 - 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21 - 60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 61 - 110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 111 - 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 17 | 24 | 9 | 19 | 19 | 36 | 64 | 61 | 110 | 127 | 71 | 60 | 23 | 8 | 6 | 4 | 658 |

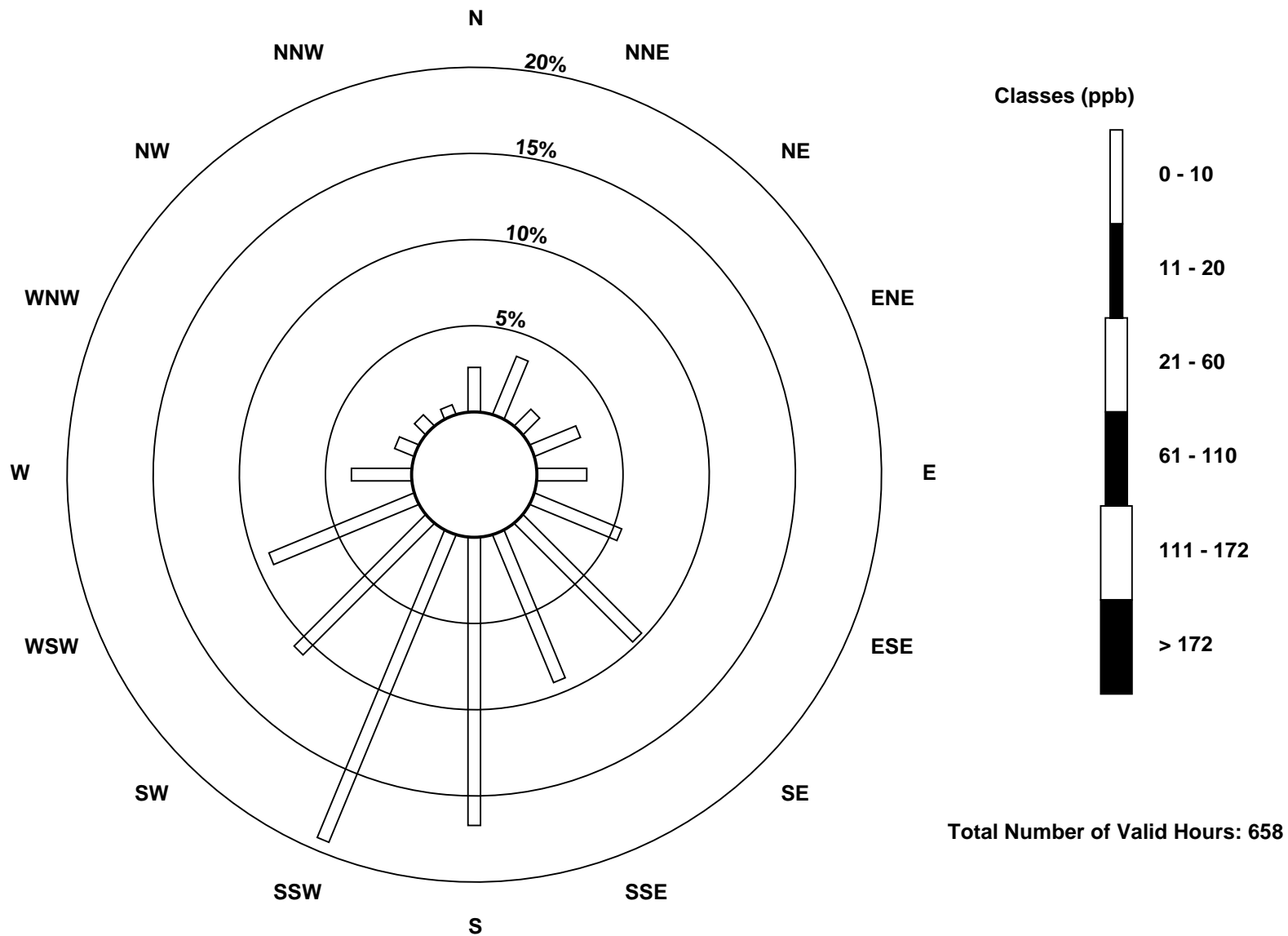
Total Number of Valid Hours: 658

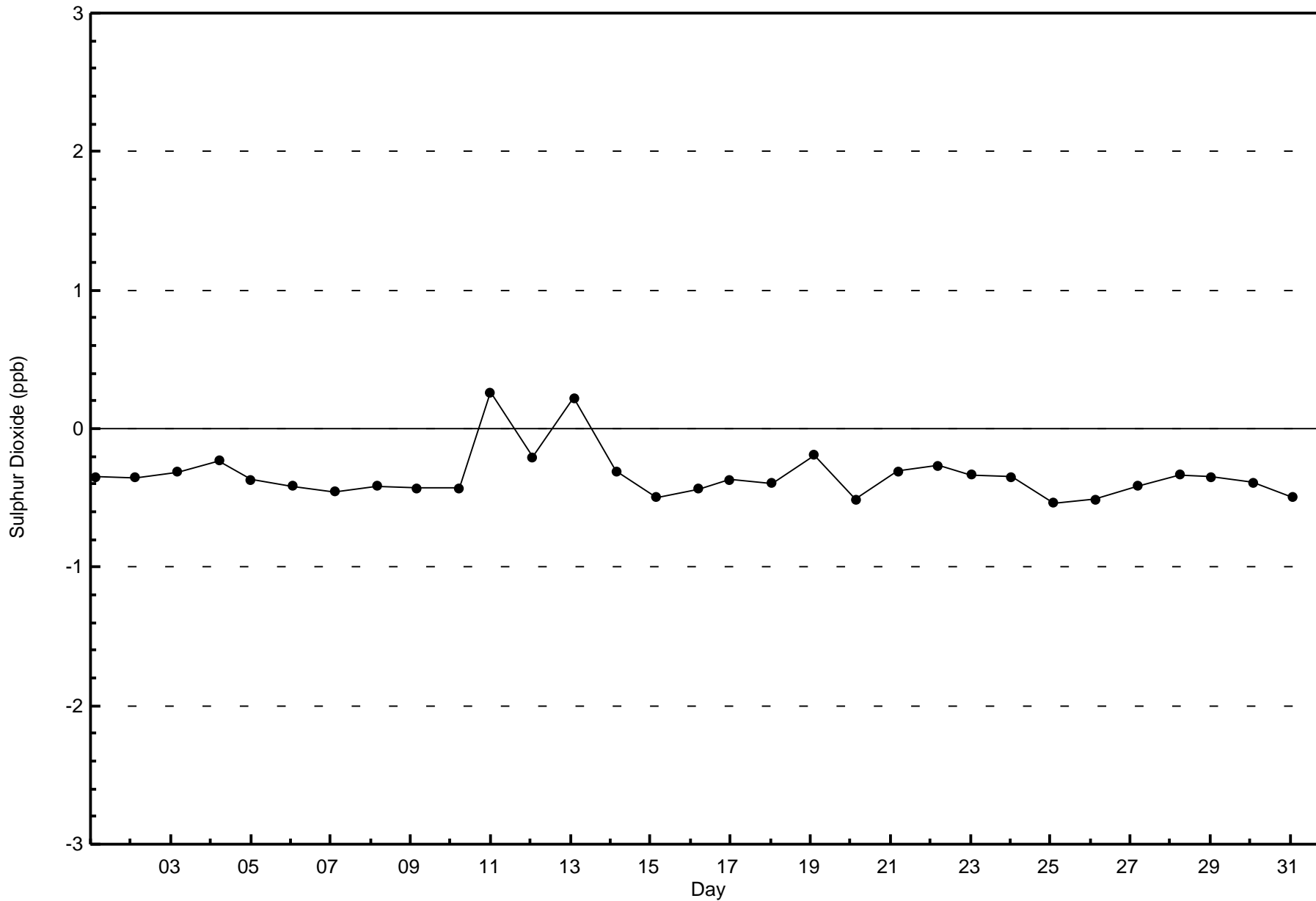
Total Number of Hours: 744

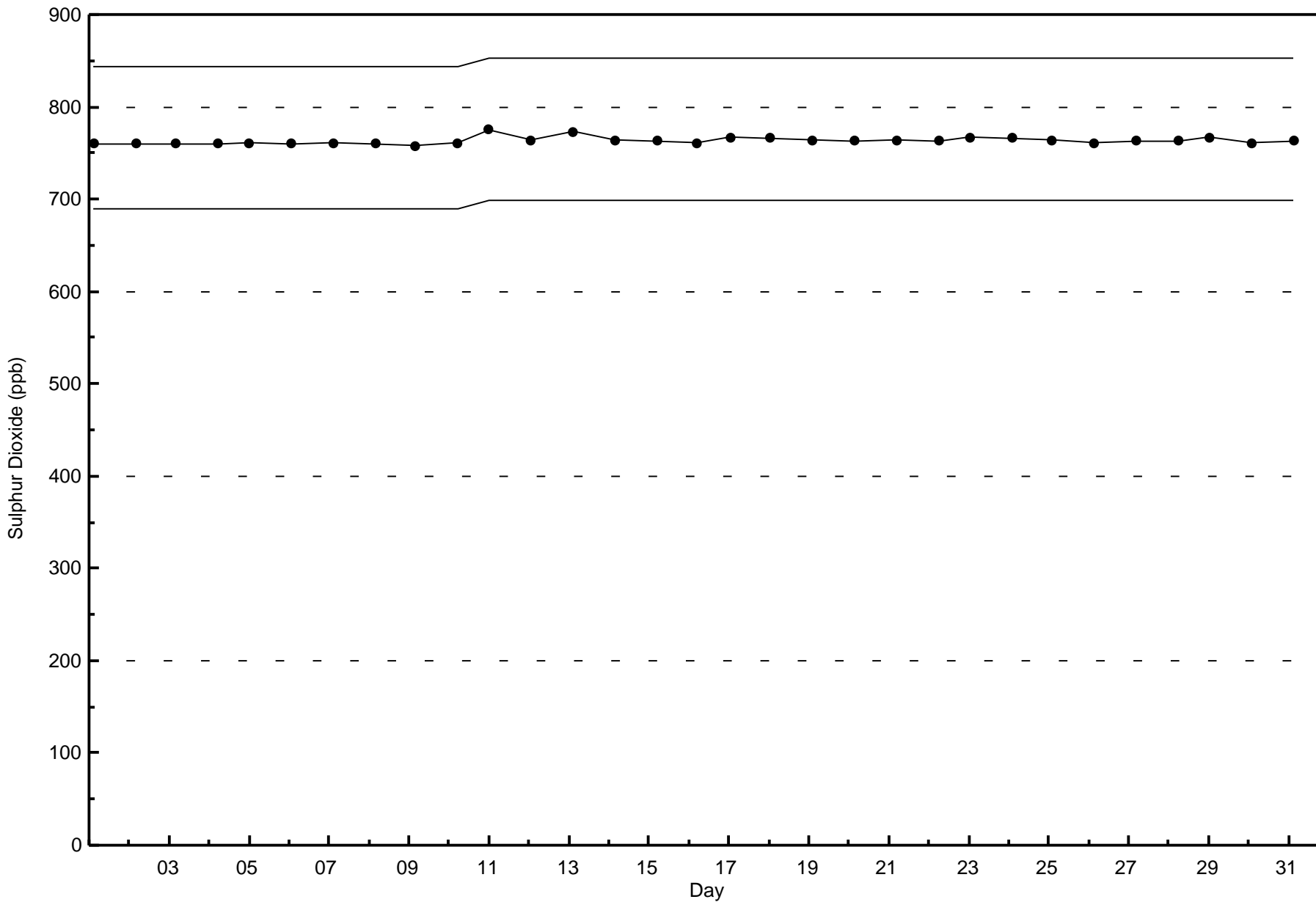


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Sulphur Dioxide (SO₂) - ppb
Janvier (AMS 22)









Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

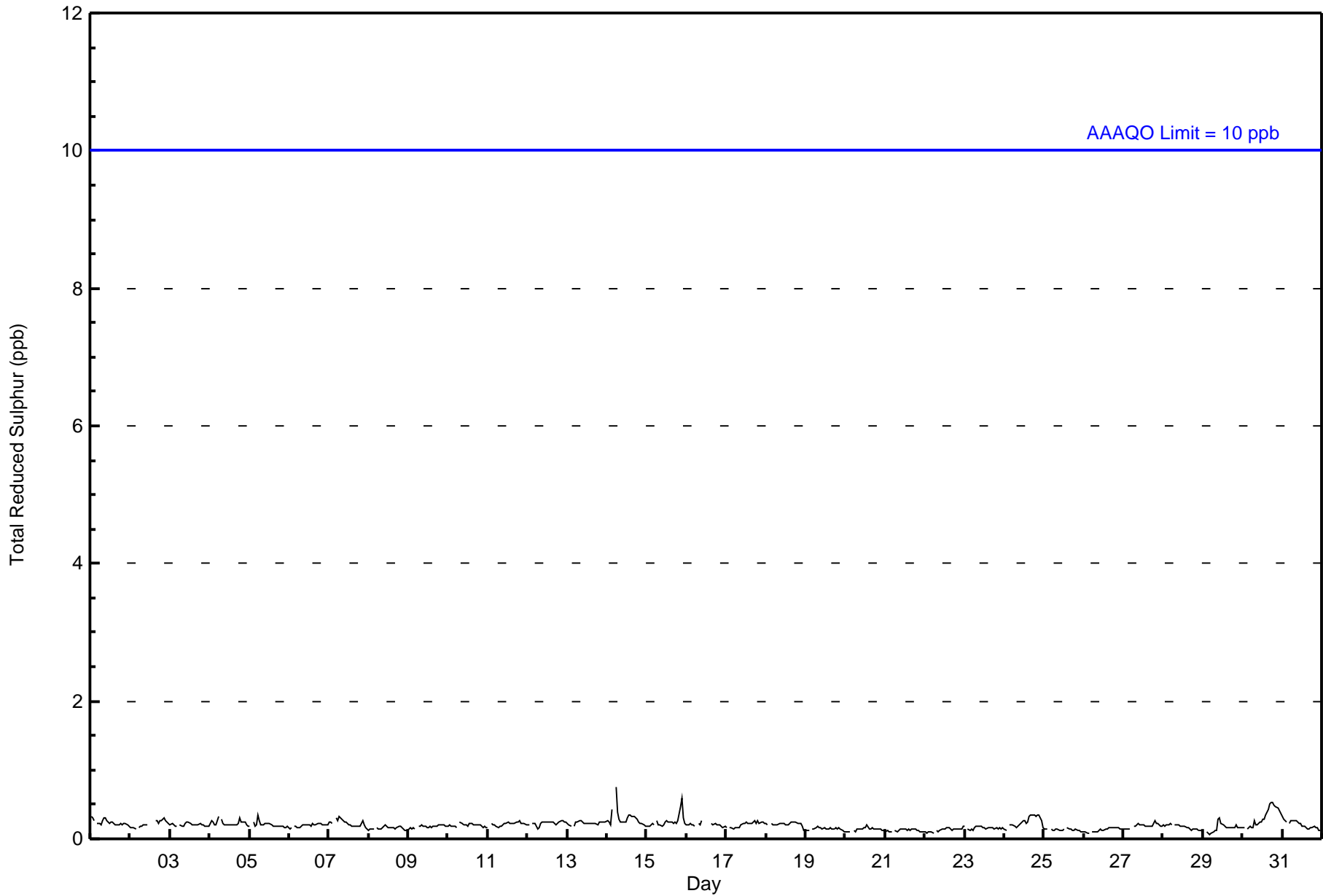
Janvier - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | Daily Average | | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|---|---|---|---|---|---|---|---|--|----|----|----|----|----|----|----|----|----|--------------------------|----|--------------------------------|----|-----|---------------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|
| Maximum Value: 1 ppb on Aug 14 06:00 | | | | | | | | | | Maximum Daily Average: 0.3 ppb on Aug 30 | | | | | | | | | | Hours of Data: 703 | | Hours of Missing Data: 41 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum Value: 0 ppb on Aug 29 05:00 | | | | | | | | | | Minimum Daily Average: 0.1 ppb on Aug 21 | | | | | | | | | | Hours of Calibration: 35 | | Percent Operational Time: 99.2 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 0.2 ppb at hour 21 | | | | | | | | | | Minimum Diurnal Average: 0.2 ppb at hour 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 0.2 ppb | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | C | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 0 | 0 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | M | M | M | M | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | Diurnal Average |
| | | | | | | | | | | | | | | | | | | | | | | | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | Diurnal Maximum |
| Z - zerospan C - Calibration M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Janvier - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Janvier - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2 | 703 | 100.00 | 100.00 |
| 3 - 4 | 0 | 0.00 | 100.00 |
| 5 - 7 | 0 | 0.00 | 100.00 |
| 8 - 11 | 0 | 0.00 | 100.00 |
| > 11 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 703

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Janvier - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2 | 18 | 24 | 8 | 18 | 18 | 36 | 64 | 61 | 113 | 125 | 68 | 60 | 23 | 8 | 6 | 4 | 654 |
| 3 - 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 - 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 - 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 18 | 24 | 8 | 18 | 18 | 36 | 64 | 61 | 113 | 125 | 68 | 60 | 23 | 8 | 6 | 4 | 654 |

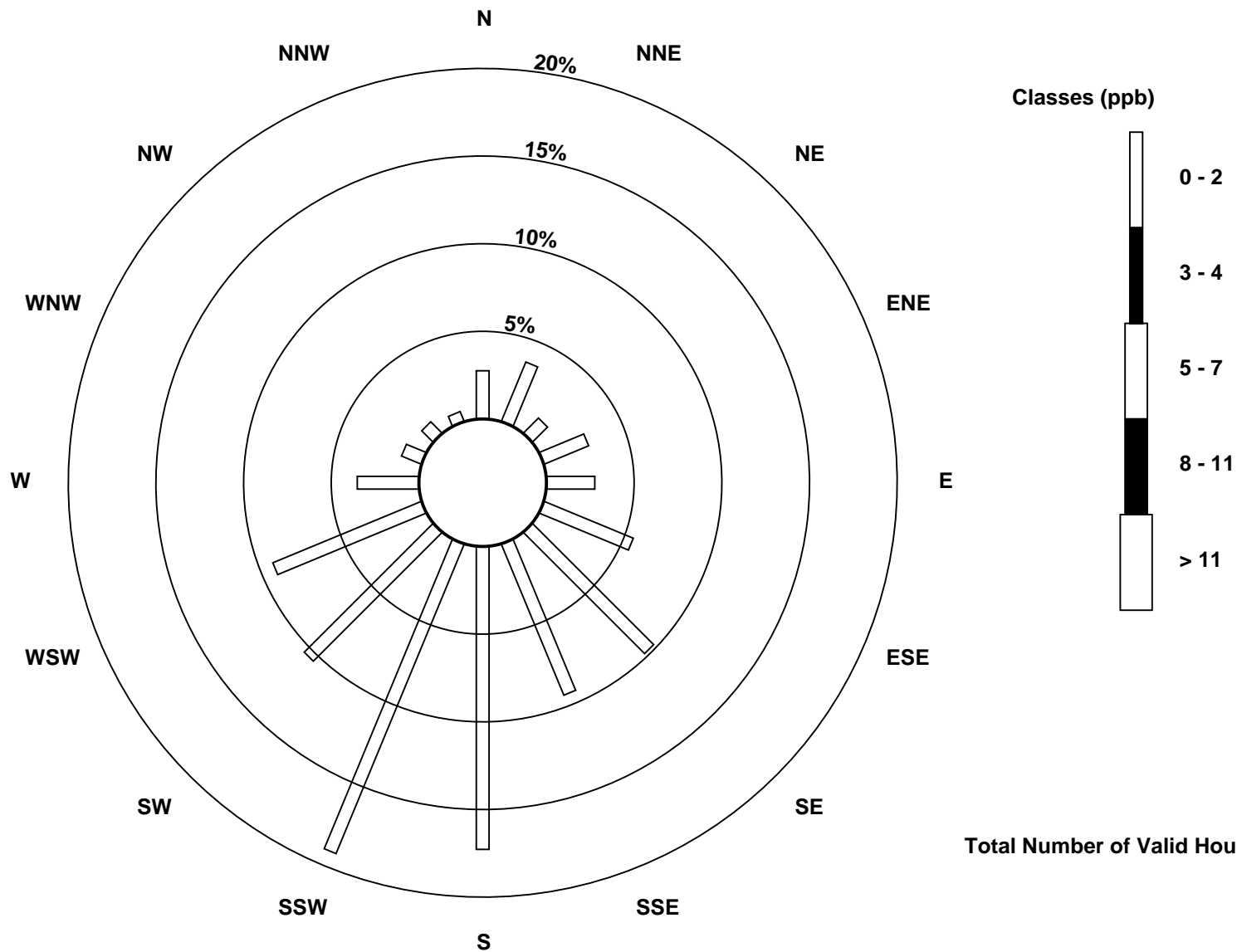
Total Number of Valid Hours: 654

Total Number of Hours: 744

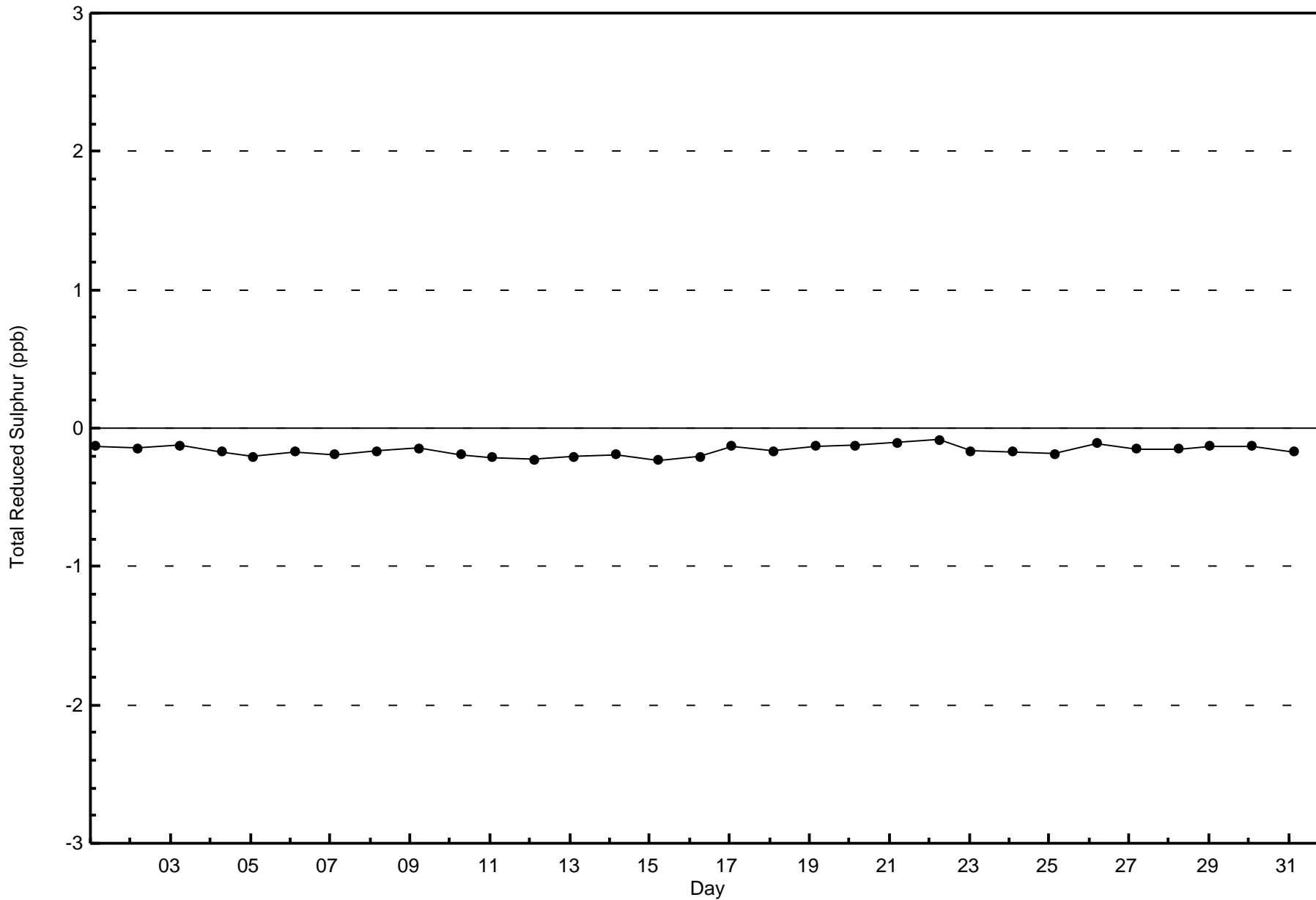


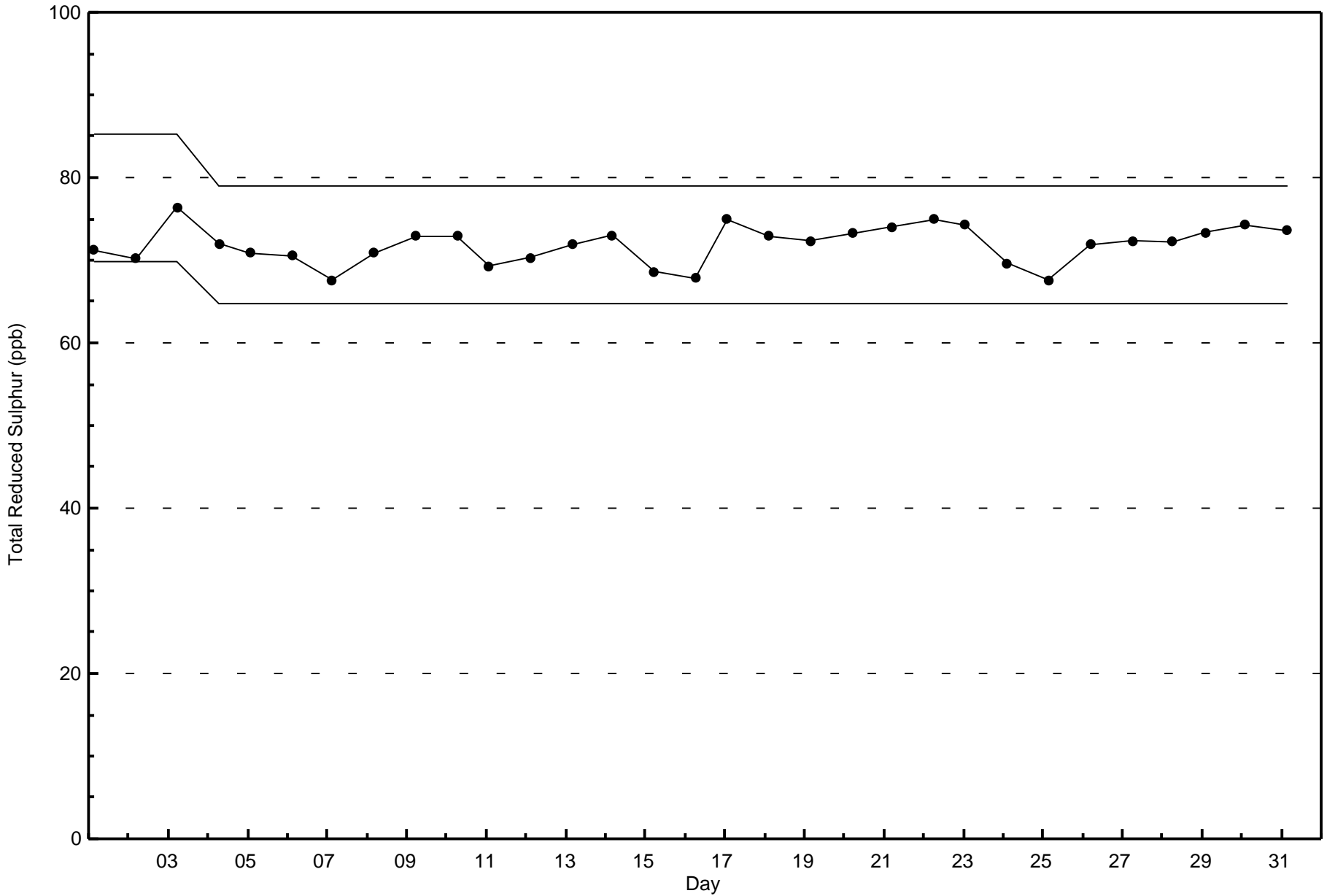
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Total Reduced Sulphur (TRS) - ppb
Janvier (AMS 22)



Total Number of Valid Hours: 654







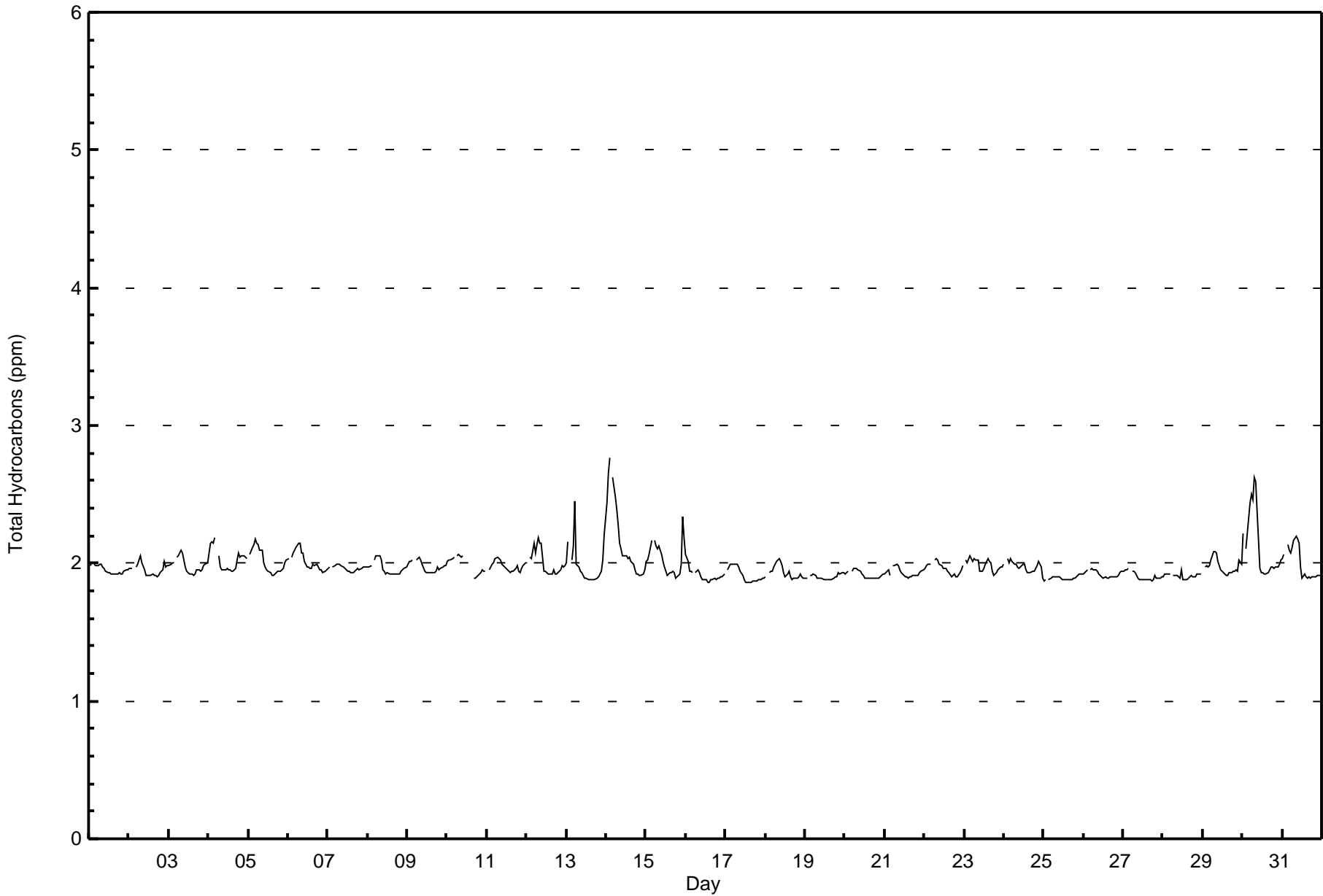
Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Janvier - August 2017

| Maximum Value: 2.8 ppm on Aug 14 03:00 | | | | | | | | | | | | | | | | | | | Maximum Daily Average: 2.2 ppm on Aug 14 | | | | | | Hours in Service: 744 | |
|--|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|-----|-----|-----|-----|-----------------|---------------------------|---------------|
| Minimum Value: 1.9 ppm on Aug 16 14:00 | | | | | | | | | | | | | | | | | | | Minimum Daily Average: 1.9 ppm on Aug 25 | | | | | | Hours of Data: 707 | |
| Maximum Diurnal Average: 2.1 ppm at hour 6 | | | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 1.9 ppm at hour 16 | | | | | | Hours of Missing Data: 37 | |
| Monthly Average: 1.97 ppm | | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 1.9 Q ₃ = 2.0 P ₉₀ = 2.1 P ₉₉ = 2.5 | | | | | | Hours of Calibration: 37 | |
| | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 2.0 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 |
| 2-Aug | 2.0 | 2.0 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| 3-Aug | 2.0 | 2.0 | 2.0 | 2.0 | Z | 2.0 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| 4-Aug | 2.1 | 2.1 | 2.2 | 2.1 | 2.2 | Z | 2.1 | 2.0 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 2.0 | 2.0 | 2.1 | 2.0 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| 5-Aug | Z | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| 6-Aug | 2.0 | Z | 2.0 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 2.0 | 2.0 | 2.2 |
| 7-Aug | 2.0 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| 8-Aug | 2.0 | 2.0 | 2.0 | Z | 2.0 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 |
| 9-Aug | 2.0 | 2.0 | 2.0 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| 10-Aug | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | Z | 2.0 | 2.1 | 2.0 | 2.1 | C | C | C | C | C | C | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | -- |
| 11-Aug | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| 12-Aug | 2.0 | Z | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.1 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.2 |
| 13-Aug | 2.0 | 2.2 | Z | 2.0 | 2.1 | 2.5 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.2 | 2.0 | 2.5 |
| 14-Aug | 2.4 | 2.7 | 2.8 | Z | 2.6 | 2.5 | 2.4 | 2.3 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.2 | 2.8 |
| 15-Aug | 2.0 | 2.0 | 2.1 | 2.2 | Z | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.3 | 2.2 | 2.0 | 2.3 |
| 16-Aug | 2.1 | 2.0 | 1.9 | 1.9 | 1.9 | Z | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.1 |
| 17-Aug | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 |
| 18-Aug | 1.9 | Z | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 |
| 19-Aug | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| 20-Aug | 1.9 | 1.9 | 1.9 | Z | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 |
| 21-Aug | 1.9 | 1.9 | 2.0 | 1.9 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 2.0 |
| 22-Aug | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 |
| 23-Aug | Z | 2.0 | 2.0 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 |
| 24-Aug | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 2.0 | 2.0 |
| 25-Aug | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| 26-Aug | 1.9 | 1.9 | 1.9 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 |
| 27-Aug | 1.9 | 1.9 | 2.0 | 2.0 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 |
| 28-Aug | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 |
| 29-Aug | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 2.0 | 2.0 | 2.0 | 2.1 |
| 30-Aug | 2.2 | Z | 2.1 | 2.2 | 2.4 | 2.5 | 2.5 | 2.6 | 2.6 | 2.4 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.6 |
| 31-Aug | 2.0 | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.1 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.2 |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| Z - zerospan C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | | | |





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Janvier - August 2017

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2.0 | 620 | 87.69 | 87.69 |
| 2.1 - 3.0 | 87 | 12.31 | 100.00 |
| 3.1 - 10.0 | 0 | 0.00 | 100.00 |
| > 10.0 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Janvier - August 2017

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---|-----------------------|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2.0 | 14 | 21 | 7 | 17 | 18 | 34 | 61 | 55 | 94 | 117 | 59 | 55 | 22 | 7 | 4 | 2 | 587 |
| 2.1 - 3.0 | 3 | 3 | 2 | 2 | 1 | 2 | 3 | 6 | 16 | 10 | 12 | 5 | 1 | 1 | 2 | 2 | 71 |
| 3.1 - 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 17 | 24 | 9 | 19 | 19 | 36 | 64 | 61 | 110 | 127 | 71 | 60 | 23 | 8 | 6 | 4 | 658 |

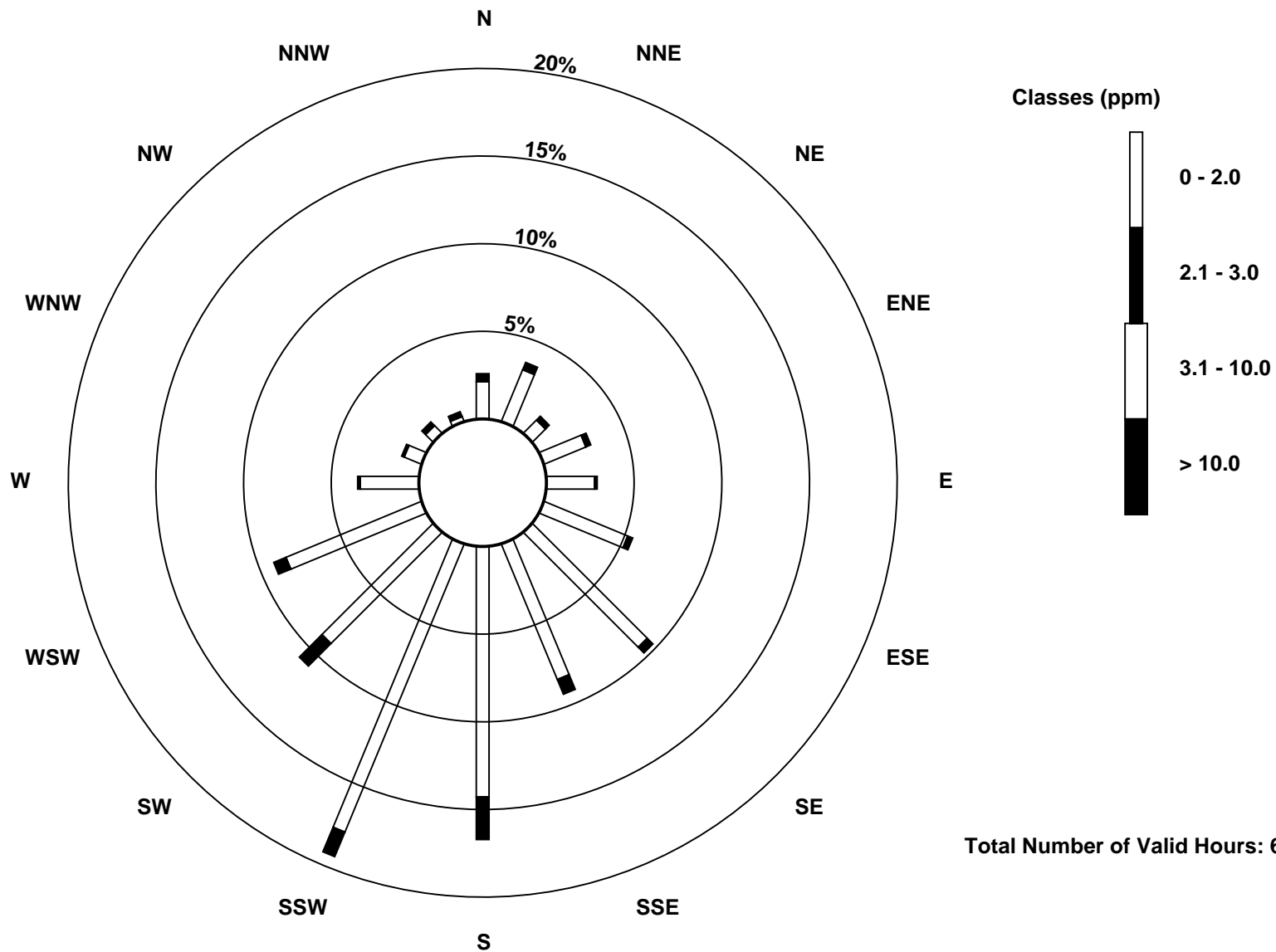
Total Number of Valid Hours: 658

Total Number of Hours: 744

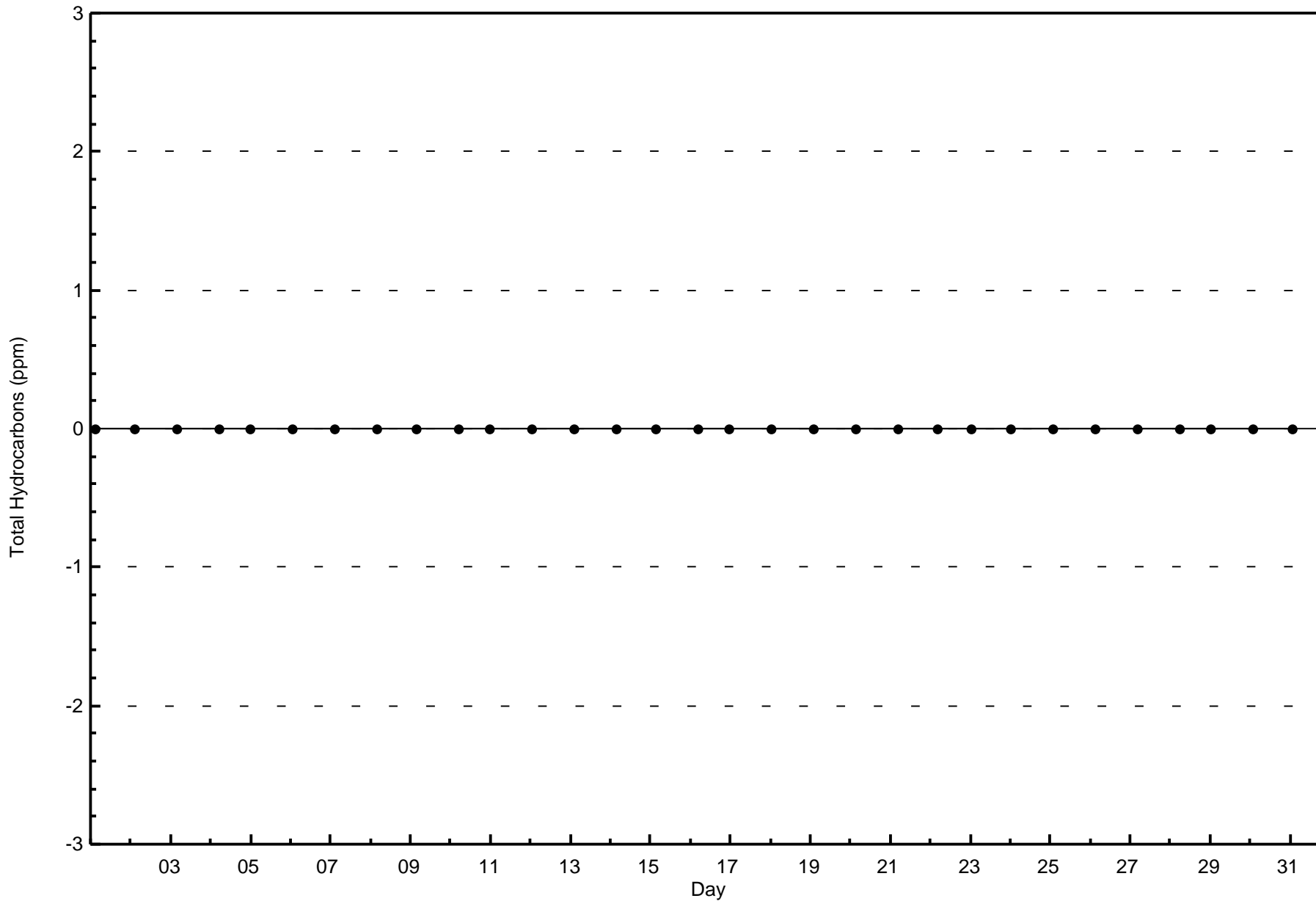


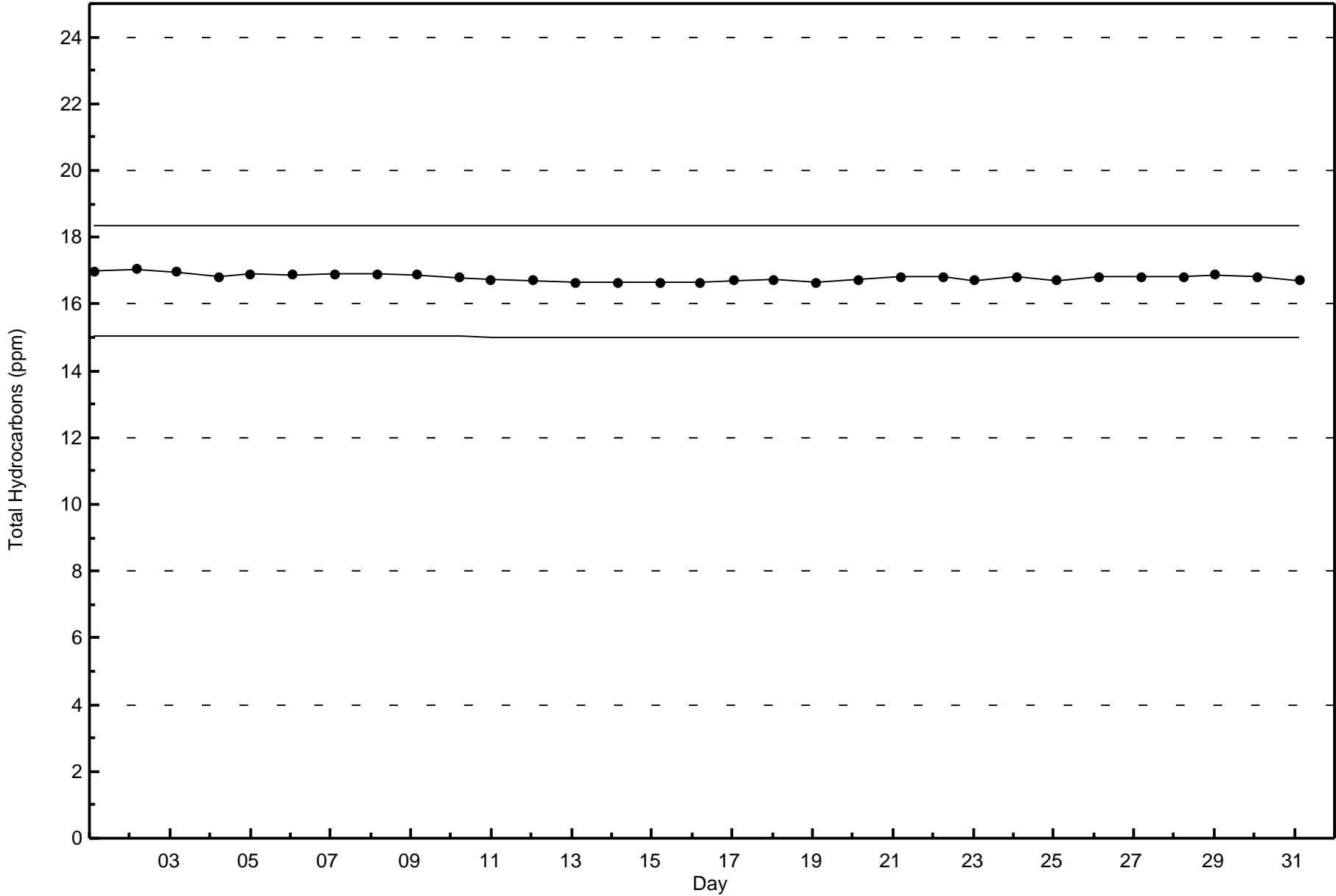
Wood Buffalo Environmental Association
Wind Rose Aug 2017

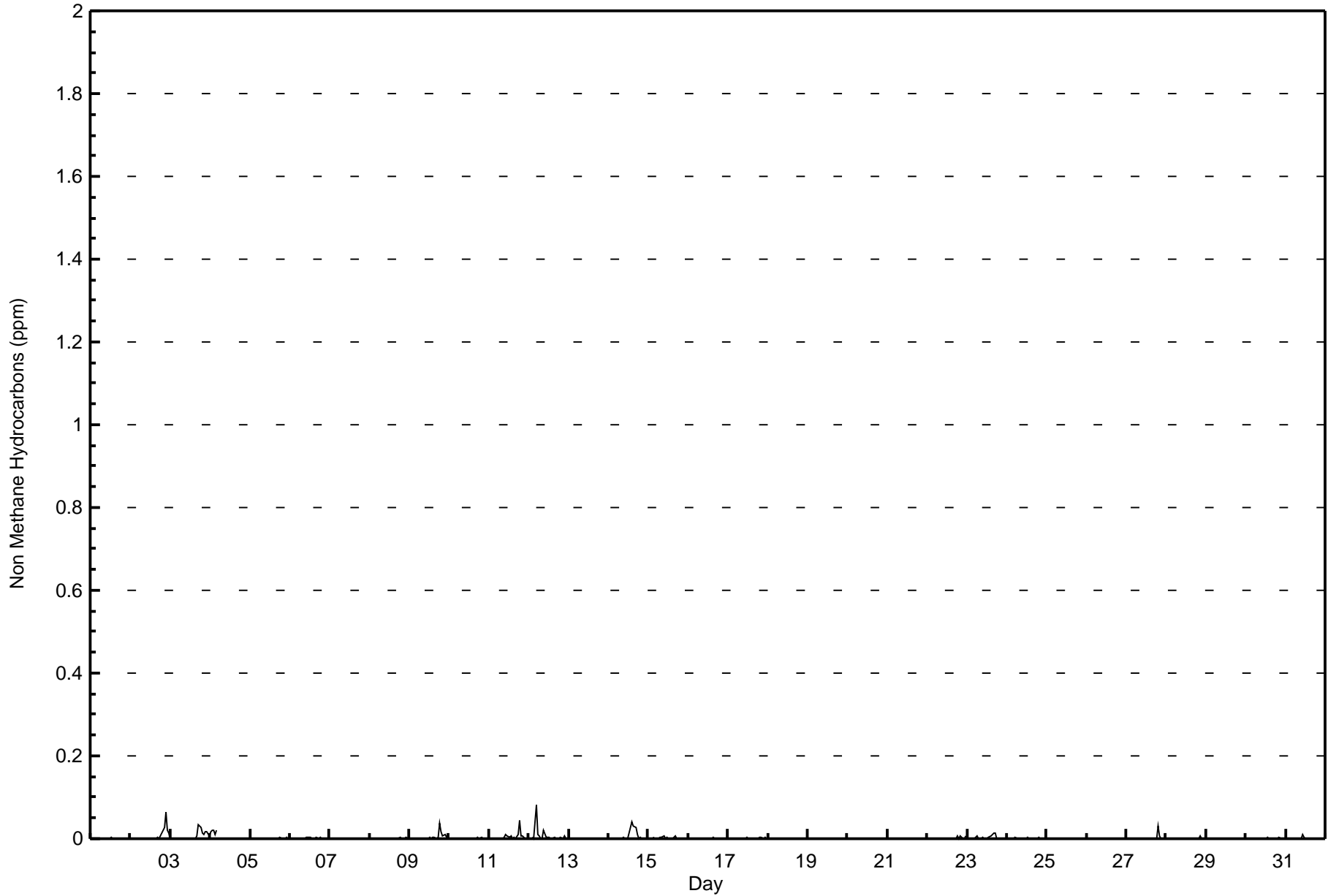
Total Hydrocarbons (THC) - ppm
Janvier (AMS 22)



Total Number of Valid Hours: 658









**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Janvier - August 2017**

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 0.005 | 654 | 92.50 | 92.50 |
| 0.006 - 0.05 | 51 | 7.21 | 99.72 |
| 0.06 - 0.1 | 2 | 0.28 | 100.00 |
| > 0.1 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Janvier - August 2017**

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 0.005 | 17 | 24 | 7 | 14 | 18 | 27 | 53 | 56 | 105 | 124 | 65 | 57 | 23 | 8 | 5 | 4 | 607 |
| 0.006 - 0.05 | 0 | 0 | 2 | 5 | 1 | 9 | 10 | 5 | 4 | 3 | 6 | 3 | 0 | 0 | 1 | 0 | 49 |
| 0.06 - 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| > 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 17 | 24 | 9 | 19 | 19 | 36 | 64 | 61 | 110 | 127 | 71 | 60 | 23 | 8 | 6 | 4 | 658 |

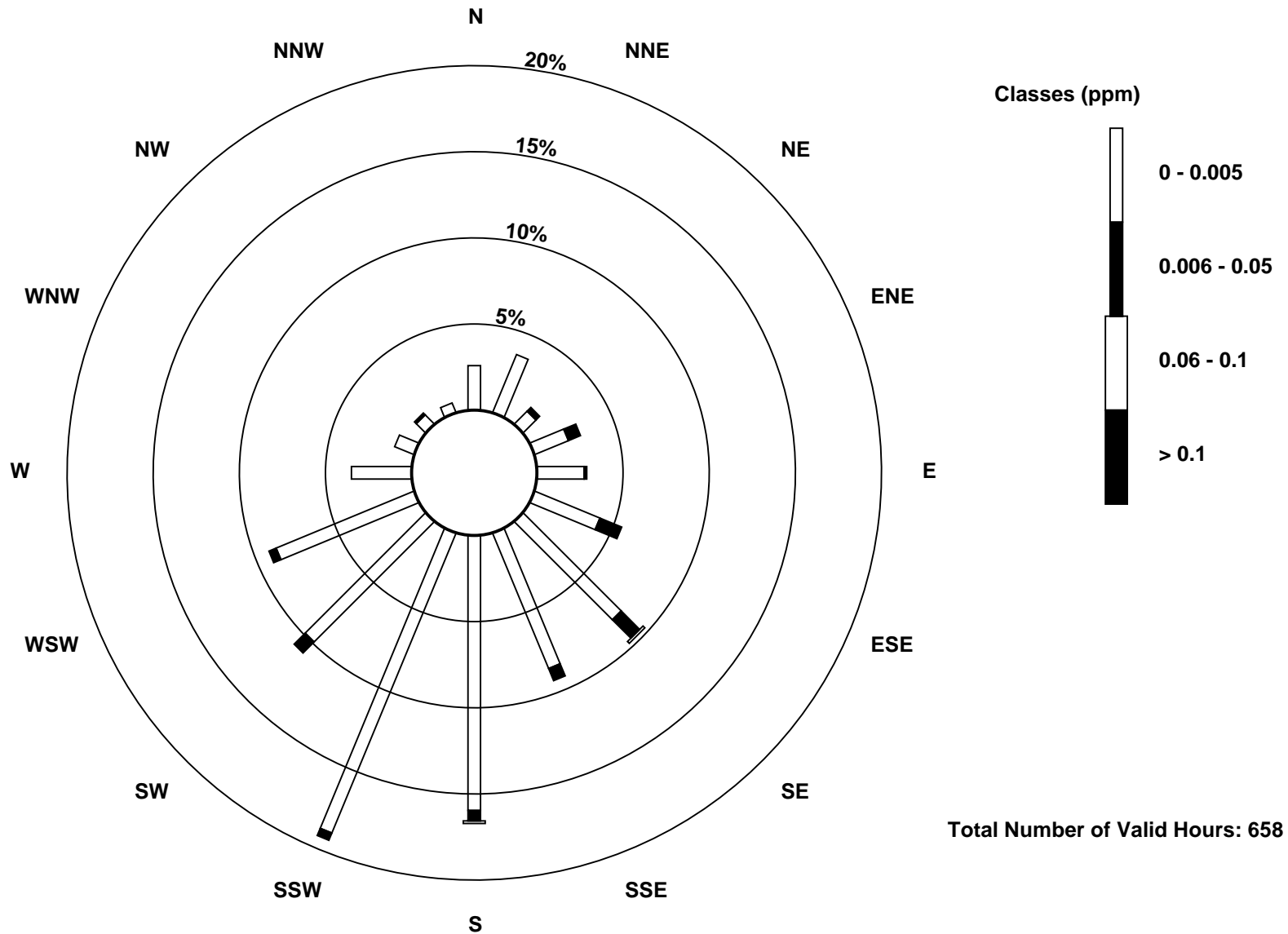
Total Number of Valid Hours: 658

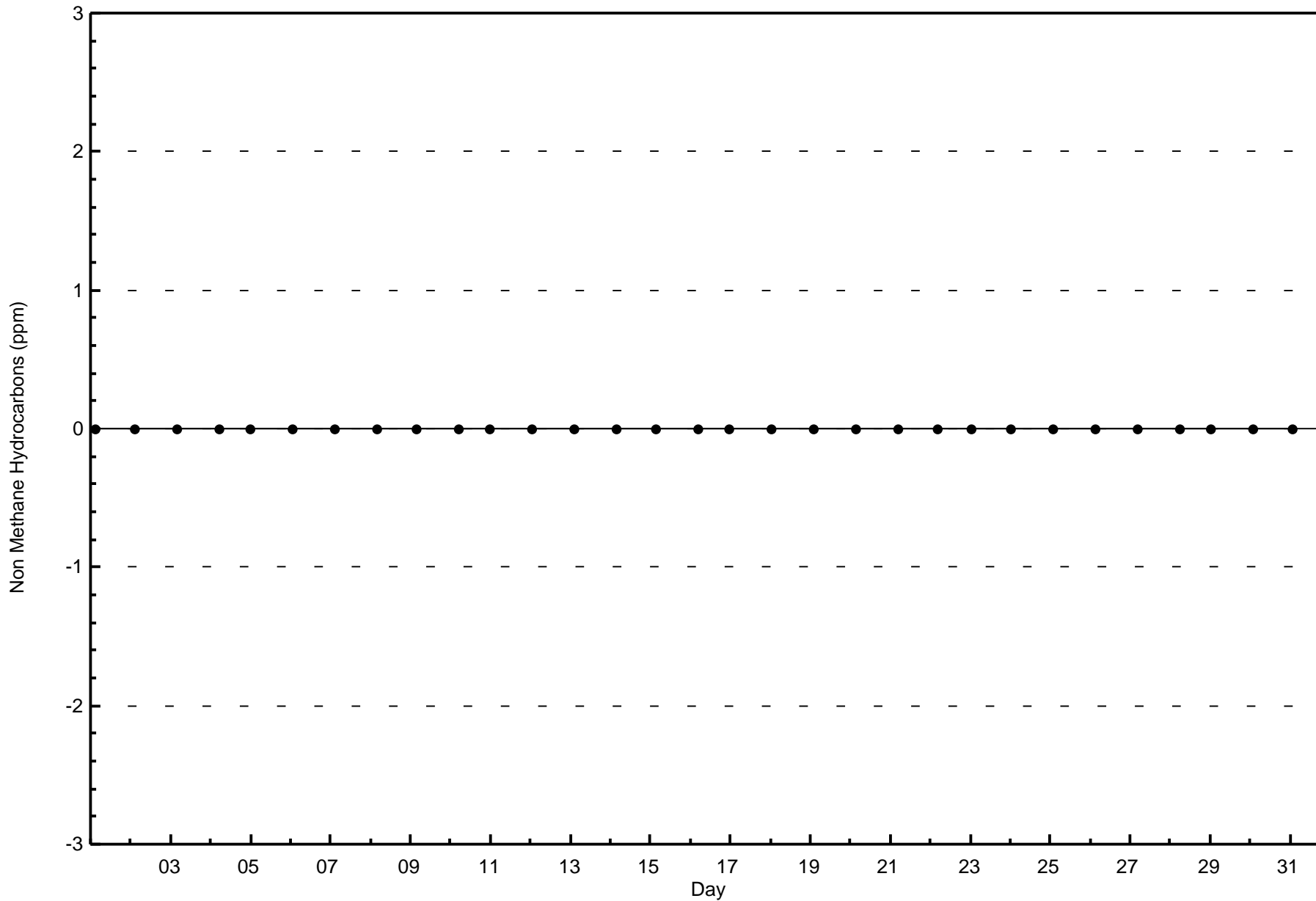
Total Number of Hours: 744

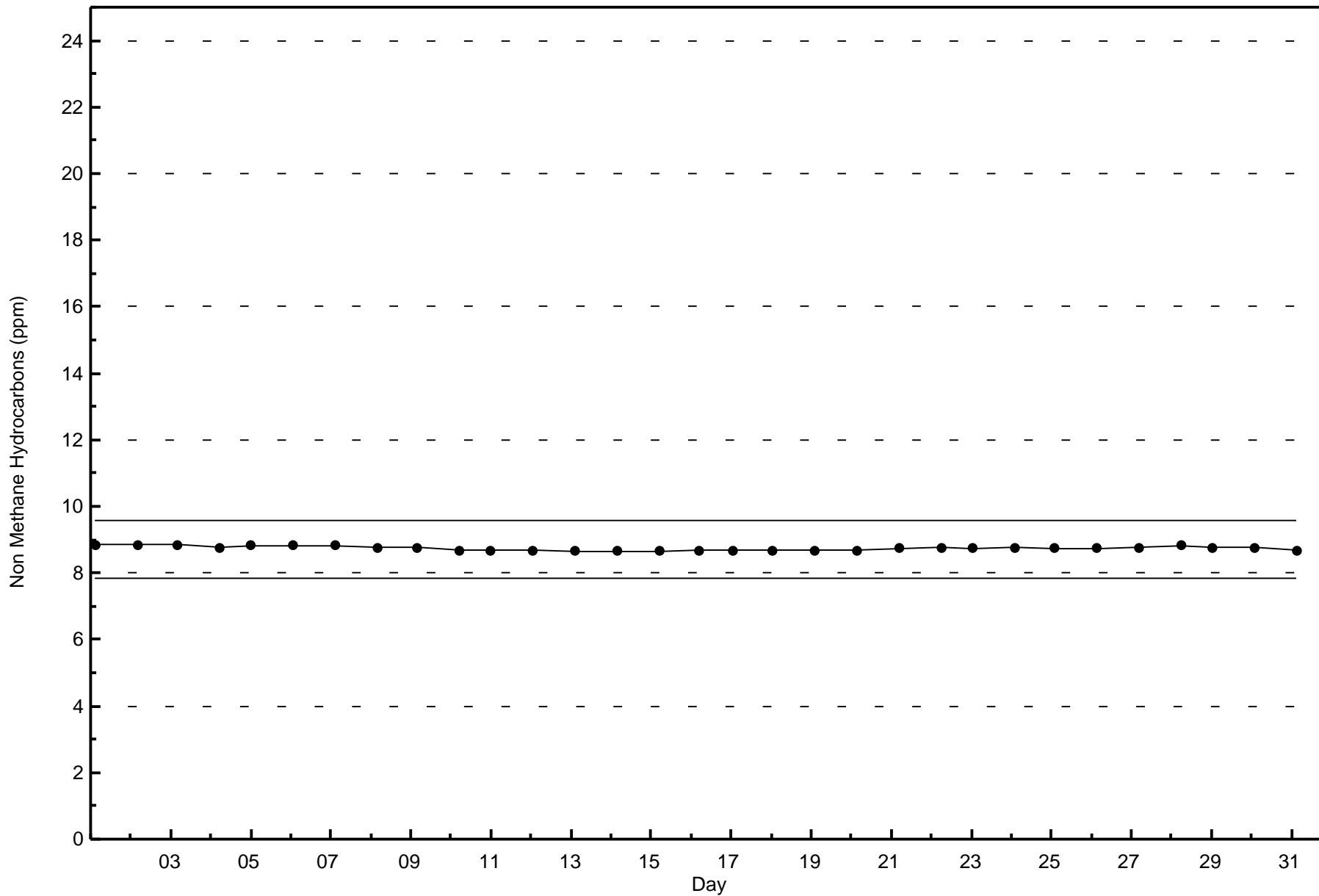


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Non Methane Hydrocarbons (NMHC) - ppm
Janvier (AMS 22)









Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH₄) - ppm

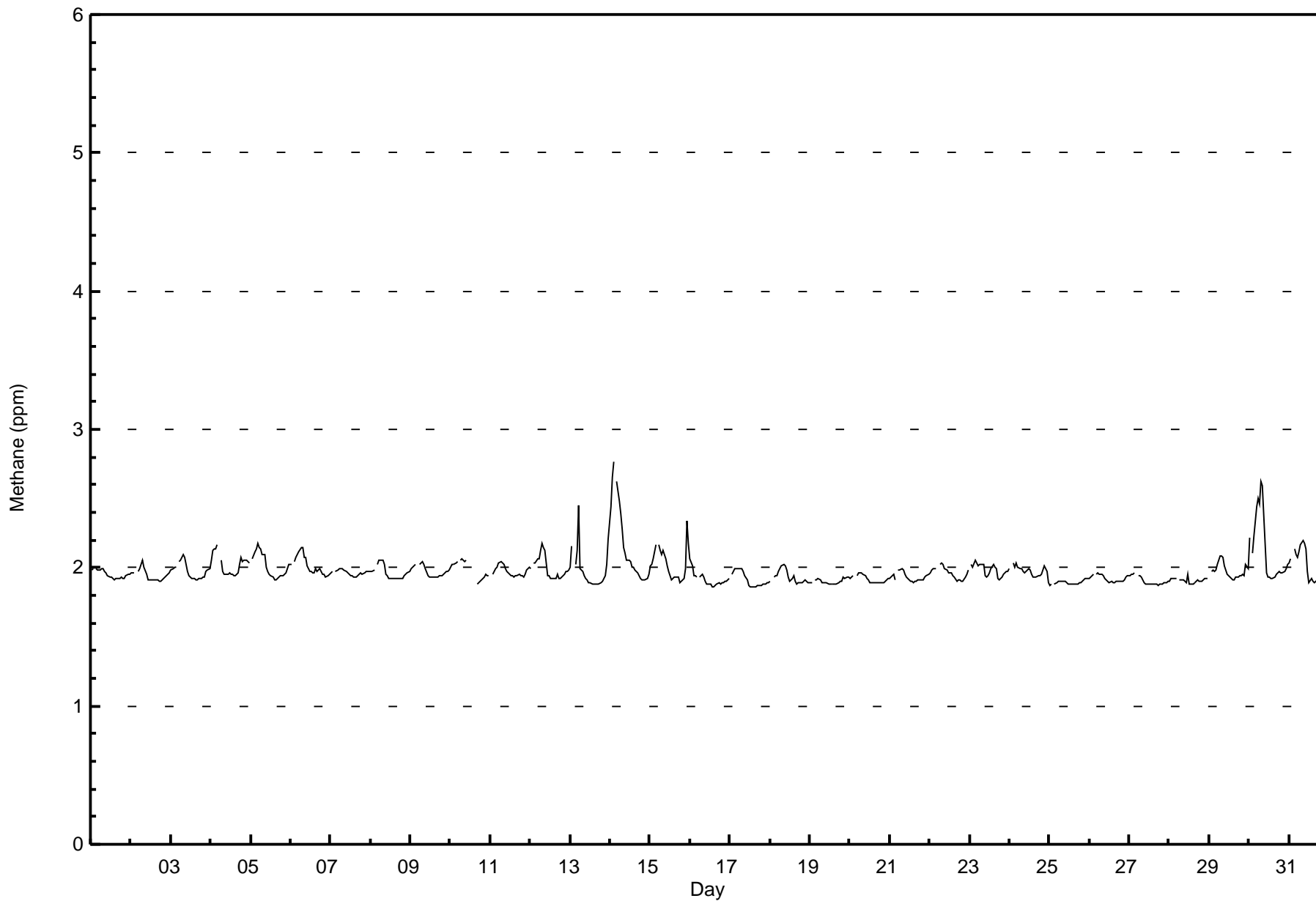
Janvier - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 2.8 ppm on Aug 14 03:00 Maximum Daily Average: 2.1 ppm on Aug 14 | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 707 | | | | | | | | | |
|---|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|-----|-----|-----|-----|-----|-----|-----------------|---------------|---------------|
| Minimum Value: 1.9 ppm on Aug 16 14:00 Minimum Daily Average: 1.9 ppm on Aug 25 Maximum Diurnal Average: 2.1 ppm at hour 6 Minimum Diurnal Average: 1.9 ppm at hour 16 Monthly Average: 1.97 ppm Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 1.9 Q ₃ = 2.0 P ₉₀ = 2.1 P ₉₉ = 2.5 | | | | | | | | | | | | | | | | | Hours of Missing Data: 37 Hours of Calibration: 37 Percent Operational Time: 100.0 | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 2.0 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 |
| 2-Aug | 2.0 | 2.0 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 1.9 | 2.1 |
| 3-Aug | 2.0 | 2.0 | 2.0 | 2.0 | Z | 2.0 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 |
| 4-Aug | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | Z | 2.1 | 2.0 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 2.0 | 2.0 | 2.1 | 2.0 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.2 |
| 5-Aug | Z | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.2 |
| 6-Aug | 2.0 | Z | 2.0 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 2.0 | 2.0 | 2.2 |
| 7-Aug | 2.0 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| 8-Aug | 2.0 | 2.0 | 2.0 | Z | 2.0 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 |
| 9-Aug | 2.0 | 2.0 | 2.0 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| 10-Aug | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | Z | 2.0 | 2.1 | 2.0 | 2.1 | C | C | C | C | C | C | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.1 | |
| 11-Aug | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| 12-Aug | 2.0 | Z | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.1 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.2 |
| 13-Aug | 2.0 | 2.2 | Z | 2.0 | 2.1 | 2.5 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.2 | 2.0 | 2.5 | |
| 14-Aug | 2.4 | 2.7 | 2.8 | Z | 2.6 | 2.5 | 2.4 | 2.3 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.1 | 2.8 | |
| 15-Aug | 2.0 | 2.0 | 2.1 | 2.2 | Z | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.3 | 2.2 | 2.0 | 2.3 | |
| 16-Aug | 2.1 | 2.0 | 1.9 | 1.9 | 1.9 | Z | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.1 | |
| 17-Aug | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | |
| 18-Aug | 1.9 | Z | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | |
| 19-Aug | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | |
| 20-Aug | 1.9 | 1.9 | 1.9 | Z | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | |
| 21-Aug | 1.9 | 1.9 | 2.0 | 1.9 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 2.0 | |
| 22-Aug | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | |
| 23-Aug | Z | 2.0 | 2.0 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.1 | |
| 24-Aug | 2.0 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 1.9 | 2.0 | 2.0 | |
| 25-Aug | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | |
| 26-Aug | 1.9 | 1.9 | 1.9 | Z | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | |
| 27-Aug | 1.9 | 1.9 | 2.0 | 2.0 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | |
| 28-Aug | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | Z | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | |
| 29-Aug | Z | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 1.9 | 2.0 | 2.0 | 2.1 | |
| 30-Aug | 2.2 | Z | 2.1 | 2.2 | 2.4 | 2.5 | 2.5 | 2.6 | 2.6 | 2.4 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.6 | |
| 31-Aug | 2.0 | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.1 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.2 | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| Z - zerospan C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Methane (CH₄) - ppm
Janvier - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Methane (CH₄) - ppm
Janvier - August 2017**

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2.0 | 622 | 87.98 | 87.98 |
| 2.1 - 3.0 | 85 | 12.02 | 100.00 |
| 3.1 - 10.0 | 0 | 0.00 | 100.00 |
| > 10.0 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Methane (CH₄) - ppm
Janvier - August 2017**

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2.0 | 14 | 21 | 7 | 17 | 18 | 34 | 61 | 55 | 94 | 117 | 60 | 55 | 22 | 7 | 4 | 2 | 588 |
| 2.1 - 3.0 | 3 | 3 | 2 | 2 | 1 | 2 | 3 | 6 | 16 | 10 | 11 | 5 | 1 | 1 | 2 | 2 | 70 |
| 3.1 - 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 17 | 24 | 9 | 19 | 19 | 36 | 64 | 61 | 110 | 127 | 71 | 60 | 23 | 8 | 6 | 4 | 658 |

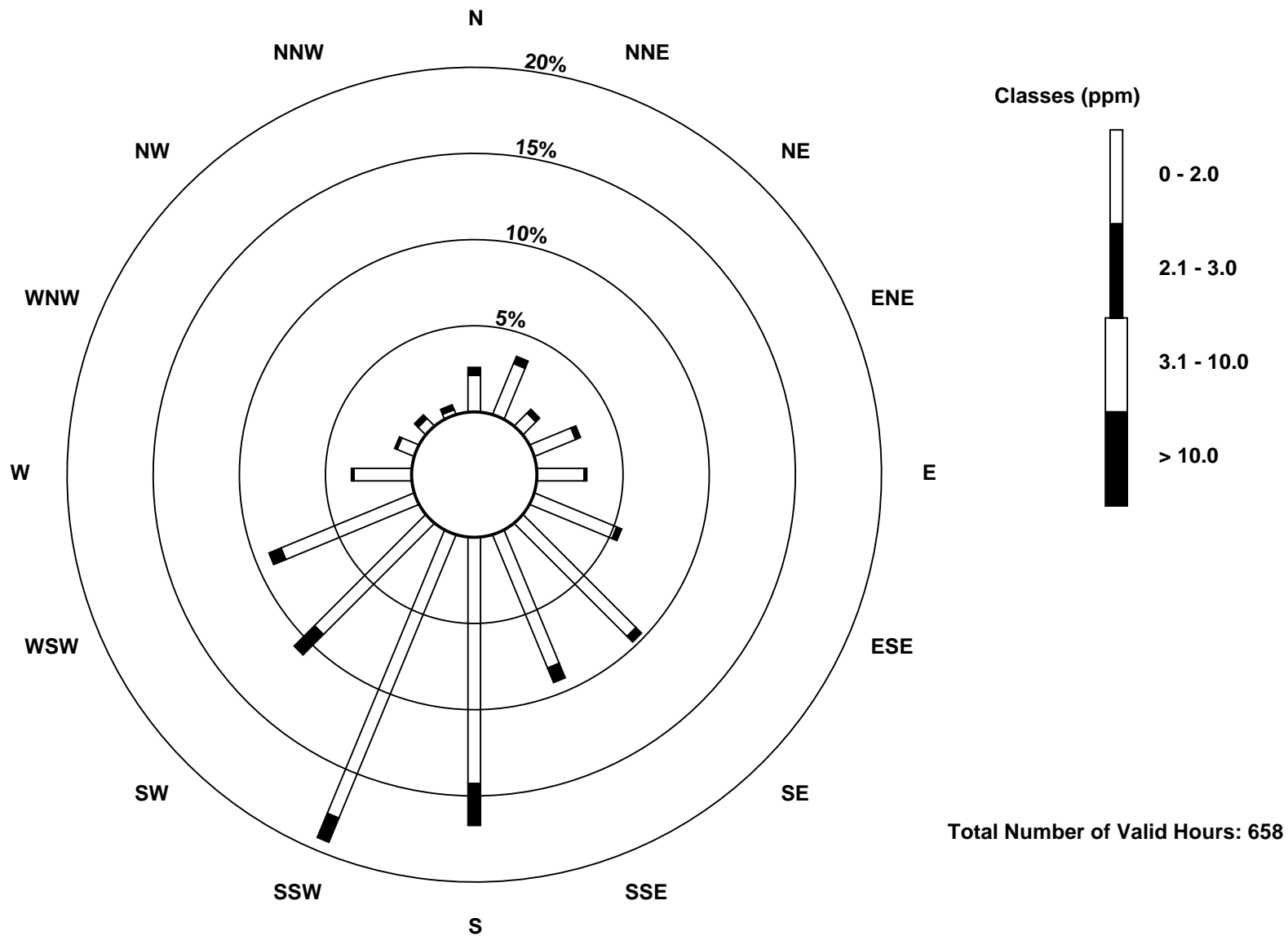
Total Number of Valid Hours: 658

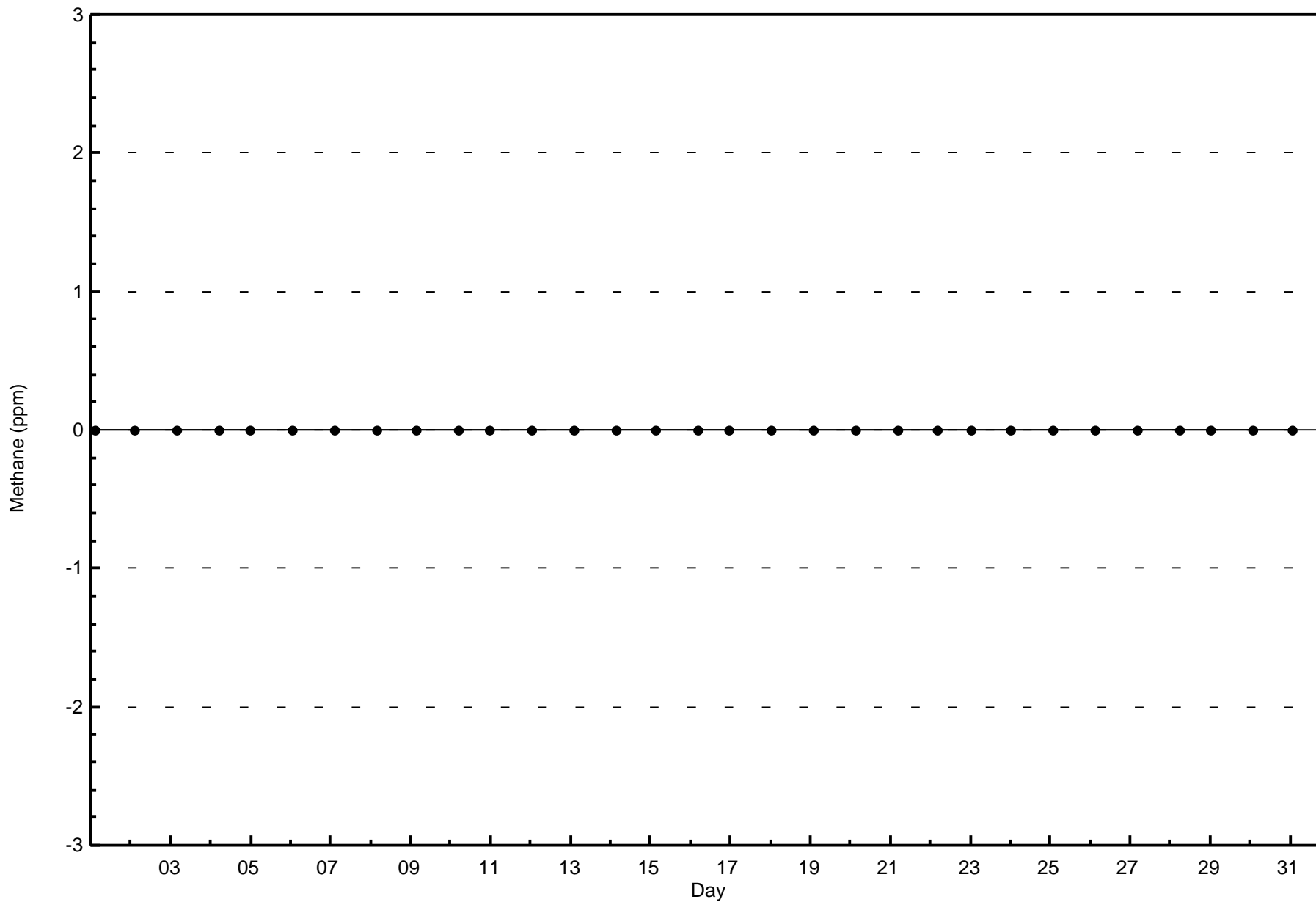
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Methane (CH₄) - ppm
Janvier (AMS 22)

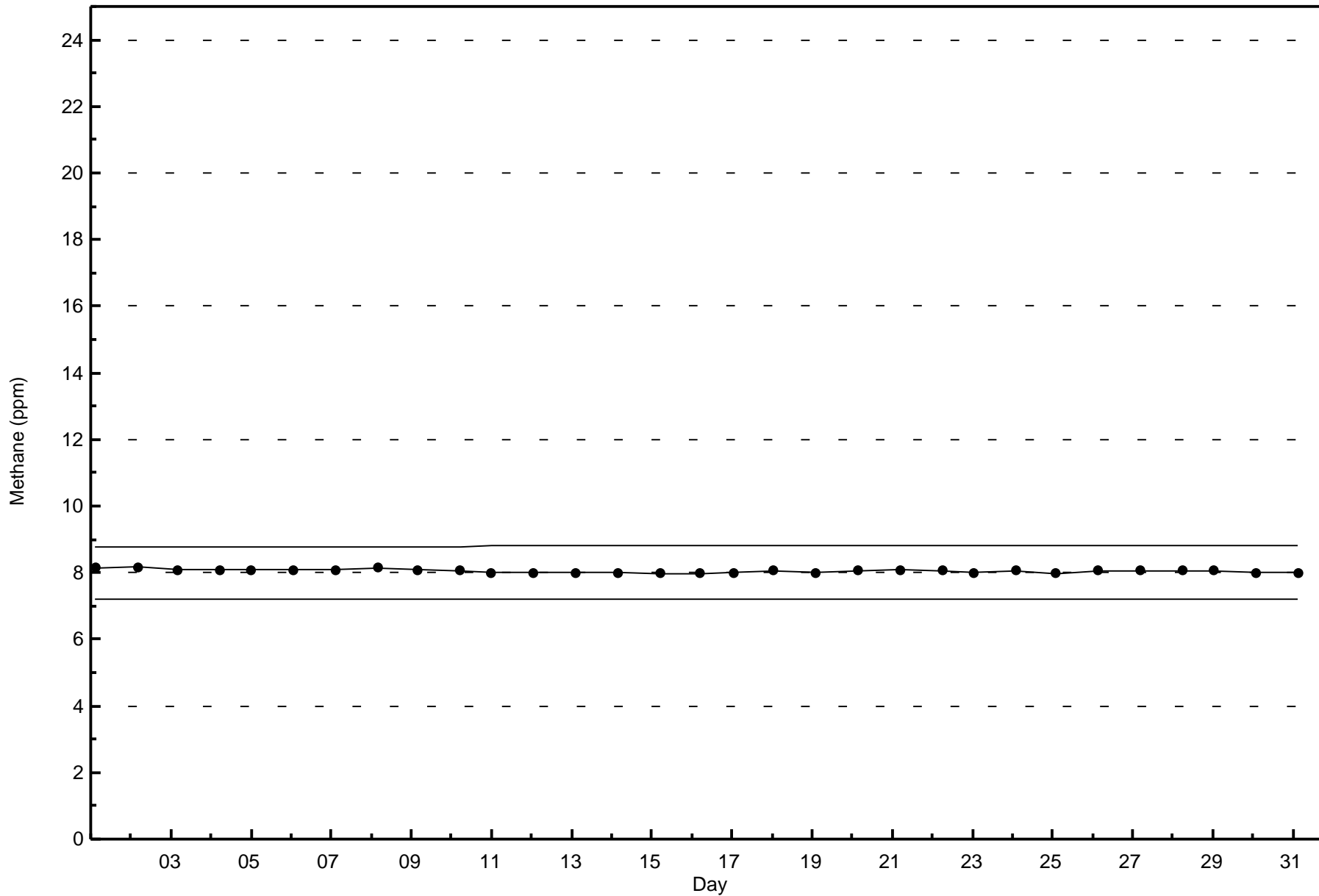






Wood Buffalo Environmental Association
Span Responses

Methane (CH₄) - ppm
Janvier - August 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

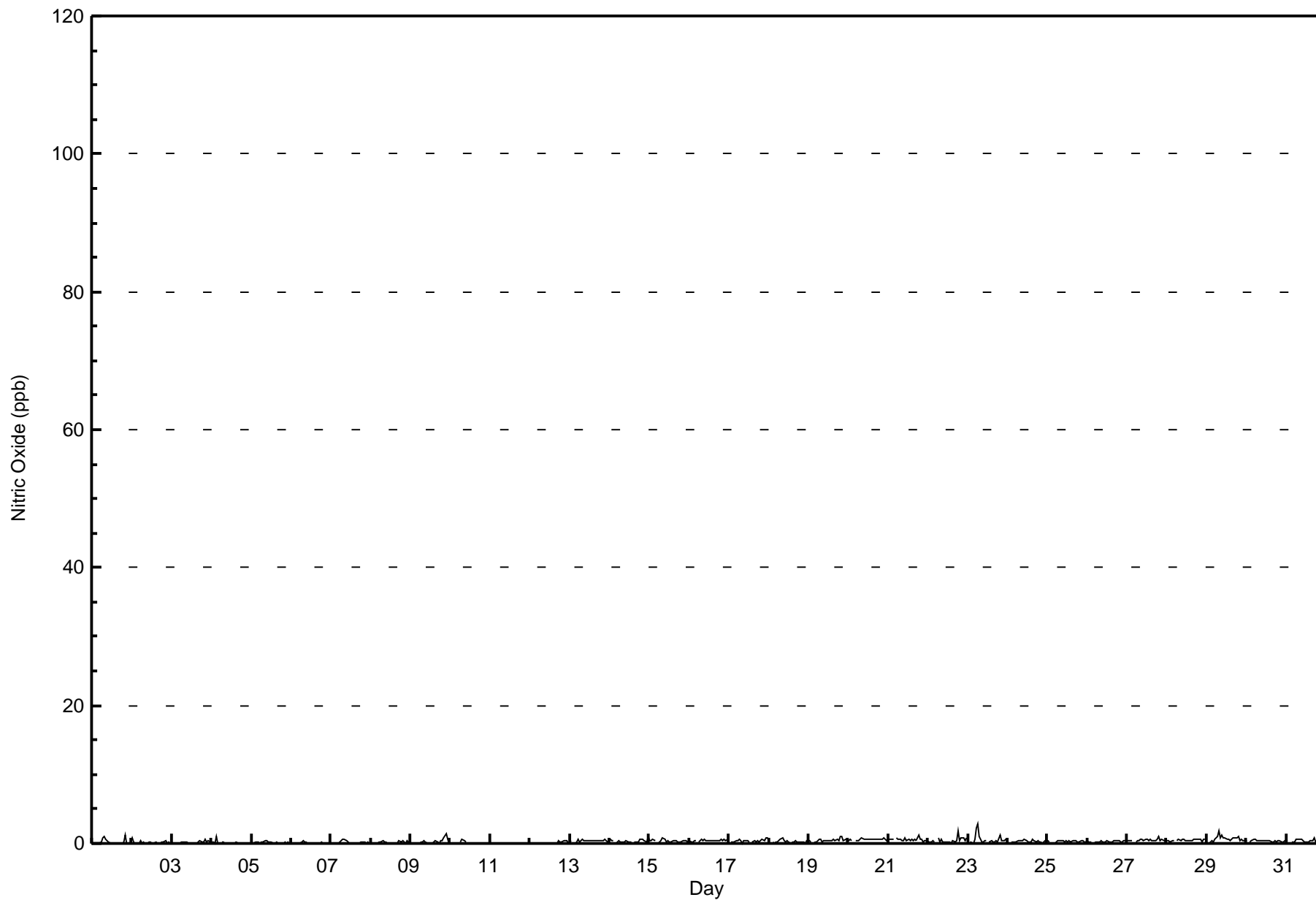
Janvier - August 2017

| Maximum Value: 3 ppb on Aug 23 07:00 | | | | | | | | | | | | | | | | | Maximum Daily Average: 0.7 ppb on Aug 29 | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|----|---|---|---|----|---|---|---|----|----|----|----|----|----|----|--|----|----|----|----|----|----|---------------------------|---------------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|
| Minimum Value: 0 ppb on Aug 2 03:00 | | | | | | | | | | | | | | | | | Minimum Daily Average: 0.1 ppb on Aug 6 | | | | | | | Hours of Data: 658 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 0.5 ppb at hour 8 | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 0.2 ppb at hour 5 | | | | | | | Hours of Missing Data: 86 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 0.3 ppb | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 1 | | | | | | | Hours of Calibration: 38 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | Percent Operational Time: 93.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 0 | 0 | Z | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 1 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0.1 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 0 | 0 | 0 | 1 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 1 | 0 | 0 | C | C | C | C | C | M | M | M | M | M | M | M | M | M | -- | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | -- | -- | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | M | M | M | M | M | M | M | M | M | M | C | C | C | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -- | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 0 | 0 | Z | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 1 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | DF | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 0 | 0 | 1 | 0 | Z | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0.5 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | Z | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | DF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 0 | DF | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 0 | 0 | Z | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0.5 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 0 | 1 | 0 | Z | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0.6 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 1 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0.6 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 0 | 0 | 0 | 0 | 0 | DF | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 0.4 | 2 | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | Z | 0 | 0 | 0 | 1 | 2 | 3 | 1 | 0 | 0 | 0 | 0 | DF | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0.6 | 3 | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0.5 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 0 | 0 | 0 | 0 | 1 | Z | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0.5 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | Z | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0.7 | 2 | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 0 | Z | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 0 | 0 | Z | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.4 | 0.5 | 0.5 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | Diurnal Average |
| | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | Diurnal Maximum |
| Z - zerospan C - Calibration M - Maintenance DF - DAS Failure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Janvier - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Janvier - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 658 | 100.00 | 100.00 |
| 21 - 40 | 0 | 0.00 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 658

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Janvier - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 17 | 24 | 8 | 16 | 18 | 35 | 54 | 59 | 101 | 121 | 68 | 57 | 23 | 7 | 4 | 4 | 616 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 17 | 24 | 8 | 16 | 18 | 35 | 54 | 59 | 101 | 121 | 68 | 57 | 23 | 7 | 4 | 4 | 616 |

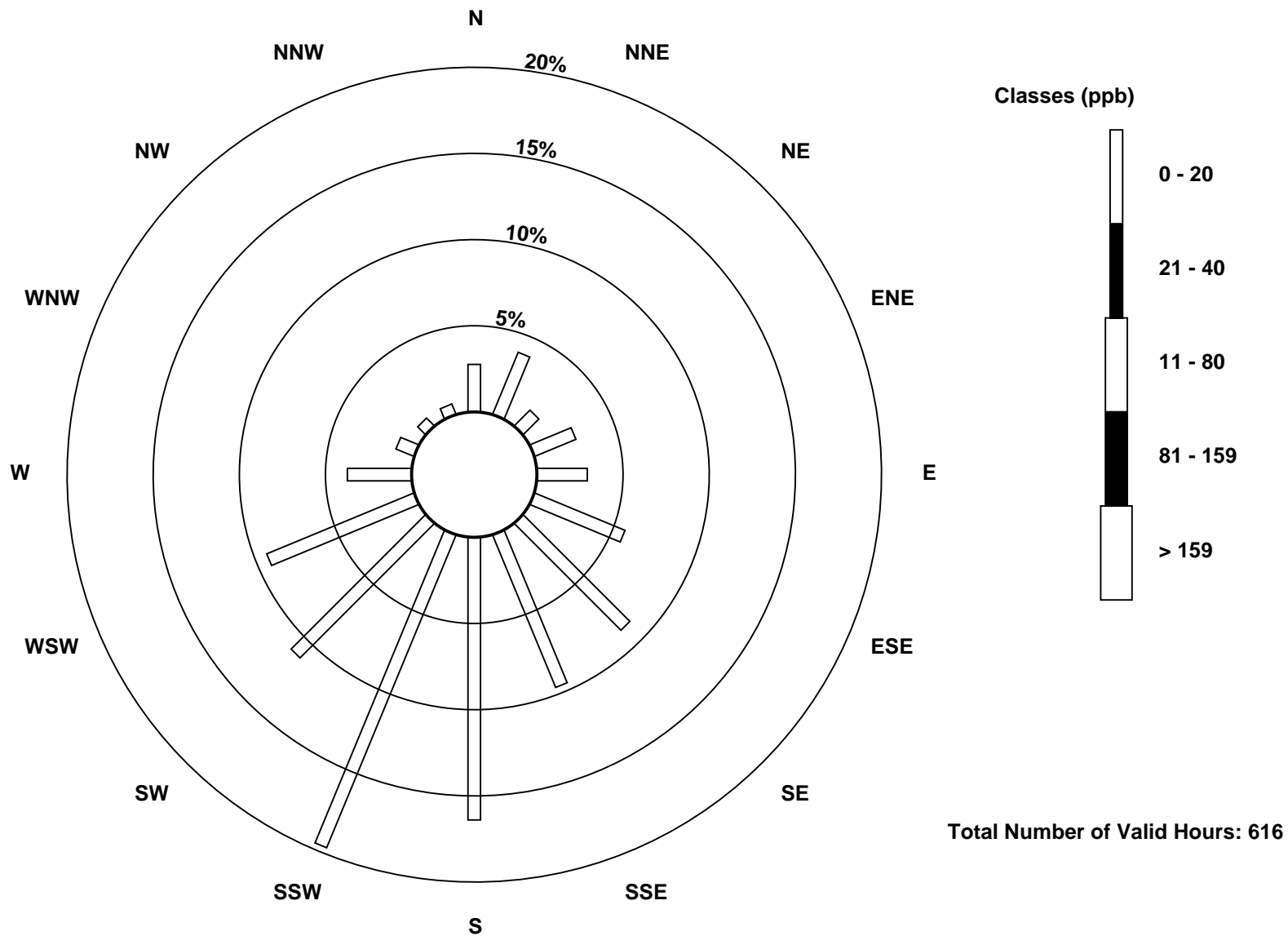
Total Number of Valid Hours: 616

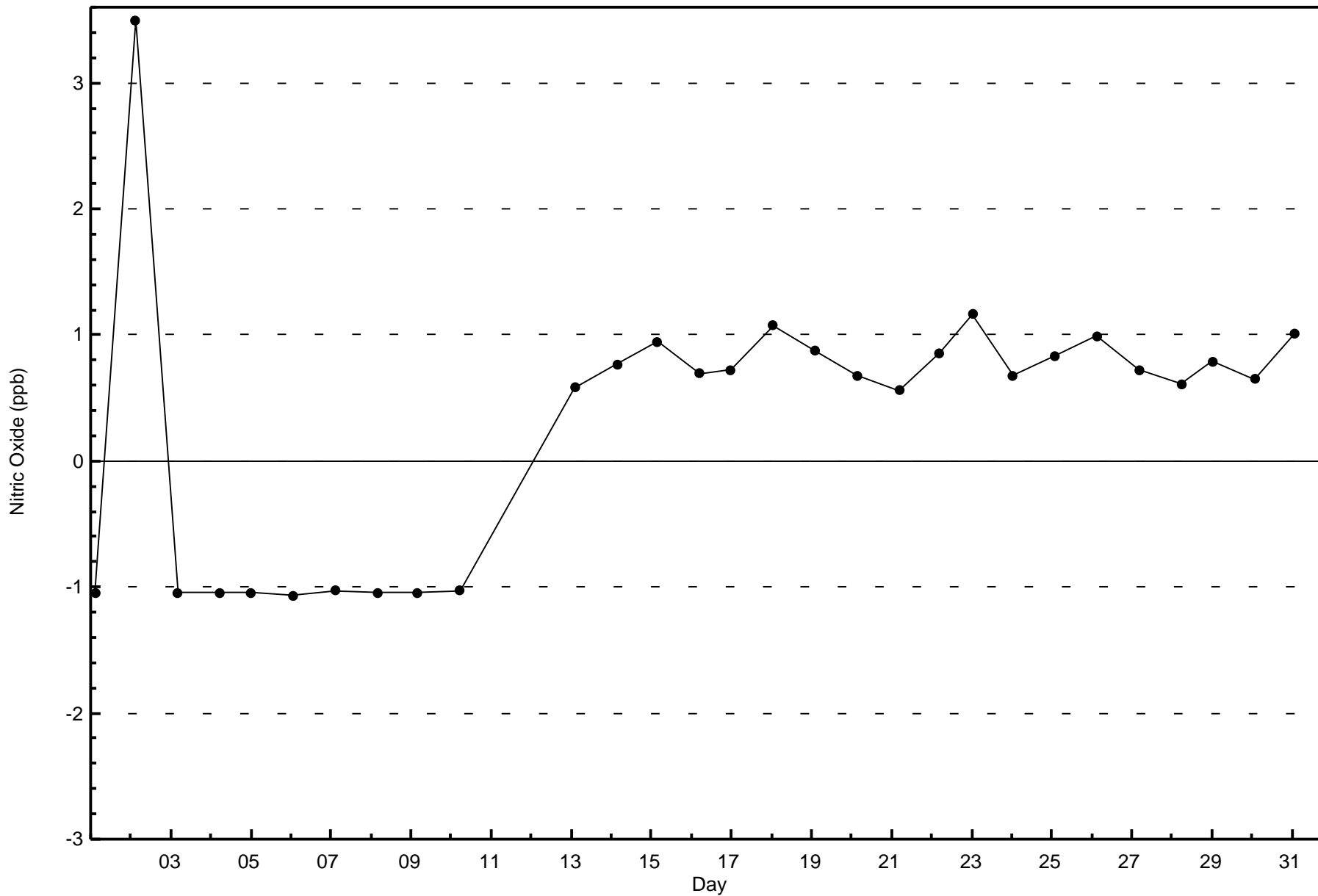
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitric Oxide (NO) - ppb
Janvier (AMS 22)

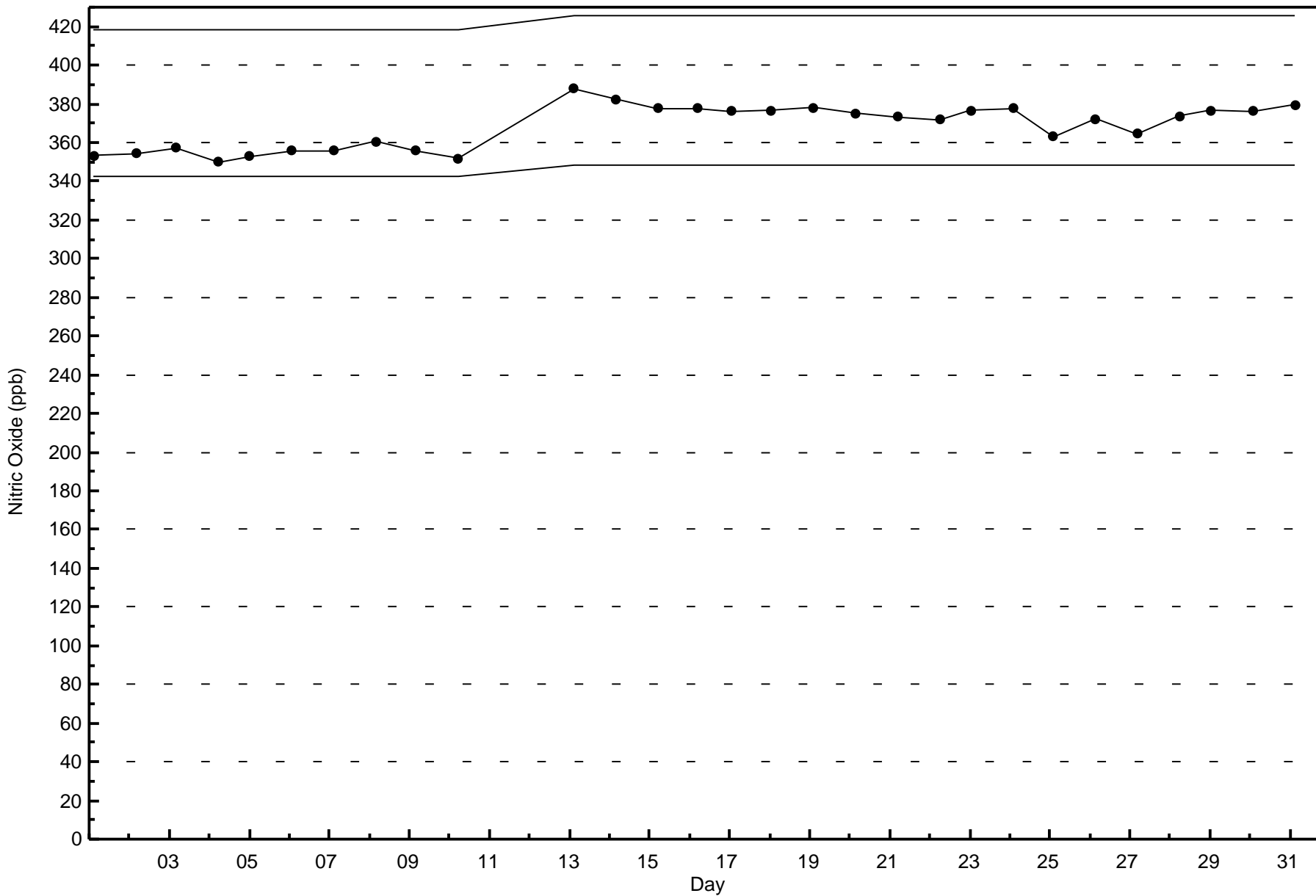






Wood Buffalo Environmental Association
Span Responses

Nitric Oxide (NO) - ppb
Janvier - August 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Janvier - August 2017

| | | | | |
|--|--|----------|---------------------------|------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 2 ppb on Aug 29 11:00 | Maximum Daily Average: 1.0 ppb on Aug 1 | | Hours of Data: | 658 |
| Minimum Value: 0 ppb on Aug 12 17:00 | Minimum Daily Average: 0.0 ppb on Aug 16 | | Hours of Missing Data: | 86 |
| Maximum Diurnal Average: 0.6 ppb at hour 6 | Minimum Diurnal Average: 0.3 ppb at hour 15 | | Hours of Calibration: | 38 |
| Monthly Average: 0.5 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 2 | | Percent Operational Time: | 93.6 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|----|---|---|---|----|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 2 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1.0 | 2 |
| 2-Aug | 1 | 1 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 0 | 1 | 1 | 0.7 | 2 |
| 3-Aug | 1 | 1 | 0 | 0 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 0.8 | 2 |
| 4-Aug | 1 | 1 | 1 | 1 | 0 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 1 |
| 5-Aug | Z | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.7 | 1 |
| 6-Aug | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0.5 | 1 |
| 7-Aug | 0 | 0 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 0.7 | 2 |
| 8-Aug | 1 | 1 | 1 | Z | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0.5 | 1 |
| 9-Aug | 0 | 0 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0.6 | 1 |
| 10-Aug | 1 | 1 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | C | C | C | C | C | M | M | M | M | M | M | M | M | M | -- | 1 |
| 11-Aug | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | -- | -- |
| 12-Aug | M | M | M | M | M | M | M | M | M | M | C | C | C | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -- | 0 |
| 13-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 14-Aug | 0 | 0 | 0 | Z | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | DF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 15-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 17-Aug | Z | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | DF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.2 | 1 |
| 18-Aug | 1 | DF | 0 | 0 | 0 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0.7 | 2 |
| 19-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0.2 | 1 |
| 20-Aug | 0 | 0 | 0 | Z | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0.3 | 1 |
| 21-Aug | 0 | 0 | 0 | 0 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0.3 | 1 |
| 22-Aug | 0 | 0 | 0 | 0 | 1 | DF | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0.5 | 1 |
| 23-Aug | Z | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | DF | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 24-Aug | 0 | Z | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0.4 | 1 |
| 25-Aug | 0 | 1 | Z | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0.3 | 1 |
| 26-Aug | 0 | 1 | 1 | Z | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0.4 | 1 |
| 27-Aug | 1 | 1 | 1 | 0 | Z | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 28-Aug | 0 | 1 | 0 | 1 | 0 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0.4 | 1 |
| 29-Aug | Z | 1 | 1 | 0 | 0 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0.8 | 2 |
| 30-Aug | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0.3 | 1 |
| 31-Aug | 0 | 0 | Z | 0 | 0 | 1 | 2 | 2 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0.7 | 2 |

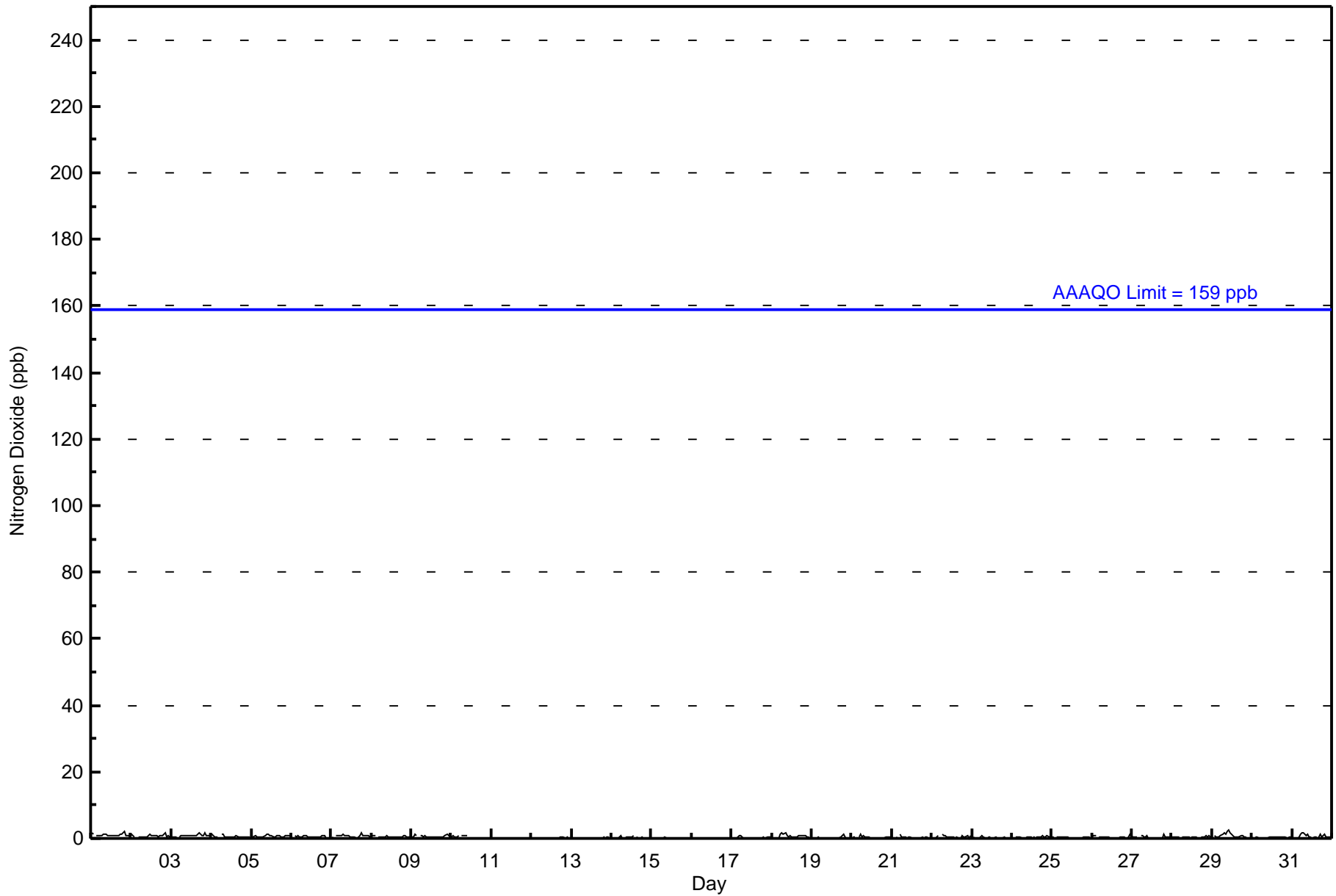
| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|
| 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.5 | 0.4 | 0.3 | 0.4 | 0.3 | 0.3 | 0.3 | 0.4 | 0.5 | 0.6 | 0.6 | 0.4 | 0.4 | 0.4 | Diurnal Average |
| 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | Diurnal Maximum |

Z - zerospan C - Calibration M - Maintenance DF - DAS Failure
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Janvier - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Janvier - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 658 | 100.00 | 100.00 |
| 21 - 40 | 0 | 0.00 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 658

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Janvier - August 2017

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---|-----------------------|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 17 | 24 | 8 | 16 | 18 | 35 | 54 | 59 | 101 | 121 | 68 | 57 | 23 | 7 | 4 | 4 | 616 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 17 | 24 | 8 | 16 | 18 | 35 | 54 | 59 | 101 | 121 | 68 | 57 | 23 | 7 | 4 | 4 | 616 |

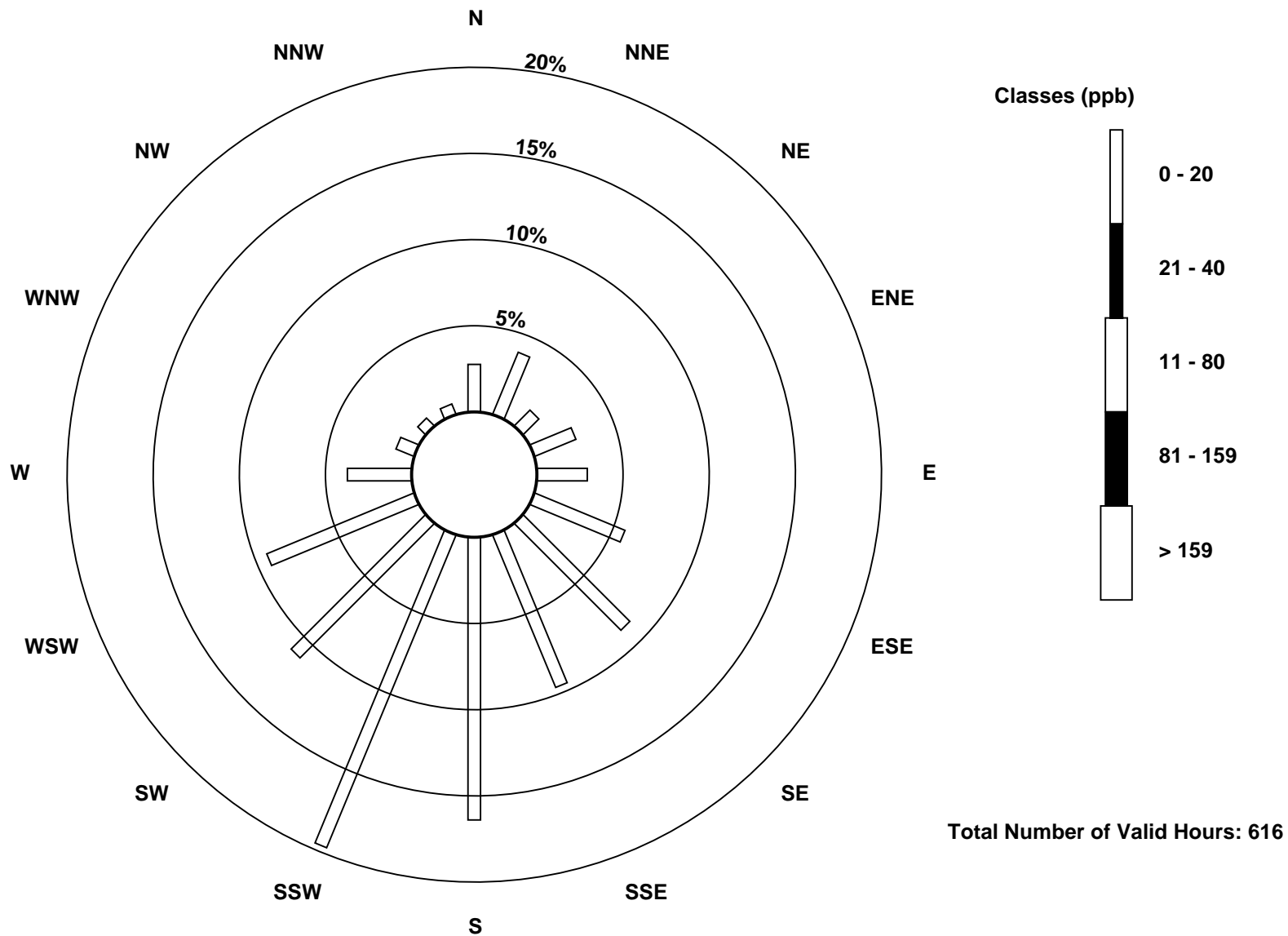
Total Number of Valid Hours: 616

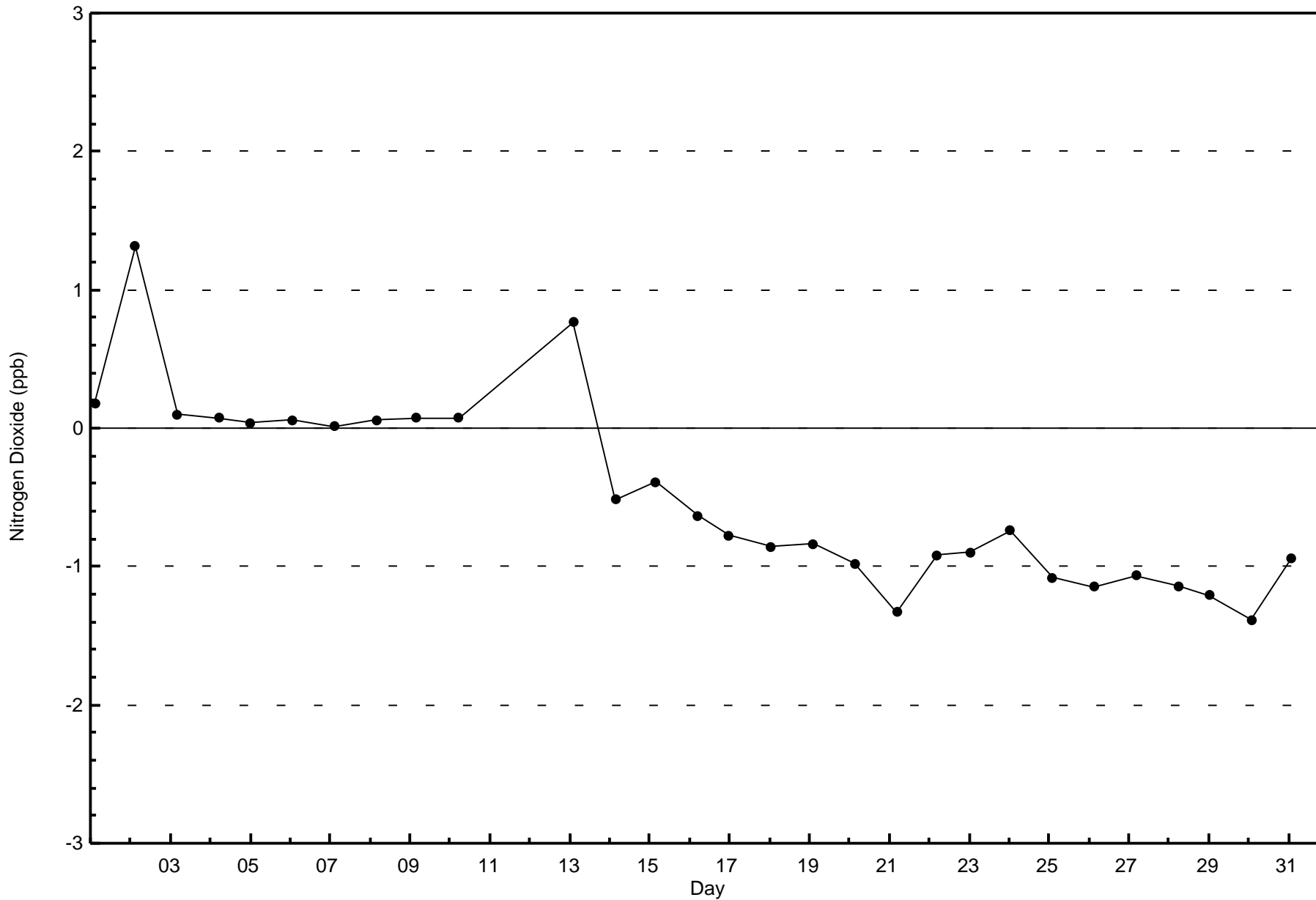
Total Number of Hours: 744

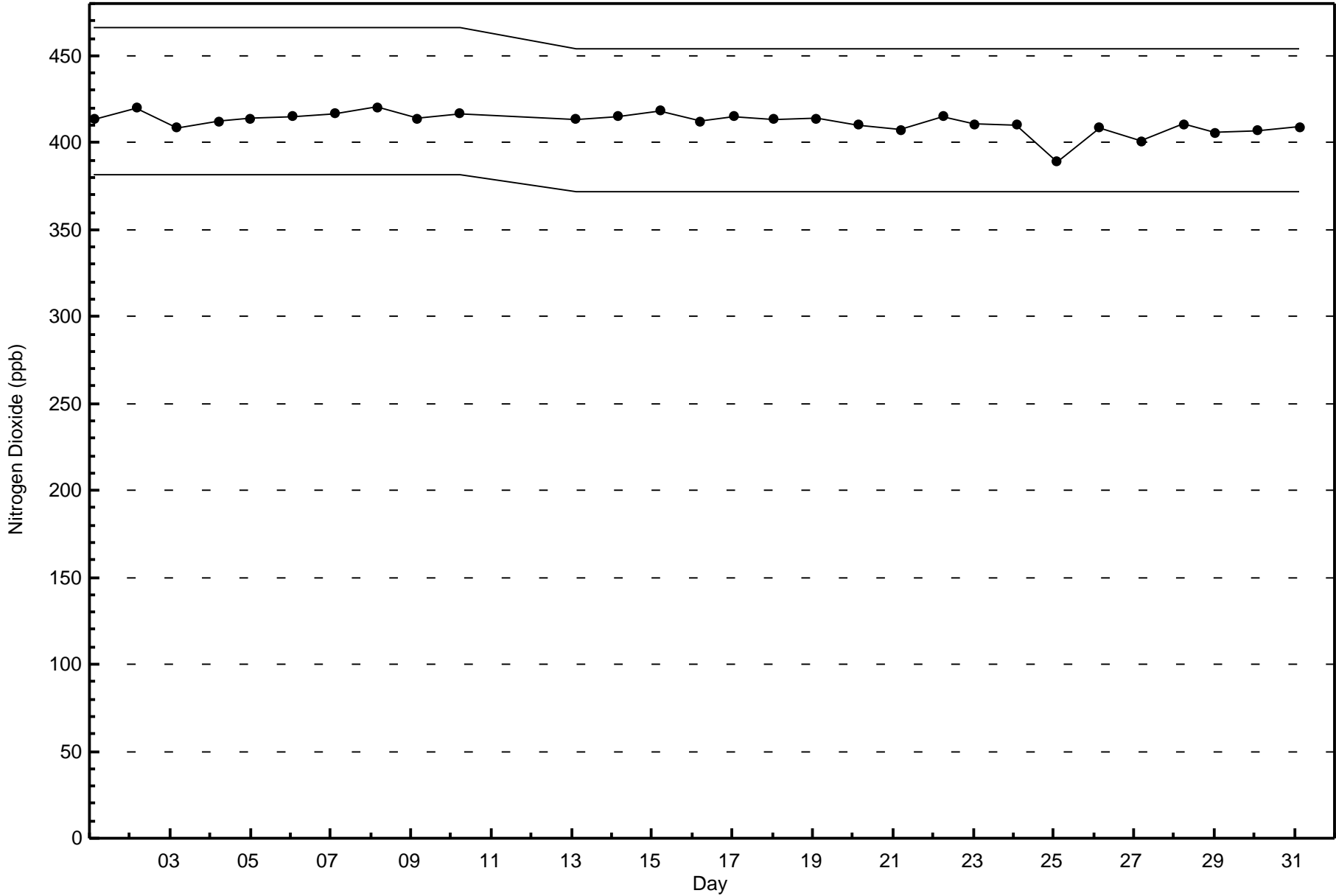


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Dioxide (NO₂) - ppb
Janvier (AMS 22)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb

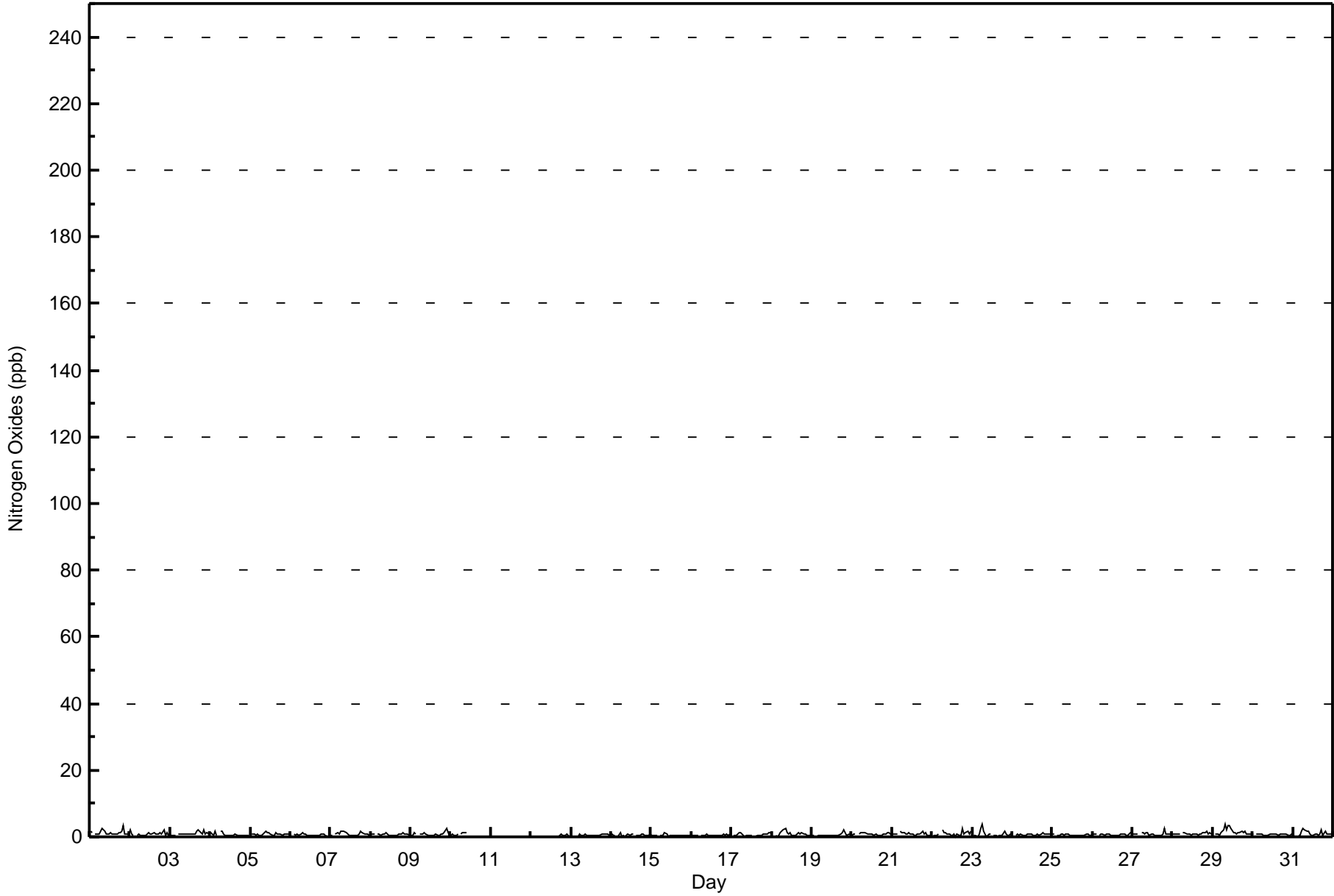
Janvier - August 2017

| Maximum Value: 4 ppb on Aug 29 08:00 | | | | | | | | | | | | | | | | | Maximum Daily Average: 1.5 ppb on Aug 29 | | | | | | | | | | | | | | | | | Hours in Service: 744 | |
|--|-------------------------------|----|---|---|---|----|---|---|---|----|----|----|----|----|----|----|--|----|----|----|----|----|----|-----------------|---------------|---------------|--|--|--|--|--|--|--|--------------------------------|--|
| Minimum Value: 0 ppb on Aug 19 04:00 | | | | | | | | | | | | | | | | | Minimum Daily Average: 0.4 ppb on Aug 15 | | | | | | | | | | | | | | | | | Hours of Data: 658 | |
| Maximum Diurnal Average: 1.1 ppb at hour 8 | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 0.6 ppb at hour 15 | | | | | | | | | | | | | | | | | Hours of Missing Data: 86 | |
| Monthly Average: 0.8 ppb | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 2 | | | | | | | | | | | | | | | | | Hours of Calibration: 38 | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 93.6 | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | |
| 1-Aug | 2 | 1 | Z | 1 | 1 | 1 | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 1 | 1 | 1 | 1.3 | 3 | | | | | | | | | |
| 2-Aug | 2 | 1 | 0 | Z | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 0 | 1 | 0 | 0.9 | 2 | | | | | | | | | |
| 3-Aug | 0 | 1 | 0 | 0 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1.0 | 2 | | | | | | | | | | |
| 4-Aug | 1 | 1 | 1 | 1 | 0 | Z | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 2 | | | | | | | | | | |
| 5-Aug | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0.8 | 2 | | | | | | | | | | |
| 6-Aug | 0 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0.6 | 1 | | | | | | | | | | |
| 7-Aug | 0 | 0 | Z | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 1 | 1 | 0.8 | 2 | | | | | | | | | | |
| 8-Aug | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0.7 | 1 | | | | | | | | | | |
| 9-Aug | 0 | 0 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 2 | 1 | 0.8 | 2 | | | | | | | | | | |
| 10-Aug | 0 | 1 | 0 | 1 | 1 | Z | 1 | 1 | 1 | 1 | C | C | C | C | C | M | M | M | M | M | M | M | M | -- | 1 | | | | | | | | | | |
| 11-Aug | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | -- | -- | | | | | | | | | | |
| 12-Aug | M | M | M | M | M | M | M | M | M | M | C | C | C | C | C | C | 0 | 1 | 1 | 1 | 1 | 1 | 0 | -- | 1 | | | | | | | | | | |
| 13-Aug | 0 | 0 | Z | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0.5 | 1 | | | | | | | | | | |
| 14-Aug | 1 | 0 | 0 | Z | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | DF | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0.6 | 1 | | | | | | | | | | |
| 15-Aug | 0 | 0 | 1 | 0 | Z | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0.5 | 1 | | | | | | | | | | |
| 17-Aug | Z | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | DF | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0.6 | 1 | | | | | | | | | | |
| 18-Aug | 1 | DF | 0 | 0 | 0 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1.0 | 2 | | | | | | | | | | |
| 19-Aug | 0 | 0 | Z | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 2 | 1 | 1 | 0.6 | 2 | | | | | | | | | | |
| 20-Aug | 0 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.9 | 1 | | | | | | | | | | |
| 21-Aug | 1 | 1 | 1 | 1 | Z | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 0 | 0.9 | 2 | | | | | | | | | | |
| 22-Aug | 0 | 0 | 0 | 1 | 1 | DF | 2 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 1 | 1 | 2 | 1 | 0.9 | 2 | | | | | | | | | | |
| 23-Aug | Z | 0 | 0 | 0 | 1 | 3 | 4 | 1 | 0 | 0 | 1 | 1 | DF | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 1 | 0 | 1 | 0.8 | 4 | | | | | | | | | | |
| 24-Aug | 0 | Z | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.7 | 1 | | | | | | | | | | |
| 25-Aug | 1 | 1 | Z | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0.6 | 1 | | | | | | | | | | |
| 26-Aug | 1 | 1 | 1 | Z | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0.7 | 1 | | | | | | | | | | |
| 27-Aug | 1 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 0.9 | 2 | | | | | | | | | | |
| 28-Aug | 1 | 1 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 0.9 | 2 | | | | | | | | | | |
| 29-Aug | Z | 1 | 1 | 1 | 1 | 1 | 2 | 4 | 2 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 1.5 | 4 | | | | | | | | | | |
| 30-Aug | 1 | Z | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.7 | 1 | | | | | | | | | | |
| 31-Aug | 1 | 0 | Z | 0 | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 2 | 0 | 2 | 1 | 1 | 1 | 1.0 | 2 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.7 | 2 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.6 | 1 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.6 | 1 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.6 | 1 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.6 | 1 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 1.0 | 3 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 1.1 | 4 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 1.1 | 4 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.9 | 2 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 1.0 | 3 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.8 | 3 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.7 | 2 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.6 | 1 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.6 | 1 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.6 | 1 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.6 | 1 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.6 | 1 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.6 | 1 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.6 | 1 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.8 | 2 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.9 | 2 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 1.0 | 2 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 1.0 | 3 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.8 | 2 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.8 | 1 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.7 | 2 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | | | | | | | |
| Z - zerospan | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DF - DAS Failure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Janvier - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Janvier - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 658 | 100.00 | 100.00 |
| 21 - 40 | 0 | 0.00 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 658

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Janvier - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 17 | 24 | 8 | 16 | 18 | 35 | 54 | 59 | 101 | 121 | 68 | 57 | 23 | 7 | 4 | 4 | 616 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 17 | 24 | 8 | 16 | 18 | 35 | 54 | 59 | 101 | 121 | 68 | 57 | 23 | 7 | 4 | 4 | 616 |

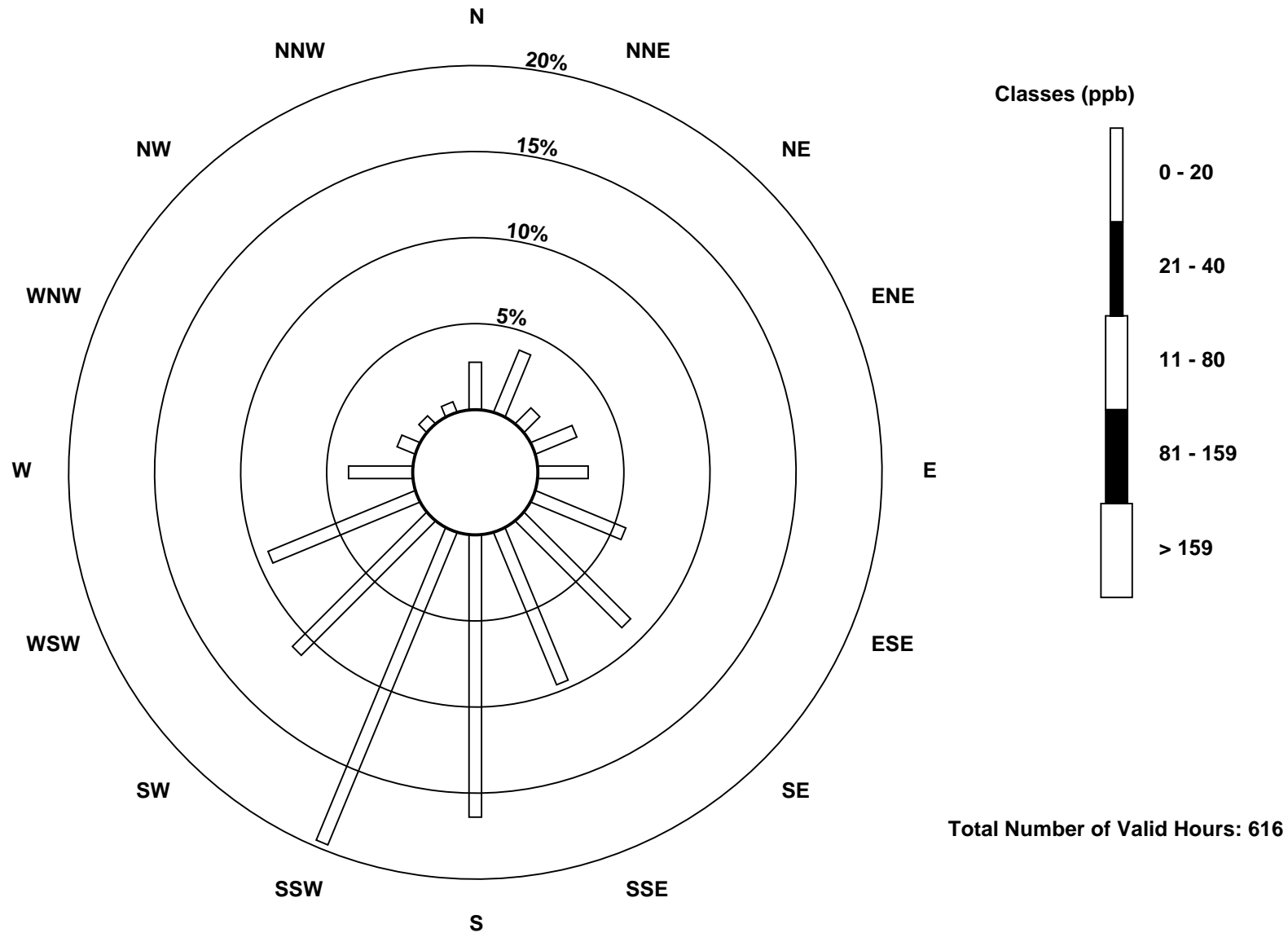
Total Number of Valid Hours: 616

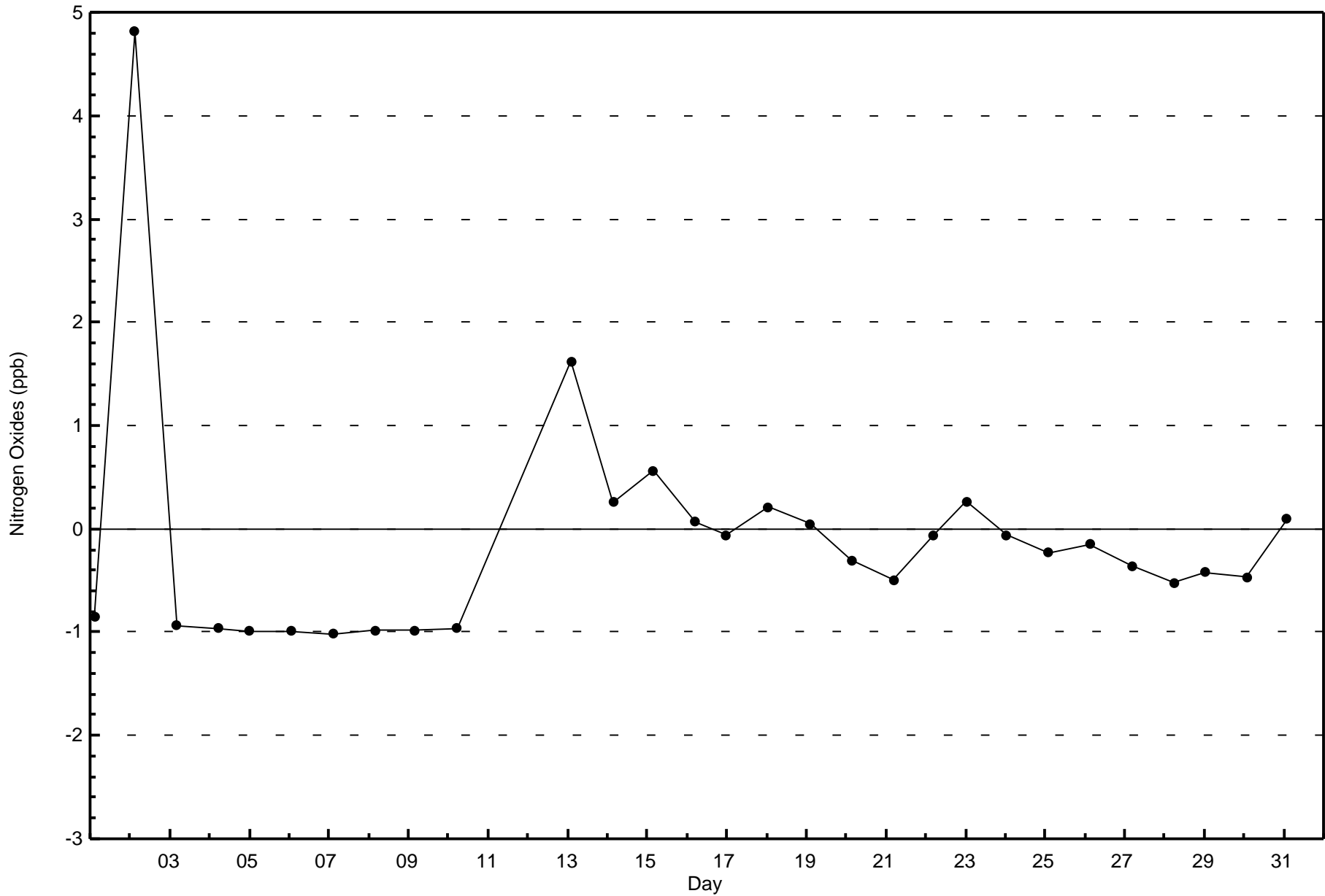
Total Number of Hours: 744

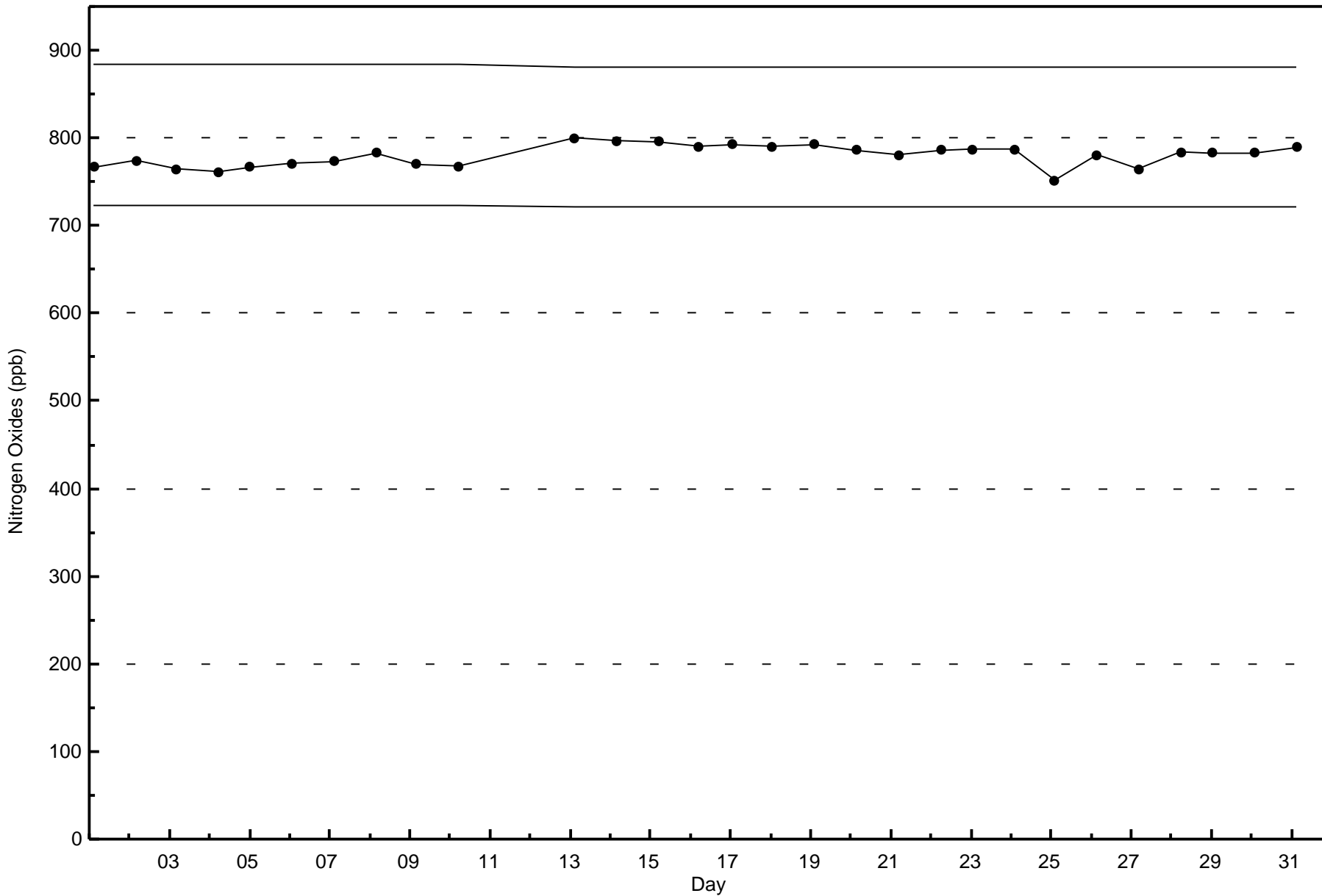


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Oxides (NO_x) - ppb
Janvier (AMS 22)









Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

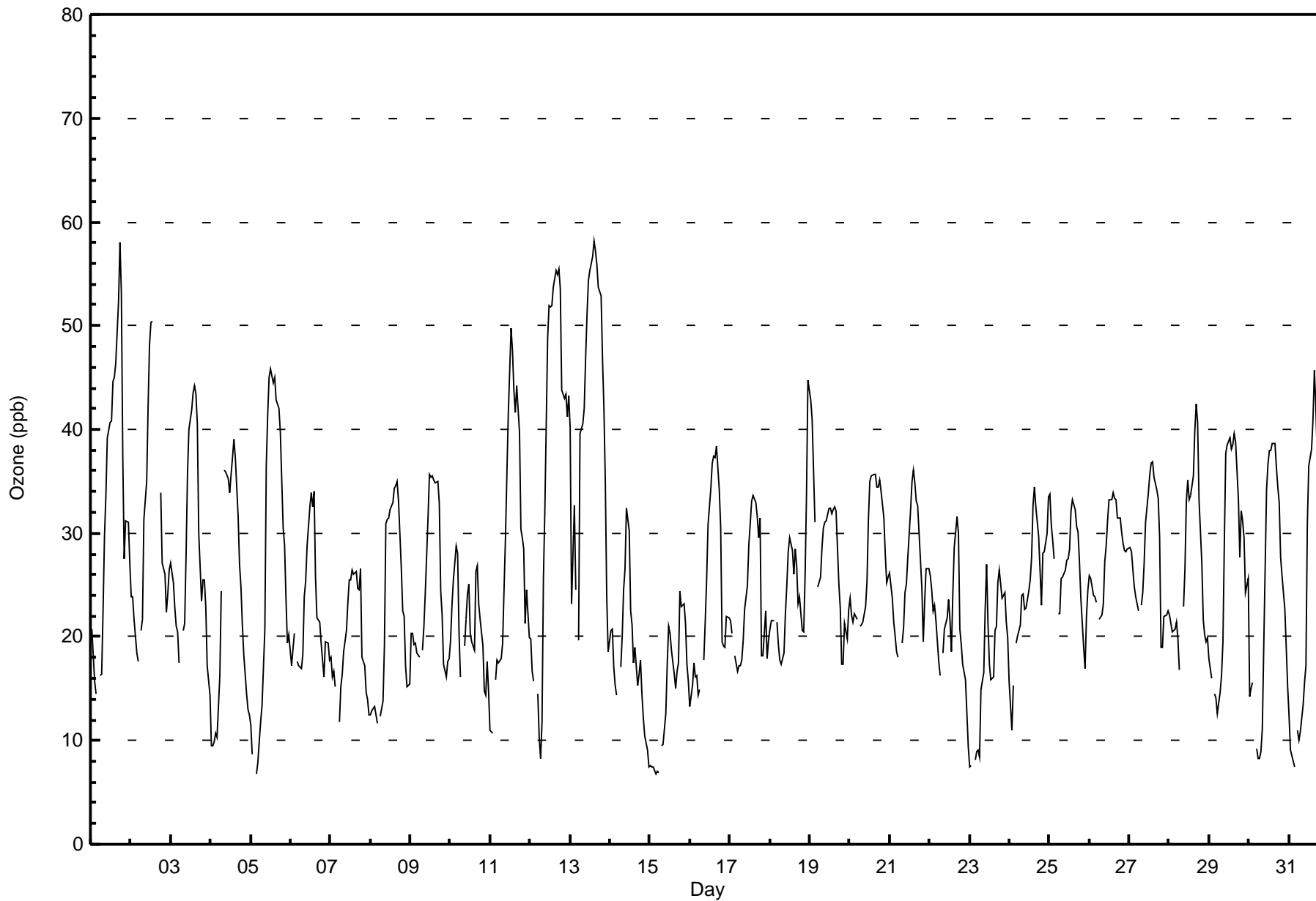
Janvier - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 58 ppb on Aug 13 15:00 Maximum Daily Average: 42.2 ppb on Aug 13 | | Hours in Service: 744 Hours of Data: 709 Hours of Missing Data: 35 Hours of Calibration: 35 Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|--|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----------------|---------------|---------------|
| Minimum Value: 7 ppb on Aug 5 04:00 Maximum Diurnal Average: 35.2 ppb at hour 16 Monthly Average: 25.8 ppb | | Minimum Daily Average: 14.9 ppb on Aug 15 Minimum Diurnal Average: 16.1 ppb at hour 6 Percentiles: P ₁ = 7 P ₁₀ = 14 Q ₁ = 18 Median = 24 Q ₃ = 33 P ₉₀ = 40 P ₉₉ = 55 | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 21 | 18 | 16 | 14 | Z | 16 | 16 | 23 | 30 | 34 | 39 | 41 | 41 | 45 | 45 | 46 | 52 | 58 | 53 | 37 | 28 | 31 | 31 | 27 | 33.2 | 58 |
| 2-Aug | 24 | 24 | 22 | 18 | 18 | Z | 21 | 22 | 31 | 35 | 42 | 48 | 50 | 50 | C | C | C | C | 34 | 27 | 26 | 22 | 24 | 26 | 29.7 | 50 |
| 3-Aug | 27 | 25 | 23 | 21 | 21 | 18 | Z | 21 | 21 | 28 | 36 | 40 | 42 | 44 | 44 | 43 | 41 | 30 | 24 | 26 | 25 | 23 | 17 | 14 | 28.4 | 44 |
| 4-Aug | 10 | 9 | 10 | 11 | 10 | 16 | 24 | Z | 36 | 36 | 35 | 34 | 36 | 37 | 39 | 37 | 32 | 27 | 25 | 21 | 18 | 14 | 13 | 12 | 23.6 | 39 |
| 5-Aug | 11 | 9 | Z | 7 | 8 | 10 | 12 | 13 | 21 | 37 | 41 | 45 | 46 | 44 | 45 | 43 | 42 | 42 | 40 | 30 | 29 | 24 | 19 | 20 | 27.8 | 46 |
| 6-Aug | 17 | 19 | 20 | Z | 18 | 17 | 17 | 18 | 24 | 25 | 29 | 33 | 34 | 33 | 34 | 26 | 22 | 21 | 19 | 18 | 16 | 20 | 19 | 18 | 22.5 | 34 |
| 7-Aug | 18 | 16 | 17 | 15 | Z | 12 | 15 | 16 | 19 | 21 | 23 | 25 | 25 | 26 | 26 | 26 | 25 | 24 | 27 | 18 | 17 | 15 | 14 | 13 | 19.7 | 27 |
| 8-Aug | 12 | 13 | 13 | 12 | 12 | Z | 12 | 14 | 19 | 31 | 31 | 31 | 32 | 33 | 34 | 35 | 35 | 33 | 27 | 22 | 22 | 17 | 15 | 16 | 22.7 | 35 |
| 9-Aug | 20 | 20 | 19 | 19 | 18 | 18 | Z | 19 | 21 | 24 | 32 | 36 | 35 | 36 | 35 | 35 | 35 | 33 | 24 | 22 | 17 | 16 | 18 | 18 | 24.8 | 36 |
| 10-Aug | 20 | 23 | 26 | 29 | 28 | 20 | 16 | Z | 19 | 22 | 24 | 25 | 20 | 20 | 19 | 26 | 27 | 23 | 22 | 19 | 15 | 14 | 18 | 15 | 21.3 | 29 |
| 11-Aug | 11 | 11 | Z | 16 | 18 | 18 | 18 | 19 | 25 | 29 | 35 | 41 | 50 | 48 | 44 | 42 | 44 | 40 | 30 | 30 | 28 | 21 | 25 | 20 | 28.8 | 50 |
| 12-Aug | 20 | 17 | 16 | Z | 15 | 10 | 8 | 12 | 26 | 32 | 49 | 52 | 52 | 52 | 54 | 55 | 55 | 55 | 53 | 44 | 43 | 43 | 41 | 43 | 36.8 | 55 |
| 13-Aug | 40 | 23 | 33 | 24 | Z | 20 | 40 | 41 | 42 | 47 | 51 | 54 | 55 | 57 | 58 | 57 | 56 | 54 | 53 | 47 | 42 | 35 | 24 | 19 | 42.2 | 58 |
| 14-Aug | 21 | 21 | 17 | 15 | 14 | Z | 17 | 20 | 25 | 27 | 32 | 30 | 22 | 21 | 18 | 19 | 15 | 16 | 18 | 15 | 12 | 10 | 9 | 7 | 18.4 | 32 |
| 15-Aug | 8 | 7 | 7 | 7 | 7 | 7 | Z | 9 | 10 | 13 | 17 | 21 | 20 | 19 | 16 | 15 | 17 | 17 | 24 | 23 | 23 | 21 | 17 | 16 | 14.9 | 24 |
| 16-Aug | 13 | 15 | 17 | 16 | 16 | 14 | 15 | Z | 18 | 21 | 26 | 31 | 34 | 37 | 37 | 37 | 38 | 34 | 30 | 19 | 19 | 19 | 22 | 22 | 24.0 | 38 |
| 17-Aug | 22 | 20 | Z | 18 | 17 | 17 | 17 | 18 | 20 | 23 | 25 | 29 | 31 | 33 | 34 | 33 | 32 | 30 | 31 | 18 | 18 | 23 | 18 | 20 | 23.7 | 34 |
| 18-Aug | 21 | 22 | 22 | Z | 21 | 19 | 18 | 17 | 18 | 22 | 25 | 28 | 30 | 28 | 26 | 28 | 27 | 23 | 24 | 21 | 20 | 26 | 34 | 45 | 24.6 | 45 |
| 19-Aug | 43 | 41 | 36 | 31 | Z | 25 | 26 | 29 | 31 | 31 | 31 | 32 | 32 | 32 | 32 | 32 | 32 | 25 | 23 | 17 | 17 | 21 | 20 | 23 | 28.8 | 43 |
| 20-Aug | 24 | 22 | 21 | 22 | 22 | Z | 21 | 21 | 21 | 23 | 25 | 31 | 35 | 36 | 36 | 36 | 34 | 34 | 35 | 34 | 32 | 28 | 25 | 26 | 28.0 | 36 |
| 21-Aug | 26 | 24 | 21 | 20 | 19 | 18 | Z | 19 | 21 | 24 | 25 | 28 | 32 | 35 | 36 | 35 | 33 | 33 | 27 | 25 | 20 | 24 | 27 | 27 | 26.0 | 36 |
| 22-Aug | 26 | 25 | 23 | 23 | 22 | 18 | 16 | Z | 18 | 21 | 22 | 24 | 22 | 19 | 24 | 29 | 32 | 30 | 21 | 19 | 17 | 16 | 13 | 9 | 21.1 | 32 |
| 23-Aug | 7 | 8 | Z | 8 | 9 | 9 | 8 | 15 | 17 | 23 | 27 | 21 | 17 | 16 | 16 | 21 | 21 | 25 | 26 | 24 | 24 | 21 | 20 | 17.7 | 27 | |
| 24-Aug | 16 | 11 | 15 | Z | 19 | 20 | 21 | 24 | 24 | 23 | 23 | 24 | 25 | 28 | 33 | 34 | 33 | 30 | 26 | 23 | 28 | 28 | 30 | 34 | 24.9 | 34 |
| 25-Aug | 34 | 31 | 29 | 28 | Z | 22 | 22 | 26 | 26 | 26 | 27 | 28 | 29 | 32 | 33 | 32 | 31 | 30 | 27 | 24 | 19 | 17 | 22 | 25 | 26.9 | 34 |
| 26-Aug | 26 | 26 | 24 | 24 | 23 | Z | 22 | 22 | 23 | 27 | 29 | 31 | 33 | 33 | 34 | 33 | 33 | 32 | 31 | 30 | 29 | 28 | 28 | 28 | 28.3 | 34 |
| 27-Aug | 29 | 28 | 26 | 25 | 24 | 23 | Z | 23 | 24 | 27 | 31 | 34 | 36 | 37 | 37 | 35 | 34 | 33 | 30 | 19 | 19 | 22 | 22 | 22 | 27.8 | 37 |
| 28-Aug | 22 | 21 | 21 | 21 | 21 | 20 | 17 | Z | 23 | 27 | 33 | 35 | 33 | 34 | 36 | 40 | 42 | 41 | 33 | 27 | 22 | 20 | 20 | 20 | 27.3 | 42 |
| 29-Aug | 18 | 16 | Z | 15 | 14 | 13 | 15 | 16 | 20 | 29 | 38 | 38 | 39 | 38 | 39 | 40 | 39 | 33 | 28 | 32 | 31 | 30 | 24 | 26 | 27.3 | 40 |
| 30-Aug | 14 | 15 | 16 | Z | 9 | 8 | 8 | 9 | 11 | 19 | 34 | 37 | 38 | 38 | 39 | 39 | 36 | 34 | 33 | 28 | 26 | 23 | 19 | 15 | 23.8 | 39 |
| 31-Aug | 12 | 9 | 8 | 7 | Z | 11 | 10 | 11 | 13 | 16 | 17 | 31 | 36 | 38 | 41 | 46 | 42 | 37 | 36 | 29 | 32 | 33 | 32 | 30 | 25.2 | 46 |
| 20.4 19.0 19.9 18.0 16.9 16.1 17.4 19.1 22.4 26.5 30.8 33.5 34.3 34.7 34.8 35.2 34.6 32.7 30.2 25.4 23.7 22.9 22.0 21.8 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| 43 41 36 31 28 25 40 41 42 47 51 54 55 57 58 57 56 58 53 47 43 43 41 45 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| Z - zerospan C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Ozone (O₃) - ppb
Janvier - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Janvier - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 238 | 33.57 | 33.57 |
| 21 - 50 | 451 | 63.61 | 97.18 |
| 51 - 82 | 20 | 2.82 | 100.00 |
| > 83 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Janvier - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 9 | 10 | 2 | 5 | 4 | 16 | 19 | 40 | 54 | 33 | 17 | 10 | 3 | 4 | 3 | 2 | 231 |
| 21 - 50 | 10 | 12 | 6 | 14 | 15 | 21 | 44 | 24 | 53 | 95 | 54 | 51 | 20 | 4 | 2 | 1 | 426 |
| 51 - 82 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 |
| > 83 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 19 | 24 | 8 | 19 | 19 | 37 | 63 | 64 | 107 | 128 | 71 | 61 | 23 | 8 | 5 | 4 | 660 |

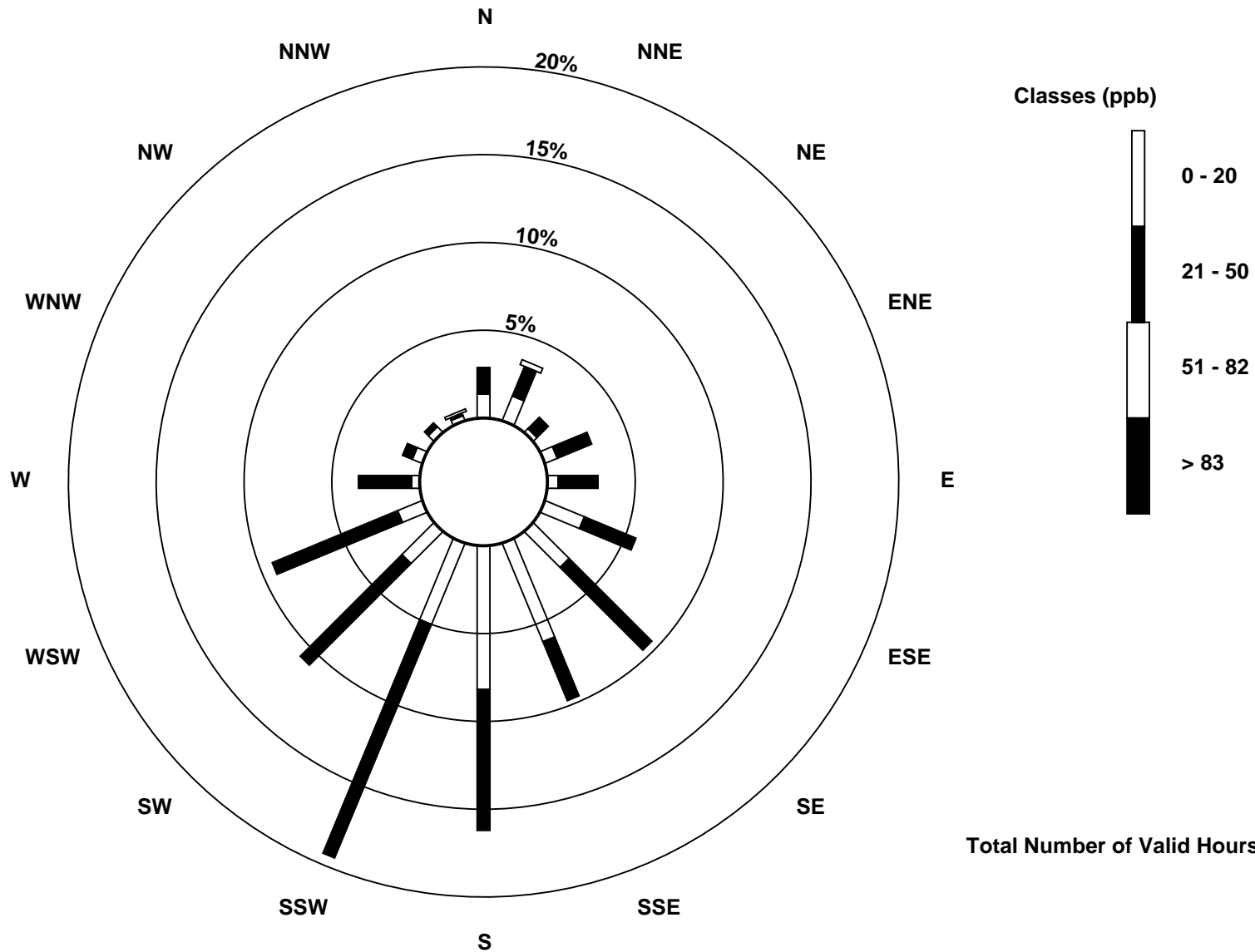
Total Number of Valid Hours: 660

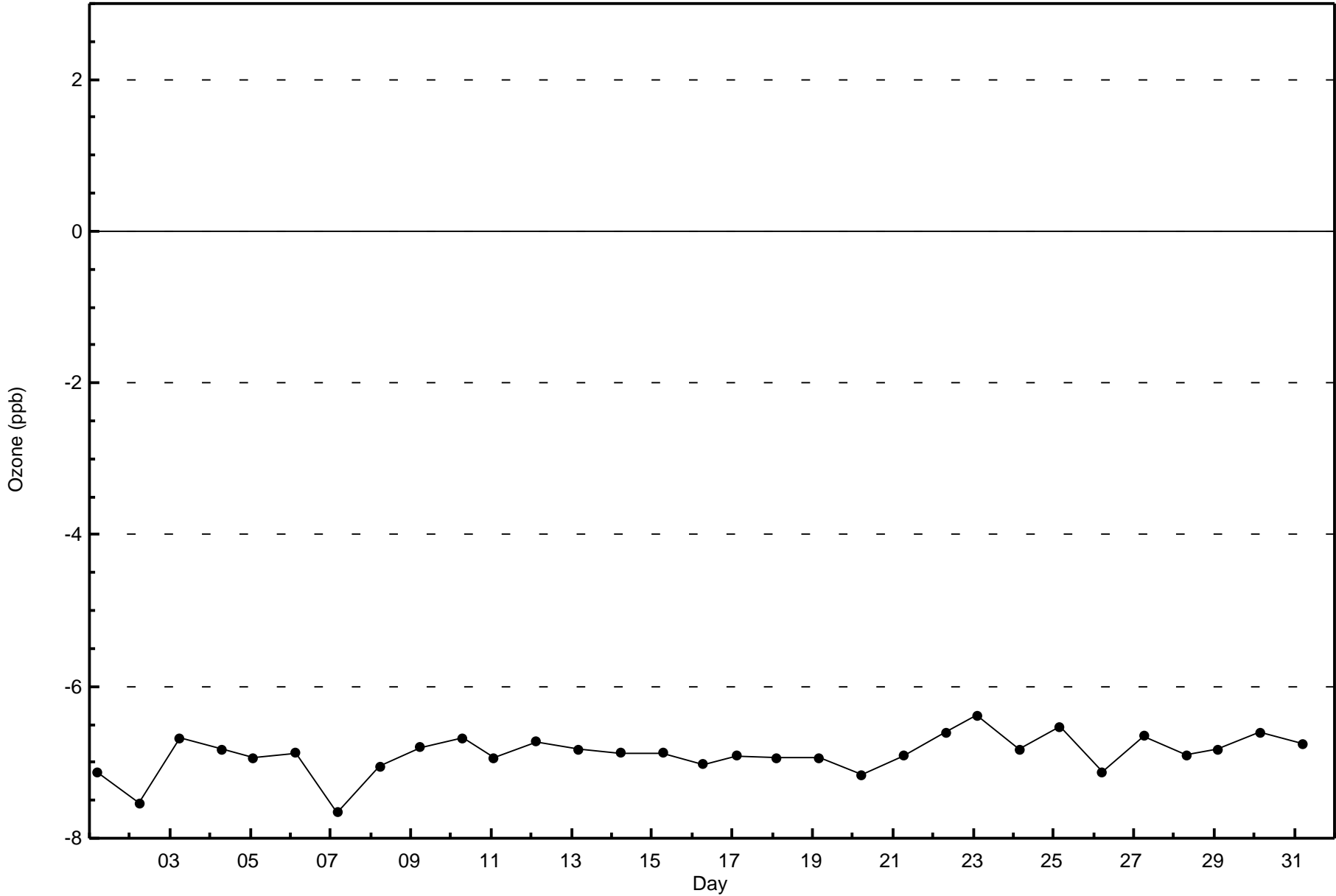
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Ozone (O₃) - ppb
Janvier (AMS 22)

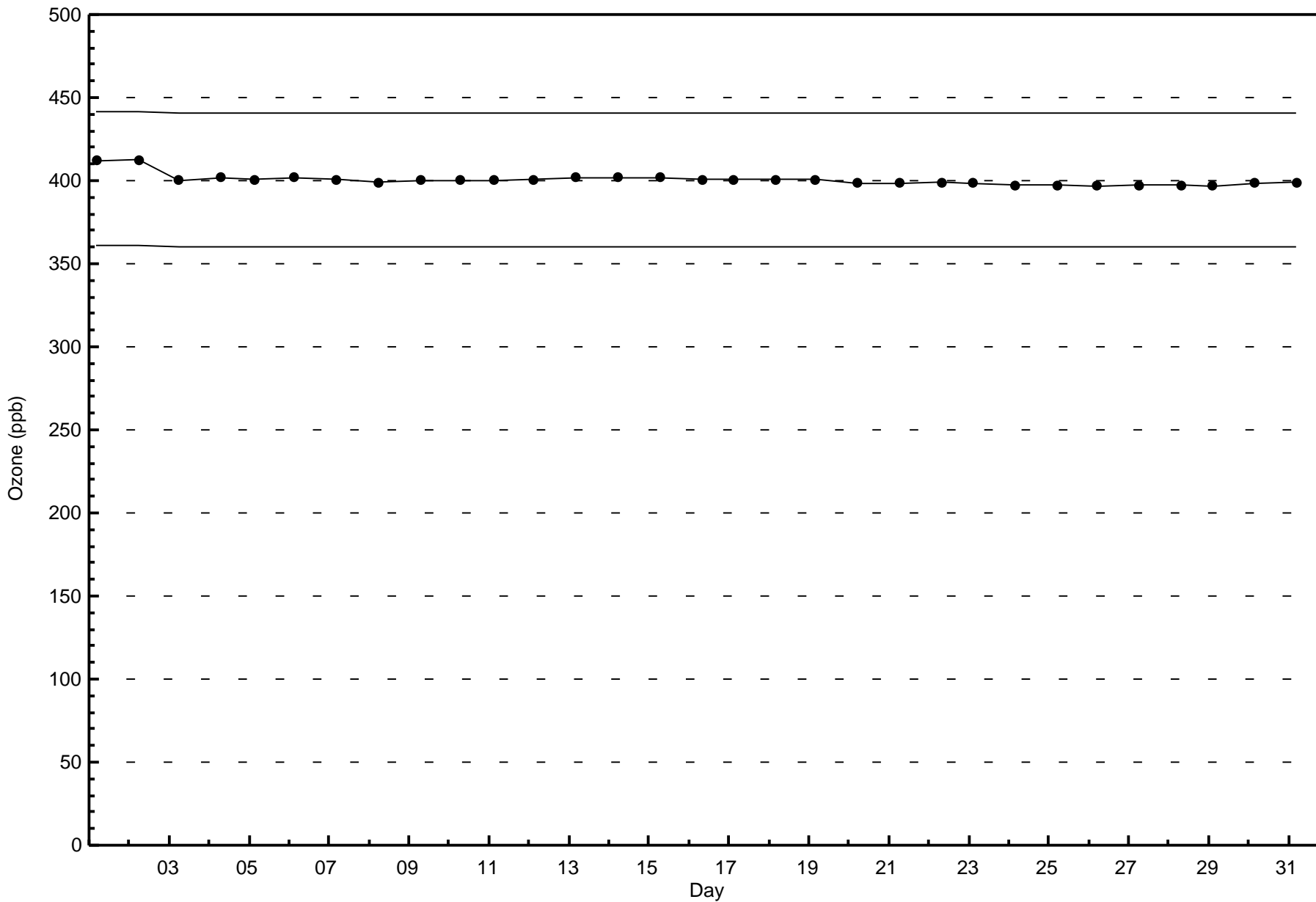






Wood Buffalo Environmental Association
Span Responses

Ozone (O₃) - ppb
Janvier - August 2017





Summary of Hour Averages

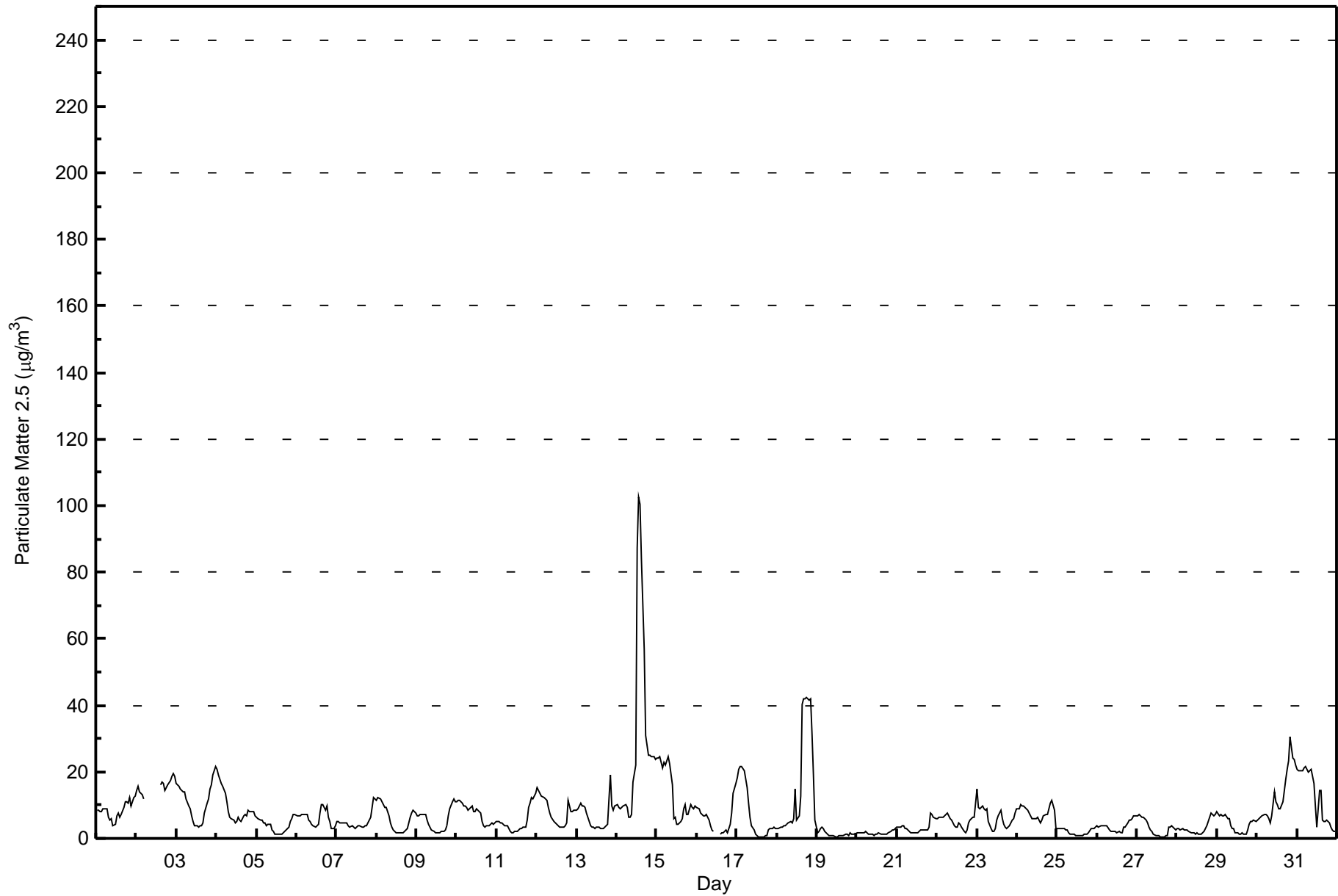
Janvier - August 2017

| Number of Exceedences (AAAQO): 24-hr: 1 Maximum Value: 102.6 µg/m ³ on Aug 14 14:00 Minimum Value: 0.4 µg/m ³ on Aug 27 17:00 Maximum Diurnal Average: 9.7 µg/m ³ at hour 21 Monthly Average: 7.62 µg/m ³ | | Maximum Daily Average: 30.8 µg/m ³ on Aug 14 Minimum Daily Average: 1.3 µg/m ³ on Aug 19 Minimum Diurnal Average: 4.5 µg/m ³ at hour 12 Percentiles: P ₁ = 0.5 P ₁₀ = 1.6 Q ₁ = 2.8 Median = 5.4 Q ₃ = 9.1 P ₉₀ = 16.0 P ₉₉ = 41.8 | | Hours in Service: 744 Hours of Data: 732 Hours of Missing Data: 12 Hours of Calibration: 3 Percent Operational Time: 98.8 | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|--|------|---|------|------|------|------|------|------|------|------|------|-------|-------|------|------|------|------|------|------|------|------|-----------------|---------------|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 8.3 | 8.3 | 8.1 | 7.8 | 8.7 | 9.1 | 8.8 | 6.6 | 5.6 | 6.0 | 4.0 | 4.3 | 6.7 | 7.4 | 6.2 | 7.1 | 9.5 | 11.0 | 11.0 | 10.5 | 12.4 | 9.7 | 12.3 | 12.6 | 8.4 | 12.6 |
| 2-Aug | 14.4 | 15.7 | 14.1 | 13.1 | 11.8 | AF | AF | AF | AF | AF | AF | AF | AF | AF | 15.9 | 16.9 | 16.7 | 14.6 | 15.2 | 16.1 | 17.4 | 18.7 | 19.6 | 18.4 | -- | 19.6 |
| 3-Aug | 16.6 | 15.8 | 14.9 | 14.2 | 14.0 | 13.9 | 11.9 | 9.7 | 8.8 | 6.7 | 5.0 | 4.0 | 3.8 | 3.6 | 4.0 | 3.9 | 4.7 | 7.6 | 10.4 | 11.8 | 14.8 | 16.2 | 19.1 | 21.8 | 10.7 | 21.8 |
| 4-Aug | 20.8 | 19.0 | 17.9 | 16.5 | 15.6 | 13.4 | 11.0 | 8.1 | 6.4 | 6.1 | 5.6 | 4.8 | 5.3 | 6.4 | 5.4 | 5.1 | 6.9 | 7.4 | 7.0 | 8.3 | 7.9 | 8.2 | 7.9 | 6.9 | 9.5 | 20.8 |
| 5-Aug | 6.2 | 5.9 | 5.6 | 5.4 | 4.5 | 4.8 | 4.0 | 4.3 | 4.2 | 2.4 | 2.0 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.9 | 2.1 | 2.6 | 3.5 | 5.0 | 6.1 | 7.2 | 7.3 | 3.8 | 7.3 |
| 6-Aug | 6.8 | 6.8 | 7.0 | 7.0 | 7.3 | 7.0 | 7.1 | 5.5 | 4.9 | 4.4 | 4.0 | 3.6 | 3.7 | 4.3 | 7.5 | 10.3 | 10.0 | 8.5 | 9.8 | 6.5 | 5.0 | 2.9 | 3.0 | 3.6 | 6.1 | 10.3 |
| 7-Aug | 5.1 | 5.0 | 4.6 | 4.5 | 4.6 | 4.5 | 4.6 | 4.0 | 3.5 | 3.7 | 3.6 | 3.0 | 3.5 | 4.0 | 3.7 | 3.4 | 3.2 | 3.8 | 3.8 | 4.8 | 6.5 | 9.1 | 12.3 | 11.8 | 5.0 | 12.3 |
| 8-Aug | 11.6 | 12.3 | 11.8 | 11.0 | 10.4 | 9.4 | 9.5 | 6.8 | 4.6 | 3.5 | 2.7 | 2.2 | 1.9 | 1.7 | 1.8 | 1.9 | 1.9 | 2.1 | 2.8 | 4.7 | 6.3 | 7.8 | 8.3 | 7.5 | 6.0 | 12.3 |
| 9-Aug | 6.7 | 6.7 | 7.0 | 7.2 | 7.3 | 7.0 | 5.6 | 4.2 | 3.3 | 2.6 | 1.9 | 1.7 | 1.6 | 1.6 | 1.8 | 2.0 | 2.0 | 2.4 | 4.0 | 6.7 | 8.7 | 11.1 | 11.8 | 11.0 | 5.3 | 11.8 |
| 10-Aug | 11.2 | 11.5 | 11.5 | 10.8 | 9.7 | 9.7 | 9.4 | 8.6 | 9.3 | 9.7 | 8.0 | 8.1 | 9.0 | 8.6 | 7.5 | 5.2 | 4.0 | 3.5 | 3.9 | 4.0 | 4.3 | 4.6 | 4.3 | 4.7 | 7.5 | 11.5 |
| 11-Aug | 5.1 | 5.1 | 4.7 | 4.5 | 4.2 | 4.0 | 3.6 | 2.8 | 2.0 | 1.8 | 1.8 | 2.0 | 2.3 | 2.4 | 2.8 | 3.1 | 3.3 | 3.4 | 5.5 | 9.1 | 10.8 | 12.4 | 11.7 | 13.4 | 5.1 | 13.4 |
| 12-Aug | 15.3 | 14.6 | 13.4 | 12.7 | 12.3 | 12.0 | 11.3 | 9.4 | 7.5 | 6.3 | 5.0 | 4.6 | 4.3 | 3.8 | 3.5 | 3.3 | 3.4 | 3.7 | 4.7 | 11.3 | 7.9 | 8.1 | 8.6 | 8.4 | 8.2 | 15.3 |
| 13-Aug | 8.4 | 8.9 | 10.7 | 9.8 | 9.8 | 9.2 | 7.8 | 5.2 | 4.0 | 3.3 | 3.3 | 3.2 | 3.4 | 3.4 | 3.0 | 3.1 | 3.1 | 3.4 | 4.3 | 11.7 | 19.1 | 9.9 | 8.3 | 9.6 | 6.9 | 19.1 |
| 14-Aug | 10.0 | 9.3 | 9.1 | 9.3 | 9.7 | 10.3 | 9.4 | 6.4 | 6.5 | 7.2 | 16.8 | 22.0 | 87.1 | 102.6 | 100.4 | 83.7 | 56.9 | 31.0 | 28.1 | 25.2 | 25.0 | 24.8 | 24.5 | 23.9 | 30.8 | 102.6 |
| 15-Aug | 24.1 | 24.4 | 24.5 | 21.3 | 22.7 | 22.1 | 23.2 | 24.4 | 22.4 | 16.3 | 6.1 | 6.1 | 4.4 | 4.1 | 5.2 | 5.9 | 8.8 | 10.0 | 7.2 | 7.1 | 10.0 | 9.5 | 8.9 | 9.6 | 13.7 | 24.5 |
| 16-Aug | 9.1 | 8.8 | 7.5 | 7.1 | 7.0 | 6.7 | 7.1 | 5.7 | 3.7 | 2.7 | 2.0 | C | C | C | 1.3 | 1.6 | 1.8 | 2.4 | 1.8 | 2.8 | 4.3 | 7.4 | 13.8 | 16.4 | 5.8 | 16.4 |
| 17-Aug | 18.1 | 20.6 | 21.8 | 21.4 | 20.2 | 18.0 | 15.1 | 10.5 | 6.2 | 4.0 | 2.4 | 1.1 | 0.7 | 0.5 | 0.4 | 0.5 | 0.5 | 0.8 | 1.0 | 2.4 | 2.9 | 2.9 | 3.2 | 3.0 | 7.4 | 21.8 |
| 18-Aug | 2.8 | 3.0 | 3.3 | 3.3 | 3.7 | 3.9 | 4.1 | 4.5 | 5.1 | 4.8 | 6.1 | 15.0 | 5.5 | 6.6 | 12.9 | 40.1 | 42.0 | 42.0 | 42.4 | 41.5 | 41.9 | 31.2 | 19.1 | 5.6 | 16.3 | 42.4 |
| 19-Aug | 1.7 | 1.9 | 3.0 | 3.3 | 2.8 | 2.1 | 1.2 | 0.8 | 0.6 | 0.7 | 0.8 | 0.6 | 0.5 | 0.7 | 0.7 | 0.8 | 0.8 | 1.2 | 1.2 | 1.0 | 1.5 | 1.2 | 1.3 | 1.5 | 1.3 | 3.3 |
| 20-Aug | 1.6 | 1.6 | 1.7 | 1.8 | 1.9 | 1.9 | 1.7 | 1.5 | 1.3 | 1.1 | 0.8 | 1.1 | 1.3 | 1.6 | 1.5 | 1.4 | 1.2 | 1.5 | 1.5 | 1.7 | 2.2 | 2.6 | 2.7 | 3.0 | 1.7 | 3.0 |
| 21-Aug | 3.4 | 3.2 | 3.4 | 3.9 | 3.6 | 3.1 | 2.8 | 1.9 | 1.7 | 1.5 | 1.9 | 1.6 | 1.9 | 2.3 | 2.4 | 2.4 | 2.3 | 2.5 | 2.6 | 3.4 | 7.4 | 7.4 | 6.2 | 6.1 | 3.3 | 7.4 |
| 22-Aug | 6.1 | 6.2 | 6.5 | 6.5 | 6.6 | 7.1 | 7.6 | 6.7 | 6.0 | 5.4 | 3.9 | 3.5 | 3.6 | 4.6 | 4.1 | 3.4 | 2.1 | 1.5 | 2.5 | 4.7 | 5.6 | 6.5 | 6.4 | 10.7 | 5.3 | 10.7 |
| 23-Aug | 15.0 | 9.5 | 8.7 | 9.8 | 9.0 | 8.5 | 9.0 | 5.1 | 3.1 | 2.0 | 2.1 | 3.0 | 5.4 | 6.9 | 8.5 | 5.9 | 4.1 | 3.3 | 3.0 | 3.9 | 4.7 | 5.4 | 5.8 | 7.5 | 6.2 | 15.0 |
| 24-Aug | 9.1 | 8.8 | 10.1 | 9.9 | 9.7 | 9.2 | 8.6 | 7.6 | 6.6 | 6.0 | 6.1 | 5.9 | 6.5 | 5.5 | 4.8 | 5.6 | 6.8 | 7.2 | 7.4 | 8.9 | 10.7 | 11.3 | 8.6 | 3.1 | 7.7 | 11.3 |
| 25-Aug | 2.9 | 3.1 | 3.1 | 3.0 | 2.8 | 2.7 | 2.5 | 1.7 | 1.2 | 1.2 | 1.1 | 0.9 | 0.8 | 0.9 | 0.9 | 1.0 | 1.2 | 1.4 | 1.4 | 1.6 | 2.8 | 3.0 | 3.0 | 3.5 | 2.0 | 3.5 |
| 26-Aug | 3.7 | 3.5 | 3.7 | 3.7 | 3.7 | 3.9 | 3.6 | 2.6 | 2.1 | 2.1 | 2.1 | 2.0 | 1.9 | 2.0 | 1.6 | 1.9 | 3.3 | 3.4 | 4.5 | 5.5 | 5.6 | 6.1 | 6.7 | 6.8 | 3.6 | 6.8 |
| 27-Aug | 6.8 | 7.1 | 6.9 | 6.3 | 6.3 | 5.6 | 4.8 | 3.5 | 2.5 | 2.1 | 1.2 | 1.0 | 0.7 | 0.7 | 0.5 | 0.5 | 0.4 | 0.7 | 1.0 | 3.6 | 3.5 | 3.6 | 2.8 | 2.7 | 3.1 | 7.1 |
| 28-Aug | 2.8 | 2.9 | 2.8 | 2.9 | 2.6 | 2.4 | 2.7 | 2.2 | 1.7 | 1.8 | 1.7 | 1.3 | 1.9 | 1.5 | 1.4 | 1.9 | 2.1 | 2.8 | 4.0 | 6.2 | 7.6 | 7.1 | 6.9 | 7.2 | 3.3 | 7.6 |
| 29-Aug | 8.2 | 6.9 | 7.2 | 6.9 | 6.7 | 7.0 | 6.0 | 6.0 | 3.8 | 2.9 | 3.1 | 1.8 | 1.6 | 1.4 | 1.5 | 1.6 | 1.5 | 1.5 | 2.7 | 4.3 | 5.3 | 5.2 | 5.4 | 5.1 | 4.3 | 8.2 |
| 30-Aug | 5.4 | 6.0 | 6.5 | 7.0 | 7.4 | 7.1 | 6.9 | 6.0 | 4.5 | 6.6 | 13.8 | 11.1 | 10.1 | 8.9 | 9.1 | 11.1 | 14.6 | 17.8 | 20.6 | 23.3 | 30.4 | 24.3 | 23.8 | 22.0 | 12.7 | 30.4 |
| 31-Aug | 20.6 | 20.3 | 20.3 | 20.2 | 21.4 | 21.8 | 20.9 | 19.9 | 20.6 | 18.6 | 16.6 | 9.6 | 3.4 | 14.3 | 14.5 | 5.4 | 5.0 | 5.0 | 5.6 | 4.8 | 3.3 | 2.5 | 2.2 | 2.2 | 12.5 | 21.8 |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| 9.3 9.1 9.1 8.8 8.6 8.2 7.7 6.4 5.5 4.8 4.5 4.5 6.3 7.4 7.6 7.8 7.3 6.8 7.2 8.4 9.7 9.2 9.2 8.9 24.1 24.4 24.5 21.4 22.7 22.1 23.2 24.4 22.4 18.6 16.8 22.0 87.1 102.6 100.4 83.7 56.9 42.0 42.4 41.5 41.9 31.2 24.5 23.9 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C - Calibration AF - Analyzer Failure Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³ | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Janvier - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Janvier - August 2017

| Concentration Ranges ($\mu\text{g}/\text{m}^3$) | Number of Hours | % | Cumulative % |
|---|------------------------|----------|---------------------|
| 1 - 5 | 342 | 46.72 | 46.72 |
| 6 - 15 | 283 | 38.66 | 85.38 |
| 16 - 25 | 62 | 8.47 | 93.85 |
| 26 - 80 | 11 | 1.50 | 95.36 |
| > 81.0 | 4 | 0.55 | 95.90 |

Total Number of Valid Hours: 732

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Janvier - August 2017

| Concentration Ranges (μg/m ³) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|--|----------------|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 1 - 5 | 10 | 13 | 2 | 11 | 11 | 12 | 25 | 23 | 37 | 88 | 42 | 24 | 15 | 4 | 2 | 2 | 321 |
| 6 - 15 | 9 | 12 | 7 | 6 | 5 | 17 | 32 | 32 | 60 | 37 | 16 | 10 | 3 | 4 | 4 | 2 | 256 |
| 16 - 25 | 0 | 0 | 0 | 2 | 2 | 7 | 8 | 9 | 17 | 3 | 5 | 5 | 1 | 0 | 0 | 0 | 59 |
| 26 - 80 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 4 | 1 | 1 | 1 | 0 | 0 | 0 | 11 |
| > 81.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 4 |
| Totals | 19 | 25 | 9 | 19 | 18 | 37 | 65 | 64 | 117 | 133 | 67 | 40 | 20 | 8 | 6 | 4 | 651 |

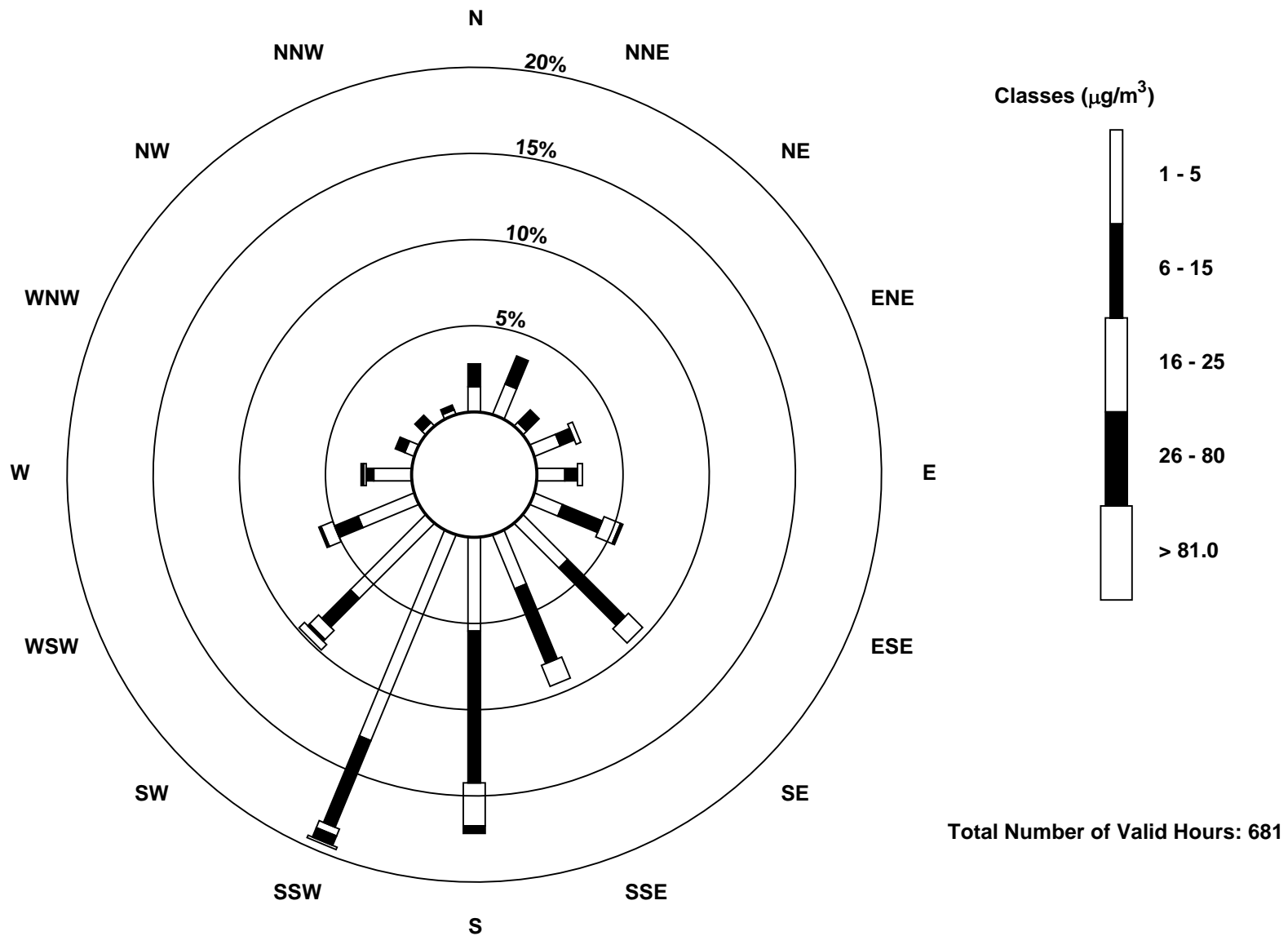
Total Number of Valid Hours: 681

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Janvier (AMS 22)



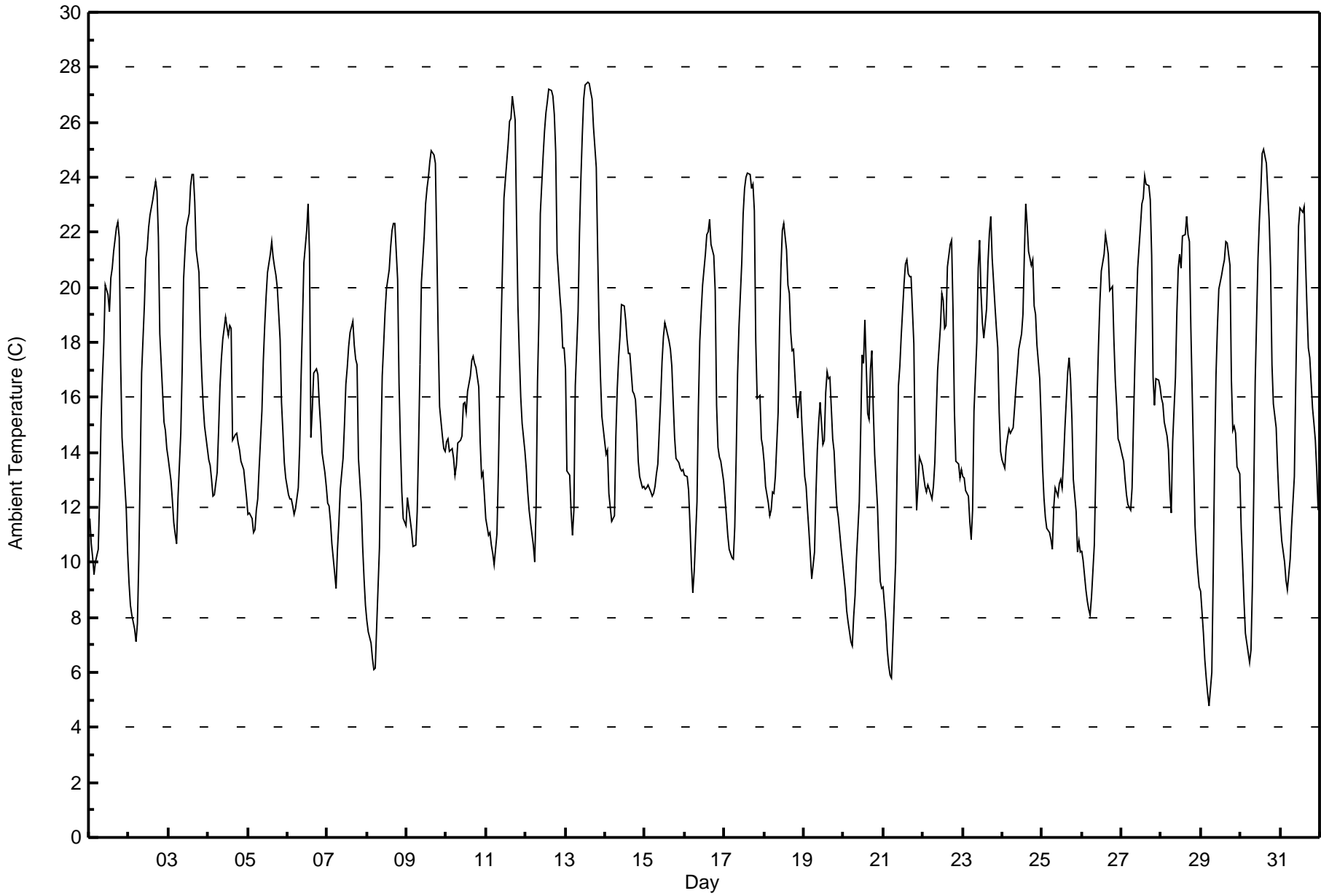


| Maximum Value: 27.5 C on Aug 13 14:00 Maximum Daily Average: 20.2 C on Aug 13 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: | 744 | | | |
|--|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------------------|-------|------|---------------|---------------|
| Minimum Value: 4.8 C on Aug 29 06:00 Minimum Daily Average: 12.2 C on Aug 20 | | | | | | | | | | | | | | | | | | | | | | Hours of Data: | 744 | | | |
| Maximum Diurnal Average: 21.1 C at hour 16 Minimum Diurnal Average: 10.2 C at hour 6 | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: | 0 | | | |
| Monthly Average: 15.85 C Percentiles: P ₁ = 6.2 P ₁₀ = 10.1 Q ₁ = 12.4 Median = 15.2 Q ₃ = 19.3 P ₉₀ = 22.4 P ₉₉ = 26.8 | | | | | | | | | | | | | | | | | | | | | | Hours of Calibration: | 0 | | | |
| | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: | 100.0 | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 11.6 | 10.7 | 10.2 | 9.6 | 10.0 | 10.5 | 12.4 | 15.2 | 16.7 | 18.0 | 20.1 | 19.7 | 19.1 | 20.3 | 20.7 | 21.3 | 22.2 | 22.4 | 21.8 | 17.3 | 14.5 | 13.7 | 11.9 | 10.4 | 15.8 | 22.4 |
| 2-Aug | 9.2 | 8.5 | 8.1 | 7.6 | 7.1 | 7.8 | 10.1 | 13.4 | 16.9 | 19.4 | 21.1 | 21.4 | 22.2 | 22.6 | 23.2 | 23.6 | 23.8 | 23.5 | 21.8 | 18.3 | 16.2 | 15.1 | 14.8 | 14.1 | 16.2 | 23.8 |
| 3-Aug | 13.8 | 13.0 | 12.3 | 11.5 | 11.0 | 10.7 | 12.4 | 14.7 | 17.0 | 20.3 | 21.3 | 22.2 | 22.7 | 23.7 | 24.1 | 24.1 | 23.1 | 21.4 | 20.5 | 18.2 | 16.8 | 15.7 | 15.0 | 14.1 | 17.5 | 24.1 |
| 4-Aug | 13.7 | 13.5 | 13.0 | 12.4 | 12.5 | 13.3 | 14.7 | 16.3 | 17.4 | 18.1 | 18.9 | 18.6 | 18.3 | 18.6 | 18.5 | 14.4 | 14.6 | 14.7 | 14.3 | 14.1 | 13.7 | 13.4 | 12.9 | 12.4 | 15.1 | 18.9 |
| 5-Aug | 11.8 | 11.8 | 11.6 | 11.1 | 11.2 | 11.9 | 12.3 | 13.4 | 15.5 | 17.3 | 18.6 | 19.7 | 20.6 | 21.2 | 21.7 | 21.1 | 20.8 | 20.4 | 20.0 | 18.1 | 15.8 | 14.7 | 13.6 | 13.1 | 16.1 | 21.7 |
| 6-Aug | 12.4 | 12.3 | 12.3 | 12.0 | 11.7 | 11.9 | 12.7 | 14.2 | 16.8 | 18.8 | 20.9 | 22.0 | 23.1 | 21.2 | 14.5 | 15.5 | 16.9 | 17.0 | 16.8 | 15.7 | 15.0 | 14.0 | 13.3 | 12.8 | 15.6 | 23.1 |
| 7-Aug | 12.2 | 12.0 | 11.5 | 10.7 | 9.6 | 9.1 | 10.5 | 11.5 | 12.7 | 13.8 | 15.0 | 16.5 | 17.1 | 17.9 | 18.4 | 18.7 | 17.9 | 17.4 | 17.2 | 13.8 | 12.1 | 10.6 | 9.4 | 8.5 | 13.5 | 18.7 |
| 8-Aug | 7.9 | 7.5 | 7.1 | 6.5 | 6.1 | 6.2 | 7.6 | 10.5 | 14.1 | 16.8 | 17.9 | 19.1 | 19.9 | 20.7 | 21.4 | 22.1 | 22.3 | 22.3 | 20.3 | 16.5 | 14.3 | 12.5 | 11.6 | 11.3 | 14.3 | 22.3 |
| 9-Aug | 12.4 | 11.9 | 11.6 | 11.1 | 10.6 | 10.6 | 11.9 | 14.3 | 17.2 | 20.2 | 21.9 | 23.1 | 23.6 | 24.0 | 24.5 | 25.0 | 24.8 | 24.5 | 21.5 | 18.2 | 15.6 | 14.6 | 14.1 | 14.0 | 17.5 | 25.0 |
| 10-Aug | 14.4 | 14.5 | 14.0 | 14.1 | 13.8 | 13.2 | 13.5 | 14.3 | 14.4 | 14.6 | 15.8 | 15.8 | 15.5 | 16.2 | 16.8 | 17.3 | 17.5 | 17.3 | 17.1 | 16.4 | 14.4 | 13.1 | 13.3 | 12.4 | 15.0 | 17.5 |
| 11-Aug | 11.6 | 11.0 | 11.1 | 10.6 | 10.3 | 9.9 | 11.0 | 13.3 | 16.2 | 18.6 | 20.9 | 23.3 | 24.6 | 25.2 | 26.0 | 26.1 | 26.9 | 26.1 | 22.5 | 19.3 | 17.5 | 16.0 | 15.1 | 14.0 | 17.8 | 26.9 |
| 12-Aug | 13.4 | 12.6 | 11.9 | 11.4 | 10.6 | 10.0 | 12.1 | 16.6 | 18.8 | 22.7 | 24.8 | 25.7 | 26.4 | 26.7 | 27.2 | 27.2 | 26.9 | 26.3 | 24.9 | 21.2 | 19.7 | 19.0 | 17.8 | 17.8 | 19.7 | 27.2 |
| 13-Aug | 17.0 | 13.3 | 13.2 | 11.9 | 11.0 | 11.9 | 16.4 | 19.1 | 22.0 | 23.9 | 25.5 | 26.8 | 27.3 | 27.5 | 27.4 | 27.1 | 26.8 | 25.8 | 24.4 | 21.3 | 18.5 | 16.7 | 15.3 | 14.9 | 20.2 | 27.5 |
| 14-Aug | 13.9 | 14.1 | 12.5 | 12.0 | 11.5 | 11.7 | 14.6 | 16.3 | 17.5 | 18.3 | 19.4 | 19.3 | 18.8 | 18.1 | 17.6 | 17.6 | 16.2 | 16.1 | 15.9 | 15.0 | 13.7 | 13.1 | 12.7 | 12.8 | 15.4 | 19.4 |
| 15-Aug | 12.7 | 12.7 | 12.8 | 12.5 | 12.4 | 12.5 | 12.8 | 13.2 | 13.6 | 15.9 | 17.3 | 18.2 | 18.7 | 18.5 | 18.1 | 17.7 | 17.1 | 15.8 | 14.5 | 13.8 | 13.6 | 13.4 | 13.3 | 13.4 | 14.8 | 18.7 |
| 16-Aug | 13.2 | 13.1 | 12.6 | 11.3 | 9.9 | 8.9 | 9.7 | 12.2 | 15.7 | 18.0 | 19.1 | 20.1 | 21.2 | 21.9 | 22.0 | 22.5 | 21.6 | 21.2 | 19.9 | 15.7 | 14.2 | 13.8 | 13.7 | 13.0 | 16.0 | 22.5 |
| 17-Aug | 12.4 | 11.7 | 11.0 | 10.5 | 10.1 | 10.1 | 11.3 | 13.8 | 16.8 | 18.6 | 20.9 | 22.7 | 23.6 | 24.0 | 24.2 | 24.1 | 23.6 | 23.8 | 22.8 | 18.0 | 16.0 | 16.1 | 14.5 | 14.2 | 17.3 | 24.2 |
| 18-Aug | 13.6 | 12.7 | 12.2 | 11.7 | 11.9 | 12.5 | 12.5 | 13.1 | 15.5 | 18.6 | 20.7 | 22.1 | 22.3 | 21.4 | 20.1 | 19.8 | 18.4 | 17.7 | 17.8 | 15.8 | 15.3 | 15.8 | 16.2 | 15.0 | 16.4 | 22.3 |
| 19-Aug | 13.1 | 12.8 | 11.9 | 11.1 | 10.3 | 9.4 | 10.4 | 12.4 | 14.1 | 15.1 | 15.8 | 14.3 | 14.5 | 16.2 | 16.9 | 16.7 | 16.7 | 14.5 | 14.0 | 12.9 | 12.0 | 11.7 | 10.5 | 10.0 | 13.2 | 16.9 |
| 20-Aug | 9.5 | 9.0 | 8.2 | 7.8 | 7.1 | 7.0 | 8.1 | 8.8 | 10.2 | 12.2 | 14.8 | 17.5 | 17.2 | 18.8 | 15.4 | 15.2 | 17.0 | 17.7 | 15.6 | 13.9 | 12.0 | 10.5 | 9.3 | 9.1 | 12.2 | 18.8 |
| 21-Aug | 9.1 | 7.8 | 6.8 | 6.3 | 5.9 | 5.8 | 7.2 | 10.0 | 13.3 | 16.4 | 17.1 | 18.3 | 20.1 | 20.8 | 21.0 | 20.5 | 20.4 | 20.4 | 18.0 | 13.9 | 11.9 | 12.8 | 13.8 | 13.5 | 13.8 | 21.0 |
| 22-Aug | 13.1 | 12.8 | 12.6 | 12.8 | 12.7 | 12.3 | 12.8 | 13.6 | 15.4 | 17.0 | 18.5 | 19.8 | 19.5 | 18.5 | 18.6 | 20.8 | 21.6 | 21.7 | 19.2 | 15.5 | 13.7 | 13.6 | 13.1 | 13.4 | 15.9 | 21.7 |
| 23-Aug | 13.1 | 13.1 | 12.6 | 12.4 | 11.5 | 10.8 | 11.9 | 15.5 | 18.0 | 20.7 | 21.7 | 19.9 | 18.7 | 18.2 | 19.2 | 20.9 | 22.0 | 22.6 | 21.0 | 19.3 | 18.5 | 17.8 | 15.5 | 14.1 | 17.0 | 22.6 |
| 24-Aug | 13.7 | 13.4 | 14.2 | 14.6 | 14.8 | 14.7 | 14.9 | 15.6 | 16.4 | 17.0 | 17.7 | 18.3 | 19.0 | 21.2 | 23.0 | 22.3 | 21.3 | 20.8 | 21.0 | 19.3 | 19.0 | 17.9 | 16.7 | 15.2 | 17.6 | 23.0 |
| 25-Aug | 13.5 | 12.3 | 11.6 | 11.2 | 11.1 | 10.8 | 10.5 | 12.0 | 12.7 | 12.4 | 12.8 | 13.0 | 12.7 | 13.7 | 14.9 | 16.9 | 17.4 | 16.7 | 15.2 | 13.0 | 11.8 | 10.4 | 10.8 | 10.4 | 12.8 | 17.4 |
| 26-Aug | 10.4 | 10.1 | 9.0 | 8.6 | 8.3 | 8.1 | 8.7 | 10.7 | 13.2 | 16.0 | 17.9 | 19.5 | 20.6 | 21.2 | 21.9 | 21.5 | 21.2 | 19.9 | 20.0 | 18.1 | 16.6 | 15.7 | 14.5 | 14.3 | 15.2 | 21.9 |
| 27-Aug | 13.9 | 13.7 | 13.0 | 12.4 | 12.1 | 11.9 | 12.7 | 15.1 | 17.3 | 19.0 | 20.7 | 22.2 | 23.0 | 23.2 | 24.1 | 23.8 | 23.7 | 23.2 | 21.2 | 16.7 | 15.7 | 16.7 | 16.6 | 16.4 | 17.8 | 24.1 |
| 28-Aug | 16.0 | 15.8 | 15.1 | 14.6 | 14.1 | 12.6 | 11.8 | 14.4 | 16.7 | 19.1 | 20.7 | 21.2 | 20.7 | 21.9 | 21.9 | 22.6 | 21.9 | 21.7 | 18.5 | 13.7 | 11.3 | 10.4 | 9.6 | 9.1 | 16.5 | 22.6 |
| 29-Aug | 9.0 | 7.4 | 6.4 | 5.8 | 5.2 | 4.8 | 6.0 | 9.6 | 13.7 | 16.8 | 18.6 | 19.9 | 20.4 | 20.8 | 21.0 | 21.7 | 21.6 | 20.8 | 16.6 | 14.8 | 14.9 | 14.7 | 13.5 | 13.2 | 14.1 | 21.7 |
| 30-Aug | 11.3 | 9.9 | 8.6 | 7.4 | 6.7 | 6.3 | 6.8 | 9.1 | 12.6 | 16.6 | 21.0 | 22.4 | 23.5 | 24.9 | 25.0 | 24.5 | 23.5 | 22.4 | 20.7 | 17.2 | 15.8 | 14.9 | 13.5 | 12.3 | 15.7 | 25.0 |
| 31-Aug | 11.5 | 10.8 | 10.0 | 9.4 | 9.0 | 9.6 | 10.1 | 11.3 | 13.1 | 16.6 | 19.6 | 22.2 | 22.9 | 22.7 | 22.9 | 21.0 | 19.3 | 17.8 | 17.5 | 15.6 | 15.0 | 14.4 | 13.3 | 11.9 | 15.3 | 22.9 |
| 12.4 11.8 11.3 10.7 10.3 10.2 11.3 13.3 15.5 17.6 19.3 20.1 20.6 21.0 21.0 21.1 20.9 20.4 19.1 16.5 15.0 14.3 13.5 12.9 | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | |
| 17.0 15.8 15.1 14.6 14.8 14.7 16.4 19.1 22.0 23.9 25.5 26.8 27.3 27.5 27.4 27.2 26.9 26.3 24.9 21.3 19.7 19.0 17.8 17.8 | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Janvier - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Janvier - August 2017**

| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 67 | 9.01 | 9.01 |
| 10 - 20 | 508 | 68.28 | 77.29 |
| > 20 | 169 | 22.72 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

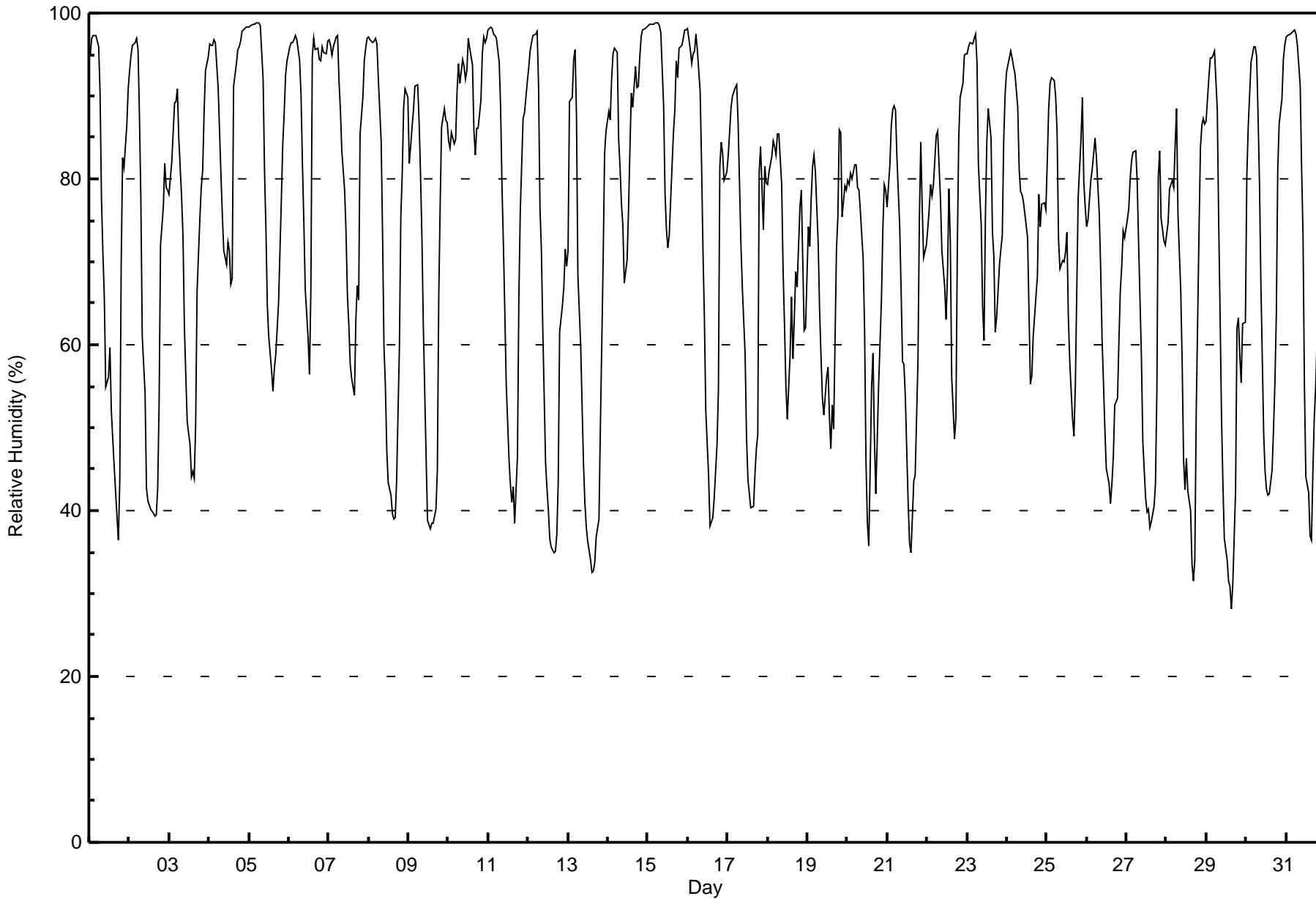
Janvier - August 2017

| Maximum Value: 99 % on Aug 5 06:00 Maximum Daily Average: 91.6 % on Aug 15 | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|----|------|----|------|----|------|---------------|---------------|----|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|-----------------|--|
| Minimum Value: 28 % on Aug 29 16:00 Minimum Daily Average: 59.5 % on Aug 13 Maximum Diurnal Average: 92.0 % at hour 6 Minimum Diurnal Average: 52.5 % at hour 16 Monthly Average: 73.6 % Percentiles: P ₁ = 34 P ₁₀ = 43 Q ₁ = 59 Median = 78 Q ₃ = 90 P ₉₀ = 97 P ₉₉ = 99 | | | | | | | | | | | | | | | | | | Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 95 | 97 | 97 | 97 | 97 | 96 | 90 | 77 | 71 | 66 | 55 | 56 | 60 | 52 | 49 | 45 | 39 | 36 | 44 | 69 | 83 | 81 | 86 | 91 | 72.1 | 97 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 93 | 95 | 96 | 97 | 97 | 96 | 88 | 78 | 61 | 54 | 43 | 41 | 41 | 40 | 40 | 39 | 40 | 43 | 53 | 72 | 77 | 82 | 79 | 79 | 67.5 | 97 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 78 | 82 | 86 | 89 | 89 | 91 | 85 | 78 | 73 | 62 | 56 | 51 | 48 | 44 | 45 | 44 | 50 | 66 | 75 | 79 | 81 | 88 | 93 | 95 | 72.0 | 95 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 96 | 96 | 96 | 97 | 97 | 91 | 86 | 80 | 76 | 71 | 70 | 72 | 71 | 67 | 68 | 91 | 94 | 96 | 96 | 97 | 98 | 98 | 98 | 98 | 87.5 | 98 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 98 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 92 | 81 | 74 | 65 | 61 | 57 | 54 | 57 | 59 | 62 | 65 | 78 | 84 | 88 | 93 | 94 | 81.4 | 99 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 96 | 96 | 97 | 97 | 97 | 97 | 94 | 90 | 82 | 75 | 67 | 61 | 56 | 67 | 95 | 97 | 96 | 96 | 94 | 94 | 96 | 95 | 95 | 97 | 88.6 | 97 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 97 | 96 | 95 | 96 | 97 | 97 | 92 | 88 | 83 | 79 | 74 | 66 | 62 | 58 | 56 | 54 | 63 | 67 | 65 | 86 | 90 | 94 | 96 | 97 | 81.1 | 97 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 97 | 97 | 96 | 97 | 97 | 96 | 92 | 85 | 73 | 60 | 55 | 47 | 43 | 42 | 40 | 39 | 39 | 44 | 60 | 75 | 81 | 89 | 91 | 90 | 71.8 | 97 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 82 | 84 | 86 | 88 | 91 | 91 | 87 | 81 | 73 | 62 | 47 | 39 | 38 | 38 | 38 | 38 | 40 | 45 | 66 | 77 | 86 | 88 | 87 | 87 | 68.4 | 91 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 85 | 84 | 86 | 84 | 85 | 90 | 94 | 91 | 94 | 94 | 92 | 93 | 97 | 96 | 94 | 86 | 83 | 86 | 86 | 90 | 95 | 97 | 96 | 97 | 90.6 | 97 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 98 | 98 | 98 | 97 | 97 | 97 | 94 | 89 | 79 | 72 | 64 | 55 | 46 | 43 | 41 | 43 | 38 | 47 | 66 | 76 | 82 | 87 | 88 | 92 | 74.5 | 98 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 93 | 95 | 97 | 97 | 97 | 98 | 91 | 77 | 71 | 62 | 46 | 43 | 40 | 37 | 36 | 35 | 35 | 37 | 43 | 61 | 65 | 67 | 72 | 70 | 65.2 | 98 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 71 | 89 | 90 | 94 | 96 | 88 | 68 | 60 | 53 | 46 | 41 | 38 | 36 | 34 | 32 | 33 | 34 | 37 | 39 | 50 | 60 | 70 | 83 | 86 | 59.5 | 96 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 88 | 87 | 92 | 95 | 96 | 95 | 85 | 81 | 77 | 74 | 68 | 70 | 76 | 83 | 90 | 89 | 93 | 91 | 91 | 95 | 97 | 98 | 98 | 98 | 87.9 | 98 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 98 | 99 | 99 | 99 | 99 | 99 | 99 | 98 | 98 | 89 | 78 | 74 | 72 | 73 | 82 | 86 | 88 | 94 | 92 | 96 | 96 | 97 | 98 | 98 | 91.6 | 99 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 98 | 96 | 94 | 95 | 95 | 97 | 96 | 90 | 82 | 71 | 63 | 52 | 44 | 38 | 39 | 39 | 42 | 48 | 55 | 81 | 84 | 83 | 80 | 81 | 72.7 | 98 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 83 | 86 | 89 | 90 | 91 | 91 | 87 | 80 | 72 | 67 | 59 | 49 | 44 | 42 | 40 | 41 | 44 | 47 | 49 | 81 | 84 | 74 | 82 | 79 | 68.7 | 91 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 79 | 81 | 83 | 85 | 84 | 83 | 85 | 85 | 79 | 69 | 62 | 55 | 51 | 59 | 66 | 58 | 63 | 69 | 67 | 77 | 79 | 70 | 62 | 62 | 71.4 | 85 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 74 | 72 | 78 | 82 | 83 | 81 | 72 | 64 | 59 | 54 | 51 | 56 | 57 | 51 | 47 | 53 | 50 | 72 | 75 | 86 | 86 | 75 | 79 | 79 | 68.1 | 86 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 80 | 79 | 81 | 80 | 82 | 82 | 79 | 79 | 76 | 70 | 62 | 46 | 39 | 36 | 55 | 59 | 49 | 42 | 48 | 55 | 65 | 74 | 79 | 79 | 65.6 | 82 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 77 | 82 | 87 | 88 | 89 | 88 | 83 | 74 | 67 | 58 | 58 | 54 | 41 | 36 | 35 | 39 | 44 | 44 | 58 | 75 | 84 | 77 | 71 | 72 | 65.8 | 89 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 74 | 76 | 79 | 78 | 79 | 85 | 86 | 82 | 78 | 71 | 67 | 63 | 68 | 79 | 73 | 56 | 49 | 51 | 72 | 85 | 90 | 91 | 95 | 95 | 75.9 | 95 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 95 | 96 | 96 | 96 | 97 | 97 | 94 | 82 | 74 | 65 | 60 | 76 | 85 | 88 | 85 | 74 | 71 | 62 | 63 | 70 | 71 | 73 | 85 | 90 | 81.0 | 97 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 93 | 95 | 95 | 95 | 94 | 93 | 89 | 81 | 78 | 78 | 77 | 74 | 73 | 64 | 55 | 56 | 61 | 66 | 68 | 78 | 74 | 77 | 77 | 76 | 77.9 | 95 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 82 | 89 | 91 | 92 | 92 | 90 | 86 | 73 | 69 | 70 | 70 | 71 | 74 | 63 | 58 | 51 | 49 | 55 | 66 | 78 | 85 | 90 | 80 | 77 | 75.0 | 92 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 74 | 75 | 80 | 81 | 83 | 85 | 83 | 76 | 69 | 61 | 55 | 50 | 45 | 43 | 41 | 43 | 46 | 53 | 54 | 60 | 67 | 69 | 74 | 73 | 64.2 | 85 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 75 | 76 | 80 | 82 | 83 | 83 | 80 | 72 | 65 | 58 | 48 | 42 | 40 | 40 | 38 | 39 | 40 | 43 | 54 | 80 | 83 | 75 | 73 | 72 | 63.5 | 83 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 73 | 75 | 79 | 80 | 79 | 84 | 88 | 76 | 66 | 58 | 46 | 42 | 46 | 42 | 40 | 34 | 32 | 34 | 52 | 74 | 84 | 86 | 87 | 87 | 64.4 | 88 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 87 | 92 | 95 | 95 | 95 | 95 | 88 | 75 | 64 | 51 | 43 | 37 | 34 | 31 | 31 | 28 | 31 | 42 | 62 | 63 | 59 | 55 | 63 | 63 | 61.6 | 95 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 80 | 86 | 90 | 94 | 96 | 96 | 95 | 88 | 80 | 68 | 49 | 45 | 43 | 42 | 42 | 45 | 50 | 55 | 64 | 81 | 87 | 90 | 94 | 96 | 73.1 | 96 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 97 | 97 | 97 | 98 | 98 | 98 | 98 | 96 | 91 | 81 | 73 | 55 | 44 | 42 | 37 | 36 | 45 | 51 | 55 | 67 | 65 | 63 | 67 | 72 | 71.8 | 98 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | 86.7 | | 88.6 | | 90.4 | | 91.4 | | 91.9 | | 92.0 | | 88.1 | | 81.4 | | 75.0 | | 67.6 | | 60.4 | | 56.0 | | 54.0 | | 52.5 | | 52.9 | | 52.5 | | 53.4 | | 57.5 | | 64.5 | | 77.0 | | 81.2 | | 82.1 | | 83.8 | | 84.5 | | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | 98 | | 99 | | 99 | | 99 | | 99 | | 99 | | 99 | | 98 | | 98 | | 94 | | 92 | | 93 | | 97 | | 96 | | 95 | | 97 | | 96 | | 96 | | 96 | | 97 | | 98 | | 98 | | 98 | | 98 | | Diurnal Maximum | |



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Janvier - August 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Janvier - August 2017

| | | |
|---|---|--------------------------------|
| Maximum Speed: 17 km/h on Aug 19 14:00 | Maximum Daily Speed Average: 9.7 km/h on Aug 25 | Hours in Service: 744 |
| Minimum Speed Value: 0 km/h on Aug 30 01:00 | Minimum Daily Speed Average: 0.9 km/h on Aug 1 | Hours of Data: 693 |
| Maximum Diurnal Speed Average: 4.4 km/h at hour 4 | Minimum Diurnal Speed Average: 2.1 km/h at hour 19 | Hours of Missing Data: 51 |
| Monthly Average Velocity: 3.4 km/h 202.5 deg | Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 3 Median = 5 Q ₃ = 7 P ₉₀ = 9 P ₉₉ = 15 | Percent Operational Time: 93.2 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
|--------|-------------------------------|------|------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|---------------|---------------|------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | S1 | WSW1 | SSE3 | SSE3 | S4 | S3 | SSW2 | NW2 | N3 | E0 | ENE2 | N5 | W5 | W2 | SSE3 | S4 | NNE3 | NNE5 | NNW1 | SE2 | S4 | S6 | S4 | SSE3 | S0.9 | S6 | |
| 2-Aug | SE2 | SE2 | SE2 | SE2 | SSE2 | S4 | S4 | S3 | SSE3 | SSE2 | SE2 | SE3 | ESE4 | E4 | SE5 | ESE4 | SSE3 | SSW3 | SSW3 | SE3 | SSE3 | S4 | S6 | S6 | SSE2.9 | S6 | |
| 3-Aug | S7 | S7 | S6 | S6 | S7 | S5 | S6 | S6 | S4 | S3 | WSW4 | SSW4 | SSE5 | SE5 | SE3 | SE4 | SSE5 | SE3 | ESE3 | ESE4 | SE3 | SE3 | ESE2 | ENE1 | S3.7 | S7 | |
| 4-Aug | ENE1 | E1 | SSE2 | ESE1 | WSW1 | NNE5 | NNE5 | NNE7 | NNE9 | N8 | NNE7 | NNE10 | NNE12 | E3 | SE5 | NE2 | N4 | N3 | SE1 | SSW2 | ESE1 | SSE2 | ESE2 | NNE3.1 | NNE12 | | |
| 5-Aug | SSE1 | ENE0 | S1 | SSE1 | SE1 | WSW1 | WSW1 | SSW1 | SW3 | S7 | SE6 | SSE8 | SSE8 | S7 | SSE6 | SSW7 | S5 | SSE5 | SE4 | SE4 | SSE3 | S2 | SSE3 | SSE3.5 | SSE8 | | |
| 6-Aug | S2 | S5 | S4 | SSW5 | SSW5 | SSW5 | SSW5 | SW6 | SW7 | SW7 | SW8 | SW7 | SSW7 | N2 | NE1 | SSW1 | WSW2 | WNW2 | N3 | NW3 | NNE6 | NNE7 | NNE7 | NNE6 | SW1.9 | SW8 | |
| 7-Aug | NNE4 | N3 | N4 | N3 | NW1 | SSE1 | NW3 | N4 | NNE7 | NNE7 | NNE4 | NE7 | NNE7 | NNE6 | N4 | NNW4 | W4 | WNW3 | N1 | ESE2 | ESE1 | SE2 | SE3 | SSE2 | NNE2.4 | NNE7 | |
| 8-Aug | S3 | S3 | S4 | S4 | S5 | S5 | S6 | S6 | S5 | SSW5 | SSW5 | SW4 | SSW4 | SSW4 | SSW4 | SSW4 | S4 | SSE4 | SE3 | ESE5 | ESE5 | SSE2 | SSE3 | S5 | S3.8 | S6 | |
| 9-Aug | S9 | SSW8 | SSW8 | S8 | SSW8 | SSW8 | S7 | SSW6 | S5 | SSW5 | SSW5 | SE4 | SSW4 | S5 | SE2 | SSE3 | SE5 | ESE3 | SE3 | ESE4 | SE3 | SSE3 | SSE4 | S5 | S4.7 | S9 | |
| 10-Aug | S7 | S8 | S7 | S9 | S5 | SSE2 | SSW3 | SE0 | S5 | SSW8 | SW4 | SE3 | ESE2 | N1 | SSE5 | SSW5 | SSW4 | SSW6 | SSW5 | SSE5 | SSE3 | S3 | S4 | S3 | S4.1 | S9 | |
| 11-Aug | SSE2 | S3 | S5 | S6 | SSW6 | SSW5 | SSW5 | SW3 | S5 | WSW3 | SW3 | WSW1 | ENE2 | NE5 | ENE4 | E3 | ENE2 | SE3 | ESE4 | SE5 | SE4 | S2 | SE3 | SE3 | SSE2.4 | SSW6 | |
| 12-Aug | SE3 | SE3 | SE3 | SE2 | SE0 | S1 | NW0 | WNV1 | NW1 | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | ---- | SE3 | |
| 13-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | ---- | ---- | |
| 14-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | ---- | WSW6 | |
| 15-Aug | WSW0 | ESE1 | SW1 | SW2 | SSE1 | SW1 | S3 | SW2 | SW3 | WSW4 | W3 | NE2 | W4 | WNW3 | NNE2 | WNW0 | SW3 | SW6 | WSW5 | NNE3 | N2 | SE0 | SW3 | SSW3 | WSW1.3 | SW6 | |
| 16-Aug | SSW4 | SW4 | SW5 | SW5 | SSW4 | S5 | S5 | S6 | SSW5 | SSW6 | SSW7 | SSW6 | SW7 | SW9 | SW7 | SW8 | WSW6 | SW5 | SSW5 | SSE3 | SSE4 | S5 | S8 | S7 | SSW5.3 | SW9 | |
| 17-Aug | S8 | SSW7 | S8 | S8 | S8 | S8 | S8 | SSW7 | SSW8 | SW7 | SSW8 | WSW9 | WSW10 | W9 | W10 | WSW8 | WSW7 | SW4 | WSW5 | SSE3 | S4 | S6 | S5 | S7 | SW6.3 | WSW10 | |
| 18-Aug | S9 | SSW8 | S8 | S8 | SSW9 | SSW7 | SSW7 | SSW7 | SSW8 | SW7 | SW6 | SW8 | SSW8 | SW5 | WSW6 | W8 | SSW4 | S5 | SSW6 | S4 | SSW6 | SW9 | WSW11 | WSW10 | SSW6.7 | WSW11 | |
| 19-Aug | SW5 | SW9 | SSW9 | SSW8 | SSW8 | SSW7 | SW7 | WSW8 | WSW11 | WSW13 | WSW14 | W16 | WSW14 | WSW17 | WSW15 | WSW15 | W10 | ENE2 | ENE4 | SSE2 | SW2 | SSW5 | S6 | S6 | WSW7.6 | WSW17 | |
| 20-Aug | S7 | S7 | S7 | SSW8 | SSW8 | SSW8 | SSW9 | SSW8 | SSW8 | SSW10 | SSW11 | SW14 | WSW14 | WSW14 | W11 | WSW9 | WSW9 | W9 | W10 | SW8 | SSW7 | SSW7 | S7 | SSW8 | SW8.0 | WSW14 | |
| 21-Aug | SW7 | SSW6 | S7 | S6 | S7 | S8 | SSW8 | SSW7 | SSW7 | SW7 | SSW6 | SW8 | WSW9 | W8 | W7 | SW7 | SSW5 | SSW6 | S5 | SE3 | SSE3 | S6 | S8 | S7 | SSW5.9 | WSW9 | |
| 22-Aug | SSW7 | SSW8 | S5 | SSW7 | S6 | S4 | SSW3 | SW4 | SW4 | SW4 | SSW3 | SE1 | E4 | N1 | N2 | E1 | S2 | ESE1 | ESE3 | SE3 | ESE2 | SSE1 | E0 | NE1 | S2.2 | SSW8 | |
| 23-Aug | WSW0 | ESE1 | SE2 | SSE1 | SSE2 | SE1 | SE1 | SSE3 | S2 | SE5 | SSE7 | SE3 | SE3 | ESE2 | ENE4 | ENE6 | ENE5 | ESE6 | ESE6 | SE4 | SE4 | SE3 | E2 | ESE3 | ESE2.6 | SSE7 | |
| 24-Aug | ENE1 | S2 | SSE3 | SSE3 | E4 | ESE8 | ESE6 | ESE9 | E3 | SE1 | NE6 | ENE5 | NNE5 | ENE6 | SE9 | S9 | SE6 | SE4 | SSE3 | SSW4 | SW6 | WSW6 | WSW7 | WSW10 | SE2.4 | WSW10 | |
| 25-Aug | WSW7 | SW6 | SW7 | SSW7 | SSW7 | SSW9 | SSW11 | SSW13 | SSW14 | SW15 | SW16 | SW17 | SW17 | WSW16 | WSW16 | WSW16 | WSW16 | WSW16 | WSW16 | WSW16 | WSW16 | WSW16 | WSW16 | WSW16 | WSW16 | SW9.7 | SW17 |
| 26-Aug | SSW9 | SSW9 | SSW9 | SSW10 | SSW9 | SSW10 | SSW10 | SW10 | SSW10 | SW10 | SSW10 | SW12 | SW12 | SW13 | SW11 | WSW11 | SW10 | SSW7 | SSW7 | SSW7 | SSW6 | SSW6 | SSW6 | SSW7 | SSW8.9 | SW13 | |
| 27-Aug | SSW7 | SSW8 | SSW8 | SSW8 | SSW8 | SW8 | SW9 | SW9 | SW10 | WSW10 | WSW13 | WSW15 | WSW14 | WSW15 | WSW14 | WSW14 | WSW11 | WSW10 | SW5 | SSE2 | S4 | SSW6 | SSW7 | SSW7 | SSW8.4 | WSW15 | |
| 28-Aug | SSW6 | SSW5 | SSW4 | SW5 | SW5 | SSW4 | SSE4 | S5 | SSW5 | SSW6 | WSW7 | W8 | W5 | W8 | W8 | WNW7 | W7 | WNW4 | E2 | SE3 | SE2 | SSE3 | S3 | S3 | SW3.6 | W8 | |
| 29-Aug | S2 | SSE2 | SSE2 | SSE2 | SE2 | S3 | S7 | S3 | SSE2 | ENE3 | ENE4 | ESE4 | E5 | ESE6 | ESE6 | E4 | E5 | ENE3 | E3 | ENE3 | E5 | E5 | ESE3 | ESE4 | ESE3.0 | S7 | |
| 30-Aug | W0 | SE0 | NE1 | NE1 | NNE2 | NNE2 | N2 | NNW1 | N2 | N1 | SSE7 | SSE8 | SE10 | SE9 | SSE12 | S13 | SSE9 | SSE8 | SSE5 | ESE4 | SE4 | SE4 | SE2 | ESE1 | SE3.5 | S13 | |
| 31-Aug | E1 | SSE1 | S1 | SSE1 | S3 | S2 | S2 | S3 | SSW4 | SSW4 | SW6 | W7 | W8 | WSW9 | WSW10 | W11 | SW6 | S6 | SSW6 | SSW5 | SW6 | SW6 | SSW5 | SSW5 | SW4.2 | W11 | |

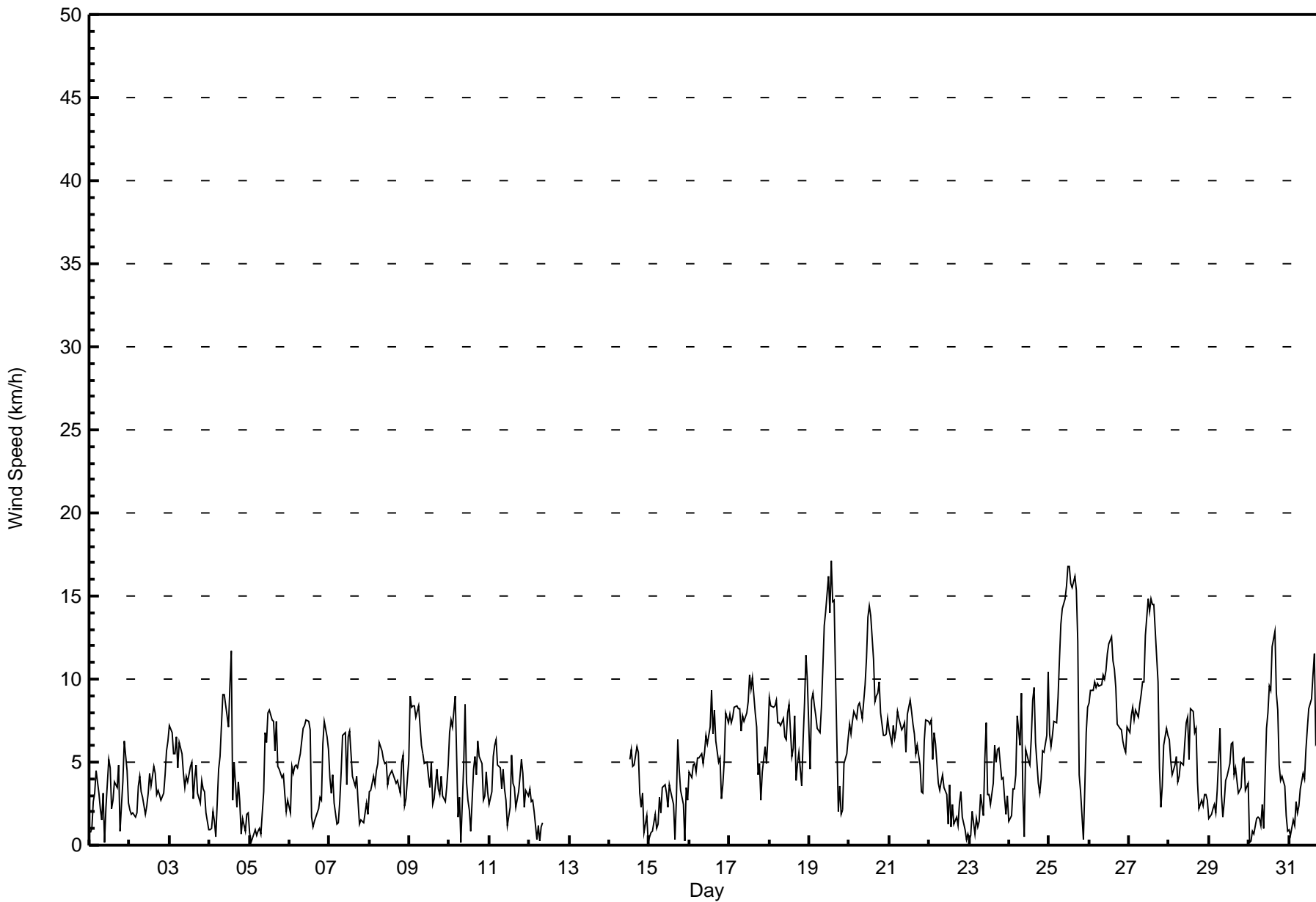
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|--------------|------------|------|------------------------|-------|-------|-------|-------|-------|-------|-------|-------------|------|--------|--------|-------|------------|-----------------|-----|-----|------|------|-------|-------|-----------------|--|--|--|--|--|
| SSW3.5SSW3.8 | S4.1SSW4.4 | S4.3 | S4.0SSW4.2SSW3.6SSW3.6 | SW4.1 | SW4.1 | SW3.7 | SW3.9 | SW3.3 | SW3.6 | SW4.2 | SW3.5SSW2.8 | S2.1 | SSE2.5 | SSE2.4 | S2.9 | S3.3SSW3.4 | Diurnal Average | | | | | | | | | | | | |
| S9 | SSW9 | SSW9 | SSW10 | SSW9 | SSW10 | SSW11 | SSW13 | SSW14 | SW15 | SW16 | SW17 | SW17 | WSW17 | WSW16 | WSW16 | WSW15 | SW12 | W10 | SW8 | SSW7 | WSW9 | WSW11 | WSW10 | Diurnal Maximum | | | | | |

AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Janvier - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Janvier - August 2017**

| Wind Speed Ranges (km/h) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 5 | 404 | 58.30 | 58.30 |
| 6 - 11 | 256 | 36.94 | 95.24 |
| 12 - 19 | 33 | 4.76 | 100.00 |
| 20 - 28 | 0 | 0.00 | 100.00 |
| 29 - 38 | 0 | 0.00 | 100.00 |
| > 38 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 693

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Janvier - August 2017**

| Wind Speed Ranges (km/h) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------------|-----------------------|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 5 | 18 | 11 | 7 | 17 | 19 | 31 | 62 | 57 | 68 | 46 | 28 | 16 | 7 | 7 | 6 | 4 | 404 |
| 6 - 11 | 1 | 13 | 2 | 2 | 0 | 7 | 5 | 9 | 51 | 87 | 37 | 26 | 15 | 1 | 0 | 0 | 256 |
| 12 - 19 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 8 | 19 | 1 | 0 | 0 | 0 | 33 |
| 20 - 28 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29 - 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 19 | 25 | 9 | 19 | 19 | 38 | 67 | 67 | 120 | 135 | 73 | 61 | 23 | 8 | 6 | 4 | 693 |

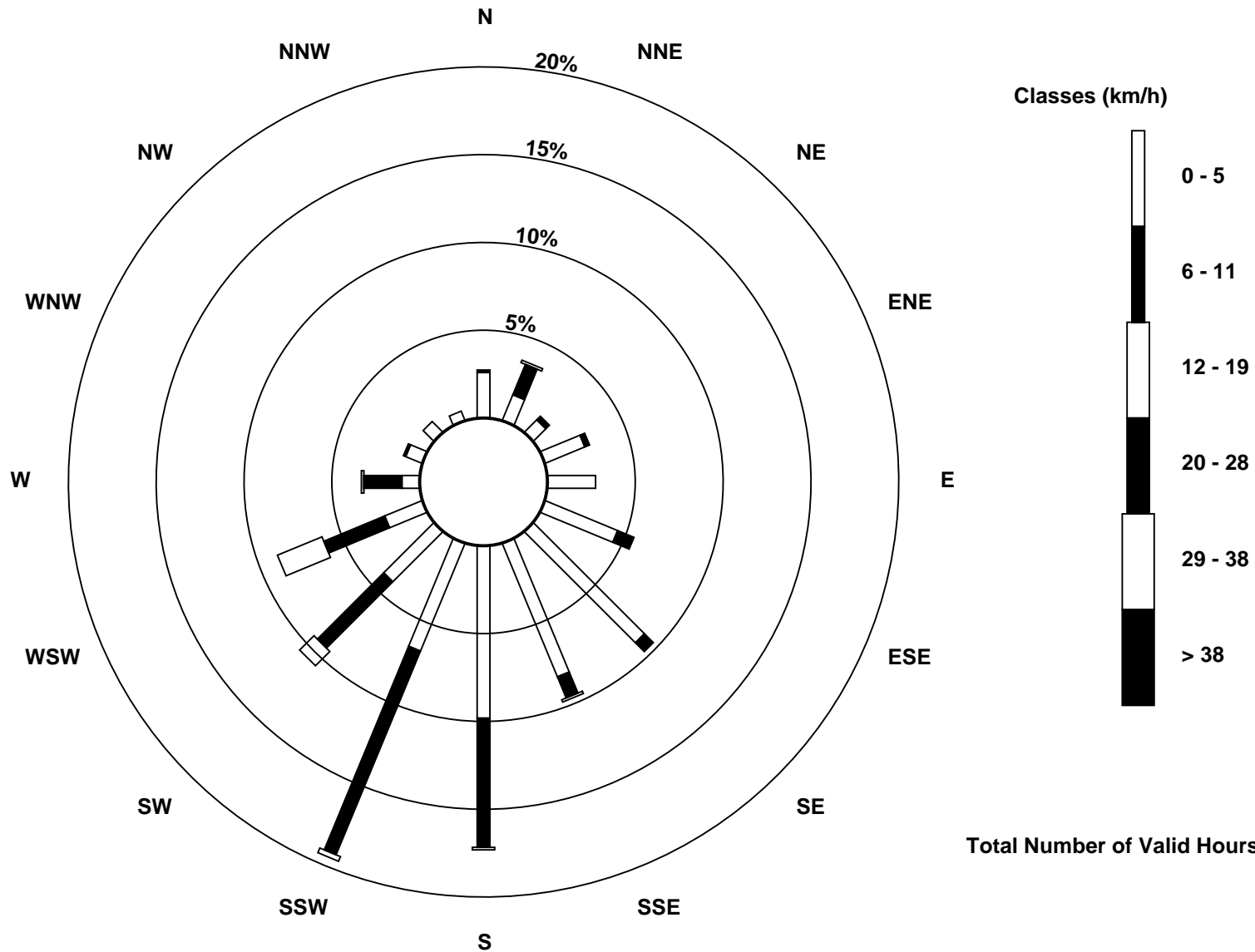
Total Number of Valid Hours: 693

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Wind Speed (WS) - km/h
Janvier (AMS 22)



Total Number of Valid Hours: 693



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Janvier - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Aug 19 14:00 Minimum Value: 0 km/h on Aug 22 19:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 2 P ₉₀ = 3 P ₉₉ = 6 | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 693 Hours of Missing Data: 51 Hours of Calibration: 0 Percent Operational Time: 93.2 | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|---------------|----|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 3 | 2 | 2 | 1 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 |
| 2-Aug | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| 3-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| 4-Aug | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 4 |
| 5-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 |
| 6-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 5 | 3 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 5 |
| 7-Aug | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 |
| 8-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 |
| 9-Aug | 2 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| 10-Aug | 1 | 1 | 1 | 2 | 3 | 1 | 1 | 2 | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 3 |
| 11-Aug | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| 12-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | 1 |
| 13-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- |
| 14-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | 2 |
| 15-Aug | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 4 | 1 | 1 | 1 | 1 | 2 | 1 | 4 |
| 16-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 3 |
| 17-Aug | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 3 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 4 |
| 18-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 1 | 3 | 3 | 4 | 5 | 5 | |
| 19-Aug | 2 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 4 | 5 | 6 | 7 | 6 | 7 | 6 | 7 | 5 | 2 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 7 |
| 20-Aug | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 6 | 6 | 6 | 6 | 4 | 4 | 4 | 4 | 3 | 2 | 1 | 2 | 2 | 6 | |
| 21-Aug | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 4 | |
| 22-Aug | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | |
| 23-Aug | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | |
| 24-Aug | 1 | 2 | 1 | 1 | 2 | 4 | 4 | 3 | 2 | 1 | 3 | 3 | 2 | 3 | 4 | 3 | 2 | 1 | 1 | 2 | 2 | 2 | 3 | 4 | 4 | |
| 25-Aug | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 5 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 5 | 3 | 1 | 1 | 1 | 2 | 2 | 6 | |
| 26-Aug | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | |
| 27-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 5 | 5 | 6 | 6 | 6 | 5 | 4 | 3 | 2 | 1 | 1 | 2 | 1 | 1 | 6 | |
| 28-Aug | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 4 | |
| 29-Aug | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 3 | 2 | 2 | 1 | 2 | 1 | 0 | 1 | 2 | 2 | 2 | 2 | 3 | |
| 30-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 4 | 4 | 4 | 4 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 4 | |
| 31-Aug | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 2 | 3 | 3 | 4 | 4 | 5 | 2 | 2 | 2 | 1 | 2 | 2 | 1 | 1 | 5 | |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AF - Analyzer Failure | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Janvier - August 2017

| | |
|---|--------------------------------|
| Direction of Maximum Speed: 251 deg on Aug 19 14:00 | Hours in Service: 744 |
| Direction of Maximum Daily Speed Average: 221.6 deg on Aug 25 | Hours of Data: 693 |
| Direction of Minimum Speed: 269 deg on Aug 30 01:00 | Hours of Missing Data: 51 |
| Direction of Minimum Daily Speed Average: 0.9 deg on Aug 1 | Percent Operational Time: 93.2 |
| Monthly Average Direction: 201.6 deg | |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average |
|--------|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 178 | 237 | 157 | 166 | 184 | 185 | 195 | 307 | 5 | 91 | 73 | 2 | 280 | 271 | 151 | 177 | 18 | 19 | 337 | 140 | 179 | 188 | 178 | 155 | 179.0 |
| 2-Aug | 139 | 143 | 144 | 138 | 151 | 178 | 182 | 177 | 157 | 149 | 130 | 139 | 104 | 101 | 134 | 114 | 165 | 207 | 192 | 143 | 156 | 178 | 182 | 188 | 156.5 |
| 3-Aug | 190 | 188 | 185 | 191 | 190 | 178 | 187 | 179 | 172 | 178 | 250 | 210 | 166 | 143 | 128 | 141 | 154 | 137 | 114 | 119 | 130 | 138 | 120 | 74 | 169.9 |
| 4-Aug | 72 | 90 | 160 | 107 | 249 | 21 | 20 | 21 | 29 | 22 | 10 | 12 | 13 | 20 | 91 | 145 | 34 | 5 | 6 | 132 | 210 | 114 | 166 | 102 | 29.3 |
| 5-Aug | 161 | 64 | 175 | 150 | 138 | 246 | 257 | 203 | 215 | 179 | 140 | 156 | 167 | 150 | 187 | 160 | 202 | 177 | 152 | 130 | 132 | 155 | 170 | 151 | 165.8 |
| 6-Aug | 176 | 188 | 190 | 193 | 195 | 201 | 220 | 231 | 227 | 225 | 229 | 217 | 207 | 355 | 38 | 211 | 237 | 302 | 350 | 320 | 13 | 14 | 16 | 12 | 232.9 |
| 7-Aug | 12 | 1 | 4 | 355 | 325 | 158 | 314 | 359 | 23 | 30 | 21 | 48 | 12 | 13 | 351 | 347 | 273 | 291 | 5 | 115 | 111 | 138 | 136 | 151 | 12.6 |
| 8-Aug | 171 | 174 | 183 | 178 | 183 | 188 | 185 | 179 | 172 | 192 | 211 | 215 | 204 | 202 | 212 | 204 | 178 | 150 | 130 | 120 | 123 | 165 | 149 | 184 | 178.6 |
| 9-Aug | 190 | 193 | 193 | 191 | 193 | 193 | 190 | 196 | 179 | 193 | 207 | 146 | 211 | 184 | 133 | 162 | 128 | 115 | 126 | 119 | 143 | 159 | 160 | 178 | 178.5 |
| 10-Aug | 187 | 188 | 186 | 189 | 186 | 164 | 194 | 131 | 188 | 213 | 233 | 127 | 115 | 350 | 163 | 205 | 192 | 195 | 203 | 163 | 162 | 186 | 187 | 188 | 188.0 |
| 11-Aug | 165 | 172 | 187 | 190 | 193 | 193 | 195 | 222 | 172 | 241 | 223 | 256 | 72 | 37 | 66 | 81 | 74 | 136 | 122 | 125 | 132 | 171 | 141 | 133 | 158.8 |
| 12-Aug | 127 | 125 | 125 | 130 | 130 | 182 | 318 | 296 | 306 | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- |
| 13-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- |
| 14-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | 214 | 211 | 233 | 229 | 237 | 210 | 191 | 153 | 122 | 145 | 128 | 265 | -- |
| 15-Aug | 242 | 113 | 221 | 220 | 160 | 225 | 187 | 229 | 236 | 251 | 281 | 53 | 280 | 297 | 25 | 287 | 226 | 214 | 251 | 20 | 358 | 137 | 228 | 201 | 245.7 |
| 16-Aug | 201 | 234 | 226 | 223 | 203 | 188 | 189 | 181 | 209 | 196 | 199 | 213 | 223 | 216 | 232 | 222 | 240 | 234 | 209 | 157 | 167 | 181 | 186 | 191 | 206.8 |
| 17-Aug | 190 | 193 | 190 | 191 | 191 | 190 | 191 | 203 | 213 | 226 | 212 | 246 | 251 | 259 | 264 | 253 | 241 | 235 | 238 | 152 | 176 | 189 | 187 | 184 | 214.5 |
| 18-Aug | 191 | 192 | 189 | 187 | 193 | 208 | 204 | 205 | 207 | 220 | 230 | 215 | 211 | 220 | 242 | 260 | 210 | 180 | 193 | 177 | 199 | 227 | 245 | 253 | 212.3 |
| 19-Aug | 216 | 217 | 213 | 213 | 207 | 212 | 225 | 255 | 257 | 252 | 256 | 269 | 251 | 251 | 249 | 252 | 269 | 60 | 61 | 166 | 236 | 208 | 187 | 188 | 239.8 |
| 20-Aug | 188 | 190 | 189 | 197 | 192 | 194 | 198 | 201 | 198 | 212 | 211 | 236 | 249 | 255 | 264 | 252 | 239 | 261 | 262 | 236 | 204 | 197 | 189 | 199 | 221.6 |
| 21-Aug | 220 | 202 | 190 | 183 | 185 | 189 | 196 | 207 | 211 | 215 | 204 | 216 | 243 | 265 | 264 | 232 | 203 | 202 | 181 | 141 | 153 | 185 | 189 | 190 | 206.1 |
| 22-Aug | 192 | 193 | 181 | 196 | 190 | 172 | 206 | 232 | 218 | 233 | 209 | 135 | 80 | 359 | 9 | 101 | 179 | 109 | 119 | 129 | 123 | 158 | 88 | 53 | 182.8 |
| 23-Aug | 254 | 115 | 145 | 156 | 155 | 127 | 134 | 165 | 187 | 140 | 151 | 139 | 144 | 102 | 57 | 61 | 74 | 111 | 105 | 130 | 141 | 129 | 97 | 110 | 120.5 |
| 24-Aug | 67 | 173 | 151 | 154 | 95 | 102 | 111 | 112 | 82 | 166 | 54 | 67 | 12 | 63 | 140 | 170 | 140 | 143 | 155 | 202 | 230 | 252 | 244 | 254 | 139.1 |
| 25-Aug | 239 | 232 | 219 | 209 | 197 | 202 | 200 | 208 | 211 | 218 | 219 | 226 | 226 | 248 | 243 | 238 | 238 | 235 | 254 | 195 | 164 | 143 | 191 | 192 | 221.6 |
| 26-Aug | 194 | 201 | 196 | 200 | 204 | 206 | 210 | 216 | 212 | 227 | 213 | 225 | 224 | 224 | 234 | 237 | 222 | 200 | 212 | 196 | 202 | 202 | 204 | 208 | 212.9 |
| 27-Aug | 203 | 208 | 201 | 204 | 202 | 215 | 217 | 229 | 228 | 239 | 248 | 247 | 248 | 244 | 253 | 257 | 256 | 242 | 224 | 157 | 171 | 197 | 193 | 195 | 229.5 |
| 28-Aug | 199 | 212 | 209 | 215 | 217 | 197 | 163 | 183 | 203 | 203 | 246 | 261 | 272 | 264 | 277 | 287 | 278 | 289 | 93 | 133 | 146 | 164 | 174 | 180 | 228.0 |
| 29-Aug | 190 | 147 | 158 | 155 | 144 | 181 | 185 | 179 | 165 | 67 | 76 | 108 | 101 | 119 | 117 | 98 | 88 | 65 | 94 | 72 | 80 | 97 | 117 | 110 | 115.5 |
| 30-Aug | 269 | 124 | 40 | 37 | 20 | 21 | 1 | 332 | 349 | 356 | 157 | 148 | 142 | 134 | 154 | 172 | 159 | 157 | 153 | 118 | 124 | 128 | 125 | 116 | 144.9 |
| 31-Aug | 94 | 161 | 172 | 160 | 183 | 171 | 186 | 185 | 204 | 204 | 214 | 262 | 269 | 258 | 258 | 260 | 229 | 188 | 203 | 200 | 229 | 227 | 212 | 202 | 226.2 |

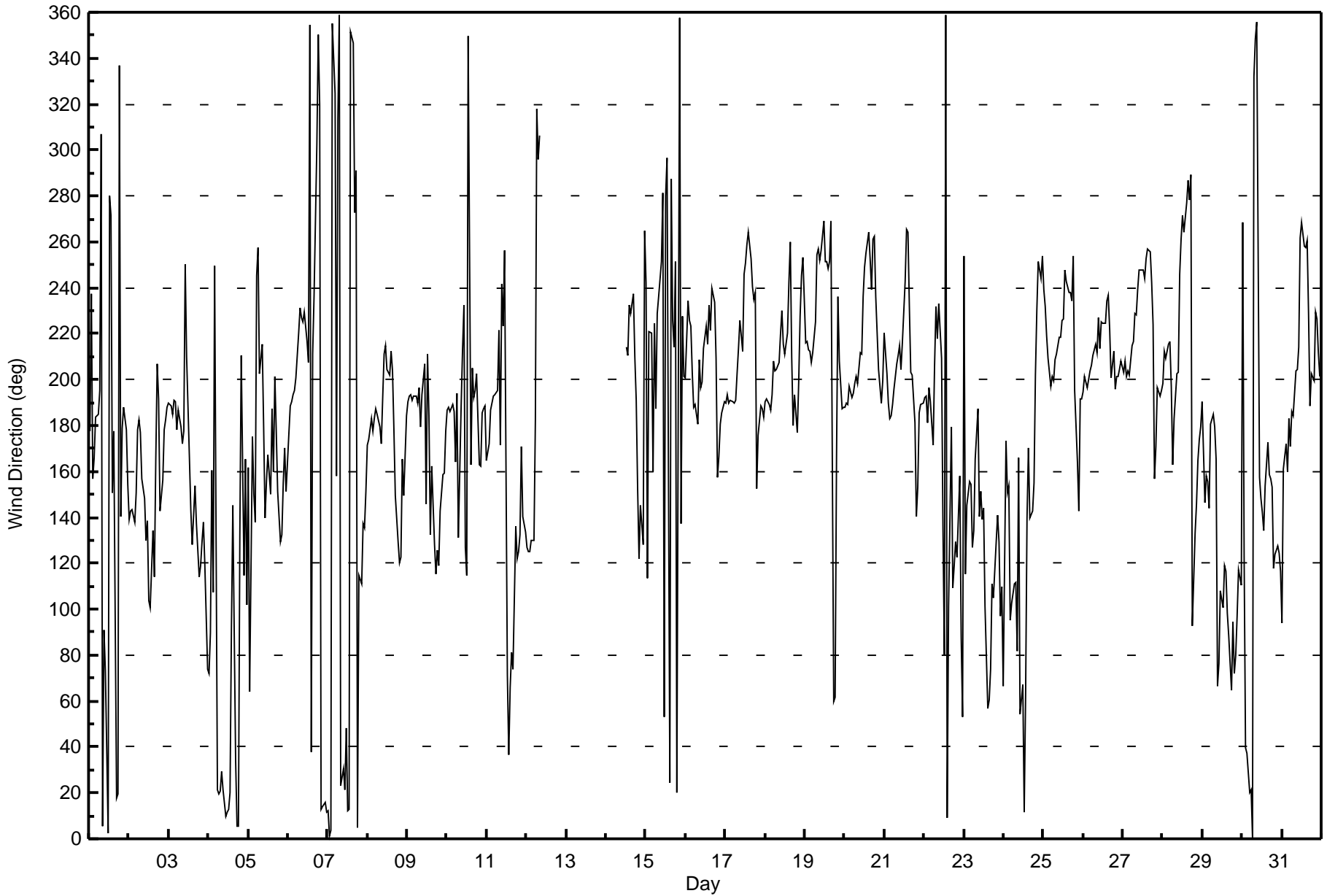
192.5 195.1 190.1 192.1 191.1 190.2 195.9 204.4 209.2 216.6 216.4 223.6 229.4 236.2 228.4 223.1 218.8 202.2 186.0 152.0 162.1 182.3 187.6 191.9
 Diurnal Average

AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Janvier - August 2017





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Janvier - August 2017

| | | | | |
|--|---------|----------|---------------------------|------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 110 deg on Aug 1 19:00 | | | Hours of Data: | 693 |
| Minimum Value: 7 deg on Aug 8 21:00 | | | Hours of Missing Data: | 51 |
| | | | Hours of Calibration: | 0 |
| | | | Percent Operational Time: | 93.2 |
| Percentiles: P ₁ = 9 P ₁₀ = 13 Q ₁ = 20 Median = 29 Q ₃ = 46 P ₉₀ = 71 P ₉₉ = 99 | | | | |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
|--------|-------------------------------|----|----|----|----|----|----|-----|----|-----|----|----|----|-----|-----|----|----|----|-----|----|----|----|----|----|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 64 | 88 | 39 | 27 | 17 | 26 | 44 | 71 | 68 | 107 | 90 | 53 | 51 | 82 | 71 | 49 | 83 | 40 | 110 | 50 | 21 | 13 | 15 | 20 | 110 |
| 2-Aug | 15 | 15 | 21 | 10 | 17 | 17 | 15 | 28 | 27 | 73 | 77 | 71 | 48 | 62 | 48 | 47 | 60 | 42 | 31 | 12 | 17 | 12 | 11 | 11 | 77 |
| 3-Aug | 10 | 12 | 12 | 12 | 12 | 17 | 17 | 15 | 25 | 58 | 45 | 61 | 48 | 48 | 59 | 44 | 22 | 17 | 11 | 8 | 23 | 28 | 27 | 70 | 70 |
| 4-Aug | 68 | 48 | 49 | 58 | 84 | 30 | 22 | 25 | 20 | 21 | 38 | 41 | 31 | 24 | 81 | 44 | 44 | 35 | 74 | 97 | 31 | 69 | 57 | 34 | 97 |
| 5-Aug | 72 | 95 | 75 | 78 | 59 | 57 | 62 | 86 | 64 | 25 | 43 | 35 | 34 | 38 | 35 | 33 | 26 | 31 | 25 | 15 | 14 | 26 | 34 | 22 | 95 |
| 6-Aug | 36 | 13 | 17 | 18 | 18 | 25 | 26 | 28 | 29 | 29 | 34 | 38 | 34 | 109 | 100 | 73 | 68 | 52 | 56 | 66 | 30 | 30 | 24 | 29 | 109 |
| 7-Aug | 29 | 29 | 31 | 42 | 53 | 49 | 45 | 40 | 36 | 28 | 84 | 38 | 44 | 58 | 57 | 59 | 41 | 62 | 95 | 47 | 53 | 31 | 14 | 15 | 95 |
| 8-Aug | 15 | 18 | 13 | 13 | 12 | 12 | 12 | 13 | 13 | 43 | 66 | 75 | 64 | 61 | 59 | 58 | 49 | 27 | 22 | 7 | 7 | 29 | 18 | 13 | 75 |
| 9-Aug | 13 | 12 | 12 | 12 | 12 | 13 | 16 | 26 | 27 | 41 | 53 | 54 | 71 | 52 | 81 | 71 | 46 | 32 | 22 | 15 | 13 | 20 | 17 | 13 | 81 |
| 10-Aug | 8 | 10 | 12 | 12 | 73 | 68 | 65 | 102 | 65 | 33 | 60 | 85 | 79 | 93 | 34 | 31 | 33 | 17 | 29 | 29 | 45 | 30 | 19 | 42 | 102 |
| 11-Aug | 17 | 28 | 17 | 14 | 13 | 19 | 24 | 34 | 24 | 58 | 70 | 95 | 73 | 32 | 46 | 39 | 68 | 40 | 16 | 7 | 14 | 21 | 12 | 9 | 95 |
| 12-Aug | 8 | 8 | 11 | 20 | 60 | 49 | 73 | 58 | 72 | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | 73 |
| 13-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | -- |
| 14-Aug | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | 82 |
| 15-Aug | 103 | 91 | 76 | 28 | 62 | 51 | 37 | 64 | 33 | 55 | 73 | 83 | 71 | 55 | 42 | 89 | 38 | 23 | 64 | 46 | 61 | 90 | 20 | 36 | 103 |
| 16-Aug | 21 | 20 | 20 | 21 | 20 | 10 | 16 | 19 | 32 | 34 | 34 | 43 | 40 | 33 | 38 | 29 | 29 | 27 | 23 | 15 | 19 | 12 | 11 | 13 | 43 |
| 17-Aug | 12 | 13 | 11 | 12 | 12 | 12 | 15 | 24 | 28 | 30 | 33 | 34 | 31 | 36 | 41 | 38 | 24 | 42 | 22 | 19 | 16 | 11 | 14 | 12 | 42 |
| 18-Aug | 14 | 14 | 13 | 13 | 16 | 25 | 22 | 22 | 23 | 33 | 27 | 30 | 27 | 37 | 39 | 31 | 51 | 28 | 23 | 28 | 19 | 28 | 27 | 31 | 51 |
| 19-Aug | 31 | 26 | 27 | 24 | 22 | 25 | 32 | 29 | 31 | 30 | 34 | 34 | 30 | 29 | 28 | 30 | 46 | 65 | 42 | 62 | 72 | 21 | 15 | 12 | 72 |
| 20-Aug | 12 | 13 | 14 | 16 | 15 | 15 | 19 | 20 | 25 | 26 | 25 | 35 | 29 | 35 | 41 | 50 | 30 | 39 | 32 | 27 | 23 | 16 | 15 | 17 | 50 |
| 21-Aug | 26 | 21 | 10 | 10 | 11 | 12 | 16 | 24 | 24 | 25 | 28 | 28 | 32 | 40 | 36 | 30 | 40 | 24 | 27 | 13 | 19 | 11 | 12 | 12 | 40 |
| 22-Aug | 12 | 15 | 27 | 18 | 15 | 21 | 35 | 24 | 34 | 47 | 55 | 93 | 35 | 80 | 57 | 90 | 65 | 87 | 29 | 19 | 46 | 82 | 86 | 89 | 93 |
| 23-Aug | 87 | 92 | 45 | 84 | 43 | 48 | 37 | 38 | 86 | 54 | 31 | 28 | 34 | 46 | 36 | 24 | 28 | 27 | 21 | 26 | 24 | 55 | 31 | 21 | 92 |
| 24-Aug | 48 | 65 | 29 | 35 | 55 | 29 | 69 | 26 | 67 | 105 | 35 | 38 | 33 | 48 | 45 | 24 | 32 | 27 | 27 | 40 | 26 | 23 | 28 | 32 | 105 |
| 25-Aug | 37 | 27 | 28 | 25 | 22 | 23 | 21 | 27 | 29 | 30 | 28 | 31 | 30 | 33 | 30 | 30 | 31 | 28 | 60 | 40 | 97 | 21 | 19 | 14 | 97 |
| 26-Aug | 16 | 19 | 17 | 18 | 22 | 22 | 23 | 24 | 25 | 29 | 31 | 30 | 32 | 31 | 34 | 32 | 29 | 22 | 26 | 17 | 18 | 18 | 22 | 22 | 34 |
| 27-Aug | 19 | 22 | 18 | 20 | 19 | 23 | 24 | 26 | 26 | 29 | 29 | 26 | 30 | 32 | 31 | 28 | 29 | 25 | 28 | 23 | 22 | 18 | 14 | 16 | 32 |
| 28-Aug | 19 | 26 | 21 | 25 | 24 | 35 | 26 | 22 | 32 | 31 | 43 | 43 | 54 | 40 | 46 | 60 | 49 | 68 | 56 | 11 | 14 | 12 | 15 | 49 | 68 |
| 29-Aug | 81 | 17 | 14 | 20 | 39 | 19 | 10 | 62 | 68 | 65 | 40 | 47 | 61 | 39 | 39 | 42 | 34 | 25 | 17 | 16 | 28 | 30 | 50 | 42 | 81 |
| 30-Aug | 90 | 90 | 28 | 29 | 18 | 19 | 34 | 46 | 42 | 90 | 31 | 31 | 35 | 32 | 29 | 26 | 27 | 27 | 25 | 9 | 10 | 16 | 83 | 86 | 90 |
| 31-Aug | 48 | 86 | 40 | 59 | 33 | 80 | 56 | 46 | 33 | 35 | 27 | 36 | 39 | 29 | 31 | 32 | 31 | 21 | 20 | 16 | 21 | 21 | 24 | 23 | 86 |
| | 103 | 95 | 76 | 84 | 84 | 80 | 73 | 102 | 86 | 107 | 90 | 95 | 79 | 109 | 100 | 90 | 83 | 87 | 110 | 97 | 97 | 90 | 86 | 89 | |
| | Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | |

AF - Analyzer Failure



Wood Buffalo Environmental Association

SO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|---------------|
| Station Name: | Janvier | Station number: | AMS 22 |
| Calibration Date: | August 10, 2017 | Last Cal Date: | July 20, 2017 |
| Start time (MST): | 10:00 | End time (MST): | 15:13 |
| Reason: | Routine | | |

Calibration Standards

| | | | | |
|-----------------------|-----------------|-----|------------------|-------------------|
| Cal Gas Concentration | <u>49.7</u> | ppm | Cal Gas Exp Date | September 8, 2018 |
| Cal Gas Cylinder # | <u>LL107937</u> | | | |
| Calibrator Make/Model | API T700 | | Serial Number | 2447 |
| ZAG Make/Model | API T701 | | Serial Number | 135 |

Analyzer Information

Analyzer make: Thermo 43i

Analyzer serial #: 1152430006

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|----------------------|--------------|---------------|--------------|--------------|---------------|
| Analyzer Range | 0 - 1000 ppb | | PMT voltage | -637 | -637 |
| Calculated slope | 0.998705 | 0.996721 | Lamp voltage | 769 | 769 |
| Calculated intercept | 0.260993 | 0.141478 | Pressure | 708.5 | 706.7 |
| Analyzer Background | 15.0 | 15.0 | Flow | 0.500 | 0.498 |
| Analyzer Coefficient | 0.934 | 0.934 | Intensity | 90 | 90 |

SO₂ Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|----------------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5009 | 0.0 | 0.0 | -0.4 | ---- |
| as found span | 4934 | 78.7 | 780.3 | 782.4 | 0.997 |
| calibrator zero | 5006 | 0.0 | 0.0 | -0.4 | ---- |
| high point | 4934 | 78.7 | 780.3 | 782.4 | 0.997 |
| second point | 4977 | 39.4 | 390.4 | 392.2 | 0.995 |
| third point | 4993 | 19.7 | 195.3 | 195.7 | 0.998 |
| as left zero | 5011 | 0.0 | 0.0 | 0.0 | ---- |
| as left span | 4828 | 78.7 | 797.2 | 783.8 | 1.017 |
| Average Correction Factor | | | | | 0.997 |
| Corrected As found | 782.80 | Previous response | 781.05 | *% change | -0.2% |

* = > +/-5% change initiates investigation

Notes:

Span adjusted after as founds.

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association

SO₂ Calibration Summary

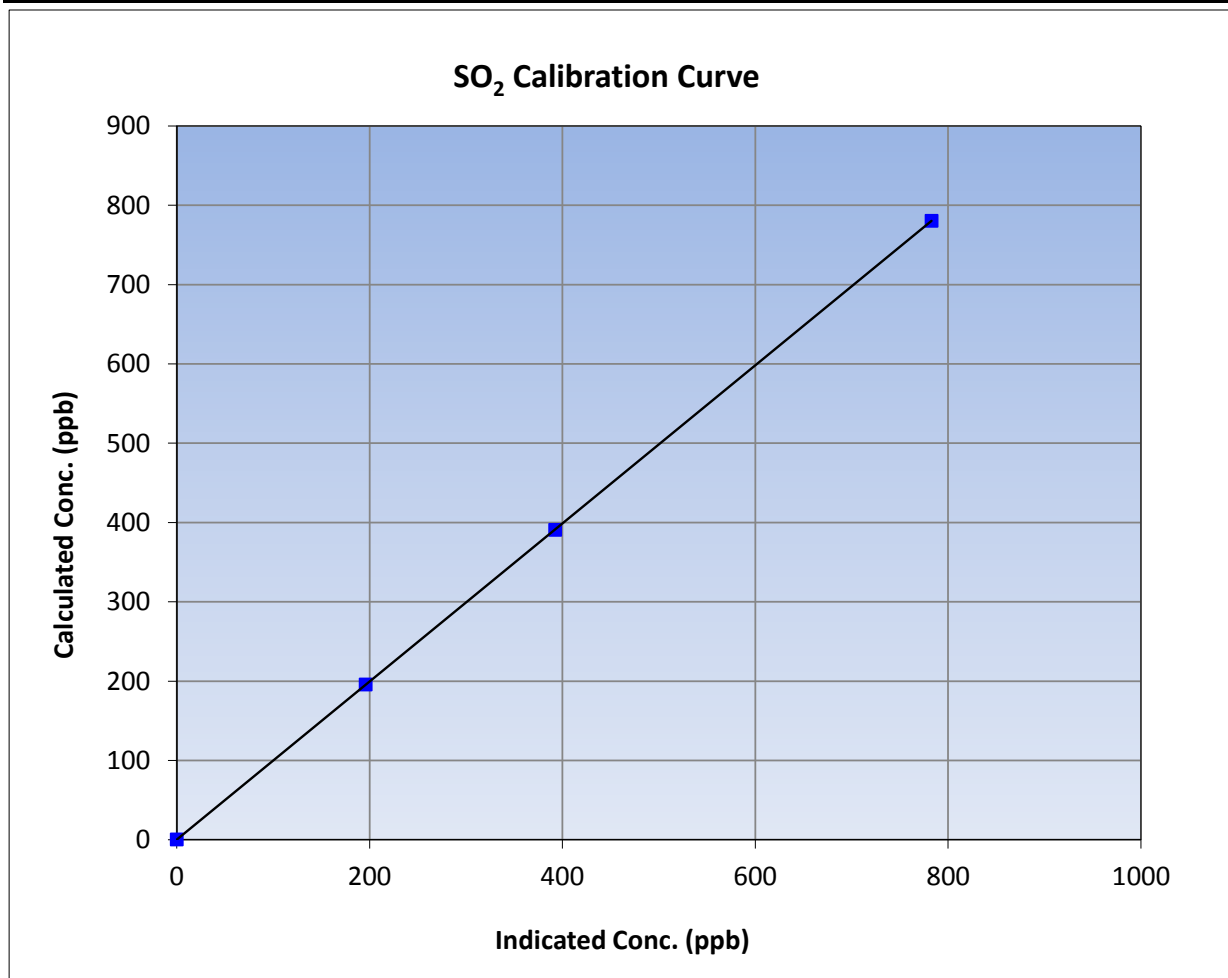
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 10, 2017 | Previous Calibration | July 20, 2017 |
| Station Name | Janvier | Station Number | AMS 22 |
| Start Time (MST) | 10:00 | End Time (MST) | 15:13 |
| Analyzer make | Thermo 43i | Analyzer serial # | 1152430006 |

Calibration Data

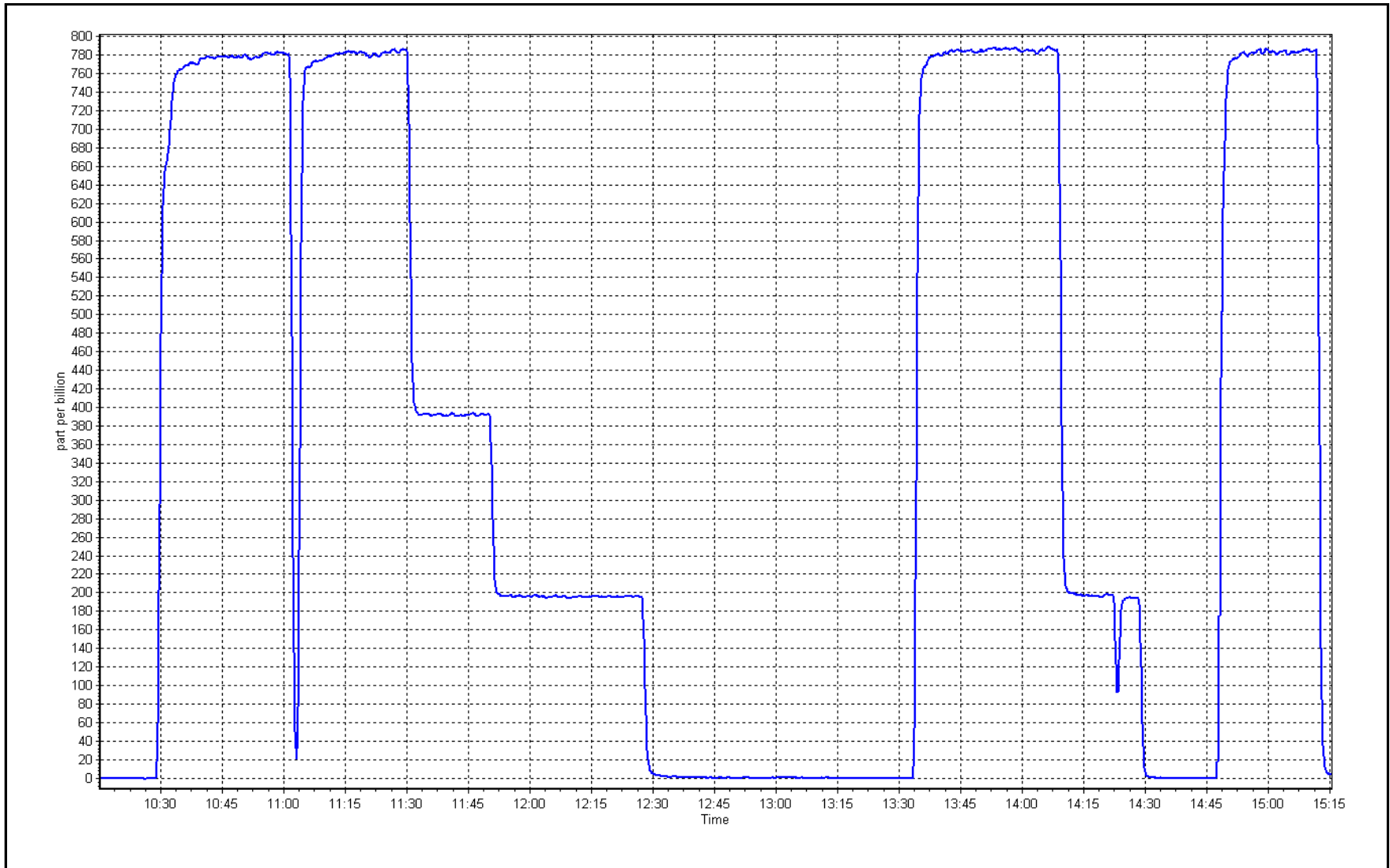
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|-------------|
| 0.0 | -0.4 | ---- | Correlation Coefficient | 0.999998 | ≥0.995 |
| 780.3 | 782.4 | 0.9973 | | | |
| 390.4 | 392.2 | 0.9953 | Slope | 0.996721 | 0.90 - 1.10 |
| 195.3 | 195.7 | 0.9981 | | | |
| | | | Intercept | 0.141478 | +/-30 |



SO2 Calibration Plot

Date: August 10, 2017

Location: Janvier





Wood Buffalo Environmental Association

TRS Calibration Summary

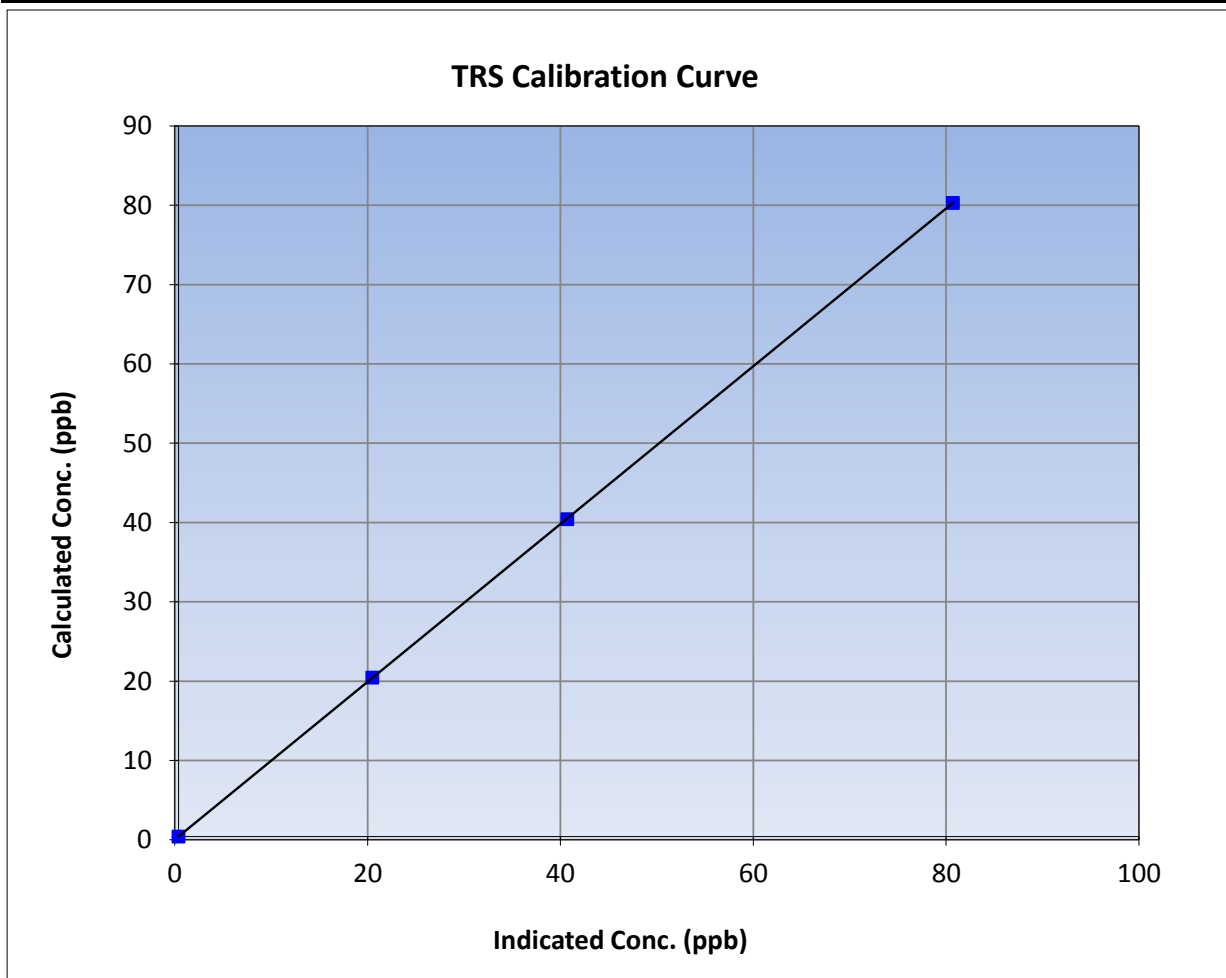
Version-03-2017

Station Information

| | | | |
|------------------|----------------|----------------------|---------------|
| Calibration Date | August 2, 2017 | Previous Calibration | July 31, 2017 |
| Station Name | Janvier | Station Number | AMS 22 |
| Start Time (MST) | 11:25 | End Time (MST) | 14:09 |
| Analyzer make | Thermo 43i-TLE | Analyzer serial # | 1151680031 |

Calibration Data

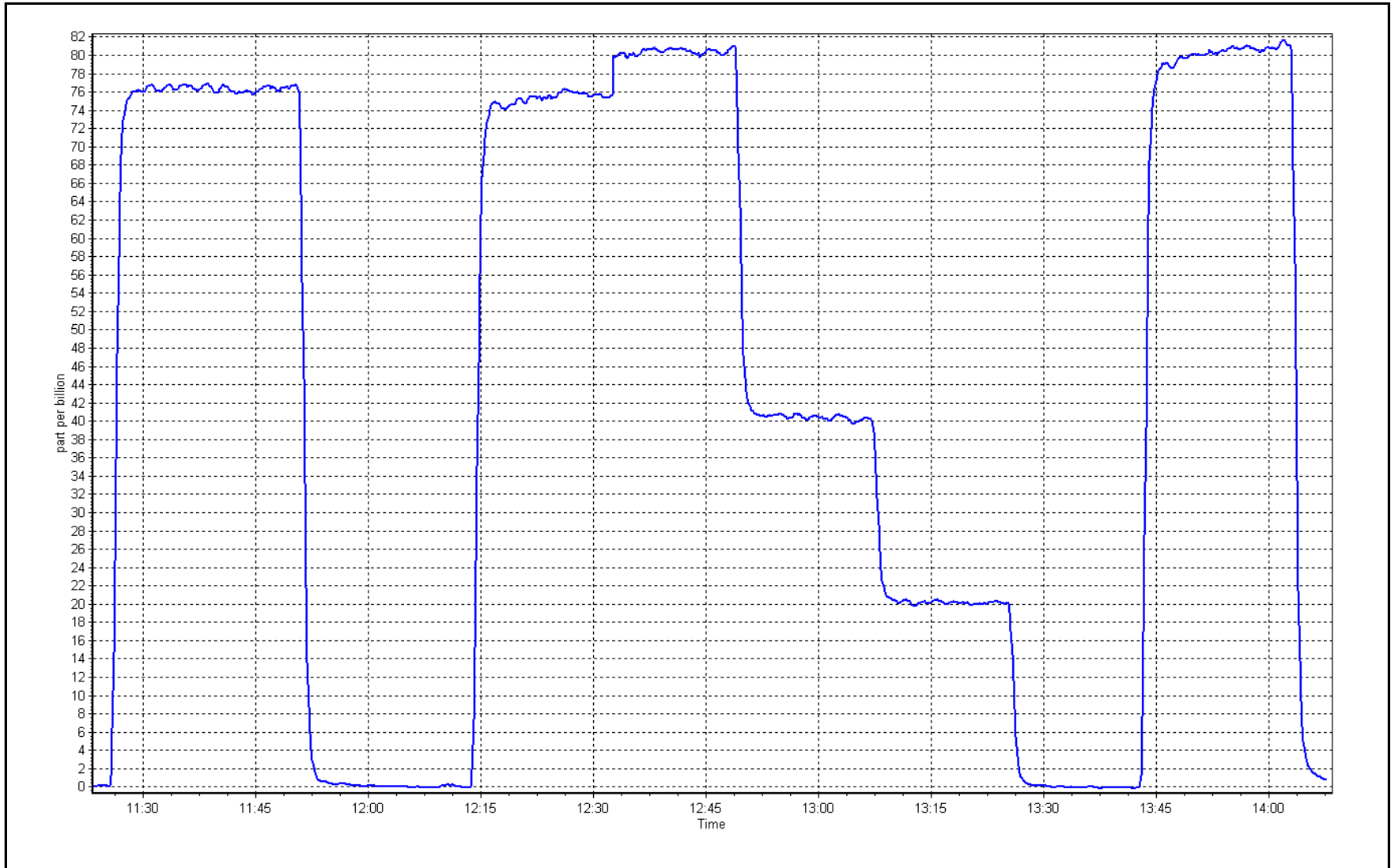
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | 0.999997 | ≥0.995 |
| 79.9 | 80.3 | 0.9953 | | | |
| 40.0 | 40.3 | 0.9932 | Slope | 0.994866 | 0.90 - 1.10 |
| 20.1 | 20.1 | 0.9986 | | | |
| | | | Intercept | 0.010187 | +/-3 |



TRS Calibration Plot

Date: August 2, 2017

Location: Janvier





Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|---------------|
| Station Name: | Janvier | Station number: | AMS 22 |
| Calibration Date: | August 10, 2017 | Last Cal Date: | July 20, 2017 |
| Start time (MST): | 10:00 | End time (MST): | 15:13 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|--------------------|------------------|---------------------|-------------------|
| Gas Cert Reference | LL107937 | Cal Gas Expiry Date | September 8, 2018 |
| CH4 Cal Gas Conc. | <u>509.0</u> ppm | CH4 Equiv Conc. | 1056.3 ppm |
| C3H8 Cal Gas Conc. | <u>199.0</u> ppm | Station temp. | 21 Deg C |
| Calibrator Model | Teledyne API 700 | Serial Number | 2447 |
| ZAG make/model | Teledyne API 701 | Serial Number | 135 |

Analyzer Information

Analyzer make: Thermo 55i

Analyzer serial #: 1501663728

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|--------------------|--------------|---------------|------------------|--------------|---------------|
| THC Range (ppm) | 0 - 50 ppm | | Column Temp | 75.0 | 75.0 |
| NMHC Range (ppm) | 0 - 25 ppm | | Detector Temp | 175.2 | 174.9 |
| CH4 SP Ratio | 0.000186 | 0.000189 | Flame Temp | 405.0 | 405.0 |
| CH4 Retention time | 12.4 | 12.4 | Carrier Pressure | 36.8 | 36.8 |
| NMHC SP Ratio | 4.30E-05 | 4.33E-05 | Fuel Pressure | 44.9 | 45.0 |
| NMHC Peak Area | 199968 | 198789 | Air Pressure | 33.8 | 33.8 |

Calibration Statistics

| | <u>Start</u> | <u>Finish</u> |
|-----------------|--------------|---------------|
| THC Cal Slope | 0.994513 | 0.997713 |
| THC Cal Offset | 0.028230 | 0.017682 |
| CH4 Cal Slope | 0.997068 | 0.997519 |
| CH4 Cal Offset | 0.024200 | 0.031108 |
| NMHC Cal Slope | 0.992205 | 0.997737 |
| NMHC Cal Offset | 0.005354 | -0.013342 |

Notes:

Span adjusted.

Calibration Performed By:

Aswin Sasi Kumar



Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Version-02-2017

THC Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|--|
| as found zero | 5007 | 0.0 | 0.00 | 0.00 | ---- |
| as found span | 4933 | 78.7 | 16.59 | 16.74 | 0.991 |
| calibrator zero | 5009 | 0.0 | 0.00 | 0.00 | ---- |
| high point | 4933 | 78.7 | 16.59 | 16.62 | 0.998 |
| second point | 4976 | 39.4 | 8.30 | 8.27 | 1.003 |
| third point | 4993 | 19.7 | 4.15 | 4.14 | 1.003 |
| as left zero | 5011 | 0.0 | 0.00 | 0.00 | ---- |
| as left span | 4828 | 78.7 | 16.94 | 16.62 | 1.019 |
| Average Correction Factor | | | | | 1.001 |
| Corrected As found | 16.74 | Prev response | 16.65 | *% change | -0.5% |

NMHC Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|--|
| as found zero | 5007 | 0 | 0.00 | 0.00 | ---- |
| as found span | 4933 | 78.7 | 8.59 | 8.67 | 0.991 |
| calibrator zero | 5009 | 0 | 0.00 | 0.00 | ---- |
| high point | 4933 | 78.7 | 8.59 | 8.62 | 0.997 |
| second point | 4976 | 39.4 | 4.30 | 4.33 | 0.993 |
| third point | 4993 | 19.7 | 2.15 | 2.18 | 0.986 |
| as left zero | 5011 | 0 | 0.00 | 0.00 | ---- |
| as left span | 4828 | 78.7 | 8.78 | 8.63 | 1.017 |
| Average Correction Factor | | | | | 0.992 |
| Corrected As found | 8.67 | Prev response | 8.66 | *% change | -0.2% |

CH4 Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|--|
| as found zero | 5007 | 0.0 | 0.00 | 0.00 | ---- |
| as found span | 4933 | 78.7 | 7.99 | 8.07 | 0.991 |
| calibrator zero | 5009 | 0.0 | 0.00 | 0.00 | ---- |
| high point | 4933 | 78.7 | 7.99 | 8.00 | 0.999 |
| second point | 4976 | 39.4 | 4.00 | 3.94 | 1.015 |
| third point | 4993 | 19.7 | 2.00 | 1.96 | 1.022 |
| as left zero | 5011 | 0.0 | 0.00 | 0.00 | ---- |
| as left span | 4828 | 78.7 | 8.16 | 7.99 | 1.022 |
| Average Correction Factor | | | | | 1.012 |
| Corrected As found | 8.07 | Prev response | 7.99 | *% change | -1.0% |

* = > +/-5% change initiates investigation



Wood Buffalo Environmental Association

THC Calibration Summary

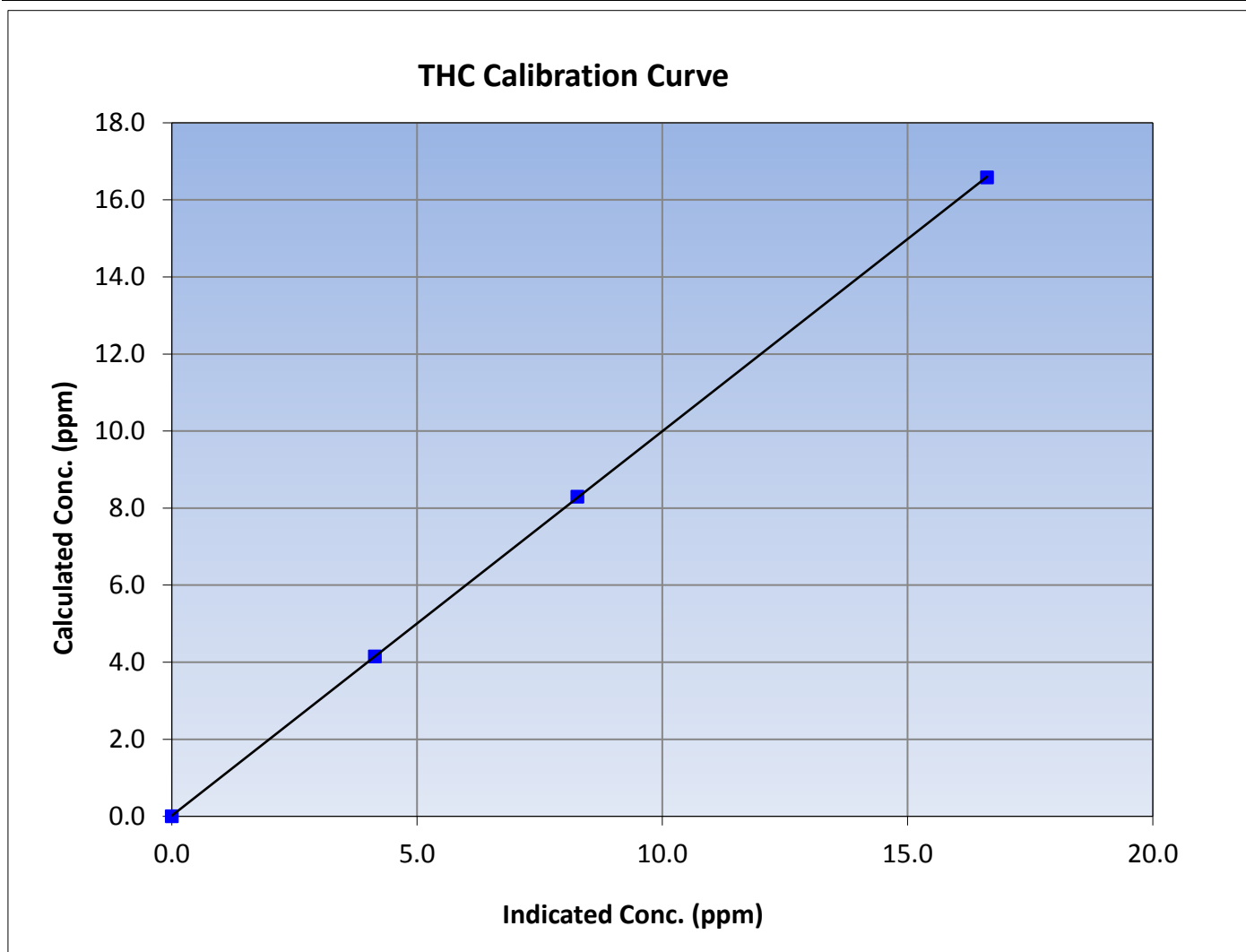
Version-02-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 10, 2017 | Previous Calibration | July 20, 2017 |
| Station Name | Janvier | Station Number | AMS 22 |
| Start Time (MST) | 14:18 | End Time (MST) | 16:50 |
| Analyzer make | Thermo 55i | Analyzer serial # | 1501663728 |

Calibration Data

| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> | | | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|---------------|-------|----------|-------------|
| 0.00 | 0.00 | ---- | Correlation Coefficient | 0.999991 | ≥ 0.995 | | | |
| 16.59 | 16.62 | 0.9979 | | | | | | |
| 8.30 | 8.27 | 1.0032 | | | | Slope | 0.997713 | 0.90 - 1.10 |
| 4.15 | 4.14 | 1.0032 | | | | | | |
| | | | Intercept | 0.017682 | ± 0.5 | | | |





Wood Buffalo Environmental Association

CH₄ Calibration Summary

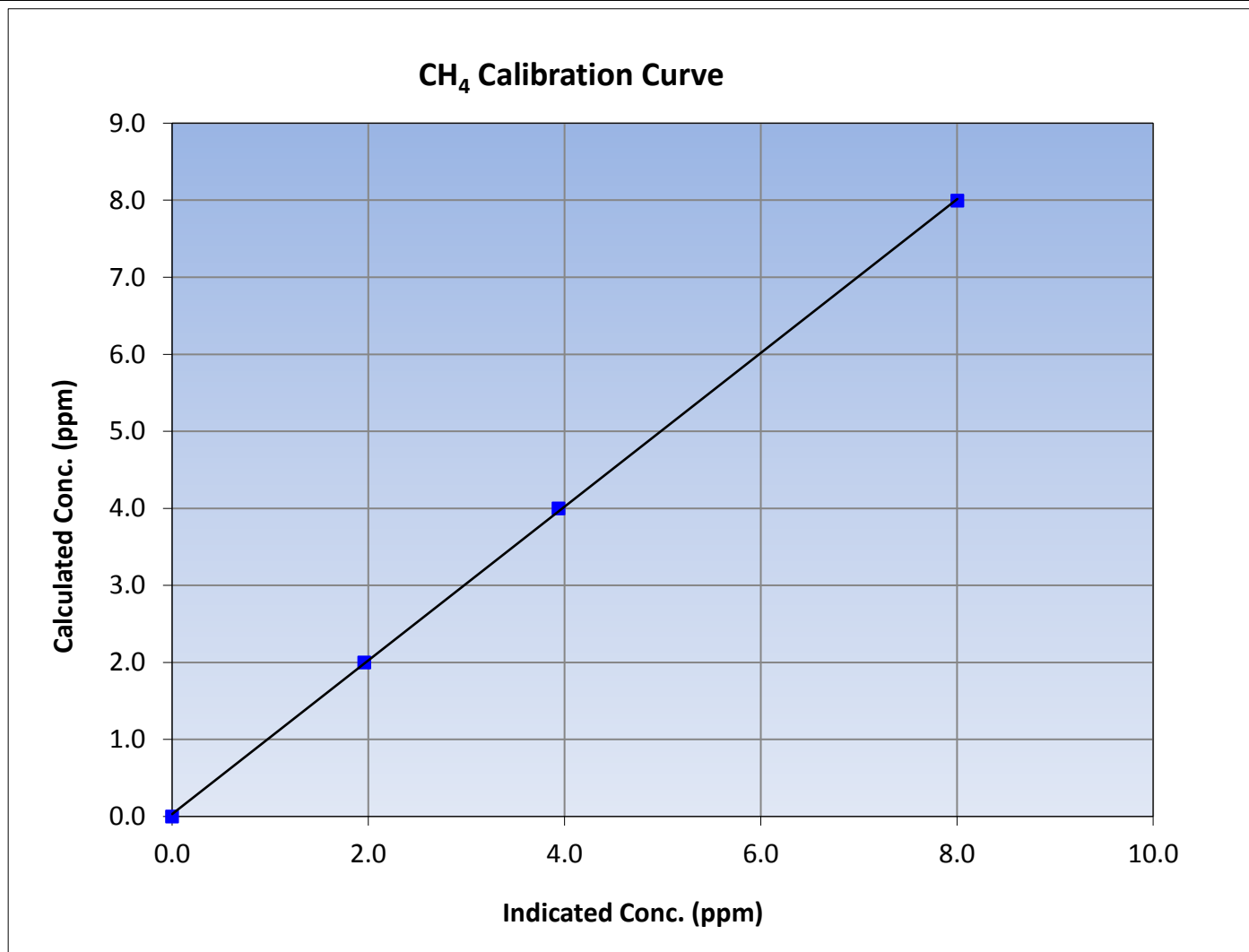
Version-02-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 10, 2017 | Previous Calibration | July 20, 2017 |
| Station Name | Janvier | Station Number | AMS 22 |
| Start Time (MST) | 14:18 | End Time (MST) | 16:50 |
| Analyzer make | Thermo 55i | Analyzer serial # | 1501663728 |

Calibration Data

| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> | | | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|---------------|-------|----------|-------------|
| 0.00 | 0.00 | ---- | Correlation Coefficient | 0.999911 | ≥ 0.995 | | | |
| 7.99 | 8.00 | 0.9986 | | | | | | |
| 4.00 | 3.94 | 1.0149 | | | | Slope | 0.997519 | 0.90 - 1.10 |
| 2.00 | 1.96 | 1.0216 | | | | | | |
| | | | Intercept | 0.031108 | ± 0.5 | | | |





Wood Buffalo Environmental Association

NMHC Calibration Summary

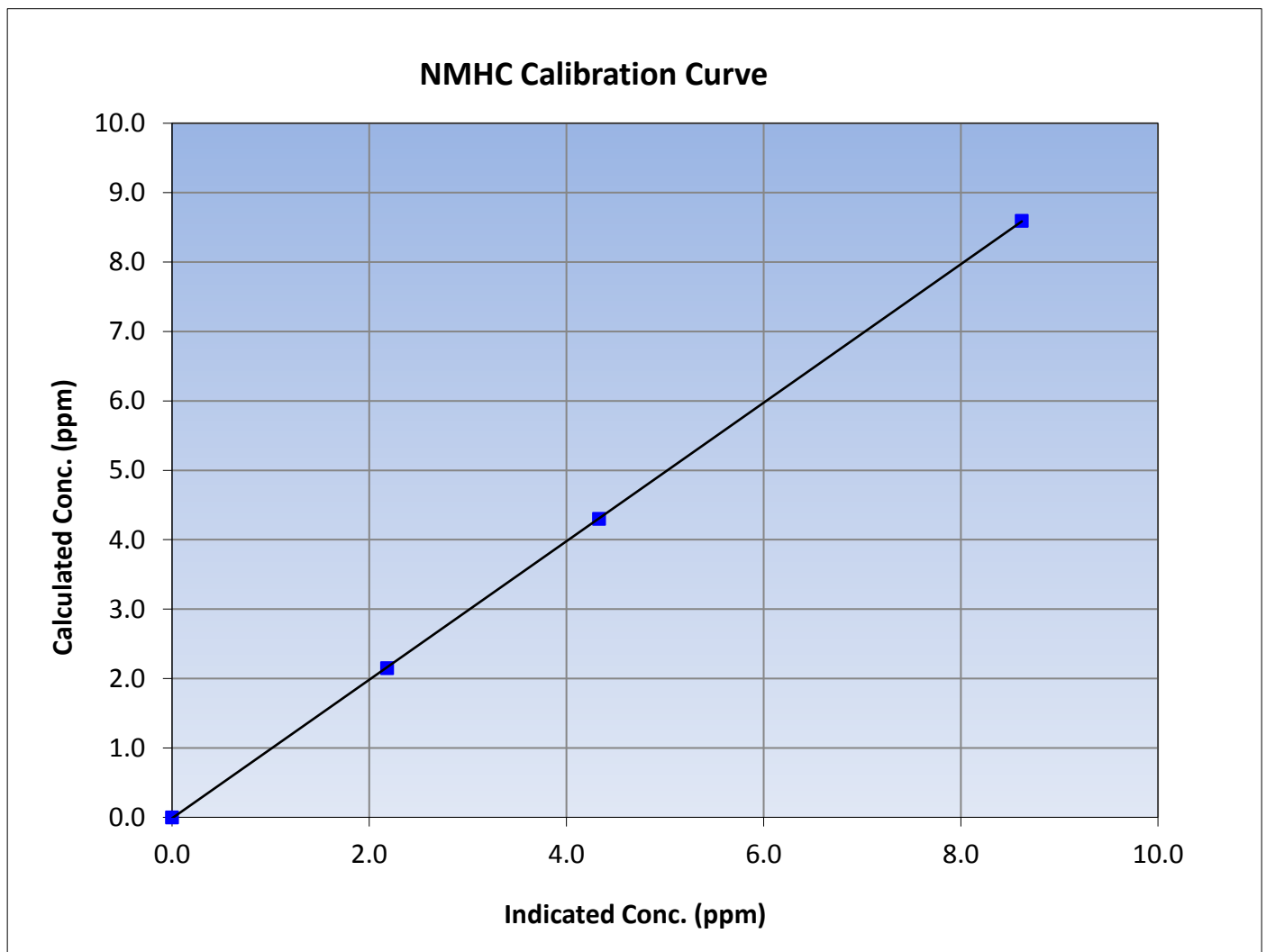
Version-02-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 10, 2017 | Previous Calibration | July 20, 2017 |
| Station Name | Janvier | Station Number | AMS 22 |
| Start Time (MST) | 14:18 | End Time (MST) | 16:50 |
| Analyzer make | Thermo 55i | Analyzer serial # | 1501663728 |

Calibration Data

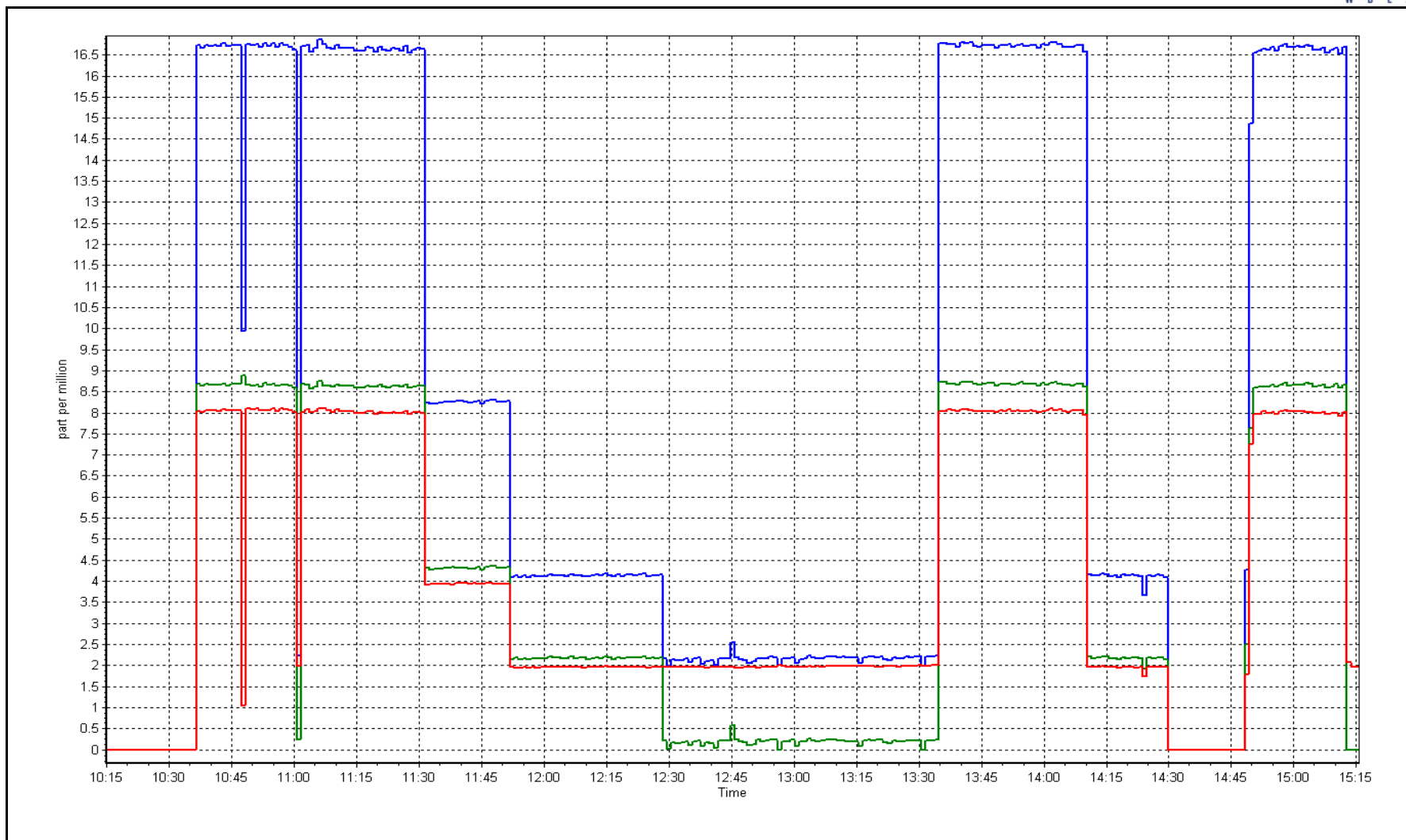
| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> | | | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|---------------|-------|----------|-------------|
| 0.00 | 0.00 | ---- | Correlation Coefficient | 0.999989 | ≥ 0.995 | | | |
| 8.59 | 8.62 | 0.9971 | | | | | | |
| 4.30 | 4.33 | 0.9926 | | | | Slope | 0.997737 | 0.90 - 1.10 |
| 2.15 | 2.18 | 0.9861 | | | | | | |
| | | | Intercept | -0.013342 | ± 0.5 | | | |



NMHC Calibration Plot

Date: August 10, 2017

Location: Janvier





Wood Buffalo Environmental Association

O₃ Calibration Summary

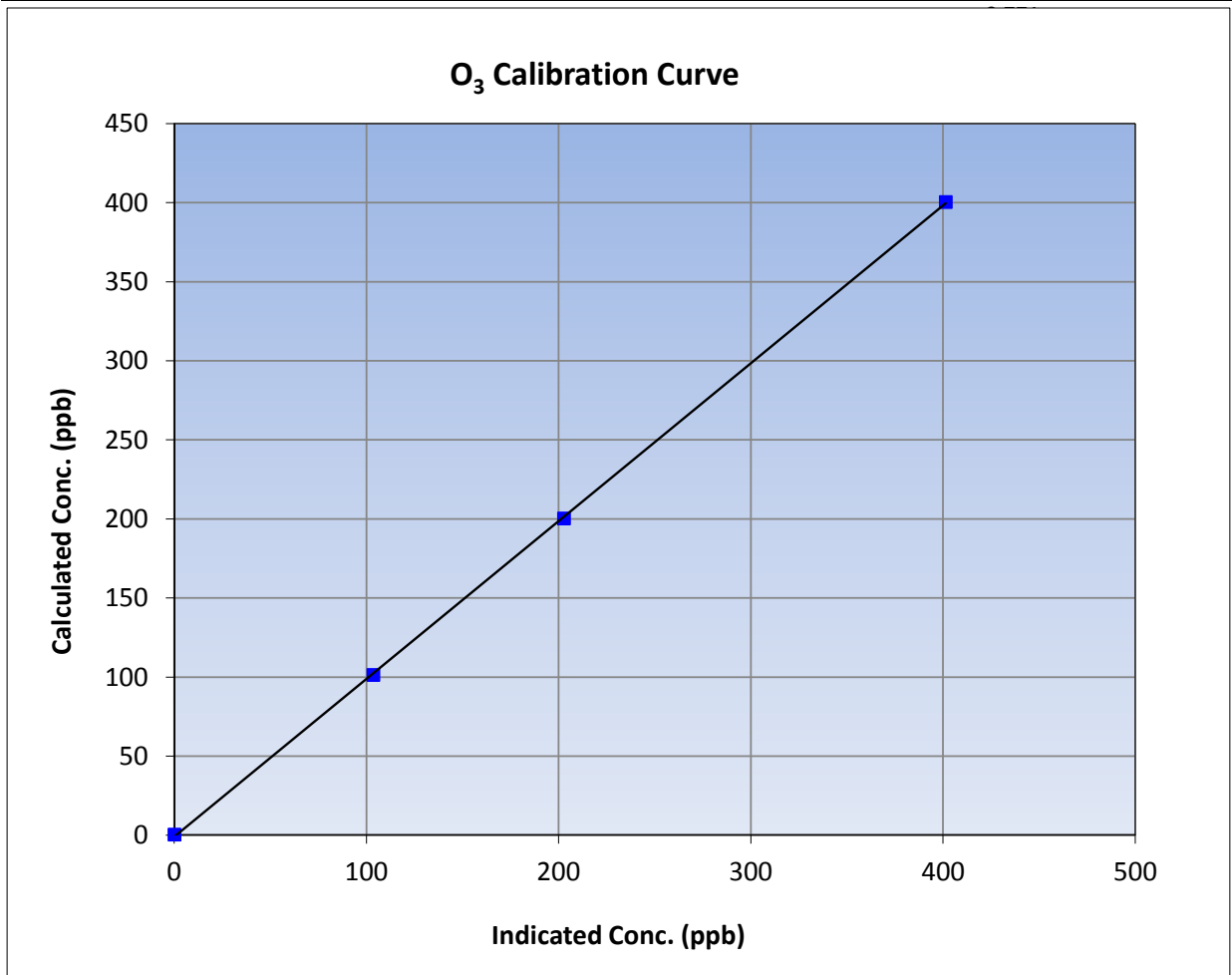
Version-03-2017

Station Information

| | | | |
|------------------|----------------|----------------------|---------------|
| Calibration Date | August 2, 2017 | Previous Calibration | July 18, 2017 |
| Station Name | Janvier | Station Number | AMS 22 |
| Start Time (MST) | 14:17 | End Time (MST) | 17:52 |
| Analyzer make | Thermo 49i | Analyzer serial # | 1227254861 |

Calibration Data

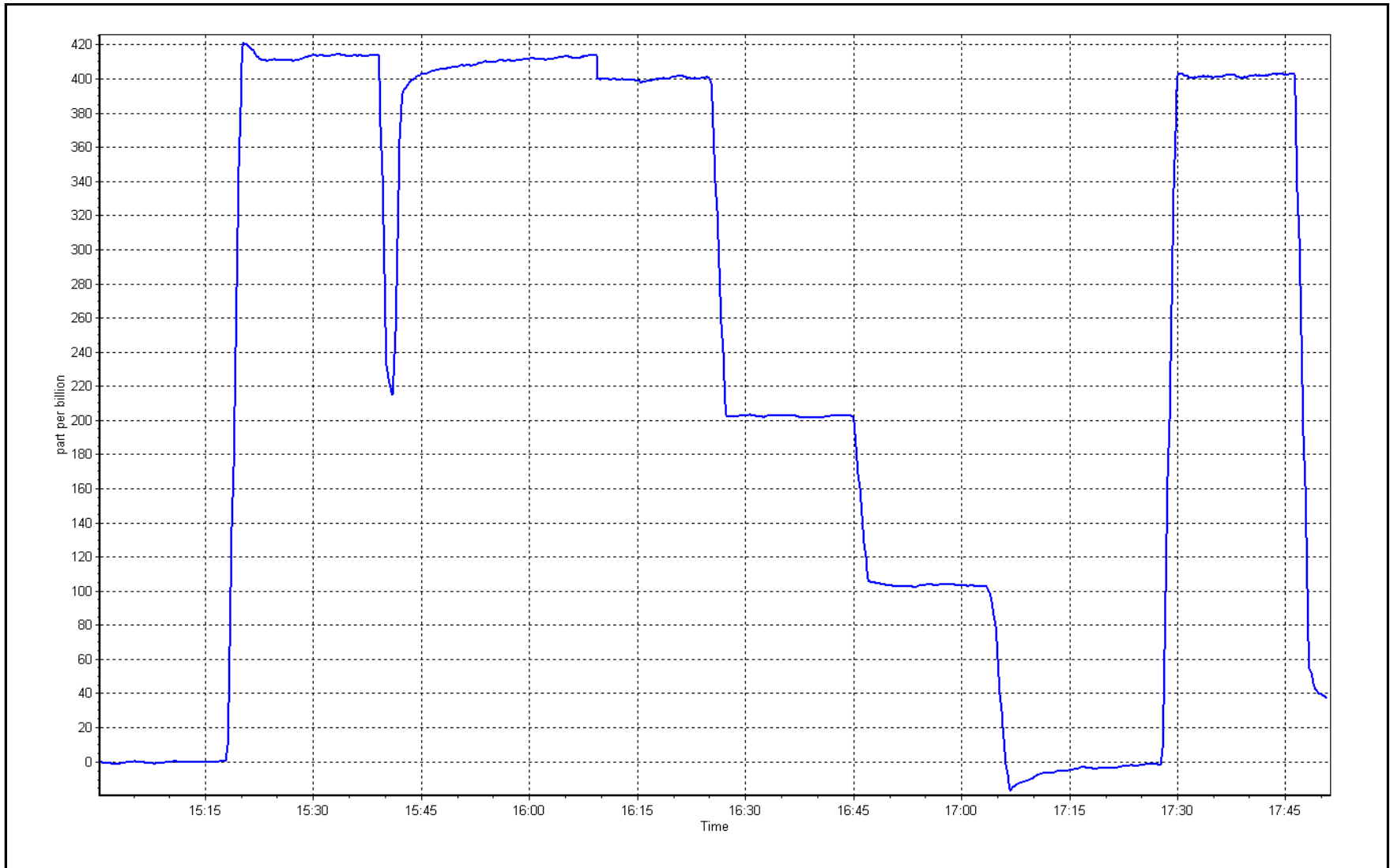
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|-------------|
| 0.0 | -0.2 | ---- | Correlation Coefficient | 0.999954 | ≥0.995 |
| 400.0 | 401.0 | 0.9975 | | | |
| 200.0 | 202.4 | 0.9881 | Slope | 0.998173 | 0.90 - 1.10 |
| 101.0 | 103.2 | 0.9787 | | | |
| | | | Intercept | -1.027286 | +/- 10 |



O₃ Calibration Plot

Date: August 2, 2017

Location: Janvier





Wood Buffalo Environmental Association

NO_x - NO - NO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|---------------|
| Station Name: | Janvier | Station number: | AMS 22 |
| Calibration Date: | August 10, 2017 | Last Cal Date: | July 14, 2017 |
| Start time (MST): | 10:00 | End time (MST): | 15:05 |
| Reason: | Removal | | |

Calibration Standards

| | | | |
|-------------------|-------------------|---------------------|-------------------|
| NO Gas Cylinder # | LL107937 | Cal Gas Expiry Date | September 8, 2018 |
| NOX Cal Gas Conc. | <u>50.9</u> ppb | NO Cal Gas Conc. | <u>50.9</u> ppb |
| Calibrator Model | API T700 | Serial Number | 2447 |
| ZAG make/model | Teledyne API T701 | Serial Number | 135 |

Analyzer Information

| | | | | | |
|-----------------------------|--------------|---------------|-------------------------------|--------------|---------------|
| Analyzer make: Thermo 42i | | | Analyzer serial #: 1229254994 | | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| NO coefficient | 1.003 | 1.024 | NOX Range (ppb) | 0 - 1000 ppb | |
| NOX coefficient | 0.997 | 1.002 | PMT Temperature | -2.7 | -3.1 |
| NO ₂ coefficient | 1.000 | 1.000 | Reaction cell Press | 159.1 | 160.6 |
| NO bkgrnd | 3.0 | 3.2 | Sample Flow | 1.015 | 1.046 |
| NOX bkgrnd | 3.1 | 3.1 | PMT Voltage | -727.4 | -727.8 |

Calibration Statistics

| | | |
|----------------------------|--------------|---------------|
| | <u>Start</u> | <u>Finish</u> |
| NO _x Cal Slope | 0.992568 | 0.989189 |
| NO _x Cal Offset | 3.486085 | 8.349525 |
| NO Cal Slope | 0.990309 | 0.988184 |
| NO Cal Offset | 4.992127 | 9.733972 |
| NO ₂ Cal Slope | 1.001167 | |
| NO ₂ Cal Offset | -1.917211 | |



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Version-03-2017

Dilution Calibration Data

| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|----------------------------------|---------------------------|-----------------------------|---|--|---|--|---------------------------------------|--|---|--|
| as found zero | 5009 | 0.0 | 0.0 | 0.0 | 0.0 | -1.0 | -1.1 | 0.1 | ---- | ---- |
| as found span | 4935 | 78.8 | 800.0 | 800.0 | 0.0 | 774.6 | 774.5 | 0.1 | 1.0328 | 1.0329 |
| calibrator zero | 5009 | 0.0 | 0.0 | 0.0 | 0.0 | -1.0 | -1.1 | 0.1 | ---- | ---- |
| high point | 4935 | 78.7 | 799.0 | 799.0 | 0.0 | 803.9 | 803.9 | 0.0 | 0.9939 | 0.9939 |
| second point | 4976 | 39.4 | 399.9 | 399.9 | 0.0 | 388.6 | 386.9 | 1.7 | 1.0290 | 1.0335 |
| third point | 4993 | 19.7 | 200.0 | 200.0 | 0.0 | 188.9 | 186.5 | 1.9 | 1.0590 | 1.0726 |
| as left zero | | | | | | | | | | |
| as left span | | | | | | | | | | |
| Average Correction Factor | | | | | | | | | 1.0273 | 1.0333 |

| | | | | | |
|--|-----------------------------|----------------|--|-----------------|------------------------|
| Corrected As found | NO _x = 775.6 ppb | NO = 775.6 ppb | | *Percent Change | NO _x = 3.5% |
| Previous Response | NO _x = 802.5 ppb | NO = 802.8 ppb | | *Percent Change | NO = 3.5% |
| <i>* = > +/-5% change initiates investigation</i> | | | | | |

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO drop conc (ppb) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | Converter Efficiency <i>Limit = 96-104%</i> |
|----------------------------------|------------------------------|---|--|---------------------------------------|--|---|--|---|--|
| 1st NO ref point | | | | | | | | | |
| 1st NO2 (400 ppb O3) | | | | | | | | | |
| 2nd NO2 (200 ppb O3) | | | | | | | | | |
| 3rd NO2 (100 ppb O3) | | | | | | | | | |
| 2nd NO ref point | | | | | | | | | |
| Average Correction Factor | | | | | | | | | |

Notes: Span adjusted after as founds. Third point did not pass. Suspected leak, tried snugging up fittings. Still seems to be a leak. Talked to senior tech and decided to remove analyzer and resume maintenance at the FOC. No as lefts done.

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association

NO_x Calibration Summary

Version-03-2017

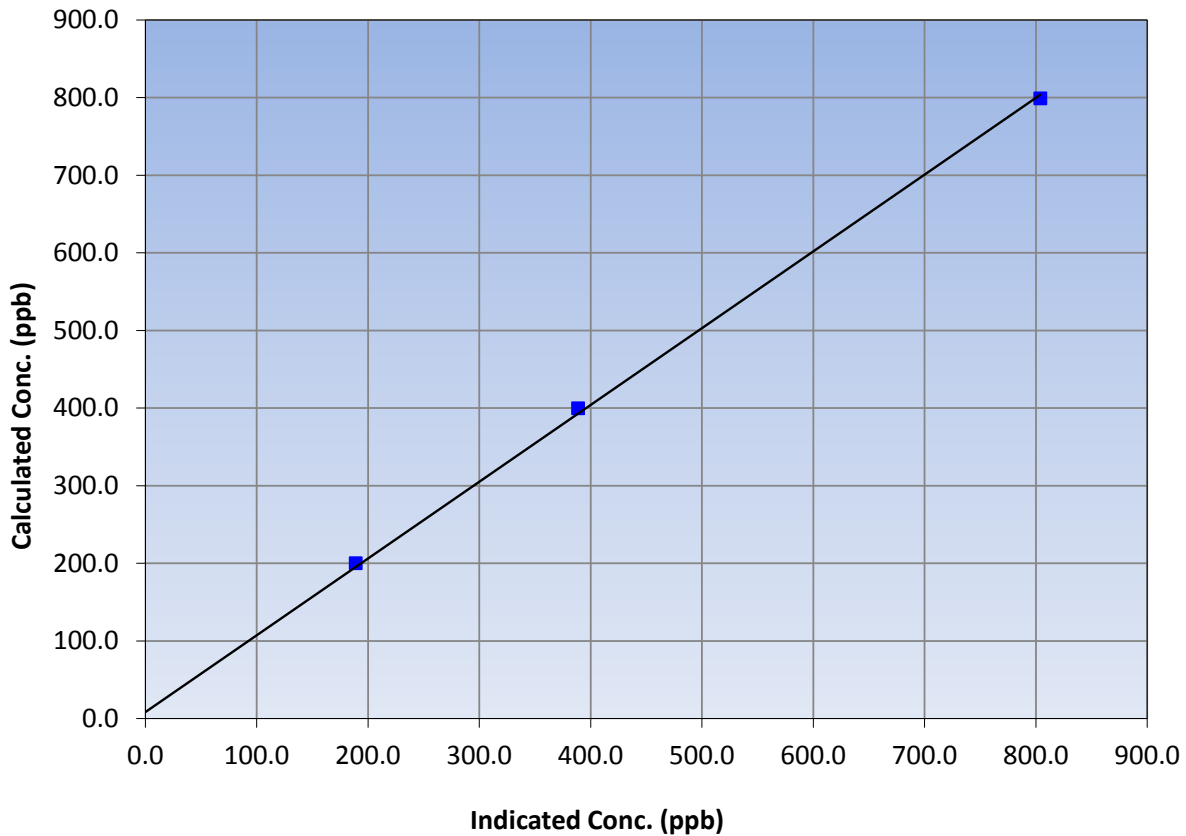
Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 10, 2017 | Previous Calibration | July 14, 2017 |
| Station Name | Janvier | Station Number | AMS 22 |
| Start Time (MST) | 10:00 | End Time (MST) | 15:05 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1229254994 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | -1.0 | ---- | Correlation Coefficient | 0.999573 | ≥0.995 |
| 799.0 | 803.9 | 0.9939 | | | |
| 399.9 | 388.6 | 1.0290 | Slope | 0.989189 | 0.90 - 1.10 |
| 200.0 | 188.9 | 1.0590 | | | |
| | | | Intercept | 8.349525 | +/-20 |

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

Version-03-2017

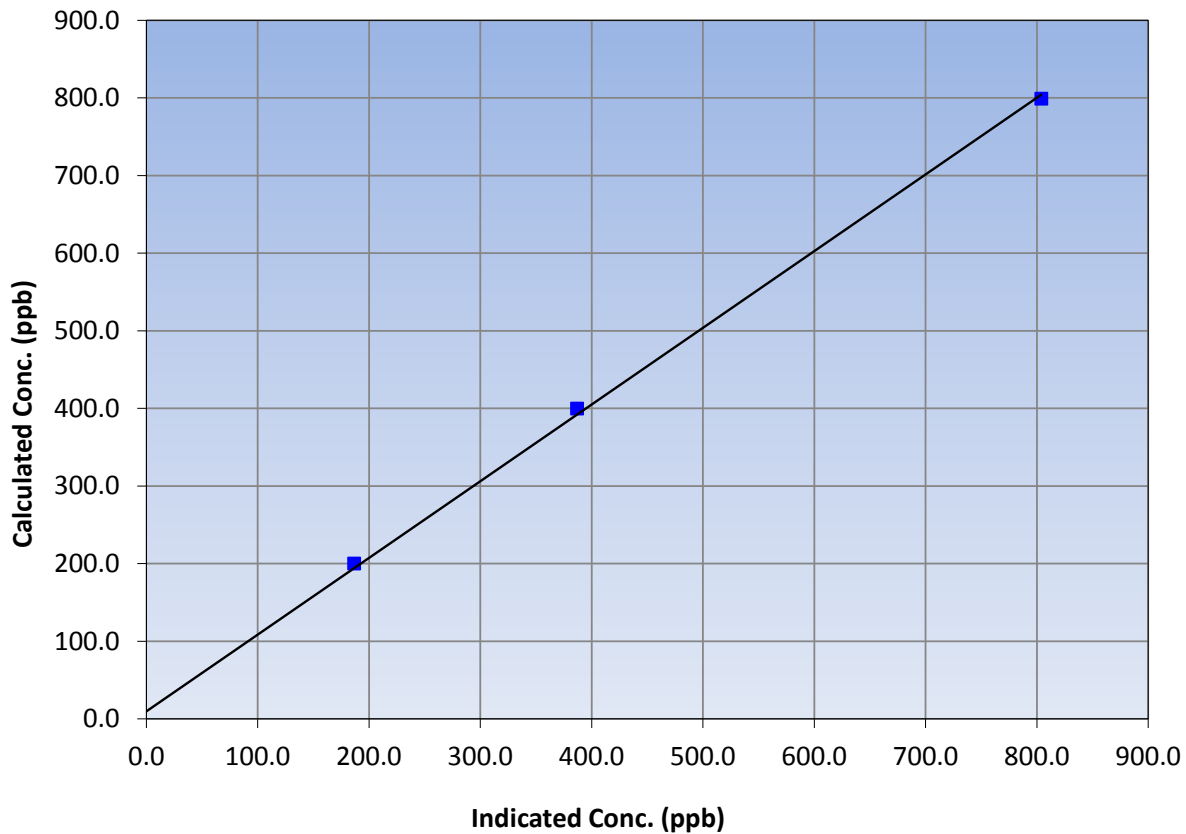
Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 10, 2017 | Previous Calibration | July 14, 2017 |
| Station Name | Janvier | Station Number | AMS 22 |
| Start Time (MST) | 10:00 | End Time (MST) | 15:05 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1229254994 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-------------|
| 0.0 | -1.1 | ---- | Correlation Coefficient | ≥0.995 |
| 799.0 | 803.9 | 0.9939 | | |
| 399.9 | 386.9 | 1.0335 | Slope | 0.90 - 1.10 |
| 200.0 | 186.5 | 1.0726 | | |
| | | | Intercept | +/-20 |

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

Version-03-2017

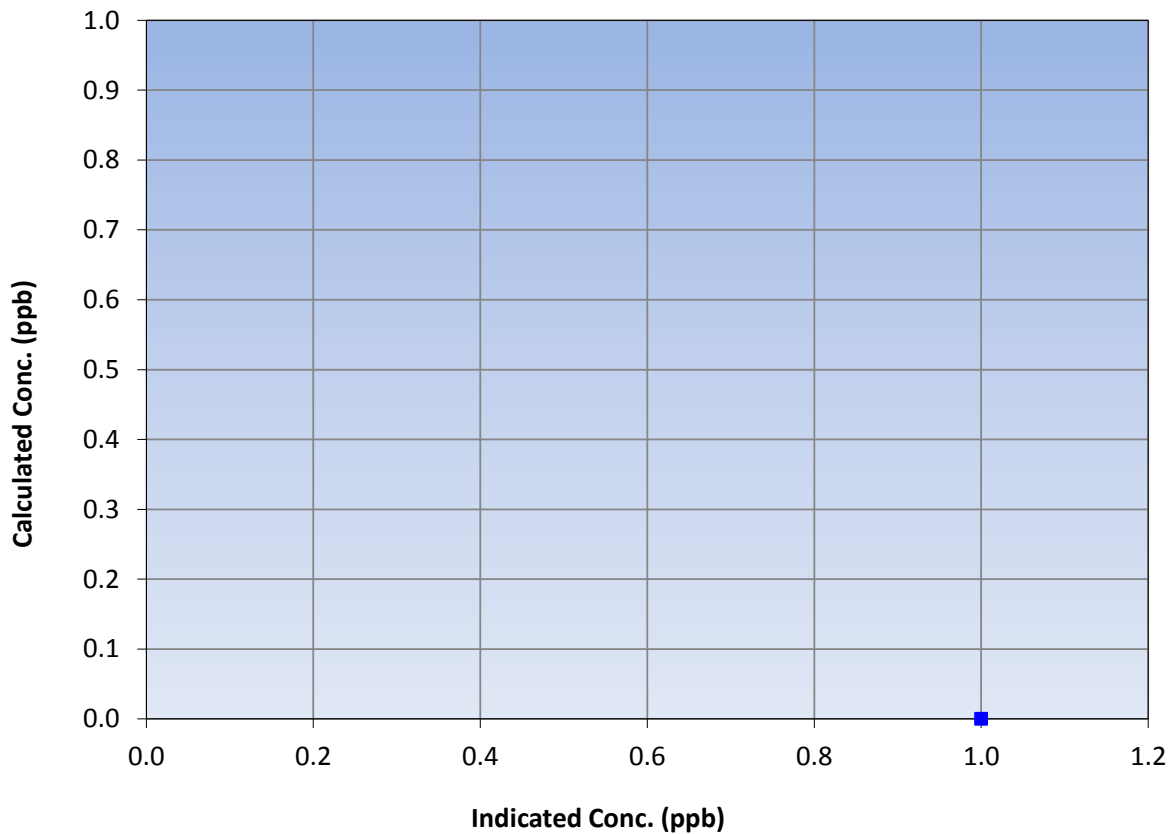
Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 10, 2017 | Previous Calibration | July 14, 2017 |
| Station Name | Janvier | Station Number | AMS 22 |
| Start Time (MST) | 10:00 | End Time (MST) | 15:05 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1229254994 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|
| 0.0 | 0.1 | ---- | Correlation Coefficient | ≥0.995 |
| | | | Slope | 0.90 - 1.10 |
| | | | Intercept | +/-20 |

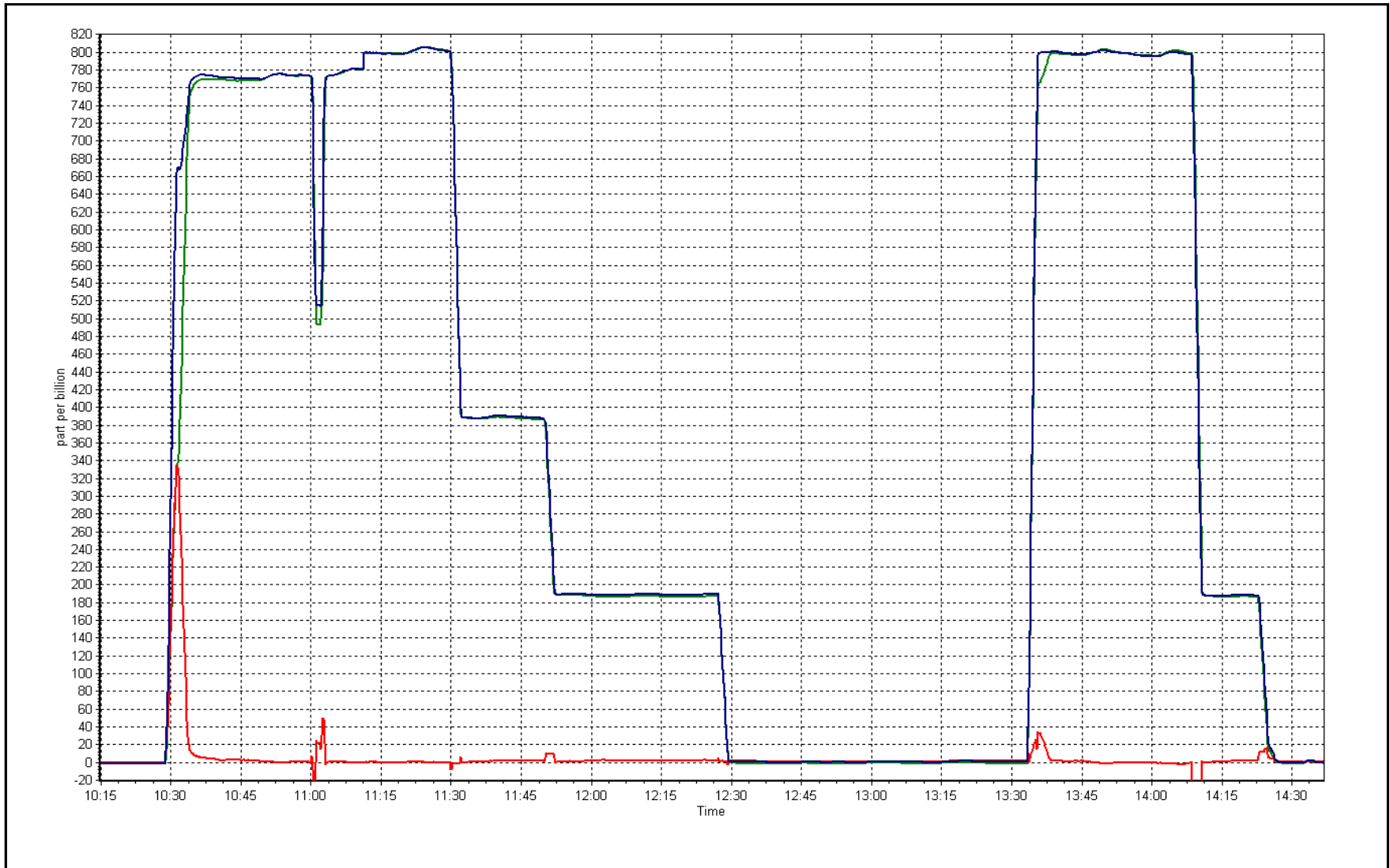
NO₂ Calibration Curve



NO_x Calibration Plot

Date: August 10, 2017

Location: Janvier





Wood Buffalo Environmental Association

NO_x - NO - NO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|-----------------|
| Station Name: | Janvier | Station number: | AMS 22 |
| Calibration Date: | August 12, 2017 | Last Cal Date: | August 10, 2017 |
| Start time (MST): | 8:50 | End time (MST): | 13:16 |
| Reason: | Install | | |

Calibration Standards

| | | | |
|-------------------|-------------------|---------------------|-------------------|
| NO Gas Cylinder # | LL107937 | Cal Gas Expiry Date | September 8, 2018 |
| NOX Cal Gas Conc. | <u>50.9</u> ppb | NO Cal Gas Conc. | <u>50.9</u> ppb |
| Calibrator Model | API T700 | Serial Number | 2447 |
| ZAG make/model | Teledyne API T701 | Serial Number | 135 |

Analyzer Information

| | | | | | |
|-----------------|--------------|--------------------|---------------------|--------------|---------------|
| Analyzer make: | API T200 | Analyzer serial #: | 722 | | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| NO coefficient | | 0.946 | NOX Range (ppb) | 0 - 1000 ppb | |
| NOX coefficient | | 0.935 | PMT Temperature | 6.8 | 6.8 |
| NO2 coefficient | | 1.000 | Reaction cell Press | 3.4 | 3.3 |
| NO bkgrnd | | -3.8 | Sample Flow | 464 | 463 |
| NOX bkgrnd | | -0.3 | PMT Voltage | 798 | 797 |

Calibration Statistics

| | | |
|----------------------------|--------------|---------------|
| | <u>Start</u> | <u>Finish</u> |
| NO _x Cal Slope | | 0.992568 |
| NO _x Cal Offset | | 3.486085 |
| NO Cal Slope | | 0.990309 |
| NO Cal Offset | | 4.992127 |
| NO ₂ Cal Slope | | 1.001167 |
| NO ₂ Cal Offset | | -1.917211 |



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Version-03-2017

Dilution Calibration Data

| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|----------------------------------|---------------------------|-----------------------------|---|--|---|--|---------------------------------------|--|---|--|
| as found zero | | | | | | | | | | |
| as found span | | | | | | | | | | |
| calibrator zero | 5009 | 0.0 | 0.0 | 0.0 | 0.0 | -1.0 | -1.1 | 0.1 | ---- | ---- |
| high point | 4935 | 78.7 | 799.0 | 799.0 | 0.0 | 801.4 | 803.4 | -1.9 | 0.9970 | 0.9945 |
| second point | 4976 | 39.4 | 399.9 | 399.9 | 0.0 | 397.4 | 397.0 | 0.5 | 1.0062 | 1.0072 |
| third point | 4993 | 19.7 | 200.0 | 200.0 | 0.0 | 197.5 | 196.0 | 1.5 | 1.0129 | 1.0206 |
| as left zero | 5009 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.6 | -0.6 | ---- | ---- |
| as left span | 4935 | 78.7 | 799.0 | 390.2 | 408.8 | 793.5 | 391.9 | 401.5 | 1.0069 | 0.9957 |
| Average Correction Factor | | | | | | | | | 1.0053 | 1.0074 |

| | | | | | | | |
|--------------------|----------------------|-----|---------|-----|--|-----------------|----------------------|
| Corrected As found | NO _x = NA | ppb | NO = NA | ppb | | *Percent Change | NO _x = NA |
| Previous Response | NO _x = NA | ppb | NO = NA | ppb | | *Percent Change | NO = NA |

* = > +/-5% change initiates investigation

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO drop conc (ppb) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | Converter Efficiency <i>Limit = 96-104%</i> |
|----------------------------------|------------------------------|---|--|---------------------------------------|--|---|--|---|--|
| 1st NO ref point | | 0.0 | 798.7 | 800.7 | -2.1 | 1.0003 | 0.9978 | ---- | ---- |
| 1st NO2 (400 ppb O3) | 390.2 | 410.5 | 795.9 | 390.2 | 405.7 | 1.0039 | ---- | 1.0118 | 98.8% |
| 2nd NO2 (200 ppb O3) | 601.0 | 199.7 | 800.1 | 601.0 | 199.1 | 0.9986 | ---- | 1.0030 | 99.7% |
| 3rd NO2 (100 ppb O3) | 702.5 | 98.2 | 798.1 | 702.5 | 95.7 | 1.0011 | ---- | 1.0261 | 97.5% |
| 2nd NO ref point | ---- | 0.0 | 798.7 | 800.7 | -2.1 | 1.0003 | 0.9978 | ---- | ---- |
| Average Correction Factor | | | | | | 1.0010 | 0.9978 | 1.0137 | 98.7% |

Notes: Install calibration. Adjusted the zero and the span. Generated 800ppb of NO and 400ppb of ozone for the first GPT ref point. Once noticed it was changed back to 800ppb of NO. Used second GPT point due to drift.

Calibration Performed By: Jayme Marcoux



Wood Buffalo Environmental Association

NO_x Calibration Summary

Version-03-2017

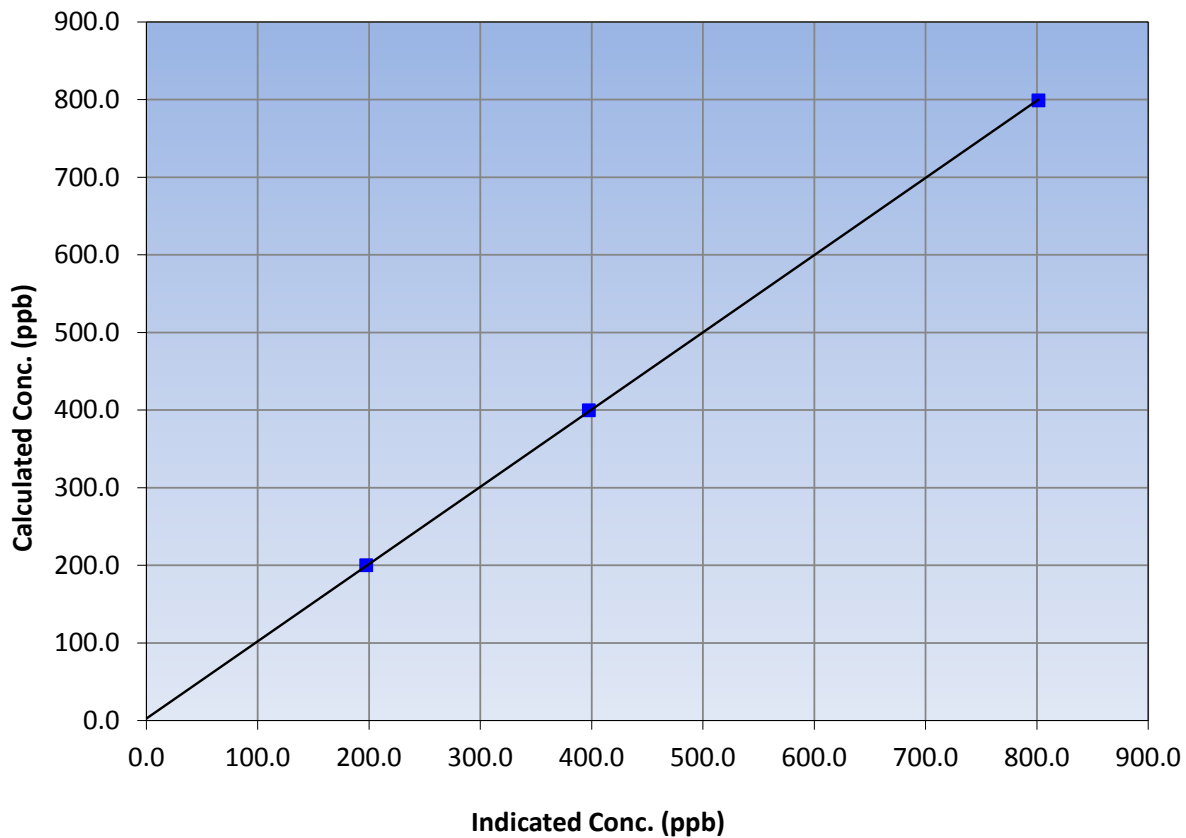
Station Information

| | | | |
|------------------|-----------------|----------------------|-----------------|
| Calibration Date | August 12, 2017 | Previous Calibration | August 10, 2017 |
| Station Name | Janvier | Station Number | AMS 22 |
| Start Time (MST) | 8:50 | End Time (MST) | 13:16 |
| Analyzer make | API T200 | Analyzer serial # | 722 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|
| 0.0 | -1.0 | ---- | Correlation Coefficient | ≥0.995 |
| 799.0 | 801.4 | 0.9970 | | |
| 399.9 | 397.4 | 1.0062 | Slope | 0.90 - 1.10 |
| 200.0 | 197.5 | 1.0129 | | |
| | | | Intercept | +/-20 |

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

Version-03-2017

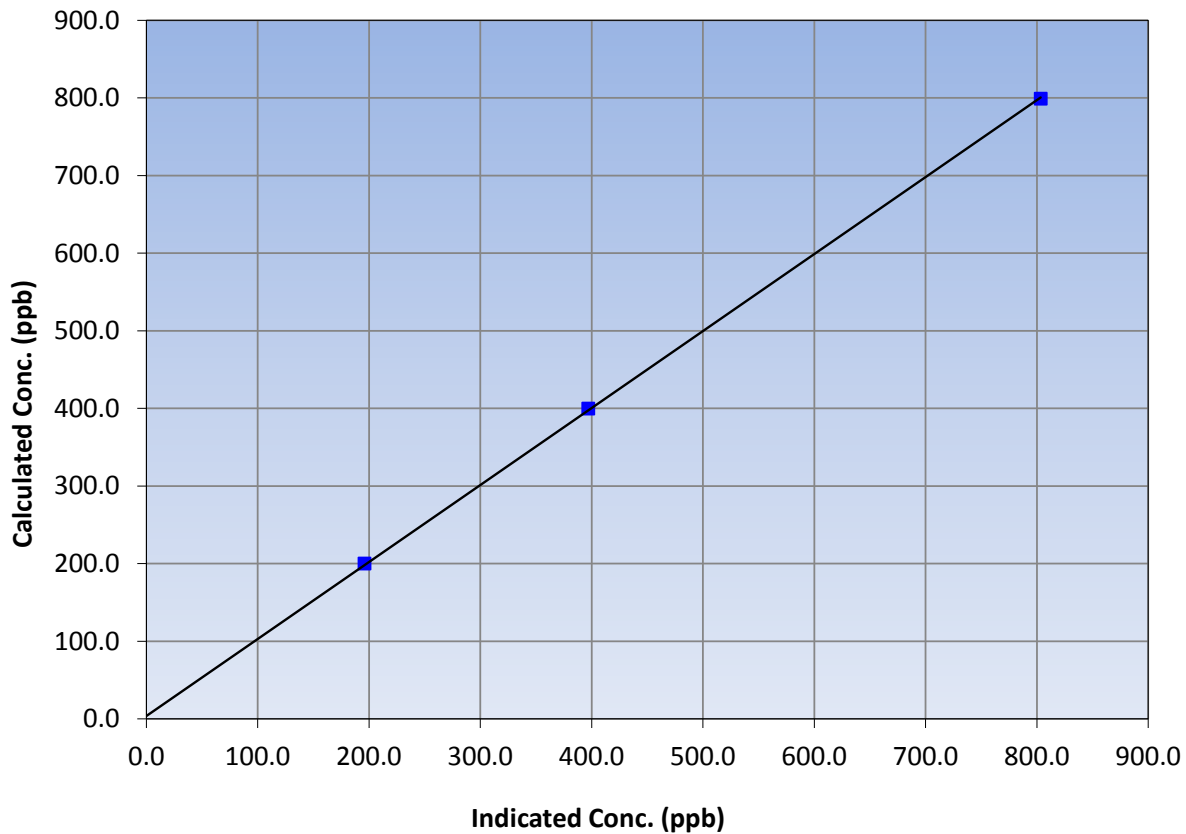
Station Information

| | | | |
|------------------|-----------------|----------------------|-----------------|
| Calibration Date | August 12, 2017 | Previous Calibration | August 10, 2017 |
| Station Name | Janvier | Station Number | AMS 22 |
| Start Time (MST) | 8:50 | End Time (MST) | 13:16 |
| Analyzer make | API T200 | Analyzer serial # | 722 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|
| 0.0 | -1.1 | ---- | Correlation Coefficient | ≥0.995 |
| 799.0 | 803.4 | 0.9945 | | |
| 399.9 | 397.0 | 1.0072 | Slope | 0.90 - 1.10 |
| 200.0 | 196.0 | 1.0206 | | |
| | | | Intercept | +/-20 |

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

Version-03-2017

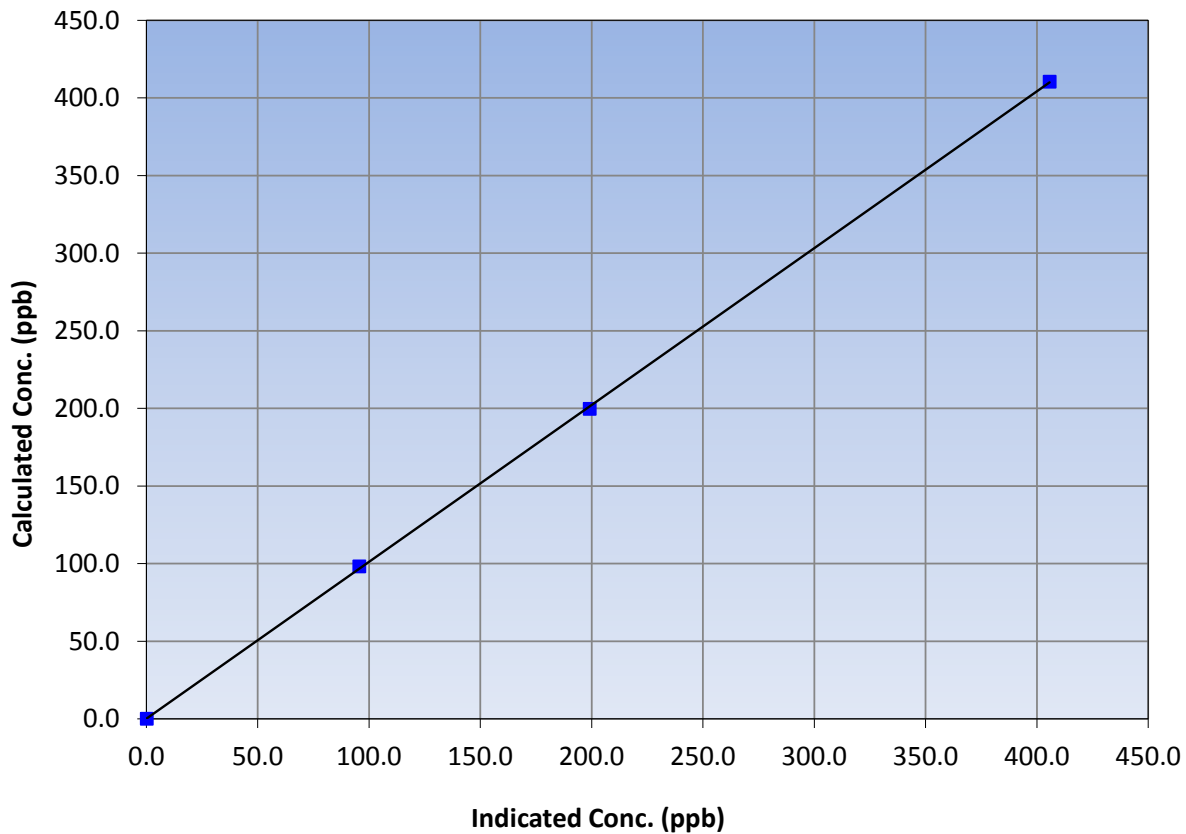
Station Information

| | | | |
|------------------|-----------------|----------------------|-----------------|
| Calibration Date | August 12, 2017 | Previous Calibration | August 10, 2017 |
| Station Name | Janvier | Station Number | AMS 22 |
| Start Time (MST) | 8:50 | End Time (MST) | 13:16 |
| Analyzer make | API T200 | Analyzer serial # | 722 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.1 | ---- | Correlation Coefficient | ≥0.995 | |
| 410.5 | 405.7 | 1.0118 | | | |
| 199.7 | 199.1 | 1.0030 | | | |
| 98.2 | 95.7 | 1.0261 | | | |
| | | | Slope | 1.010365 | 0.90 - 1.10 |
| | | | Intercept | 0.134620 | +/-20 |

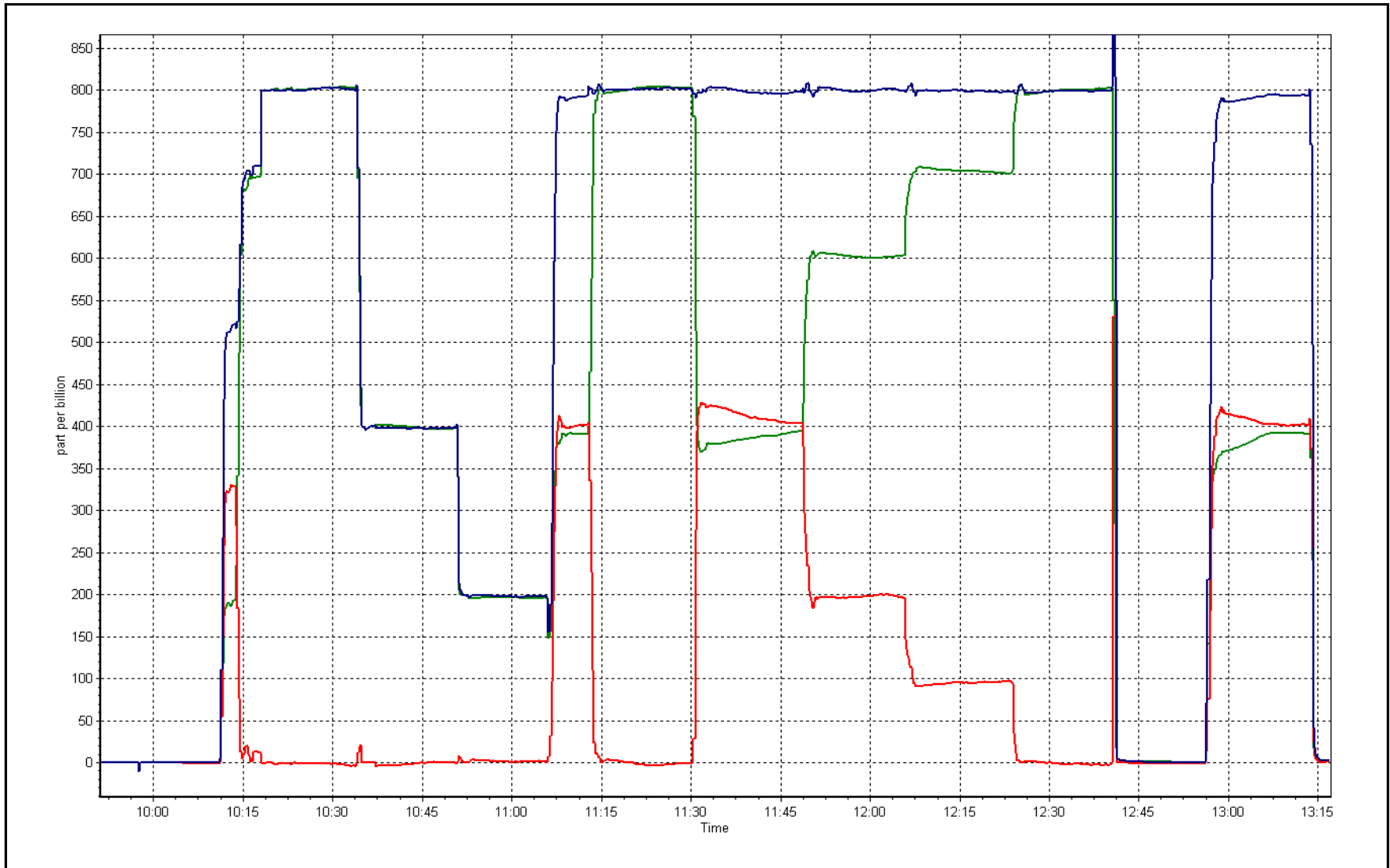
NO₂ Calibration Curve



NO_x Calibration Plot

Date: August 12, 2017

Location: Janvier





Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-08-2016

Station Information

| | | | |
|-----------------------|-------------------|-----------------|---------------|
| Station Name: | Janvier | Station number: | AMS 22 |
| Calibration Date: | August 16, 2017 | Last Cal Date: | July 18, 2017 |
| Start time (MST): | 11:43 | End time (MST): | 13:30 |
| Sharp Model: | Thermo 5030 SHARP | S/N: | E-1333 |
| Particulate Fraction: | PM2.5 | C14 Source S/N: | 5341 |
| Flow Standard Model: | Delta-Cal | S/N: | 954 |
| Temp/RH standard: | Delta-Cal | S/N: | 954 |

Monthly Calibration Test

| <u>Parameter</u> | <u>As found</u> | <u>Measured</u> | <u>As left</u> | <u>Adjusted</u> | <u>Tolerance</u> |
|------------------------|--|-----------------|---|-------------------------------------|------------------|
| T1 (°C) | 20 | 22 | 20 | <input type="checkbox"/> | +/- 2 °C |
| P3 (hPa) | 936 | 949 | 936 | <input type="checkbox"/> | +/- 13 hPa |
| flow (LPH) | 1000 | 1024 | 1000 | <input type="checkbox"/> | +/- 50 LPH |
| Nephelometer zero | 0.9 | 0.9 | -0.1 | <input checked="" type="checkbox"/> | +/- 0.5 ug/m3 |
| Instrument Clock: | Verified <input checked="" type="checkbox"/> | | | | |
| Cyclone cleaning : | PM10 Cyclone <input checked="" type="checkbox"/> | | PM2.5 Cyclone <input checked="" type="checkbox"/> | | |
| Filter Tape Installed: | <input type="checkbox"/> | | | | |

Quarterly Calibration Test

| | | | | <u>Tolerance</u> |
|------------|---------------------------------------|------------------|--------------|------------------|
| Leak Test: | Date of check: <u>August 16, 2017</u> | Last Cal Date: | <u>N/A</u> | |
| | Flow w/o adaptor: <u>17.08</u> | Flow w/ adaptor: | <u>17.07</u> | 0.4 LPM |

Annual Calibration Test

| | | |
|------------------|------------------------------|----------------------|
| Foil Calibration | Foil Mass: _____ | S/N: _____ |
| | Date of check: _____ | Last Cal Date: _____ |
| | New Correction Factor: _____ | 7036 _____ |

| <u>Parameter</u> | <u>As found</u> | <u>Measured</u> | <u>As left</u> | <u>Adjusted</u> | <u>Tolerance</u> |
|------------------|-----------------|-----------------|----------------|--------------------------|------------------|
| T2 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| T3 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| T4 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| RH (%) | | | | <input type="checkbox"/> | +/- 10% |

Notes: Leak check passed. Nephelometer zero adjusted.

Calibration by: Aswin Sasi Kumar



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 23
FORT HILLS
AUGUST 2017**

Operations, Data Collection,
QA/QC, Data Validation and Reporting by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

September 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT HILLS (AMS 23)
AUGUST 2017

MONTHLY SUMMARY for
AMD SECTION III.B.1(c)

| Parameter | Hours of Data | Hours of Calibration | Hours without Data | Operational Time | Maximum 1-Hour Value | 1-Hour Exceedances | Maximum 24-Hour Value | 24-Hour Exceedances |
|-----------------------------------|---------------|----------------------|--------------------|------------------|----------------------|--------------------|-----------------------|---------------------|
| SO2(ppb) Average | 706 | 36 | 38 | 99.73 | 17 | 0 | 3 | 0 |
| TRS(ppb) Average | 691 | 35 | 53 | 97.58 | 1 | 0 | 1 | 0 |
| THC(ppm) Average | 697 | 36 | 47 | 98.52 | 5 | - | 3 | - |
| NO2 (ppb) Average | 705 | 36 | 39 | 99.6 | 30 | 0 | 12 | - |
| NO (ppb) Average | 705 | 36 | 39 | 99.6 | 76 | - | 11 | - |
| NOX (ppb) Average | 705 | 36 | 39 | 99.6 | 100 | - | 23 | - |
| PM2.5 (ug/m3) Average | 737 | 2 | 7 | 99.33 | 125 | - | 35 | 1 |
| Temperature 2 m (C) Average | 744 | 0 | 0 | 100 | 31 | - | 24 | - |
| Relative Humidity (%) Average | 744 | 0 | 0 | 100 | 95 | - | 87 | - |
| Wind Speed 10 m (km/h) Average | 742 | 0 | 2 | 99.73 | 35 | - | 21 | - |
| Wind Direction 10 m (deg) Average | 742 | 0 | 2 | 99.73 | - | - | - | - |

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT HILLS (AMS 23)
AUGUST 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

| Parameter | Number | Mean | StnDev | Total | Percentile | | | | | | |
|-----------------------------------|--------|------|--------|-------|------------|-----|----|--------|----|-----|-----|
| | | | | | Min | P10 | Q1 | Median | Q3 | P90 | Max |
| SO2 (ppb) Average | 706 | 0.6 | 2 | - | 0 | 0 | 0 | 0 | 0 | 1 | 17 |
| TRS (ppb) Average | 691 | 0.3 | 0 | - | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| THC (ppm) Average | 697 | 2.1 | 0 | - | 2 | 2 | 2 | 2 | 2 | 2 | 5 |
| NO2 (ppb) Average | 705 | 4.1 | 5 | - | 0 | 1 | 1 | 2 | 5 | 11 | 30 |
| NO (ppb) Average | 705 | 1.7 | 5 | - | 0 | 0 | 0 | 0 | 1 | 3 | 76 |
| NOX (ppb) Average | 705 | 5.8 | 9 | - | 0 | 1 | 1 | 2 | 7 | 15 | 100 |
| PM2.5 (ug/m3) Average | 737 | 10.3 | 12 | - | 0 | 1 | 3 | 7 | 13 | 22 | 125 |
| Temperature 2 m (C) Average | 744 | 18.2 | 5 | - | 7 | 12 | 14 | 18 | 22 | 25 | 31 |
| Relative Humidity (%) Average | 744 | 61.2 | 20 | - | 22 | 31 | 44 | 63 | 78 | 87 | 95 |
| Wind Speed 10 m (km/h) Average | 742 | 11.3 | 7 | - | 0 | 3 | 6 | 10 | 15 | 21 | 35 |
| Wind Direction 10 m (deg) Average | 742 | - | - | - | - | - | - | - | - | - | - |

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT HILLS (AMS 23)
AUGUST 2017

OPERATIONAL NOTES

| Parameter | Period Start | Period End | Duration (Hours) | Notes |
|----------------------------|-------------------|-------------------|------------------|---|
| SO2 | 09 Aug 2017 11:00 | 09 Aug 2017 12:00 | 2 | Maintenance - WBEA internal audit |
| TRS | 02 Aug 2017 12:00 | 02 Aug 2017 12:00 | 1 | Maintenance - manifold cleaning |
| TRS | 09 Aug 2017 12:00 | 09 Aug 2017 16:00 | 5 | Maintenance - WBEA internal audit |
| TRS | 10 Aug 2017 10:00 | 10 Aug 2017 12:00 | 3 | Maintenance - WBEA internal audit |
| TRS | 15 Aug 2017 10:00 | 15 Aug 2017 14:00 | 5 | Maintenance - SOx scrubber replaced |
| TRS | 31 Aug 2017 11:00 | 31 Aug 2017 14:00 | 4 | Maintenance - WBEA internal audit |
| THC | 09 Aug 2017 10:00 | 09 Aug 2017 15:00 | 6 | Maintenance - WBEA internal audit |
| THC | 22 Aug 2017 11:00 | 22 Aug 2017 13:00 | 3 | Maintenance - baseline adjustment and calibration |
| THC | 31 Aug 2017 13:00 | 31 Aug 2017 14:00 | 2 | Maintenance - WBEA internal audit |
| NO2, NO, NOX | 08 Aug 2017 13:00 | 08 Aug 2017 15:00 | 3 | Maintenance - WBEA internal audit |
| PM2.5 | 06 Aug 2017 19:00 | 06 Aug 2017 20:00 | 2 | Unstable operation - excessive baseline drift |
| PM2.5 | 07 Aug 2017 11:00 | 07 Aug 2017 11:00 | 1 | Unstable operation - excessive baseline drift |
| PM2.5 | 19 Aug 2017 09:00 | 19 Aug 2017 10:00 | 2 | Unstable operation - excessive baseline drift |
| Wind Speed, Wind Direction | 27 Aug 2017 22:00 | 27 Aug 2017 23:00 | 2 | Flat line in sensor output signal |



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Fort Hills - August 2017

| | | | | |
|---|---|----------|---------------------------|------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 17 ppb on Aug 5 13:00 | Maximum Daily Average: 2.9 ppb on Aug 5 | | Hours of Data: | 706 |
| Minimum Value: 0 ppb on Aug 1 01:00 | Minimum Daily Average: 0.0 ppb on Aug 18 | | Hours of Missing Data: | 38 |
| Maximum Diurnal Average: 1.7 ppb at hour 14 | Minimum Diurnal Average: 0.1 ppb at hour 3 | | Hours of Calibration: | 36 |
| Monthly Average: 0.6 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 10 | | Percent Operational Time: | 99.7 |

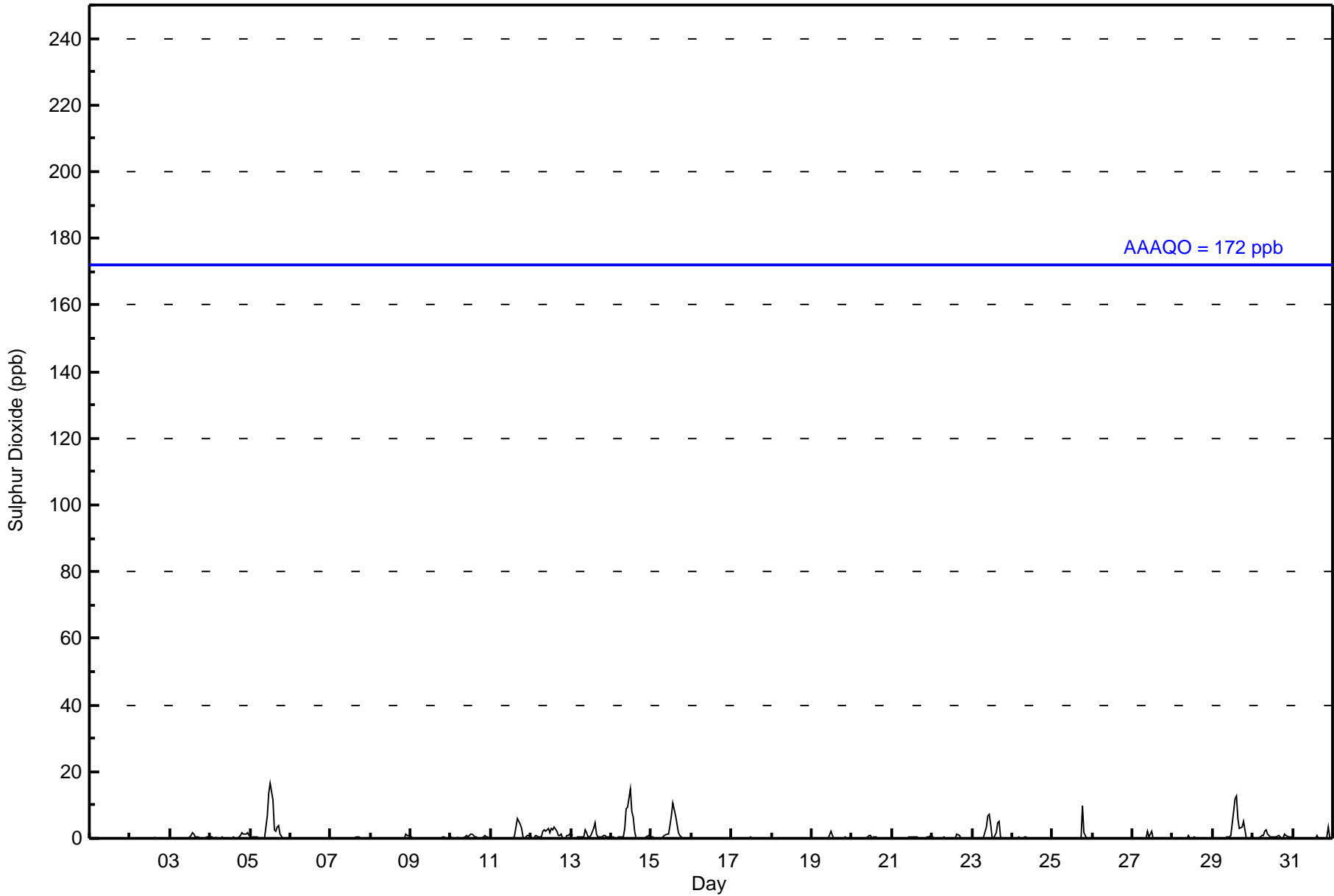
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----------------|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 2-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | C | C | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 3-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 2 |
| 4-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 2 | 1 | 0.5 | 2 |
| 5-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 7 | 13 | 17 | 11 | 3 | 2 | 3 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 2.9 | 17 |
| 6-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 7-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 |
| 8-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0.1 | 1 |
| 9-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | M | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 10-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0.4 | 1 |
| 11-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 6 | 4 | 3 | 0 | 0 | 0 | 0 | 1 | 1 | 0.9 | 6 |
| 12-Aug | 1 | Z | 1 | 1 | 0 | 0 | 0 | 2 | 3 | 2 | 3 | 1 | 3 | 2 | 3 | 2 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1.3 | 3 |
| 13-Aug | 2 | 1 | Z | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 0 | 0 | 1 | 3 | 5 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1.0 | 5 |
| 14-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 3 | 9 | 9 | 15 | 8 | 6 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2.5 | 15 |
| 15-Aug | 0 | 1 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 1 | 1 | 4 | 7 | 11 | 7 | 4 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1.8 | 11 |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 17-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 18-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 19-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 2 |
| 20-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 21-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.2 | 1 |
| 22-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 23-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 7 | 7 | 4 | 0 | 0 | 2 | 5 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1.5 | 7 |
| 24-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 25-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 2 | 0 | 0 | 0 | 0 | 0.6 | 10 |
| 26-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 27-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 2 |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 |
| 29-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 8 | 12 | 13 | 6 | 3 | 3 | 5 | 2 | 0 | 0 | 0 | 0 | 2.4 | 13 |
| 30-Aug | 0 | Z | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0.6 | 2 |
| 31-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0.3 | 3 |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |

Z - zerospan C - Calibration M - Maintenance
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Fort Hills - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort Hills - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 10 | 699 | 99.01 | 99.01 |
| 11 - 20 | 7 | 0.99 | 100.00 |
| 21 - 60 | 0 | 0.00 | 100.00 |
| 61 - 110 | 0 | 0.00 | 100.00 |
| 111 - 172 | 0 | 0.00 | 100.00 |
| > 172 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 706

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort Hills - August 2017

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-----------------------------------|-----------------------|------------|-----------|------------|----------|------------|-----------|------------|------------|------------|------------|------------|-----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 10 | 36 | 39 | 16 | 12 | 4 | 10 | 13 | 59 | 122 | 116 | 117 | 41 | 30 | 34 | 24 | 24 | 697 |
| 11 - 20 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 7 |
| 21 - 60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 61 - 110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 111 - 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 36 | 39 | 16 | 13 | 4 | 11 | 13 | 59 | 124 | 118 | 117 | 41 | 30 | 34 | 24 | 25 | 704 |

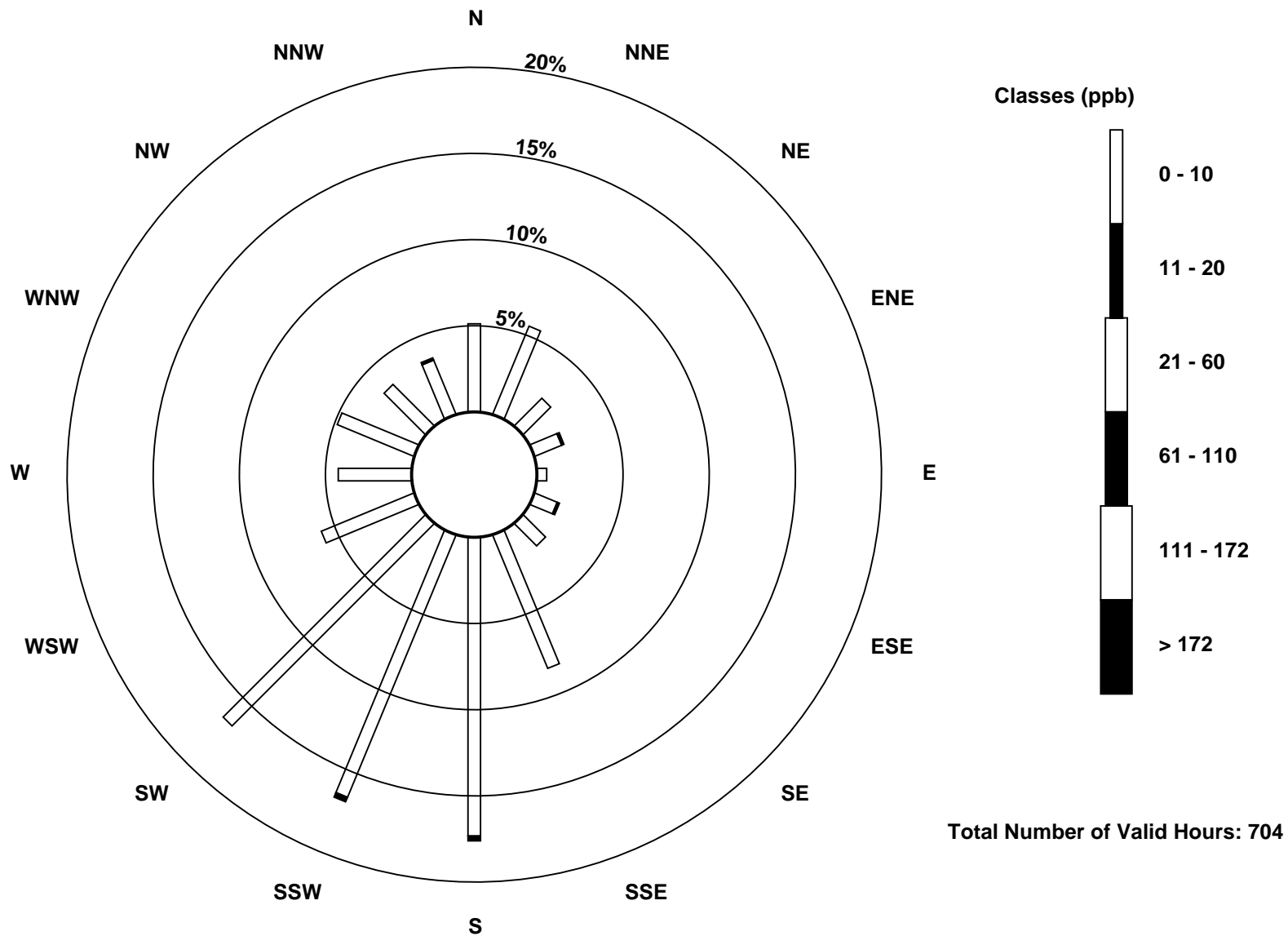
Total Number of Valid Hours: 704

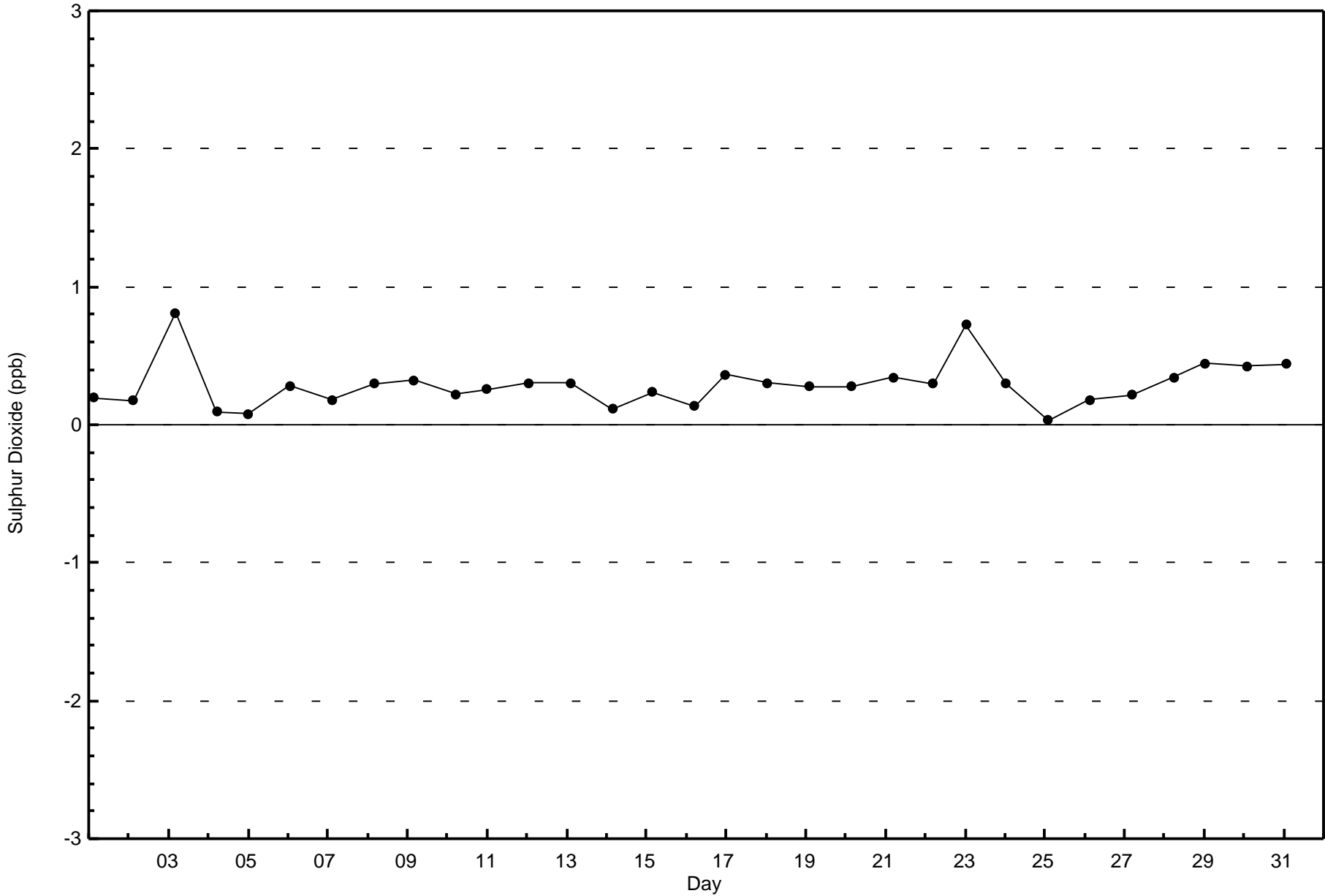
Total Number of Hours: 744

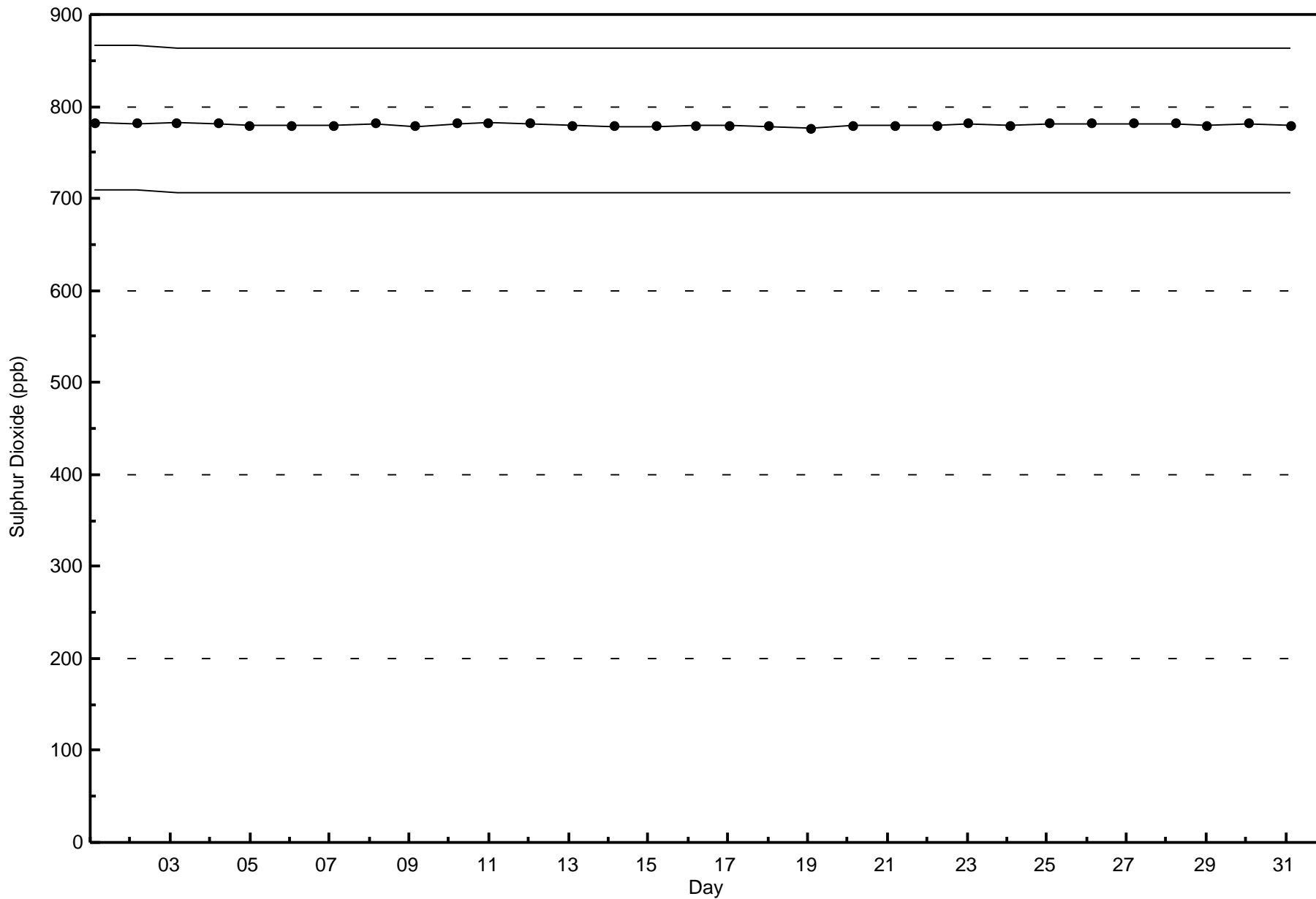


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Sulphur Dioxide (SO₂) - ppb
Fort Hills (AMS 23)









Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

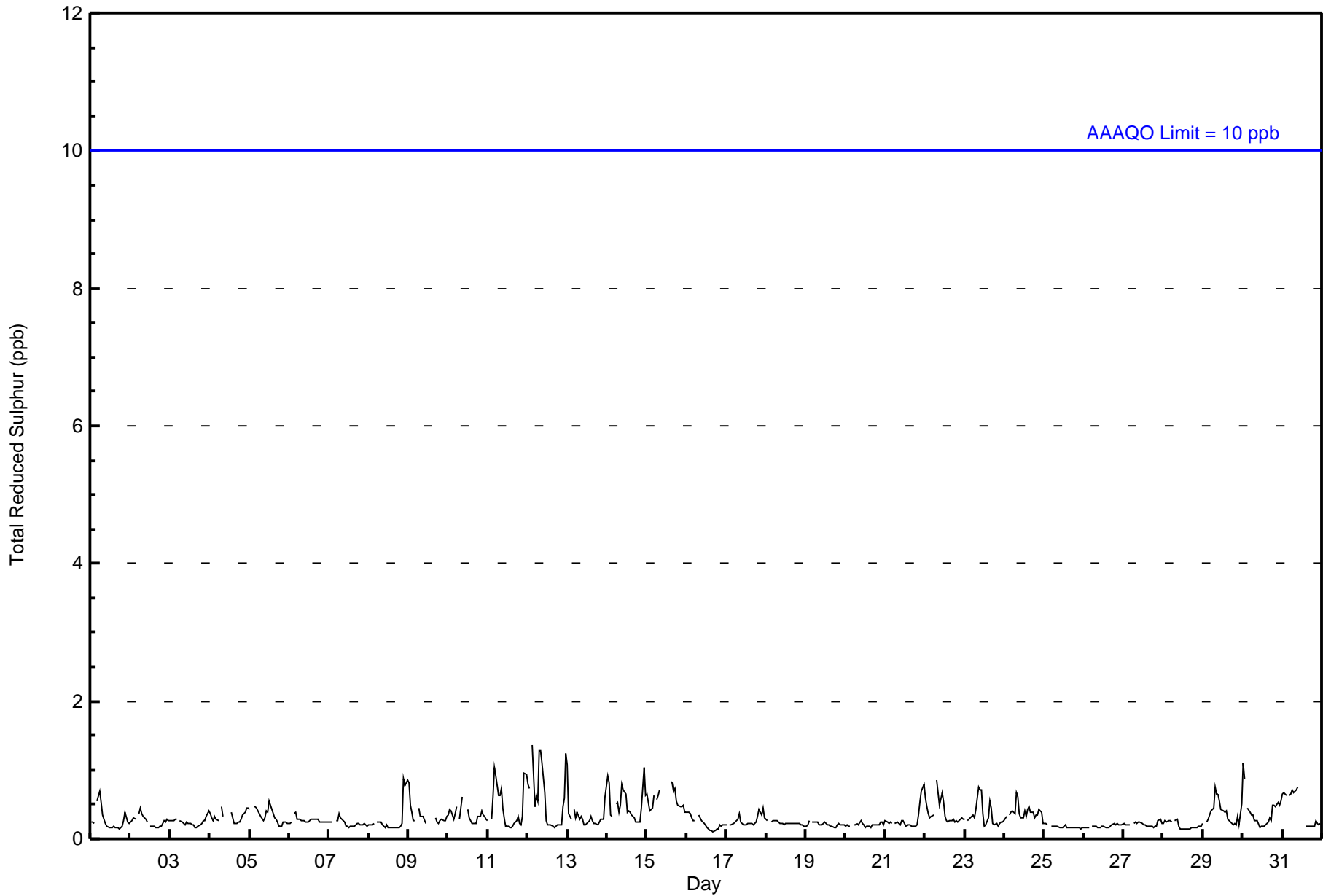
Fort Hills - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|---|---|---|---|---|---|---|---|--|----|----|----|----|----|----|----|----|----|--------------------------------|----|----|----|-----|---------------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|-----------------|
| Maximum Value: 1 ppb on Aug 12 04:00 | | | | | | | | | | Maximum Daily Average: 0.6 ppb on Aug 15 | | | | | | | | | | Hours of Data: 691 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum Value: 0 ppb on Aug 16 17:00 | | | | | | | | | | Minimum Daily Average: 0.2 ppb on Aug 25 | | | | | | | | | | Hours of Missing Data: 53 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 0.4 ppb at hour 9 | | | | | | | | | | Minimum Diurnal Average: 0.2 ppb at hour 18 | | | | | | | | | | Hours of Calibration: 35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 0.3 ppb | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 O ₃ = 0 P ₉₀ = 1 P ₉₉ = 1 | | | | | | | | | | Percent Operational Time: 97.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 0 | 0 | 0 | Z | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | C | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 1 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | M | M | M | M | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 1 | M | M | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 0 | Z | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 1 | 1 | Z | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.6 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 1 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 1 | 1 | 0 | 0 | Z | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.5 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 1 | 1 | 0 | 0 | 1 | Z | 1 | 1 | 1 | M | M | M | M | M | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0.6 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 1 | 0 | 0 | 0 | 0 | 0 | Z | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 1 | 1 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | M | M | M | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.4 | 0.4 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.2 | 0.2 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.4 | 0.4 | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | Diurnal Maximum |
| Z - zerospan C - Calibration M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Fort Hills - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Fort Hills - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2 | 691 | 100.00 | 100.00 |
| 3 - 4 | 0 | 0.00 | 100.00 |
| 5 - 7 | 0 | 0.00 | 100.00 |
| 8 - 11 | 0 | 0.00 | 100.00 |
| > 11 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 691

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Fort Hills - August 2017

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|---|-----|----|-----|-----|-----|-----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2 | 33 | 38 | 14 | 12 | 4 | 10 | 13 | 62 | 125 | 117 | 113 | 41 | 26 | 35 | 24 | 22 | 689 |
| 3 - 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 - 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 - 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 33 | 38 | 14 | 12 | 4 | 10 | 13 | 62 | 125 | 117 | 113 | 41 | 26 | 35 | 24 | 22 | 689 |

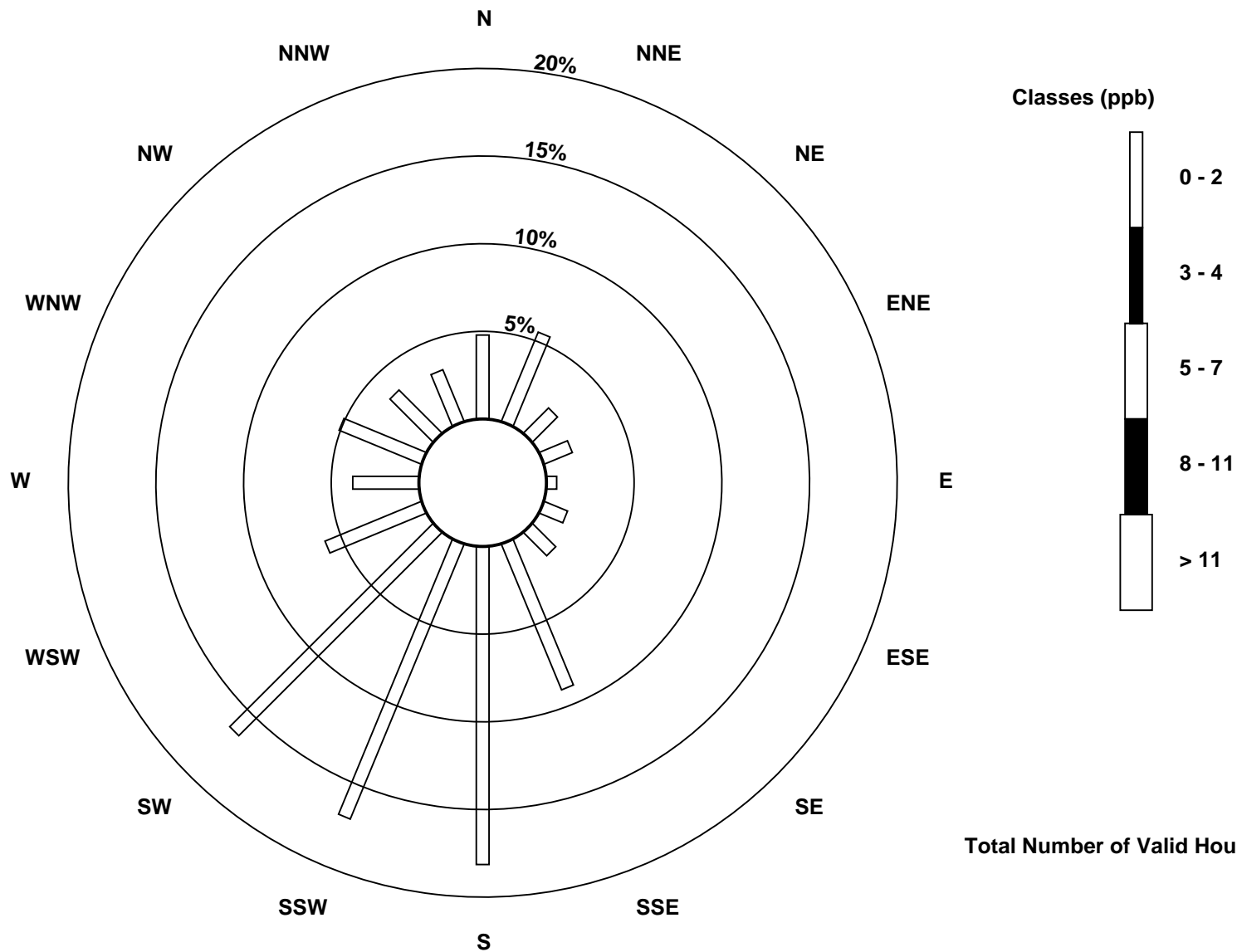
Total Number of Valid Hours: 689

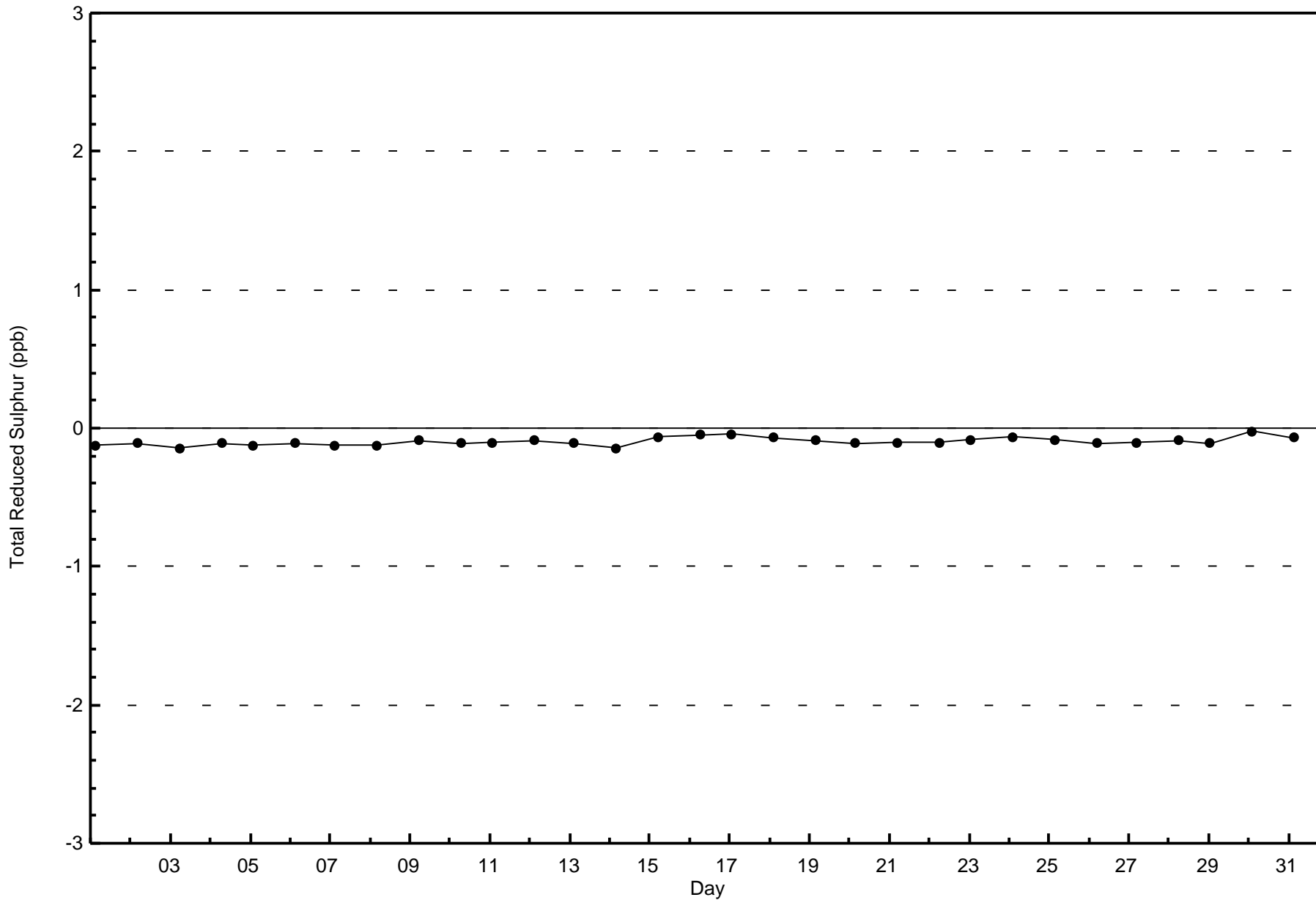
Total Number of Hours: 744

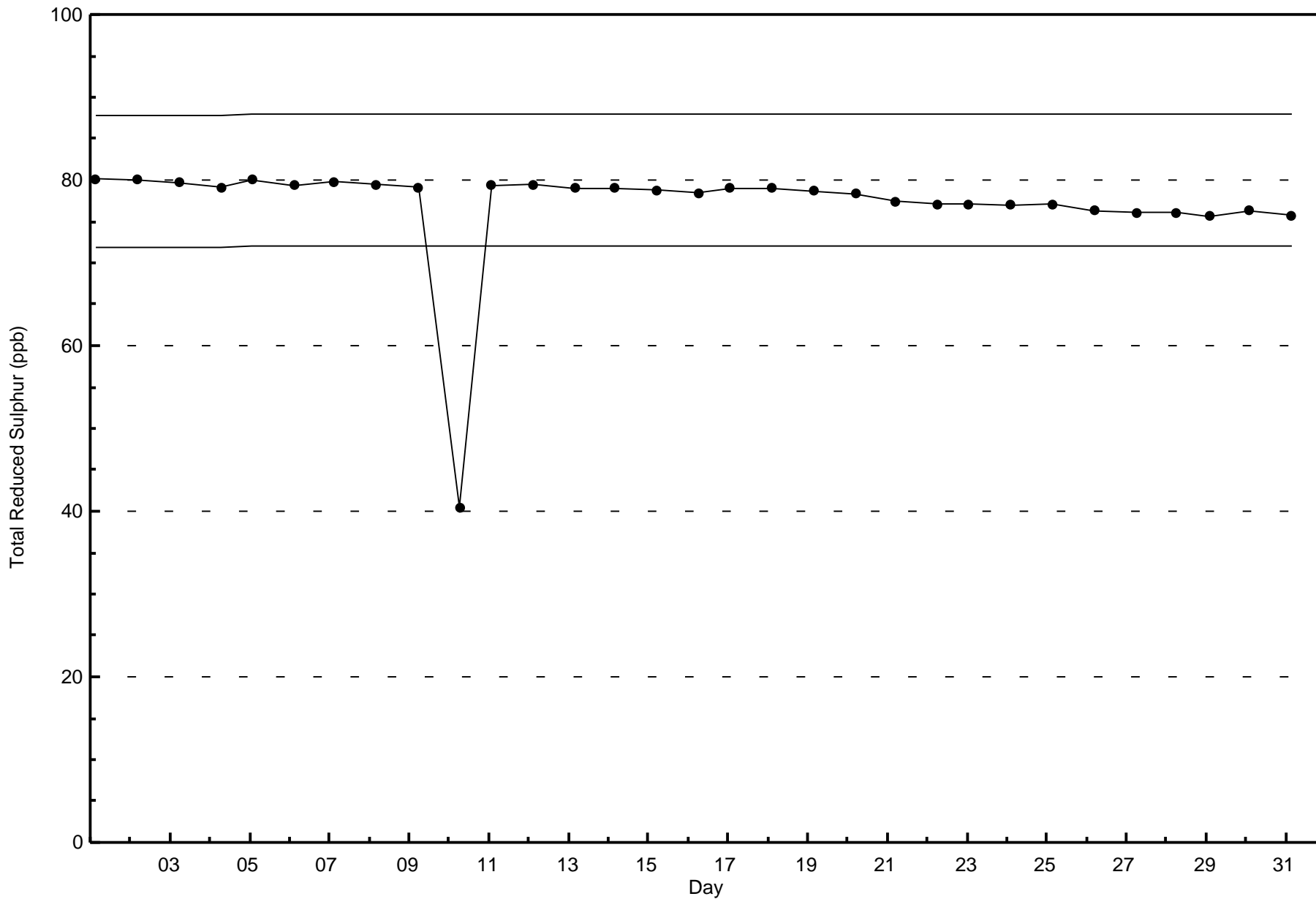


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Total Reduced Sulphur (TRS) - ppb
Fort Hills (AMS 23)









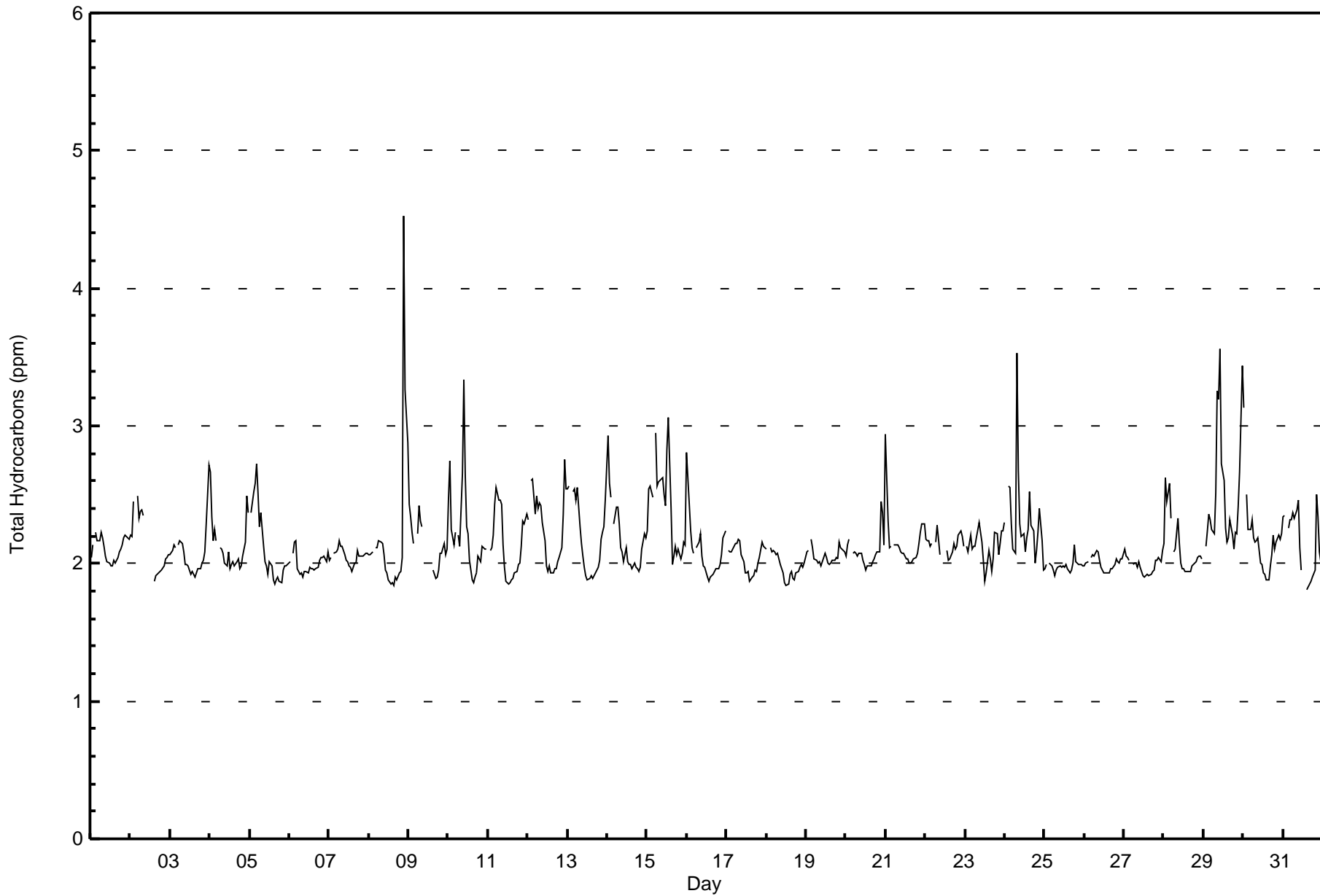
Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Fort Hills - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | |
|---|-------------------------------|---|-----------------|---|---|-----------------|---|---|---|--|----|----|----|----|----|----|----|----|----|--------------------------------|----|----|----|-----------------|---------------|---------------|---|
| Maximum Value: 5 ppm on Aug 8 22:00 | | | | | | | | | | Maximum Daily Average: 2.5 ppm on Aug 29 | | | | | | | | | | Hours of Data: 697 | | | | | | | |
| Minimum Value: 2 ppm on Aug 31 15:00 | | | | | | | | | | Minimum Daily Average: 2.0 ppm on Aug 18 | | | | | | | | | | Hours of Missing Data: 47 | | | | | | | |
| Maximum Diurnal Average: 2.3 ppm at hour 1 | | | | | | | | | | Minimum Diurnal Average: 2.0 ppm at hour 16 | | | | | | | | | | Hours of Calibration: 36 | | | | | | | |
| Monthly Average: 2.1 ppm | | | | | | | | | | Percentiles: P ₁ = 2 P ₁₀ = 2 Q ₁ = 2 Median = 2 Q ₃ = 2 P ₉₀ = 2 P ₉₉ = 3 | | | | | | | | | | Percent Operational Time: 98.5 | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 2 | 2 | Z | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2.1 | 2 | |
| 2-Aug | 2 | 2 | 2 | Z | 2 | 2 | 2 | 2 | 2 | C | C | C | C | C | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2.1 | 2 | |
| 3-Aug | 2 | 2 | 2 | 2 | Z | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2.1 | 3 | |
| 4-Aug | 3 | 2 | 2 | 2 | 2 | Z | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2.1 | 3 | |
| 5-Aug | Z | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2.1 | 3 | |
| 6-Aug | 2 | Z | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2.0 | 2 | |
| 7-Aug | 2 | 2 | Z | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2.1 | 2 | |
| 8-Aug | 2 | 2 | 2 | Z | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 5 | 3 | 3 | 2.2 | 5 |
| 9-Aug | 2 | 2 | 2 | 2 | Z | 2 | 2 | 2 | 2 | M | M | M | M | M | M | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | -- | 2 | |
| 10-Aug | 2 | 3 | 2 | 2 | 2 | Z | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2.2 | 3 | |
| 11-Aug | Z | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2.1 | 3 | |
| 12-Aug | 2 | Z | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 2.2 | 3 | |
| 13-Aug | 3 | 3 | Z | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2.2 | 3 | |
| 14-Aug | 3 | 3 | 2 | Z | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2.2 | 3 | |
| 15-Aug | 2 | 3 | 3 | 2 | Z | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2.4 | 3 | |
| 16-Aug | 3 | 2 | 2 | 2 | 2 | Z | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2.1 | 3 | |
| 17-Aug | Z | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2.0 | 2 | |
| 18-Aug | 2 | Z | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2.0 | 2 | |
| 19-Aug | 2 | 2 | Z | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2.1 | 2 | |
| 20-Aug | 2 | 2 | 2 | Z | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2.1 | 2 | |
| 21-Aug | 3 | 2 | 2 | 2 | Z | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2.1 | 3 | |
| 22-Aug | 2 | 2 | 2 | 2 | 2 | Z | 2 | 2 | 2 | M | M | M | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2.1 | 2 | |
| 23-Aug | Z | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2.1 | 2 | |
| 24-Aug | 2 | Z | 3 | 3 | 2 | 2 | 2 | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2.3 | 4 | |
| 25-Aug | 2 | 2 | Z | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2.0 | 2 | |
| 26-Aug | 2 | 2 | 2 | Z | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2.0 | 2 | |
| 27-Aug | 2 | 2 | 2 | 2 | Z | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2.0 | 2 | |
| 28-Aug | 2 | 3 | 2 | 3 | 2 | Z | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2.1 | 3 | |
| 29-Aug | Z | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 2.5 | 4 | |
| 30-Aug | 3 | Z | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2.2 | 3 | |
| 31-Aug | 2 | 2 | Z | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | M | M | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2.2 | 3 | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | |
| Z - zerospan | | | C - Calibration | | | M - Maintenance | | | | | | | | | | | | | | | | | | | | | |





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Fort Hills - August 2017

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2.0 | 309 | 44.33 | 44.33 |
| 2.1 - 3.0 | 378 | 54.23 | 98.57 |
| 3.1 - 10.0 | 10 | 1.43 | 100.00 |
| > 10.0 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 697

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Fort Hills - August 2017

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-----------------------------------|-----------------------|------------|-----------|------------|----------|------------|-----------|------------|------------|------------|------------|------------|-----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2.0 | 5 | 21 | 6 | 5 | 0 | 3 | 3 | 7 | 48 | 52 | 67 | 26 | 15 | 26 | 18 | 5 | 307 |
| 2.1 - 3.0 | 30 | 18 | 10 | 8 | 3 | 7 | 9 | 49 | 73 | 64 | 47 | 12 | 15 | 8 | 6 | 19 | 378 |
| 3.1 - 10.0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 3 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 10 |
| > 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 35 | 39 | 16 | 13 | 3 | 11 | 13 | 59 | 123 | 116 | 115 | 39 | 30 | 34 | 24 | 25 | 695 |

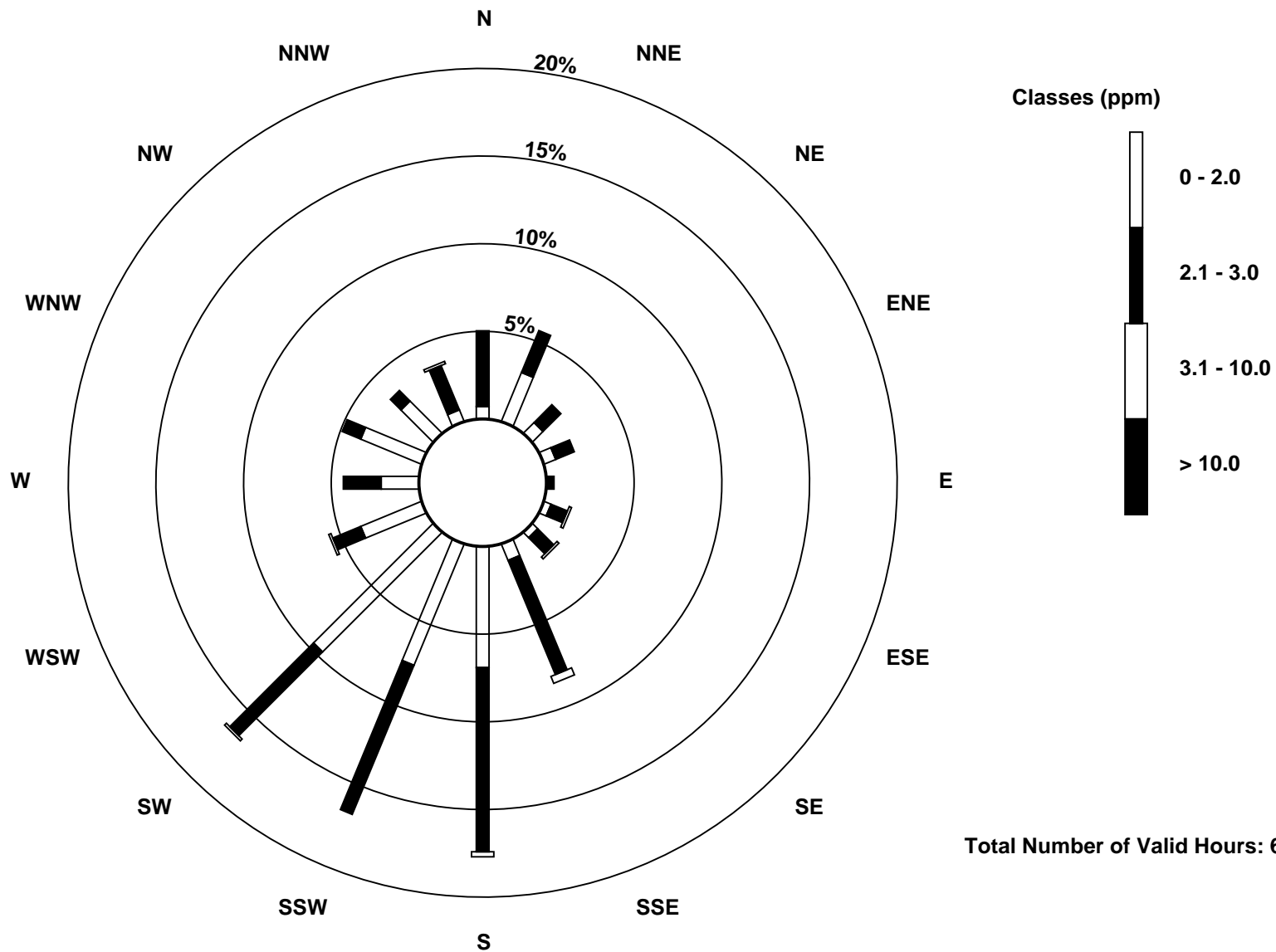
Total Number of Valid Hours: 695

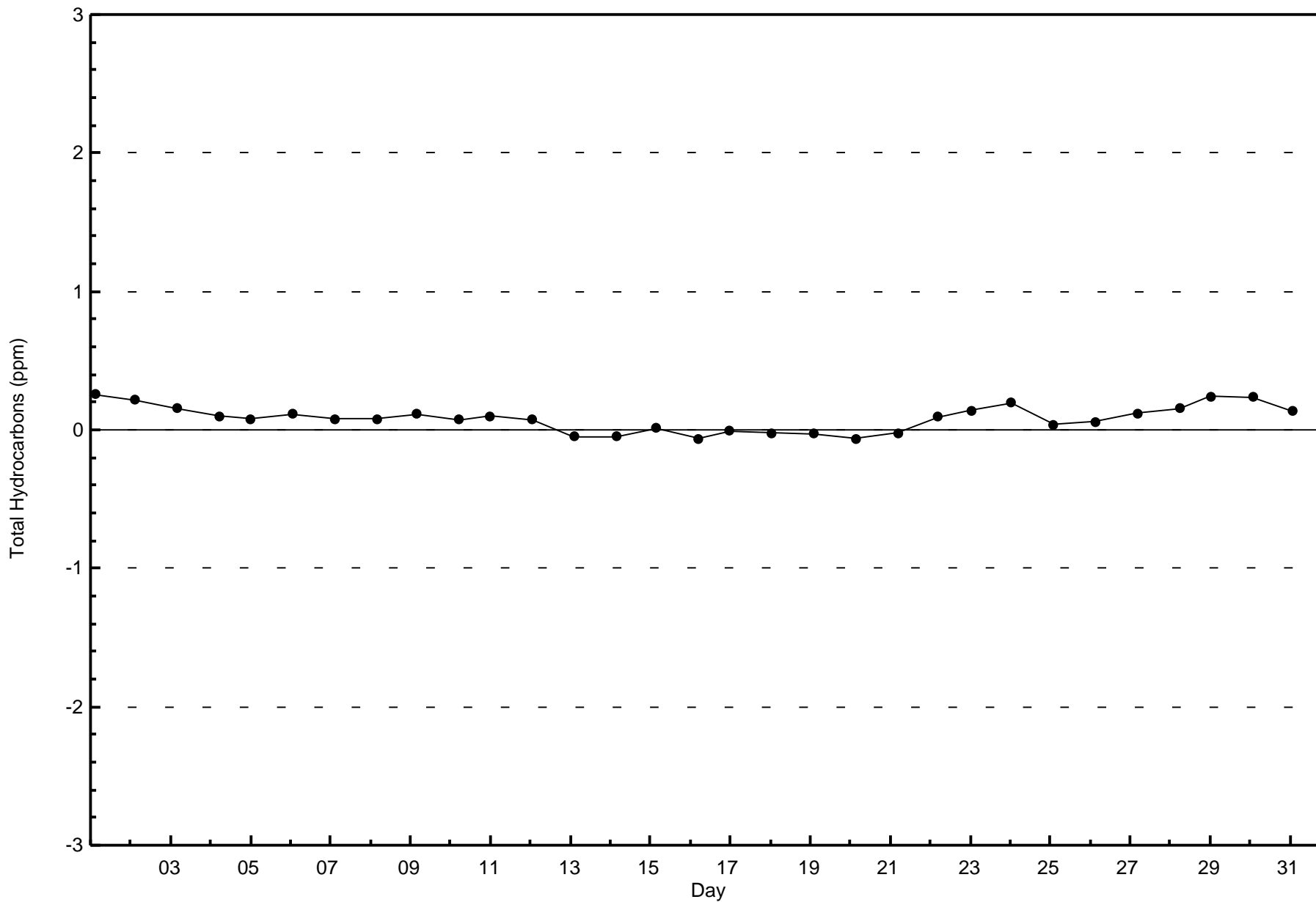
Total Number of Hours: 744

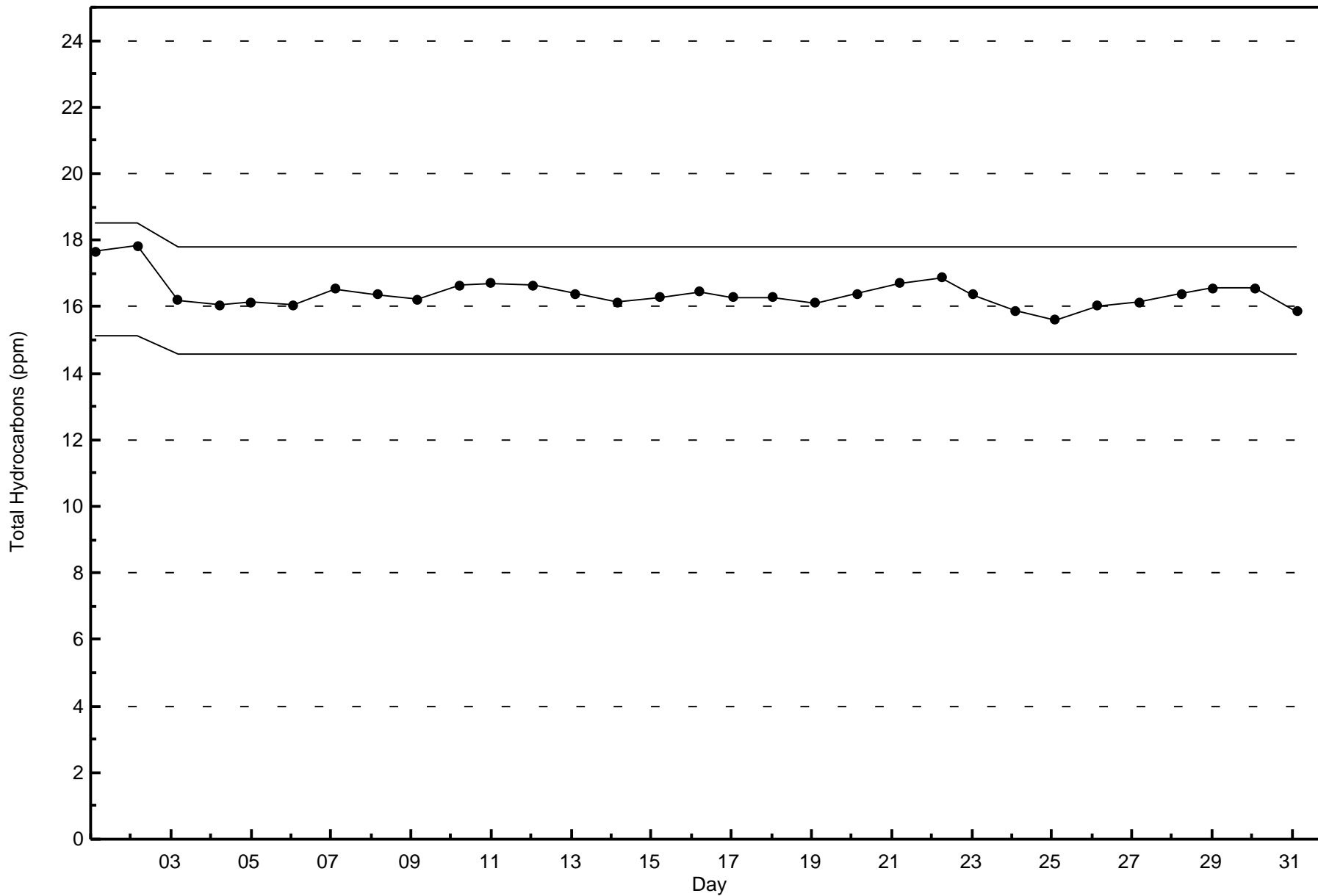


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Total Hydrocarbons (THC) - ppm
Fort Hills (AMS 23)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

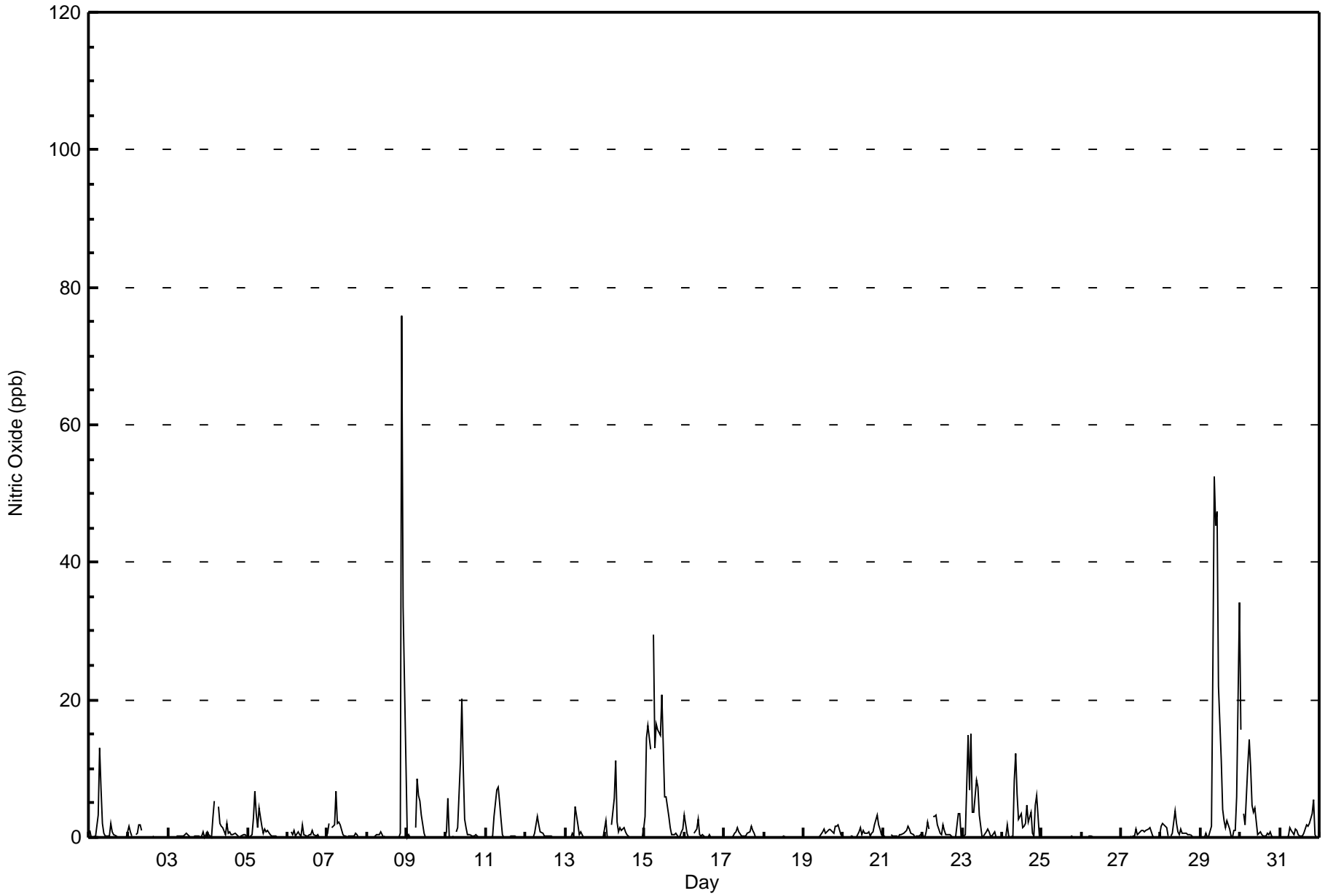
Fort Hills - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 76 ppb on Aug 8 22:00 Maximum Daily Average: 11.3 ppb on Aug 29 | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 705 Hours of Missing Data: 39 Hours of Calibration: 36 Percent Operational Time: 99.6 | | | | | | | | | |
|--|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|----|----|----|----|----|----|-----------------|---------------|---------------|
| Minimum Value: 0 ppb on Aug 5 21:00 Minimum Daily Average: 0.0 ppb on Aug 18 Maximum Diurnal Average: 4.5 ppb at hour 9 Minimum Diurnal Average: 0.3 ppb at hour 20 Monthly Average: 1.7 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 O ₃ = 1 P ₉₀ = 3 P ₉₉ = 27 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 1 | 0 | Z | 0 | 0 | 3 | 13 | 7 | 2 | 1 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1.4 | 13 |
| 2-Aug | 2 | 1 | 0 | Z | 0 | 1 | 2 | 2 | 1 | C | C | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 2 | |
| 3-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0.2 | 1 | |
| 4-Aug | 0 | 0 | 0 | 3 | 5 | Z | 5 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.1 | 5 | |
| 5-Aug | Z | 0 | 0 | 3 | 7 | 3 | 1 | 4 | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.1 | 7 | |
| 6-Aug | 0 | Z | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 2 | |
| 7-Aug | 1 | 2 | Z | 1 | 2 | 7 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1.0 | 7 | |
| 8-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | M | M | M | 0 | 0 | 0 | 0 | 0 | 1 | 76 | 34 | 6.2 | 76 | |
| 9-Aug | 0 | 0 | 0 | 0 | Z | 1 | 8 | 6 | 5 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.1 | 8 | |
| 10-Aug | 1 | 6 | 0 | 0 | 0 | Z | 1 | 1 | 11 | 20 | 10 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.5 | 20 | |
| 11-Aug | Z | 0 | 0 | 0 | 0 | 3 | 7 | 7 | 5 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.1 | 7 | |
| 12-Aug | 0 | Z | 0 | 0 | 0 | 1 | 2 | 3 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 3 | |
| 13-Aug | 0 | 0 | Z | 0 | 1 | 0 | 5 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 5 | |
| 14-Aug | 2 | 0 | 0 | Z | 2 | 6 | 11 | 2 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1.3 | 11 | |
| 15-Aug | 3 | 14 | 16 | 13 | Z | 29 | 13 | 16 | 16 | 15 | 21 | 13 | 6 | 6 | 3 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 8.3 | 29 | |
| 16-Aug | 3 | 1 | 0 | 0 | 0 | Z | 1 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 3 | |
| 17-Aug | Z | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0.4 | 2 | |
| 18-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | |
| 19-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 0 | 0.6 | 2 | |
| 20-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 2 | 3 | 2 | 1 | 0.7 | 3 | |
| 21-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0.4 | 2 | |
| 22-Aug | 0 | 0 | 1 | 2 | 1 | Z | 3 | 3 | 3 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 3 | 3 | 1.2 | 3 | |
| 23-Aug | Z | 0 | 0 | 15 | 7 | 15 | 4 | 4 | 8 | 7 | 3 | 2 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 3.0 | 15 | |
| 24-Aug | 0 | Z | 0 | 2 | 0 | 0 | 0 | 8 | 12 | 6 | 3 | 3 | 1 | 2 | 2 | 5 | 2 | 4 | 1 | 0 | 5 | 6 | 0 | 2.7 | 12 | |
| 25-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | |
| 26-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | |
| 27-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0.5 | 1 | |
| 28-Aug | 2 | 2 | 2 | 1 | 0 | Z | 0 | 1 | 4 | 2 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0.8 | 4 | |
| 29-Aug | Z | 0 | 0 | 1 | 0 | 0 | 2 | 25 | 52 | 45 | 47 | 22 | 11 | 4 | 2 | 1 | 2 | 1 | 0 | 0 | 1 | 1 | 6 | 11.3 | 52 | |
| 30-Aug | 16 | Z | 3 | 2 | 11 | 14 | 10 | 5 | 4 | 4 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 3.2 | 16 | |
| 31-Aug | 0 | 0 | Z | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 2 | 3 | 6 | 0 | 0 | 1.0 | 6 | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| Z - zerospan C - Calibration M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Fort Hills - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Fort Hills - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 695 | 98.58 | 98.58 |
| 21 - 40 | 6 | 0.85 | 99.43 |
| 41 - 80 | 4 | 0.57 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Fort Hills - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|---|-----|----|-----|-----|-----|-----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 36 | 39 | 15 | 13 | 3 | 11 | 12 | 57 | 122 | 117 | 116 | 40 | 29 | 34 | 24 | 25 | 693 |
| 21 - 40 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 6 |
| 41 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 4 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 36 | 39 | 16 | 13 | 4 | 11 | 13 | 59 | 124 | 117 | 117 | 41 | 30 | 34 | 24 | 25 | 703 |

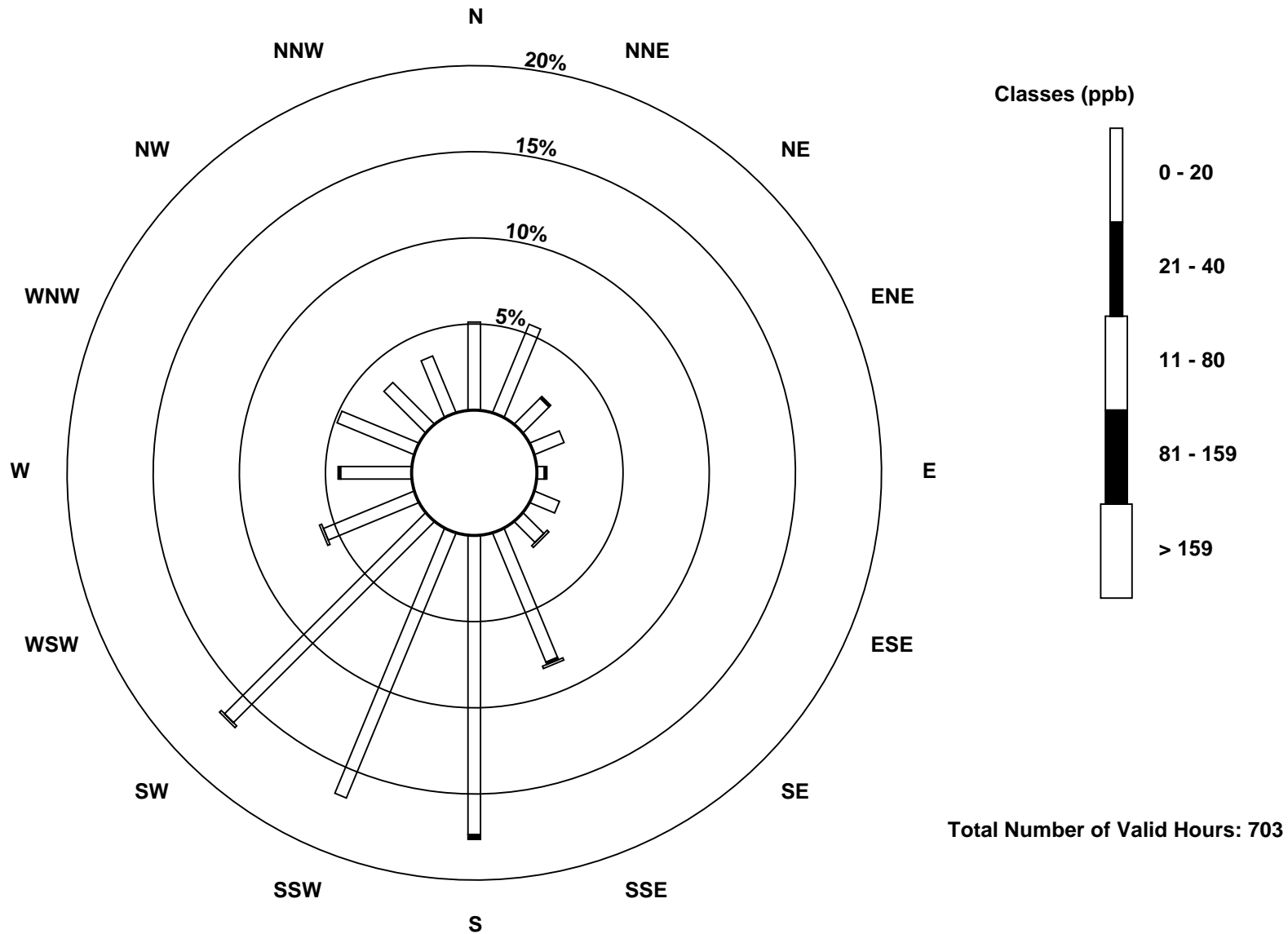
Total Number of Valid Hours: 703

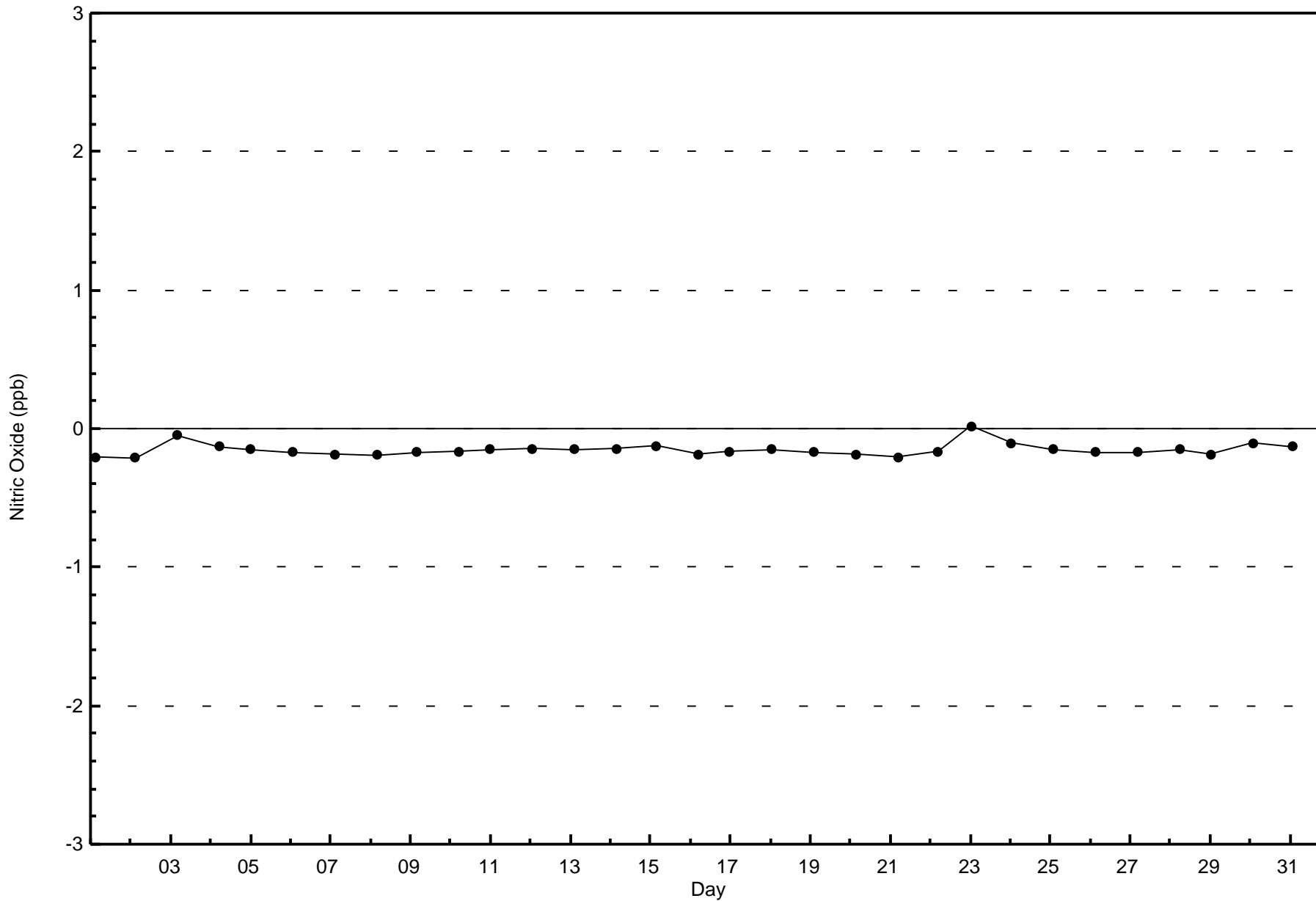
Total Number of Hours: 744

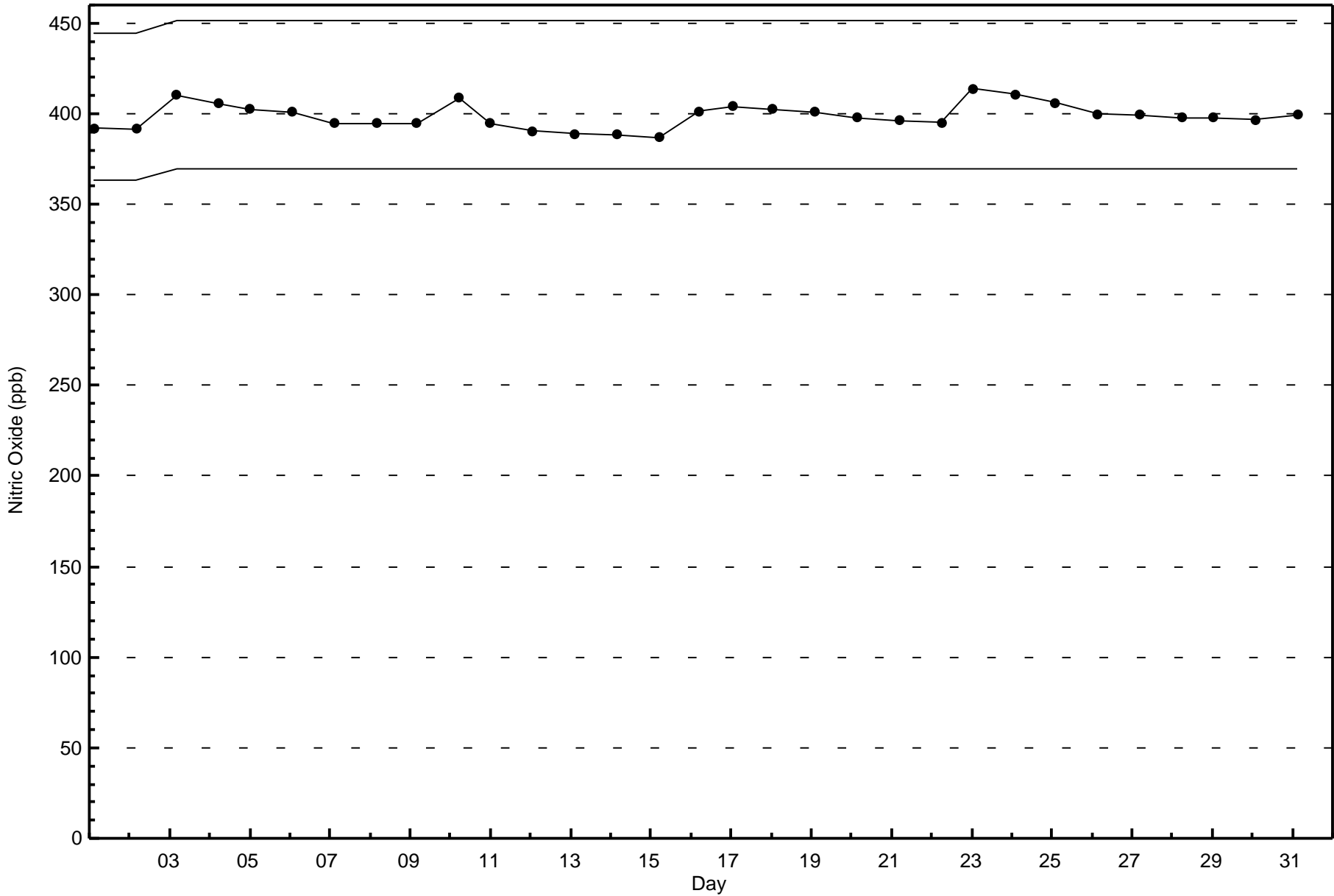


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitric Oxide (NO) - ppb
Fort Hills (AMS 23)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Fort Hills - August 2017

| | | | | |
|--|--|----------|---------------------------|------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 30 ppb on Aug 14 01:00 | Maximum Daily Average: 12.2 ppb on Aug 29 | | Hours of Data: | 705 |
| Minimum Value: 0 ppb on Aug 26 00:00 | Minimum Daily Average: 0.4 ppb on Aug 26 | | Hours of Missing Data: | 39 |
| Maximum Diurnal Average: 7.1 ppb at hour 1 | Minimum Diurnal Average: 2.0 ppb at hour 15 | | Hours of Calibration: | 36 |
| Monthly Average: 4.1 ppb | Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 5 P ₉₀ = 11 P ₉₉ = 23 | | Percent Operational Time: | 99.6 |

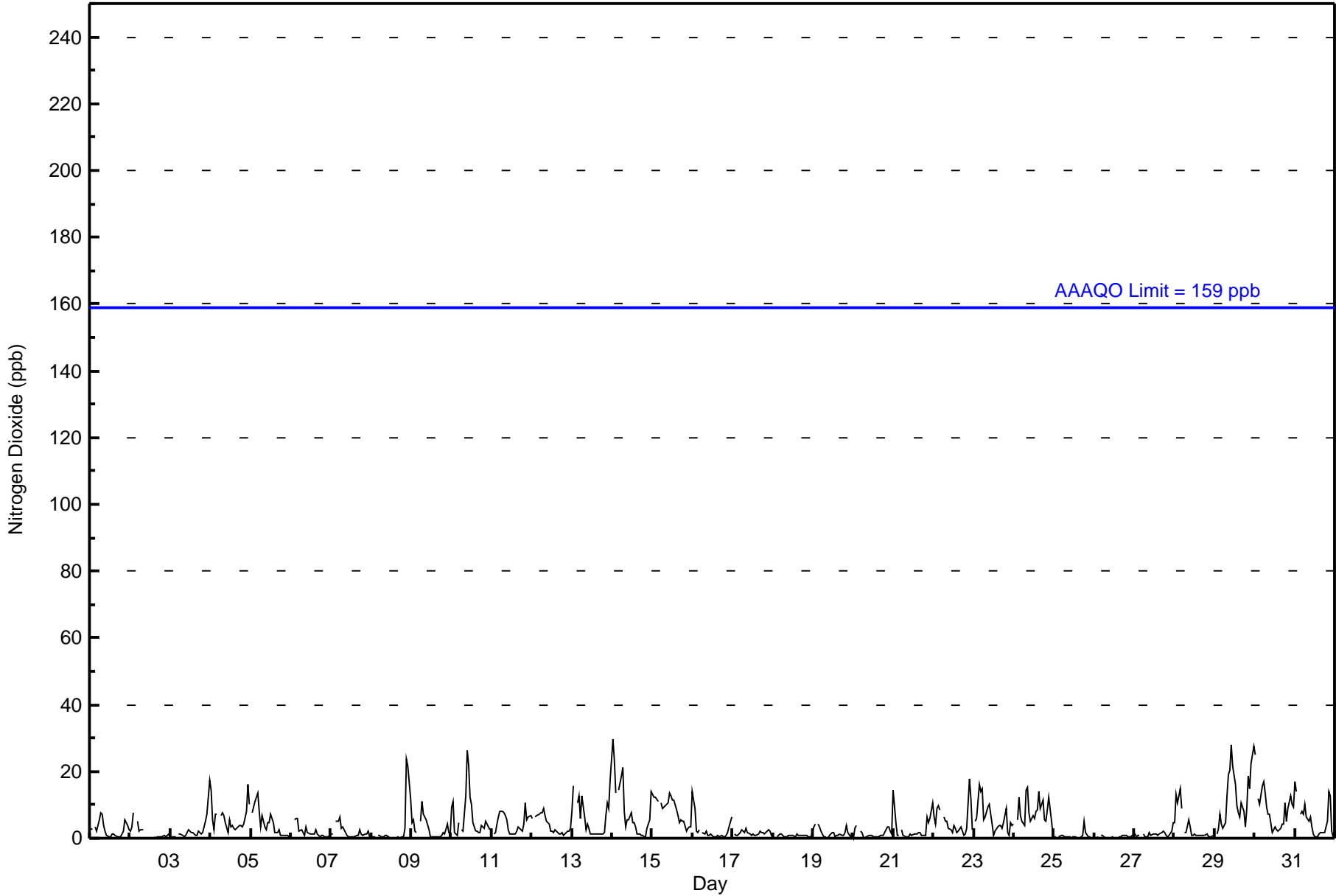
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | |
|--------|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|---------------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|--|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 3 | 3 | Z | 4 | 2 | 6 | 8 | 7 | 4 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 2 | 6 | 4 | 3 | 2.6 | 8 | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 2 | 4 | 8 | Z | 5 | 2 | 3 | 2 | 2 | C | C | C | C | C | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1.9 | 8 | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 1 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 4 | 5 | 7 | 17 | 2.4 | 17 | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 15 | 5 | 3 | 7 | 7 | Z | 7 | 8 | 7 | 5 | 2 | 5 | 4 | 4 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 8 | 16 | 10 | 5.9 | 16 | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | Z | 8 | 11 | 12 | 14 | 8 | 3 | 7 | 3 | 2 | 5 | 5 | 7 | 5 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 4.4 | 14 | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 1 | Z | 5 | 6 | 6 | 2 | 3 | 2 | 1 | 3 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1.9 | 6 | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 1 | 1 | Z | 5 | 5 | 7 | 3 | 4 | 3 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 2 | 0 | 1.9 | 7 | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 0 | 0 | 0 | Z | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | M | M | M | 0 | 0 | 0 | 0 | 0 | 3 | 24 | 22 | 12 | 3.4 | 24 | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 5 | 5 | 2 | 2 | Z | 5 | 11 | 7 | 6 | 5 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 4 | 2 | 1 | 2.8 | 11 | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 9 | 11 | 2 | 1 | 5 | Z | 3 | 2 | 13 | 26 | 22 | 12 | 10 | 5 | 2 | 2 | 2 | 2 | 4 | 3 | 5 | 4 | 3 | 3 | 6.6 | 26 | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | Z | 1 | 2 | 4 | 6 | 8 | 8 | 8 | 7 | 5 | 3 | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 2 | 4 | 11 | 6 | 6 | 7 | 4.4 | 11 | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 6 | Z | 6 | 7 | 7 | 8 | 8 | 9 | 7 | 5 | 4 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 3 | 3.9 | 9 | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 8 | 16 | Z | 10 | 13 | 6 | 13 | 7 | 3 | 4 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 7 | 11 | 9 | 17 | 6.0 | 17 | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 30 | 23 | 13 | Z | 14 | 19 | 21 | 8 | 3 | 6 | 6 | 8 | 5 | 5 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 6 | 14 | 8.3 | 30 | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 13 | 12 | 12 | 11 | Z | 10 | 9 | 9 | 10 | 11 | 13 | 13 | 12 | 12 | 9 | 7 | 5 | 6 | 5 | 5 | 2 | 3 | 4 | 3 | 8.5 | 13 | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 14 | 9 | 2 | 2 | 2 | Z | 2 | 1 | 2 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 4 | 7 | 2.4 | 14 | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | Z | 1 | 1 | 1 | 2 | 3 | 2 | 2 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 2 | 3 | 2 | 1 | 1.6 | 3 | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0.7 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 3 | 4 | Z | 4 | 3 | 2 | 1 | 0 | 0 | 0 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 4 | 2 | 1 | 1 | 1.6 | 4 | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 0 | 3 | 4 | Z | 2 | 2 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 4 | 3 | 2 | 1 | 1.3 | 4 | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 14 | 5 | 1 | 1 | Z | 2 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 6 | 5 | 6 | 10 | 2.8 | 14 | | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 6 | 4 | 9 | 10 | 9 | Z | 6 | 5 | 5 | 3 | 3 | 2 | 4 | 3 | 2 | 2 | 3 | 2 | 1 | 1 | 3 | 18 | 12 | 3 | 5.0 | 18 | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | Z | 5 | 6 | 16 | 14 | 15 | 6 | 6 | 10 | 10 | 7 | 4 | 1 | 2 | 3 | 4 | 4 | 3 | 5 | 9 | 2 | 1 | 5 | 4 | 6.1 | 16 | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 4 | Z | 5 | 12 | 7 | 5 | 4 | 15 | 15 | 8 | 5 | 7 | 6 | 8 | 9 | 14 | 9 | 11 | 6 | 5 | 8 | 12 | 5 | 1 | 7.8 | 15 | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 1 | 1 | Z | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 2 | 0 | 1 | 0 | 0 | 0.7 | 5 | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 0 | 0 | 0 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 1 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 5 | 1.2 | 5 | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 5 | 13 | 11 | 15 | 9 | Z | 2 | 2 | 6 | 4 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 3.3 | 15 | | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | Z | 1 | 3 | 7 | 4 | 3 | 5 | 13 | 19 | 20 | 28 | 22 | 16 | 10 | 8 | 6 | 11 | 8 | 3 | 9 | 19 | 15 | 23 | 28 | 12.2 | 28 | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 25 | Z | 12 | 10 | 16 | 17 | 14 | 9 | 7 | 7 | 2 | 3 | 3 | 3 | 2 | 3 | 4 | 4 | 11 | 5 | 9 | 13 | 10 | 9 | 8.6 | 25 | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 17 | 14 | Z | 7 | 8 | 7 | 10 | 7 | 5 | 6 | 4 | 1 | 0 | 1 | 1 | 2 | 2 | 2 | 2 | 5 | 14 | 13 | 2 | 0 | 5.7 | 17 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 7.1 | 5.8 | 4.8 | 6.0 | 6.3 | 5.5 | 4.9 | 4.6 | 4.7 | 4.7 | 4.0 | 3.4 | 2.9 | 2.5 | 2.0 | 2.1 | 2.1 | 2.2 | 2.1 | 2.3 | 3.8 | 5.4 | 5.1 | 5.3 | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | | | | | | | 30 | 23 | 13 | 16 | 16 | 19 | 21 | 15 | 19 | 26 | 28 | 22 | 16 | 12 | 9 | 14 | 11 | 11 | 11 | 9 | 19 | 24 | 23 | 28 | Diurnal Maximum | |

Z - zerospan C - Calibration M - Maintenance
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Fort Hills - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort Hills - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 693 | 98.30 | 98.30 |
| 21 - 40 | 12 | 1.70 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort Hills - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|---|-----|----|-----|-----|-----|-----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 36 | 38 | 16 | 13 | 3 | 10 | 11 | 55 | 122 | 117 | 116 | 41 | 30 | 34 | 24 | 25 | 691 |
| 21 - 40 | 0 | 1 | 0 | 0 | 1 | 1 | 2 | 4 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 12 |
| 41 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 36 | 39 | 16 | 13 | 4 | 11 | 13 | 59 | 124 | 117 | 117 | 41 | 30 | 34 | 24 | 25 | 703 |

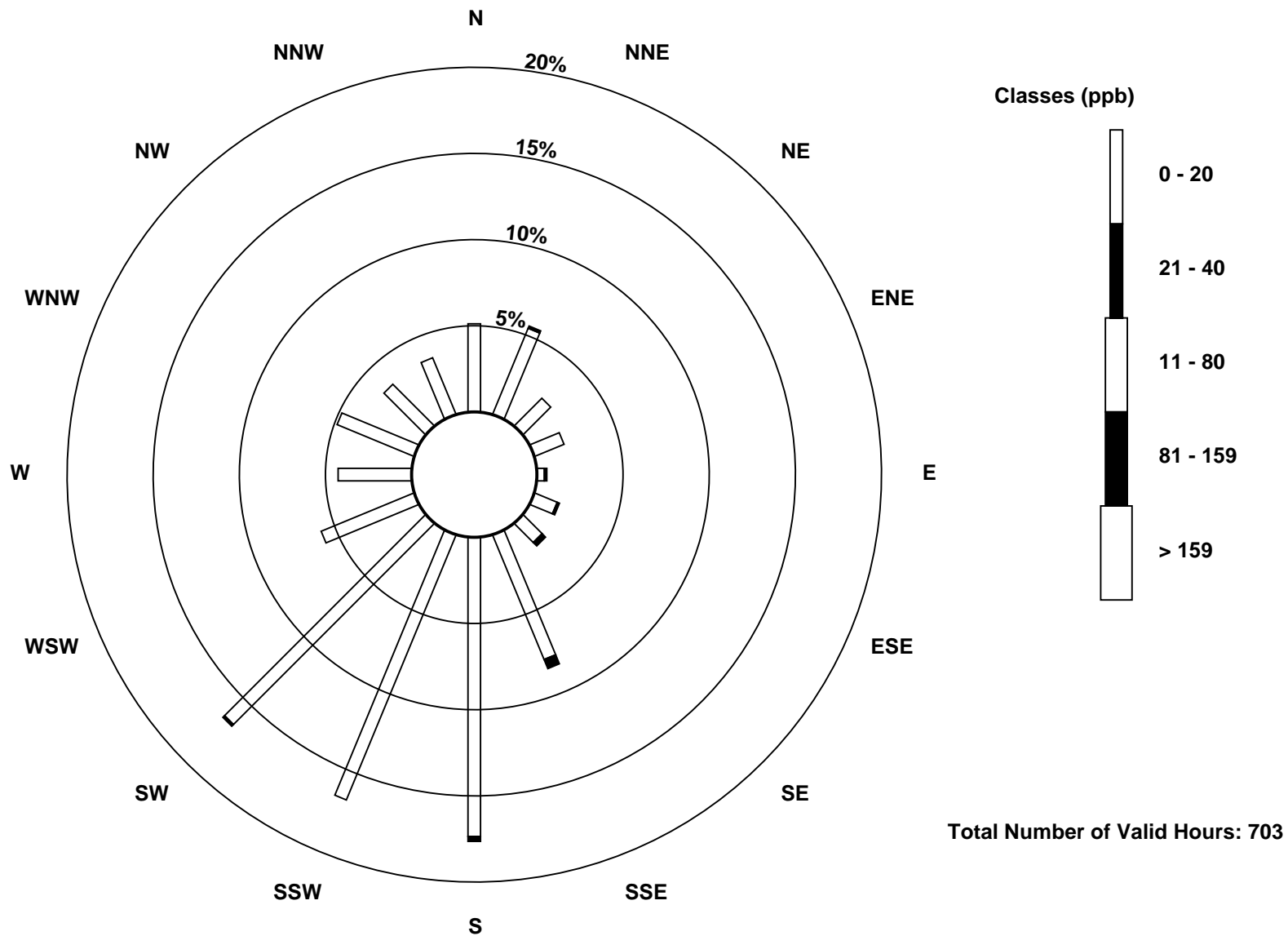
Total Number of Valid Hours: 703

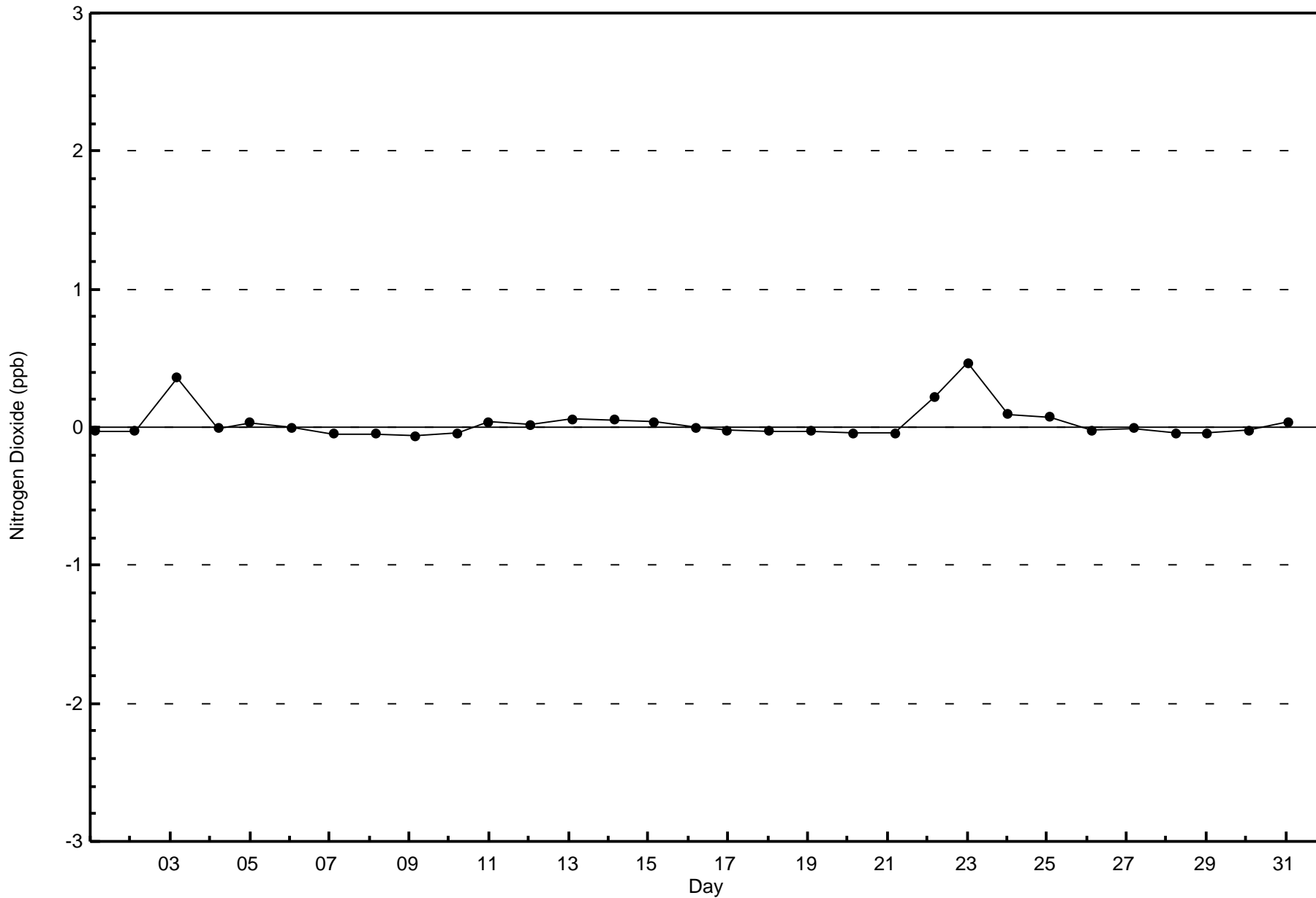
Total Number of Hours: 744

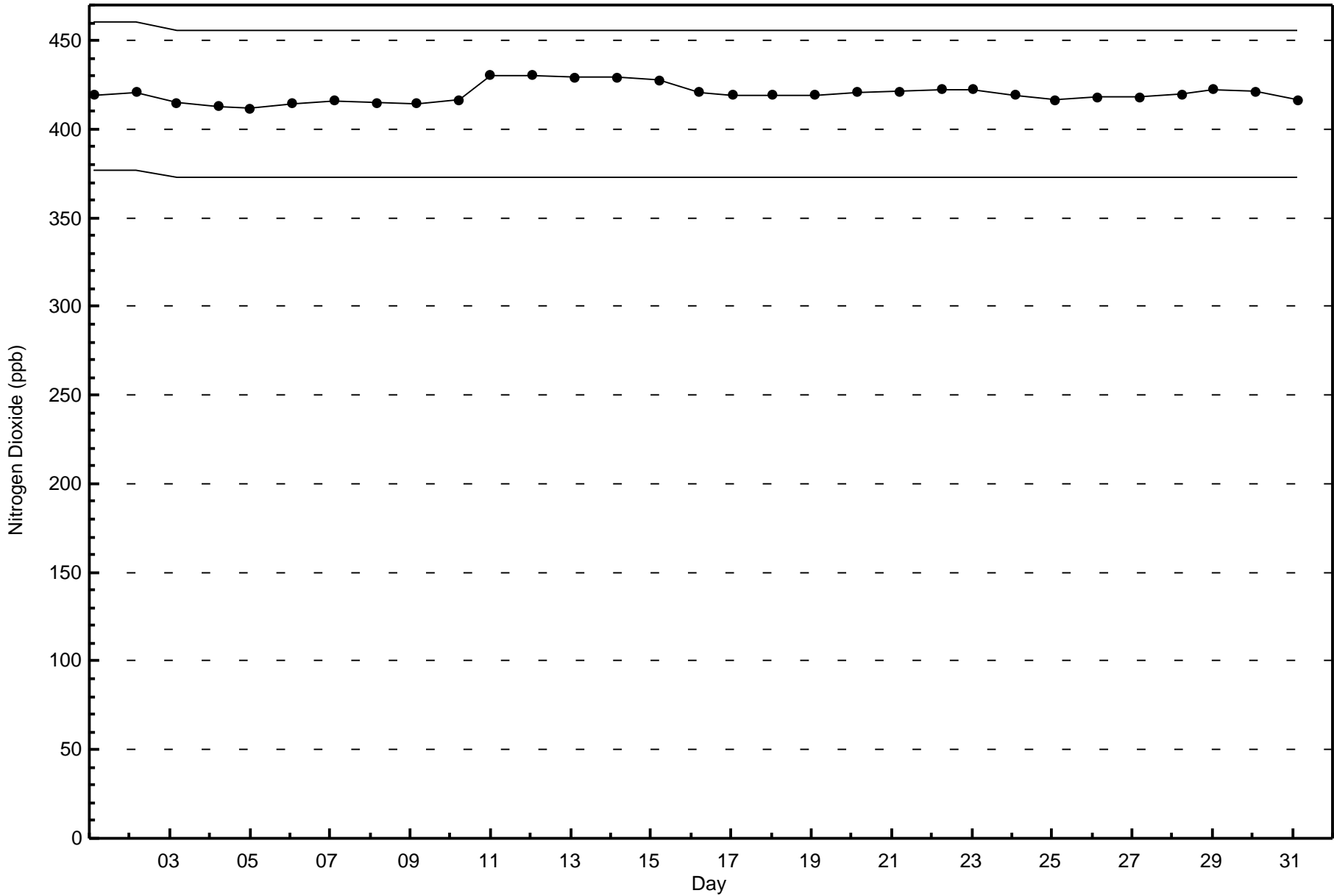


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Dioxide (NO₂) - ppb
Fort Hills (AMS 23)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb

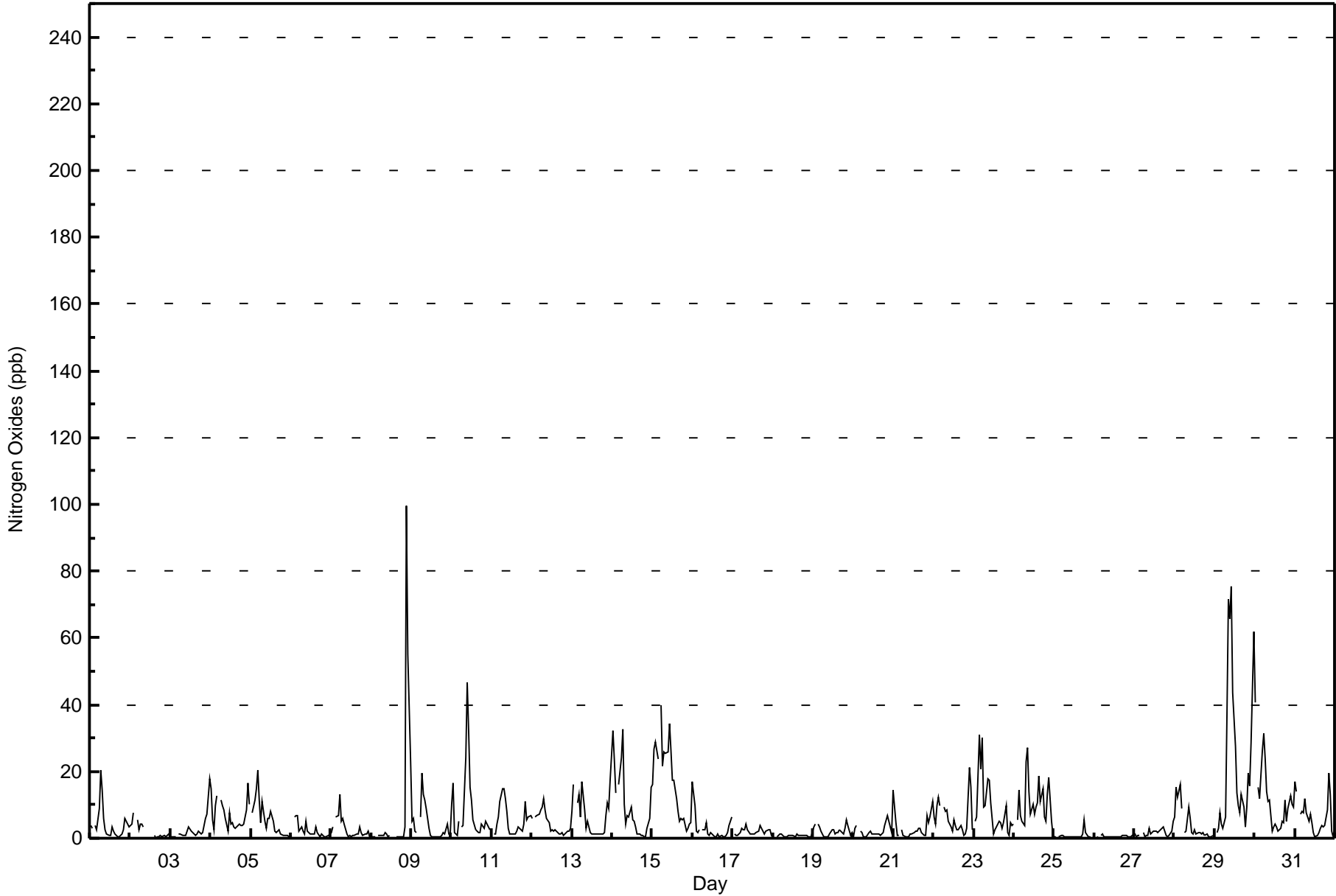
Fort Hills - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 100 ppb on Aug 8 22:00 Maximum Daily Average: 23.5 ppb on Aug 29 | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 705 | | | | | | | | | | | |
|--|-------------------------------|----|-----------------|----|----|----|----|----|-----------------|----|----|----|----|----|----|----|----|---|----|----|----|-----|----|-----------------|---------------|---------------|---|--|--|
| Minimum Value: 0 ppb on Aug 26 00:00 Minimum Daily Average: 0.5 ppb on Aug 26 Maximum Diurnal Average: 9.1 ppb at hour 9 Minimum Diurnal Average: 2.4 ppb at hour 19 Monthly Average: 5.8 ppb Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 7 P ₉₀ = 15 P ₉₉ = 42 | | | | | | | | | | | | | | | | | | Hours of Missing Data: 39 Hours of Calibration: 36 Percent Operational Time: 99.6 | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | |
| 1-Aug | 4 | 3 | Z | 4 | 2 | 9 | 20 | 15 | 6 | 3 | 1 | 1 | 1 | 3 | 2 | 1 | 1 | 0 | 1 | 1 | 2 | 6 | 4 | 3 | 4.1 | 20 | | | |
| 2-Aug | 4 | 4 | 8 | Z | 5 | 3 | 4 | 4 | 3 | C | C | C | C | C | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 2.4 | 8 | | | |
| 3-Aug | 1 | 0 | 0 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 4 | 6 | 7 | 18 | 2.6 | 18 | | | |
| 4-Aug | 15 | 6 | 2 | 10 | 13 | Z | 11 | 10 | 9 | 6 | 2 | 7 | 4 | 5 | 4 | 3 | 4 | 4 | 4 | 4 | 8 | 16 | 10 | 7.0 | 16 | | | | |
| 5-Aug | Z | 8 | 11 | 15 | 20 | 11 | 5 | 11 | 5 | 3 | 6 | 7 | 8 | 5 | 2 | 2 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 5.6 | 20 | | | |
| 6-Aug | 1 | Z | 6 | 7 | 7 | 2 | 3 | 2 | 1 | 5 | 2 | 1 | 1 | 1 | 1 | 3 | 2 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 2.3 | 7 | | | |
| 7-Aug | 2 | 3 | Z | 7 | 7 | 13 | 5 | 6 | 4 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 3 | 2 | 1 | 1 | 1 | 2 | 0 | 2.8 | 13 | | | |
| 8-Aug | 0 | 0 | 0 | Z | 1 | 1 | 1 | 1 | 2 | 1 | 0 | 1 | M | M | M | 0 | 0 | 0 | 0 | 0 | 3 | 100 | 55 | 23 | 9.6 | 100 | | | |
| 9-Aug | 5 | 6 | 2 | 2 | Z | 7 | 20 | 13 | 11 | 9 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 4 | 1 | 1 | 3.9 | 20 | | | |
| 10-Aug | 10 | 17 | 2 | 1 | 5 | Z | 3 | 4 | 24 | 47 | 32 | 15 | 12 | 5 | 2 | 2 | 2 | 2 | 4 | 3 | 5 | 4 | 3 | 3 | 9.0 | 47 | | | |
| 11-Aug | Z | 1 | 1 | 4 | 6 | 11 | 15 | 15 | 12 | 8 | 3 | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 2 | 4 | 11 | 6 | 6 | 7 | 5.5 | 15 | | | |
| 12-Aug | 6 | Z | 6 | 7 | 7 | 8 | 9 | 12 | 9 | 6 | 5 | 2 | 2 | 2 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 4.3 | 12 | | | |
| 13-Aug | 8 | 16 | Z | 11 | 13 | 6 | 17 | 8 | 3 | 5 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 7 | 11 | 9 | 17 | 6.4 | 17 | | | |
| 14-Aug | 32 | 23 | 14 | Z | 16 | 24 | 32 | 10 | 4 | 7 | 7 | 9 | 5 | 5 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 6 | 15 | 9.7 | 32 | | | |
| 15-Aug | 16 | 27 | 29 | 24 | Z | 40 | 22 | 26 | 26 | 26 | 34 | 26 | 17 | 17 | 12 | 8 | 5 | 6 | 6 | 6 | 2 | 3 | 4 | 5 | 16.8 | 40 | | | |
| 16-Aug | 17 | 10 | 2 | 2 | 2 | Z | 2 | 2 | 5 | 1 | 1 | 2 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 4 | 7 | 2.8 | 17 | | | |
| 17-Aug | Z | 1 | 1 | 1 | 2 | 3 | 3 | 2 | 4 | 3 | 1 | 1 | 1 | 1 | 2 | 2 | 4 | 3 | 2 | 1 | 2 | 3 | 2 | 1 | 2.0 | 4 | | | |
| 18-Aug | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0.8 | 1 | | | |
| 19-Aug | 4 | 4 | Z | 4 | 3 | 2 | 1 | 0 | 0 | 0 | 1 | 2 | 3 | 1 | 2 | 2 | 3 | 2 | 1 | 3 | 5 | 4 | 1 | 2 | 2.2 | 5 | | | |
| 20-Aug | 0 | 3 | 4 | Z | 2 | 2 | 1 | 0 | 0 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 4 | 7 | 5 | 3 | 2 | 2.0 | 7 | | |
| 21-Aug | 15 | 5 | 1 | 1 | Z | 3 | 1 | 1 | 1 | 0 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 2 | 1 | 1 | 7 | 5 | 6 | 11 | 3.2 | 15 | | | |
| 22-Aug | 6 | 4 | 10 | 12 | 10 | Z | 9 | 8 | 9 | 5 | 3 | 2 | 6 | 4 | 2 | 3 | 4 | 2 | 1 | 1 | 3 | 21 | 15 | 2 | 6.2 | 21 | | | |
| 23-Aug | Z | 5 | 6 | 31 | 21 | 30 | 9 | 10 | 18 | 18 | 11 | 6 | 1 | 2 | 4 | 5 | 5 | 3 | 5 | 10 | 2 | 1 | 5 | 4 | 9.2 | 31 | | | |
| 24-Aug | 4 | Z | 5 | 14 | 7 | 5 | 4 | 23 | 27 | 14 | 7 | 10 | 7 | 9 | 11 | 19 | 11 | 15 | 6 | 5 | 13 | 18 | 5 | 1 | 10.5 | 27 | | | |
| 25-Aug | 1 | 1 | Z | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 5 | 2 | 0 | 1 | 0 | 0 | 0.7 | 5 | | | |
| 26-Aug | 0 | 0 | 0 | Z | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0.5 | 1 | | | |
| 27-Aug | 1 | 1 | 1 | 1 | Z | 2 | 1 | 1 | 1 | 3 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 2 | 1 | 0 | 1 | 2 | 5 | 1.7 | 5 | | | |
| 28-Aug | 6 | 15 | 12 | 16 | 9 | Z | 2 | 2 | 10 | 6 | 2 | 1 | 3 | 1 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 0 | 1 | 4.2 | 16 | | | |
| 29-Aug | Z | 2 | 3 | 8 | 4 | 3 | 6 | 38 | 72 | 66 | 75 | 44 | 27 | 14 | 10 | 8 | 13 | 9 | 3 | 9 | 20 | 16 | 28 | 62 | 23.5 | 75 | | | |
| 30-Aug | 40 | Z | 15 | 12 | 26 | 31 | 24 | 14 | 11 | 12 | 2 | 3 | 4 | 3 | 2 | 3 | 5 | 5 | 12 | 5 | 9 | 13 | 10 | 9 | 11.8 | 40 | | | |
| 31-Aug | 17 | 14 | Z | 7 | 8 | 8 | 12 | 8 | 5 | 7 | 5 | 2 | 0 | 1 | 2 | 3 | 4 | 3 | 4 | 8 | 20 | 13 | 2 | 0 | 6.7 | 20 | | | |
| 8.3 6.9 5.8 7.7 7.7 8.8 7.9 8.0 9.1 8.8 7.2 5.2 4.0 3.2 2.6 2.7 2.7 2.7 2.4 2.6 4.4 8.3 6.6 7.0 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | | |
| 40 27 29 31 26 40 32 38 72 66 75 44 27 17 12 19 13 15 12 10 20 100 55 62 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | |
| Z - zerospan | | | C - Calibration | | | | | | M - Maintenance | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Fort Hills - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort Hills - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 667 | 94.61 | 94.61 |
| 21 - 40 | 30 | 4.26 | 98.87 |
| 41 - 80 | 7 | 0.99 | 99.86 |
| 81 - 159 | 1 | 0.14 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort Hills - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|---|-----|----|-----|-----|-----|-----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 31 | 35 | 15 | 11 | 2 | 10 | 10 | 51 | 119 | 117 | 115 | 40 | 28 | 34 | 23 | 24 | 665 |
| 21 - 40 | 5 | 4 | 1 | 2 | 1 | 1 | 2 | 6 | 3 | 0 | 1 | 0 | 2 | 0 | 1 | 1 | 30 |
| 11 - 80 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 7 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 36 | 39 | 16 | 13 | 4 | 11 | 13 | 59 | 124 | 117 | 117 | 41 | 30 | 34 | 24 | 25 | 703 |

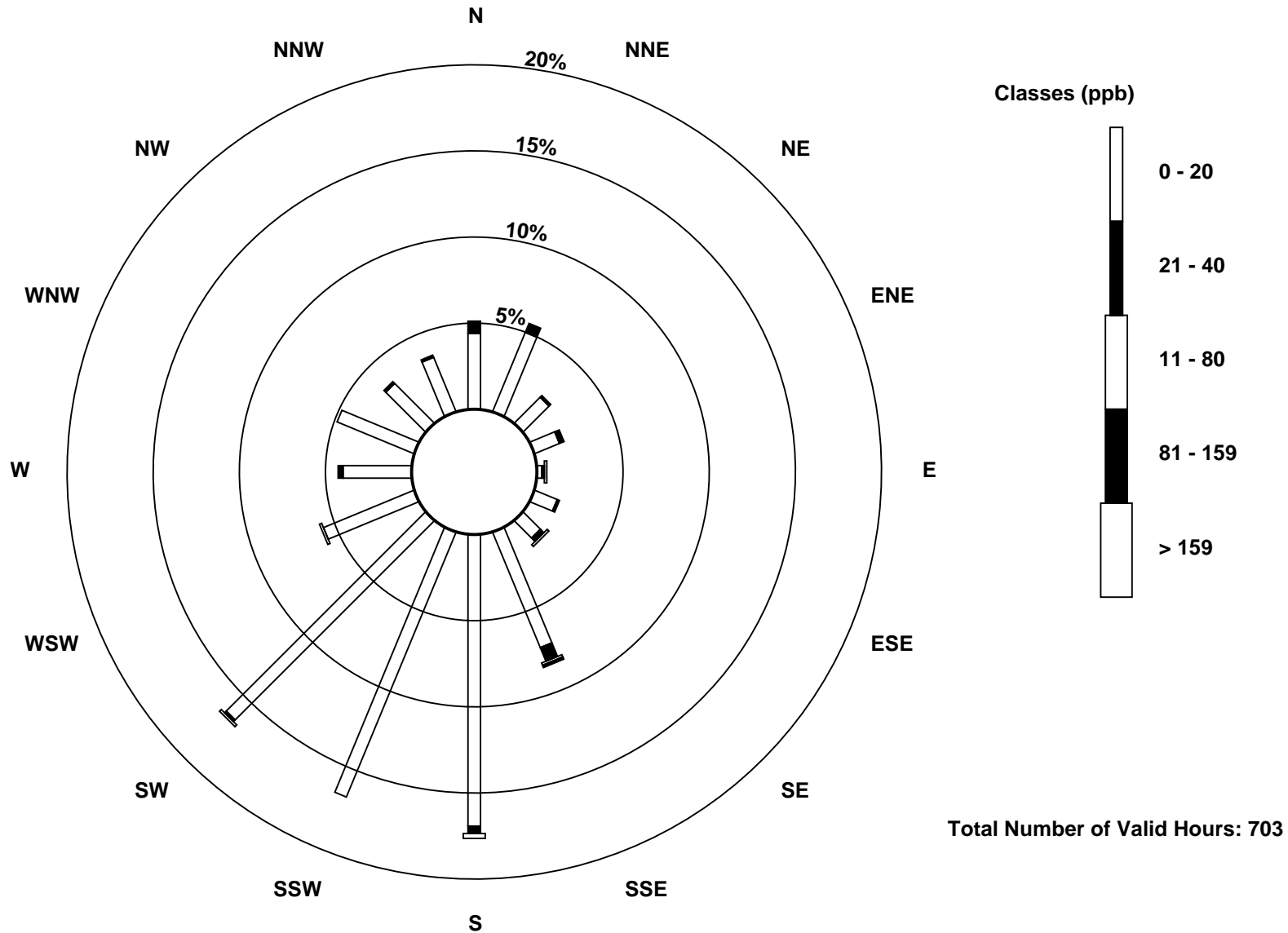
Total Number of Valid Hours: 703

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

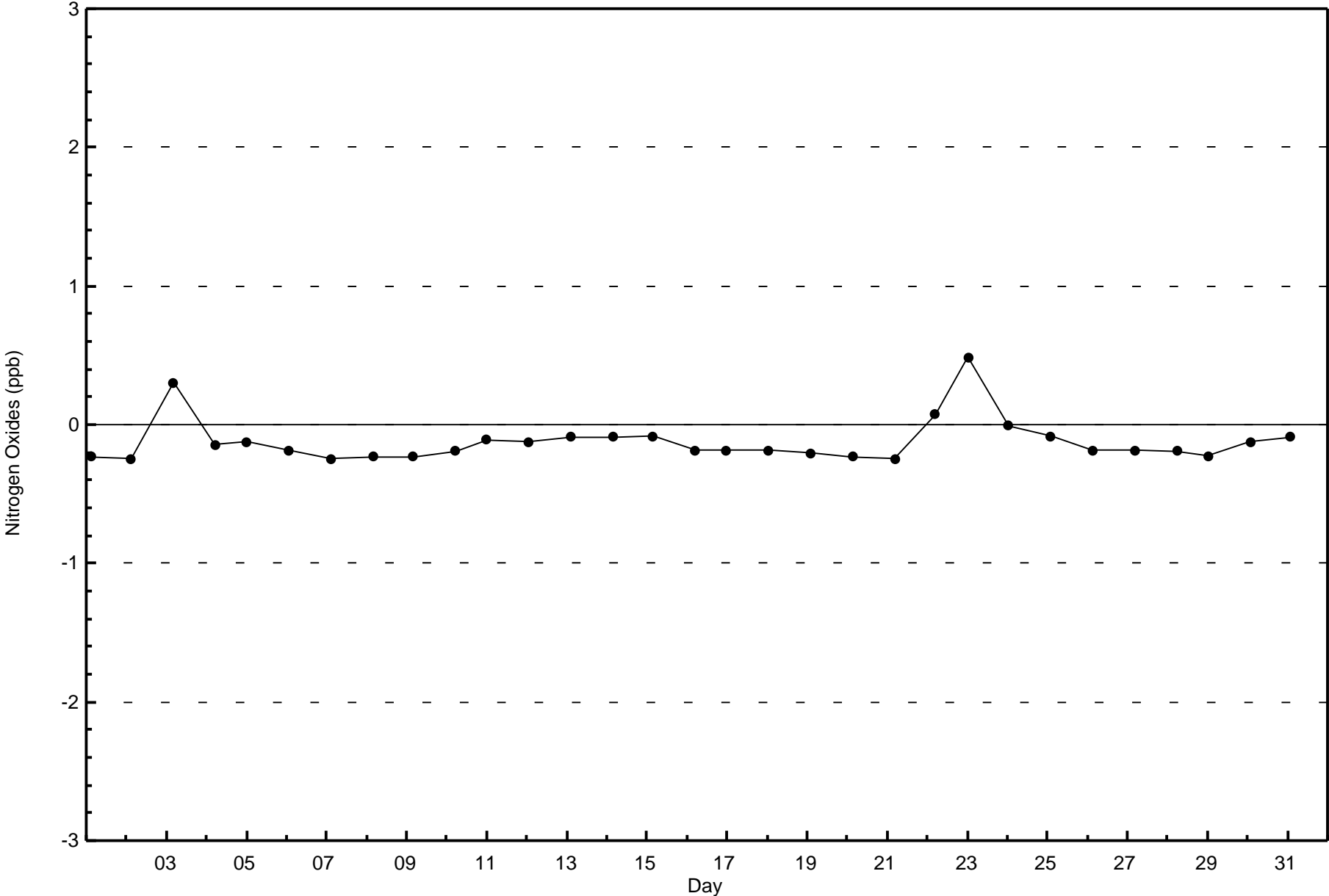
Nitrogen Oxides (NO_x) - ppb
Fort Hills (AMS 23)

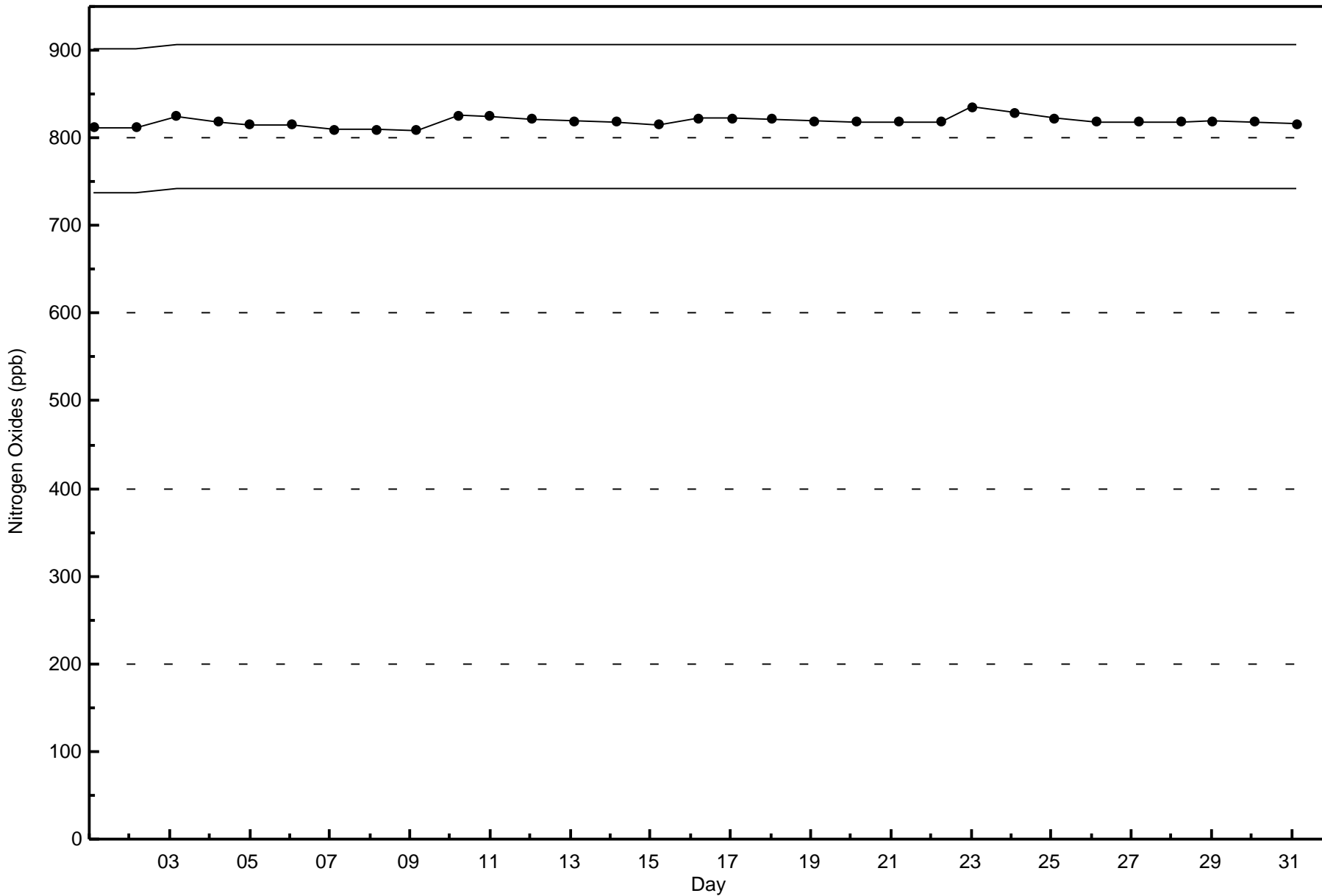




Wood Buffalo Environmental Association
Zero Responses

Nitrogen Oxides (NO_x) - ppb
Fort Hills - August 2017







Summary of Hour Averages

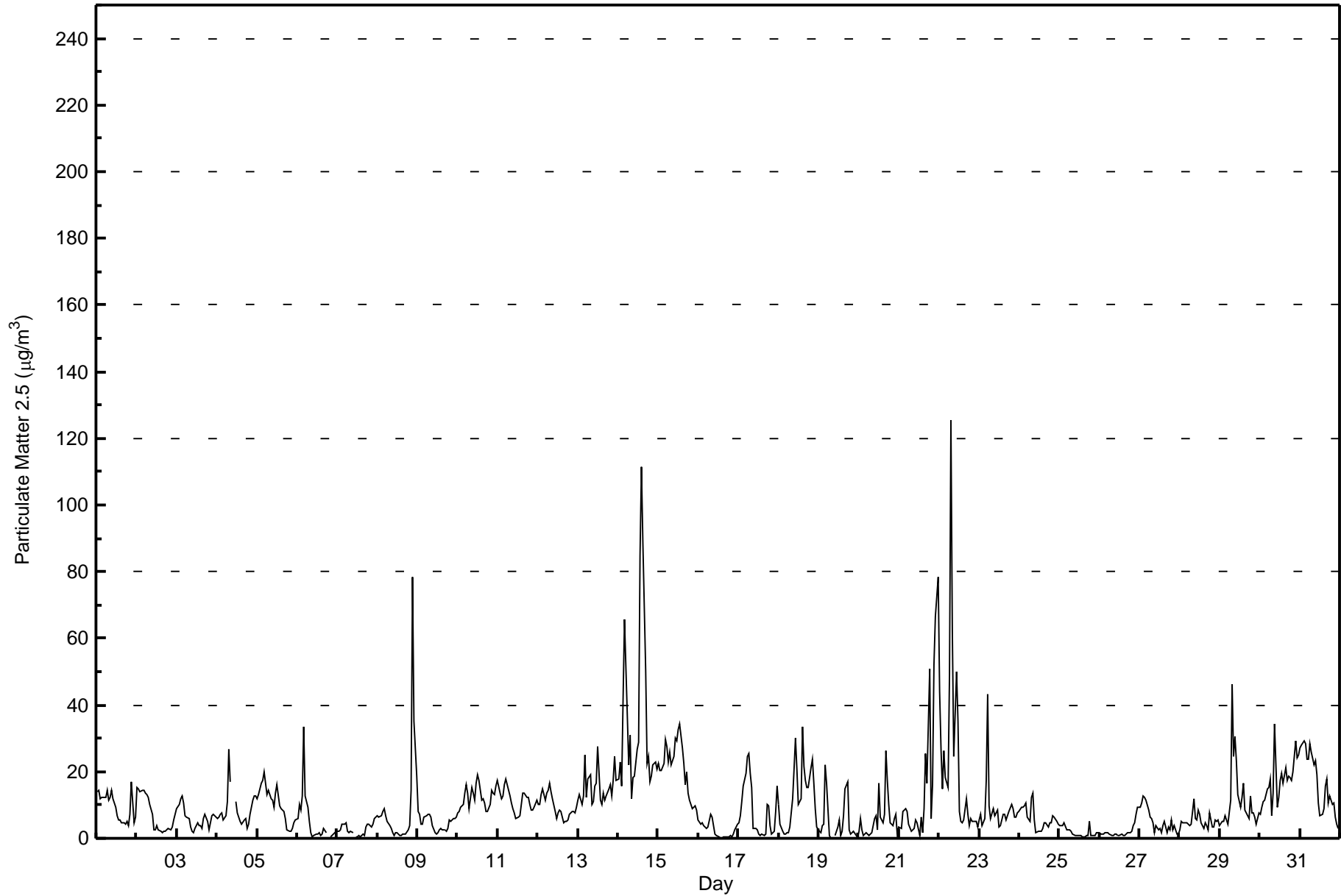
Fort Hills - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 1 Maximum Value: 125 µg/m ³ on Aug 22 08:00 Minimum Value: 0 µg/m ³ on Aug 19 08:00 Maximum Diurnal Average: 15.2 µg/m ³ at hour 8 Monthly Average: 10.3 µg/m ³ | | | | | | | | | | | | | | | | | Maximum Daily Average: 35.1 µg/m ³ on Aug 14 Minimum Daily Average: 1.9 µg/m ³ on Aug 25 Minimum Diurnal Average: 6.9 µg/m ³ at hour 20 Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 3 Median = 7 Q ₃ = 13 P ₉₀ = 22 P ₉₉ = 56 | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 737 Hours of Missing Data: 7 Hours of Calibration: 2 Percent Operational Time: 99.3 | |
|---|-------------------------------|----|----|----|----|----|----|-----|----|----|----|----|----|----|-----|----|---|----|----|----|----|----|----|-----------------|---------------|---------------|--|--|--|--|--|--|--|--|--|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | |
| 1-Aug | 14 | 14 | 12 | 12 | 12 | 12 | 14 | 11 | 12 | 15 | 12 | 9 | 7 | 5 | 6 | 5 | 5 | 4 | 5 | 4 | 7 | 17 | 5 | 7 | 9.5 | 17 | | | | | | | | | |
| 2-Aug | 15 | 15 | 14 | 14 | 14 | 14 | 13 | 12 | 10 | 7 | 2 | 2 | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 5 | 7 | 7.2 | 15 | | | | | | | | | |
| 3-Aug | 9 | 10 | 12 | 13 | 10 | 7 | 6 | 6 | 4 | 2 | 2 | 3 | 5 | 4 | 4 | 3 | 6 | 7 | 5 | 2 | 5 | 7 | 7 | 7 | 6.0 | 13 | | | | | | | | | |
| 4-Aug | 6 | 6 | 7 | 8 | 6 | 7 | 11 | 27 | 17 | C | C | 11 | 8 | 6 | 5 | 4 | 6 | 6 | 3 | 4 | 7 | 12 | 13 | 13 | 8.7 | 27 | | | | | | | | | |
| 5-Aug | 12 | 13 | 17 | 17 | 20 | 17 | 13 | 14 | 12 | 11 | 10 | 14 | 16 | 10 | 9 | 8 | 8 | 6 | 3 | 2 | 2 | 3 | 5 | 6 | 10.3 | 20 | | | | | | | | | |
| 6-Aug | 6 | 10 | 9 | 13 | 34 | 13 | 9 | 5 | 2 | 0 | 1 | 1 | 1 | 2 | 1 | 1 | 3 | 2 | UO | UO | 0 | 1 | 2 | 2 | 5.3 | 34 | | | | | | | | | |
| 7-Aug | 2 | 2 | 2 | 4 | 4 | 5 | 2 | 2 | 2 | 2 | UO | 1 | 0 | 1 | 1 | 1 | 1 | 4 | 4 | 4 | 3 | 4 | 6 | 6 | 2.8 | 6 | | | | | | | | | |
| 8-Aug | 7 | 6 | 7 | 8 | 9 | 7 | 5 | 4 | 3 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 4 | 15 | 78 | 35 | 18 | 9.1 | 78 | | | | | | | | | |
| 9-Aug | 8 | 7 | 4 | 4 | 6 | 7 | 7 | 7 | 6 | 4 | 2 | 1 | 2 | 3 | 3 | 3 | 3 | 2 | 3 | 5 | 5 | 6 | 6 | 6 | 4.6 | 8 | | | | | | | | | |
| 10-Aug | 8 | 8 | 9 | 10 | 13 | 16 | 14 | 9 | 15 | 13 | 11 | 17 | 19 | 17 | 11 | 12 | 11 | 8 | 8 | 10 | 15 | 14 | 13 | 16 | 12.4 | 19 | | | | | | | | | |
| 11-Aug | 18 | 14 | 12 | 13 | 16 | 18 | 14 | 13 | 11 | 9 | 8 | 6 | 6 | 7 | 10 | 14 | 14 | 12 | 12 | 10 | 9 | 8 | 9 | 11 | 11.3 | 18 | | | | | | | | | |
| 12-Aug | 10 | 10 | 13 | 15 | 12 | 14 | 14 | 17 | 14 | 12 | 8 | 6 | 7 | 8 | 8 | 5 | 5 | 5 | 6 | 7 | 8 | 8 | 8 | 9 | 9.6 | 17 | | | | | | | | | |
| 13-Aug | 12 | 13 | 10 | 13 | 25 | 12 | 18 | 19 | 10 | 11 | 16 | 17 | 28 | 11 | 10 | 13 | 12 | 13 | 15 | 16 | 13 | 17 | 25 | 17 | 15.2 | 28 | | | | | | | | | |
| 14-Aug | 18 | 23 | 16 | 42 | 66 | 37 | 22 | 31 | 12 | 18 | 19 | 27 | 29 | 85 | 111 | 89 | 51 | 22 | 25 | 17 | 18 | 22 | 23 | 21 | 35.1 | 111 | | | | | | | | | |
| 15-Aug | 23 | 20 | 21 | 22 | 30 | 27 | 23 | 26 | 22 | 24 | 30 | 29 | 33 | 34 | 27 | 22 | 16 | 20 | 13 | 12 | 9 | 9 | 10 | 8 | 21.3 | 34 | | | | | | | | | |
| 16-Aug | 5 | 4 | 5 | 4 | 3 | 3 | 3 | 7 | 6 | 4 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 3 | 4 | 2.5 | 7 | | | | | | | | | |
| 17-Aug | 5 | 7 | 11 | 16 | 19 | 25 | 25 | 20 | 15 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 10 | 10 | 4 | 1 | 2 | 8 | 16 | 8.6 | 25 | | | | | | | | | |
| 18-Aug | 10 | 4 | 2 | 1 | 1 | 2 | 2 | 3 | 12 | 21 | 30 | 21 | 10 | 12 | 33 | 22 | 18 | 15 | 15 | 21 | 24 | 16 | 9 | 3 | 12.8 | 33 | | | | | | | | | |
| 19-Aug | 2 | 2 | 4 | 4 | 22 | 17 | 1 | 0 | UO | UO | 1 | 4 | 6 | 1 | 2 | 7 | 15 | 17 | 2 | 1 | 2 | 2 | 1 | 1 | 5.1 | 22 | | | | | | | | | |
| 20-Aug | 2 | 6 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 6 | 7 | 3 | 17 | 6 | 5 | 7 | 26 | 17 | 10 | 5 | 4 | 6 | 7 | 1 | 6.0 | 26 | | | | | | | | | |
| 21-Aug | 3 | 3 | 8 | 9 | 9 | 8 | 4 | 2 | 3 | 3 | 6 | 5 | 1 | 7 | 2 | 9 | 26 | 17 | 51 | 6 | 16 | 52 | 67 | 78 | 16.3 | 78 | | | | | | | | | |
| 22-Aug | 44 | 27 | 15 | 26 | 18 | 15 | 49 | 125 | 62 | 24 | 50 | 35 | 8 | 5 | 5 | 6 | 12 | 7 | 4 | 6 | 5 | 5 | 3 | 23.4 | 125 | | | | | | | | | | |
| 23-Aug | 6 | 7 | 4 | 6 | 17 | 43 | 10 | 6 | 9 | 7 | 7 | 8 | 3 | 4 | 7 | 7 | 5 | 7 | 8 | 10 | 9 | 6 | 6 | 8 | 8.8 | 43 | | | | | | | | | |
| 24-Aug | 8 | 9 | 9 | 10 | 11 | 7 | 5 | 12 | 14 | 6 | 2 | 2 | 2 | 2 | 3 | 5 | 4 | 3 | 5 | 4 | 7 | 6 | 5 | 4 | 6.0 | 14 | | | | | | | | | |
| 25-Aug | 4 | 4 | 4 | 5 | 2 | 2 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 5 | 1 | 1 | 1 | 2 | 2 | 1.9 | 5 | | | | | | | | | |
| 26-Aug | 2 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 4 | 5 | 7 | 9 | 2.1 | 9 | | | | | | | | | |
| 27-Aug | 9 | 11 | 13 | 12 | 11 | 8 | 6 | 6 | 5 | 2 | 4 | 2 | 3 | 2 | 4 | 5 | 2 | 3 | 3 | 6 | 2 | 4 | 1 | 1 | 5.2 | 13 | | | | | | | | | |
| 28-Aug | 2 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 12 | 6 | 6 | 9 | 7 | 5 | 3 | 5 | 4 | 3 | 7 | 4 | 3 | 6 | 5 | 5 | 5.1 | 12 | | | | | | | | | |
| 29-Aug | 4 | 5 | 5 | 7 | 5 | 4 | 11 | 46 | 25 | 30 | 23 | 13 | 9 | 12 | 16 | 9 | 8 | 6 | 13 | 8 | 8 | 7 | 4 | 7 | 11.9 | 46 | | | | | | | | | |
| 30-Aug | 7 | 9 | 11 | 12 | 15 | 15 | 18 | 7 | 13 | 34 | 9 | 12 | 18 | 20 | 17 | 21 | 18 | 18 | 18 | 17 | 20 | 29 | 24 | 25 | 17.0 | 34 | | | | | | | | | |
| 31-Aug | 27 | 28 | 29 | 28 | 24 | 24 | 28 | 26 | 22 | 23 | 19 | 11 | 7 | 7 | 9 | 16 | 18 | 10 | 13 | 10 | 11 | 6 | 4 | 3 | 16.8 | 29 | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | | | | | | | |
| C - Calibration UO - Unstable Operation Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Hills - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Hills - August 2017

| Concentration Ranges ($\mu\text{g}/\text{m}^3$) | Number of Hours | % | Cumulative % |
|---|------------------------|----------|---------------------|
| 1 - 5 | 250 | 33.92 | 33.92 |
| 6 - 15 | 296 | 40.16 | 74.08 |
| 16 - 25 | 94 | 12.75 | 86.84 |
| 26 - 80 | 46 | 6.24 | 93.08 |
| > 81.0 | 4 | 0.54 | 93.62 |

Total Number of Valid Hours: 737

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Fort Hills - August 2017

| Concentration Ranges (μg/m ³) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|--|----------------|-----------|-----------|-----------|----------|-----------|-----------|-----------|------------|------------|------------|-----------|-----------|-----------|-----------|-----------|------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 1 - 5 | 6 | 15 | 3 | 2 | 1 | 3 | 5 | 5 | 29 | 60 | 57 | 13 | 12 | 18 | 9 | 10 | 248 |
| 6 - 15 | 15 | 9 | 7 | 6 | 2 | 8 | 5 | 41 | 69 | 46 | 34 | 11 | 11 | 14 | 7 | 11 | 296 |
| 16 - 25 | 5 | 5 | 4 | 3 | 1 | 0 | 3 | 15 | 25 | 13 | 12 | 1 | 1 | 3 | 3 | 0 | 94 |
| 26 - 80 | 8 | 4 | 3 | 0 | 0 | 0 | 0 | 5 | 8 | 3 | 1 | 4 | 3 | 1 | 2 | 4 | 46 |
| > 81.0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 4 |
| Totals | 35 | 33 | 17 | 11 | 4 | 11 | 13 | 66 | 132 | 123 | 105 | 29 | 27 | 36 | 21 | 25 | 688 |

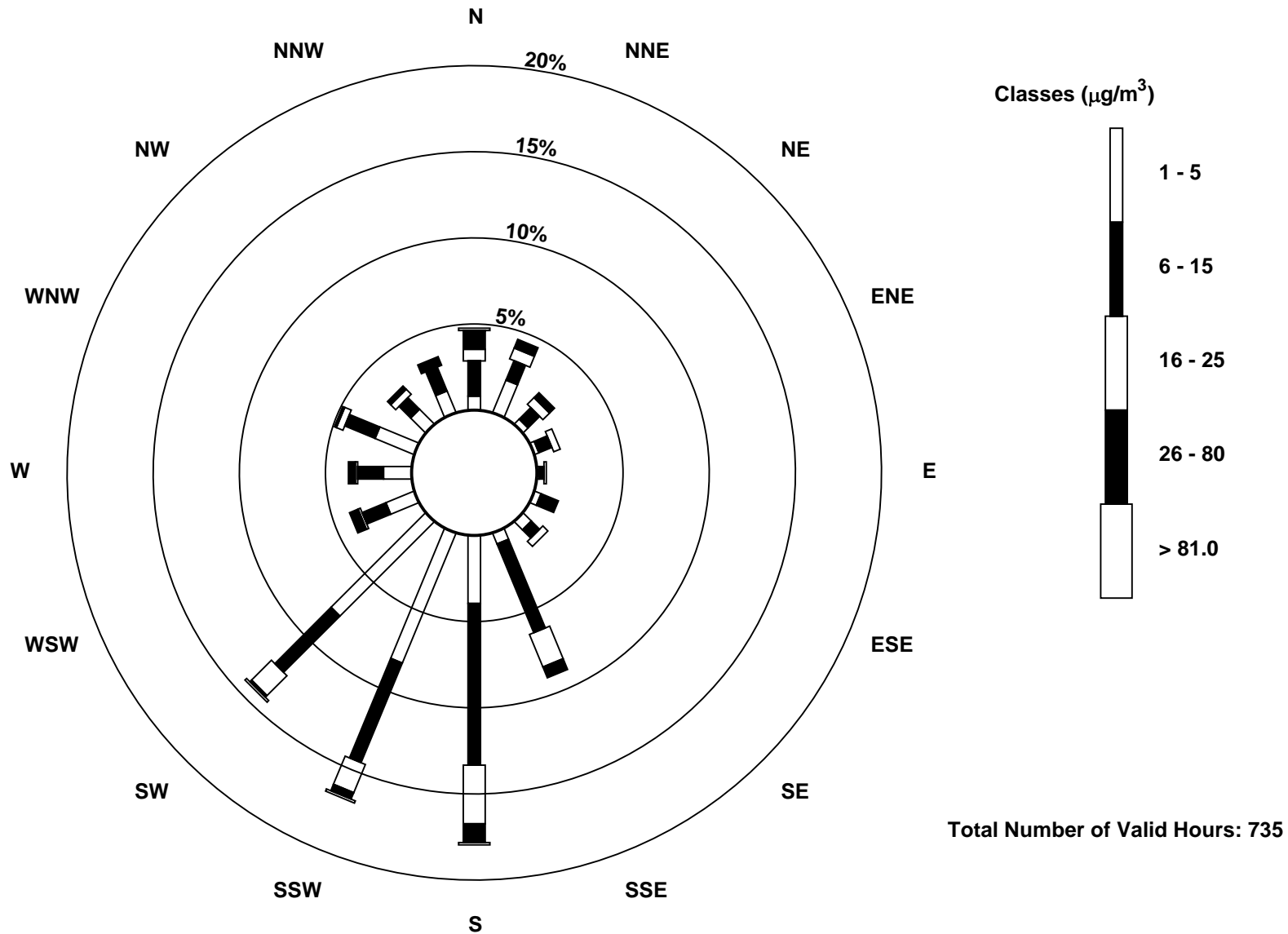
Total Number of Valid Hours: 735

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Hills (AMS 23)





Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

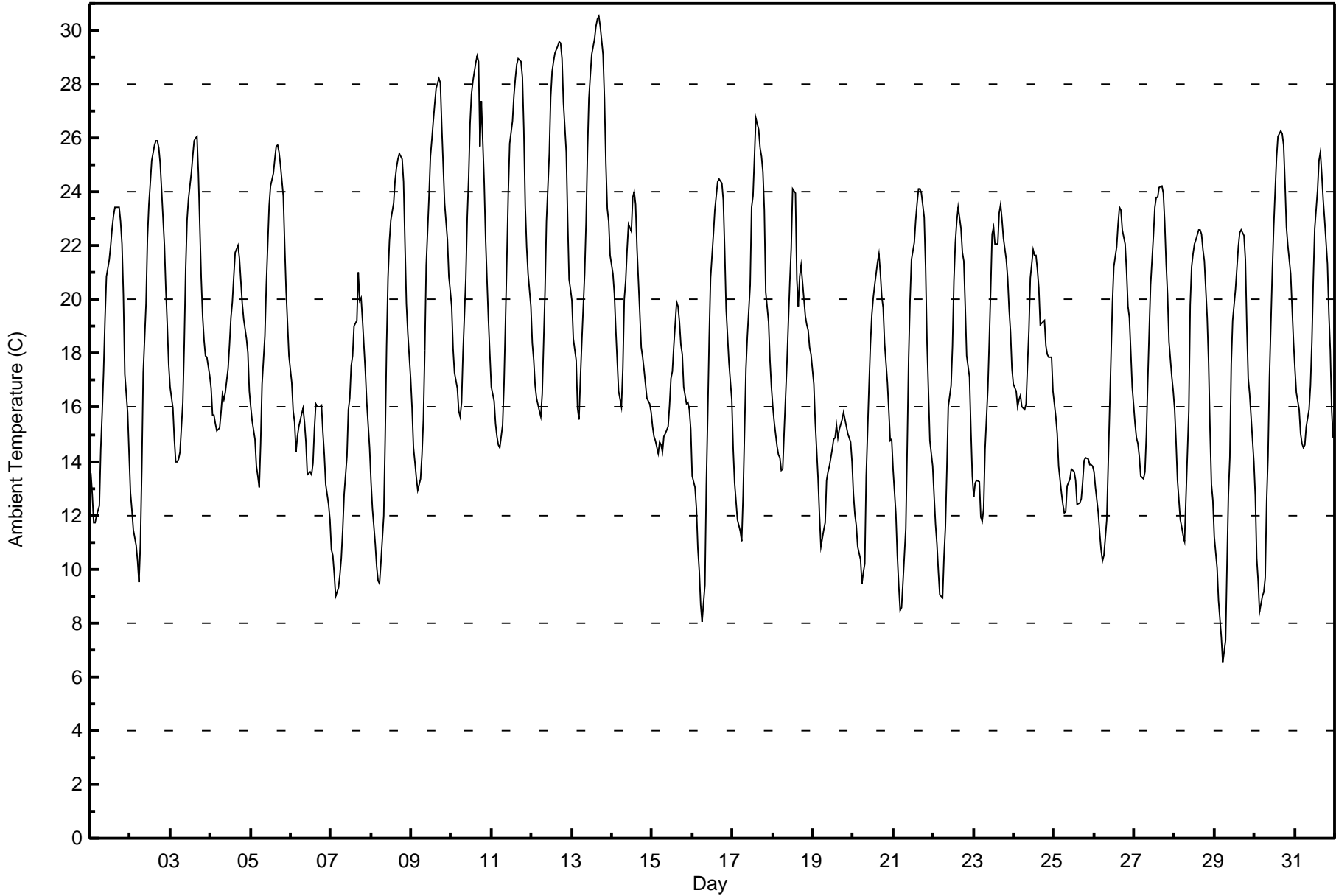
Fort Hills - August 2017

| Maximum Value: 31 C on Aug 13 17:00 Maximum Daily Average: 24.1 C on Aug 13 | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|-----------------|---------------|---------------|
| Minimum Value: 7 C on Aug 29 06:00 Minimum Daily Average: 13.6 C on Aug 25 Maximum Diurnal Average: 23.4 C at hour 16 Minimum Diurnal Average: 12.3 C at hour 6 Monthly Average: 18.2 C Percentiles: P ₁ = 9 P ₁₀ = 12 Q ₁ = 14 Median = 18 Q ₃ = 22 P ₉₀ = 25 P ₉₉ = 29 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 14 | 13 | 12 | 12 | 12 | 12 | 14 | 16 | 17 | 19 | 21 | 22 | 22 | 23 | 23 | 23 | 23 | 23 | 23 | 22 | 20 | 17 | 16 | 14 | 18.1 | 23 |
| 2-Aug | 13 | 12 | 11 | 11 | 10 | 9 | 11 | 14 | 17 | 20 | 22 | 24 | 24 | 25 | 26 | 26 | 26 | 26 | 25 | 24 | 22 | 20 | 19 | 18 | 19.0 | 26 |
| 3-Aug | 17 | 16 | 15 | 14 | 14 | 14 | 14 | 16 | 18 | 21 | 23 | 24 | 25 | 25 | 26 | 26 | 26 | 25 | 21 | 19 | 19 | 18 | 18 | 17 | 19.6 | 26 |
| 4-Aug | 17 | 16 | 16 | 15 | 15 | 15 | 16 | 16 | 16 | 17 | 17 | 18 | 19 | 20 | 21 | 22 | 22 | 22 | 21 | 20 | 19 | 19 | 18 | 17 | 18.0 | 22 |
| 5-Aug | 16 | 15 | 15 | 14 | 13 | 13 | 15 | 17 | 19 | 21 | 22 | 23 | 24 | 25 | 25 | 26 | 26 | 25 | 25 | 24 | 22 | 20 | 19 | 18 | 20.1 | 26 |
| 6-Aug | 17 | 16 | 15 | 14 | 15 | 15 | 16 | 16 | 15 | 15 | 13 | 14 | 14 | 14 | 15 | 16 | 16 | 16 | 16 | 15 | 14 | 13 | 12 | 12 | 14.8 | 17 |
| 7-Aug | 11 | 11 | 10 | 9 | 9 | 10 | 10 | 11 | 13 | 14 | 16 | 16 | 18 | 18 | 19 | 19 | 21 | 20 | 20 | 19 | 17 | 16 | 15 | 15 | 14.9 | 21 |
| 8-Aug | 13 | 12 | 11 | 10 | 10 | 9 | 10 | 12 | 15 | 18 | 21 | 22 | 23 | 24 | 24 | 25 | 25 | 25 | 25 | 24 | 22 | 20 | 19 | 17 | 18.2 | 25 |
| 9-Aug | 16 | 14 | 14 | 13 | 13 | 13 | 14 | 16 | 18 | 21 | 24 | 25 | 26 | 27 | 27 | 28 | 28 | 28 | 26 | 25 | 24 | 22 | 21 | 20 | 21.0 | 28 |
| 10-Aug | 20 | 18 | 17 | 17 | 16 | 16 | 16 | 18 | 21 | 23 | 25 | 27 | 28 | 28 | 29 | 29 | 29 | 26 | 27 | 24 | 22 | 21 | 19 | 18 | 22.2 | 29 |
| 11-Aug | 17 | 16 | 15 | 15 | 15 | 15 | 15 | 17 | 19 | 21 | 24 | 26 | 27 | 28 | 28 | 29 | 29 | 29 | 28 | 26 | 23 | 22 | 21 | 20 | 21.9 | 29 |
| 12-Aug | 18 | 18 | 17 | 16 | 16 | 16 | 17 | 18 | 20 | 23 | 25 | 28 | 28 | 29 | 29 | 29 | 30 | 30 | 29 | 27 | 25 | 23 | 21 | 20 | 23.0 | 30 |
| 13-Aug | 20 | 19 | 18 | 16 | 16 | 17 | 18 | 21 | 23 | 25 | 27 | 28 | 29 | 30 | 30 | 30 | 31 | 30 | 29 | 28 | 25 | 23 | 23 | 22 | 24.1 | 31 |
| 14-Aug | 21 | 20 | 19 | 18 | 17 | 16 | 17 | 20 | 21 | 22 | 23 | 23 | 24 | 24 | 24 | 22 | 20 | 18 | 18 | 17 | 17 | 16 | 16 | 16 | 19.5 | 24 |
| 15-Aug | 15 | 15 | 15 | 14 | 15 | 15 | 14 | 15 | 15 | 15 | 16 | 17 | 17 | 18 | 20 | 20 | 19 | 18 | 18 | 17 | 16 | 16 | 16 | 15 | 16.3 | 20 |
| 16-Aug | 13 | 13 | 12 | 11 | 10 | 9 | 8 | 9 | 13 | 16 | 19 | 21 | 22 | 23 | 24 | 24 | 24 | 24 | 24 | 22 | 20 | 19 | 18 | 16 | 17.3 | 24 |
| 17-Aug | 14 | 13 | 12 | 12 | 11 | 11 | 13 | 15 | 17 | 19 | 21 | 23 | 24 | 25 | 27 | 26 | 26 | 25 | 25 | 23 | 20 | 19 | 18 | 17 | 19.1 | 27 |
| 18-Aug | 16 | 15 | 15 | 14 | 14 | 14 | 14 | 15 | 18 | 19 | 21 | 22 | 24 | 24 | 21 | 20 | 21 | 21 | 21 | 19 | 19 | 19 | 18 | 18 | 18.4 | 24 |
| 19-Aug | 17 | 15 | 14 | 13 | 12 | 11 | 11 | 12 | 13 | 14 | 14 | 14 | 15 | 15 | 15 | 15 | 16 | 16 | 16 | 15 | 15 | 15 | 14 | 14.3 | 17 | |
| 20-Aug | 13 | 12 | 12 | 11 | 10 | 9 | 10 | 10 | 13 | 17 | 18 | 19 | 20 | 21 | 21 | 22 | 21 | 20 | 20 | 18 | 17 | 16 | 15 | 15 | 15.8 | 22 |
| 21-Aug | 14 | 12 | 11 | 9 | 8 | 9 | 10 | 12 | 15 | 18 | 20 | 21 | 22 | 23 | 24 | 24 | 24 | 24 | 23 | 21 | 18 | 17 | 15 | 14 | 16.9 | 24 |
| 22-Aug | 13 | 12 | 11 | 10 | 9 | 9 | 10 | 12 | 14 | 16 | 17 | 18 | 21 | 22 | 23 | 23 | 23 | 22 | 21 | 20 | 18 | 17 | 15 | 13 | 16.2 | 23 |
| 23-Aug | 13 | 13 | 13 | 13 | 12 | 12 | 12 | 14 | 17 | 19 | 20 | 22 | 23 | 22 | 22 | 23 | 24 | 23 | 22 | 21 | 21 | 20 | 19 | 17 | 18.2 | 24 |
| 24-Aug | 17 | 17 | 16 | 16 | 16 | 16 | 16 | 16 | 18 | 19 | 21 | 22 | 22 | 22 | 21 | 20 | 19 | 19 | 19 | 18 | 18 | 18 | 18 | 17 | 18.3 | 22 |
| 25-Aug | 16 | 16 | 15 | 14 | 13 | 12 | 12 | 12 | 13 | 13 | 14 | 14 | 14 | 13 | 12 | 12 | 13 | 13 | 14 | 14 | 14 | 14 | 14 | 14 | 13.6 | 16 |
| 26-Aug | 14 | 13 | 12 | 11 | 11 | 10 | 11 | 12 | 14 | 16 | 18 | 20 | 21 | 22 | 23 | 23 | 23 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 17.2 | 23 |
| 27-Aug | 15 | 15 | 15 | 14 | 13 | 13 | 14 | 15 | 17 | 19 | 21 | 22 | 23 | 24 | 24 | 24 | 24 | 24 | 23 | 21 | 20 | 18 | 17 | 17 | 18.9 | 24 |
| 28-Aug | 16 | 15 | 13 | 12 | 12 | 11 | 11 | 13 | 16 | 20 | 21 | 22 | 22 | 22 | 23 | 23 | 22 | 22 | 21 | 19 | 18 | 15 | 13 | 13 | 17.3 | 23 |
| 29-Aug | 11 | 10 | 9 | 8 | 7 | 7 | 7 | 10 | 13 | 14 | 18 | 19 | 20 | 21 | 22 | 22 | 23 | 22 | 21 | 19 | 17 | 17 | 16 | 14 | 15.3 | 23 |
| 30-Aug | 13 | 10 | 10 | 8 | 9 | 9 | 10 | 12 | 14 | 17 | 21 | 23 | 24 | 25 | 26 | 26 | 26 | 26 | 24 | 23 | 22 | 21 | 20 | 18 | 18.3 | 26 |
| 31-Aug | 17 | 17 | 16 | 15 | 15 | 15 | 15 | 15 | 16 | 17 | 18 | 21 | 23 | 24 | 25 | 25 | 25 | 24 | 23 | 21 | 20 | 18 | 16 | 15 | 18.9 | 25 |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Fort Hills - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Fort Hills - August 2017**

| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 30 | 4.03 | 4.03 |
| 10 - 20 | 440 | 59.14 | 63.17 |
| > 20 | 274 | 36.83 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

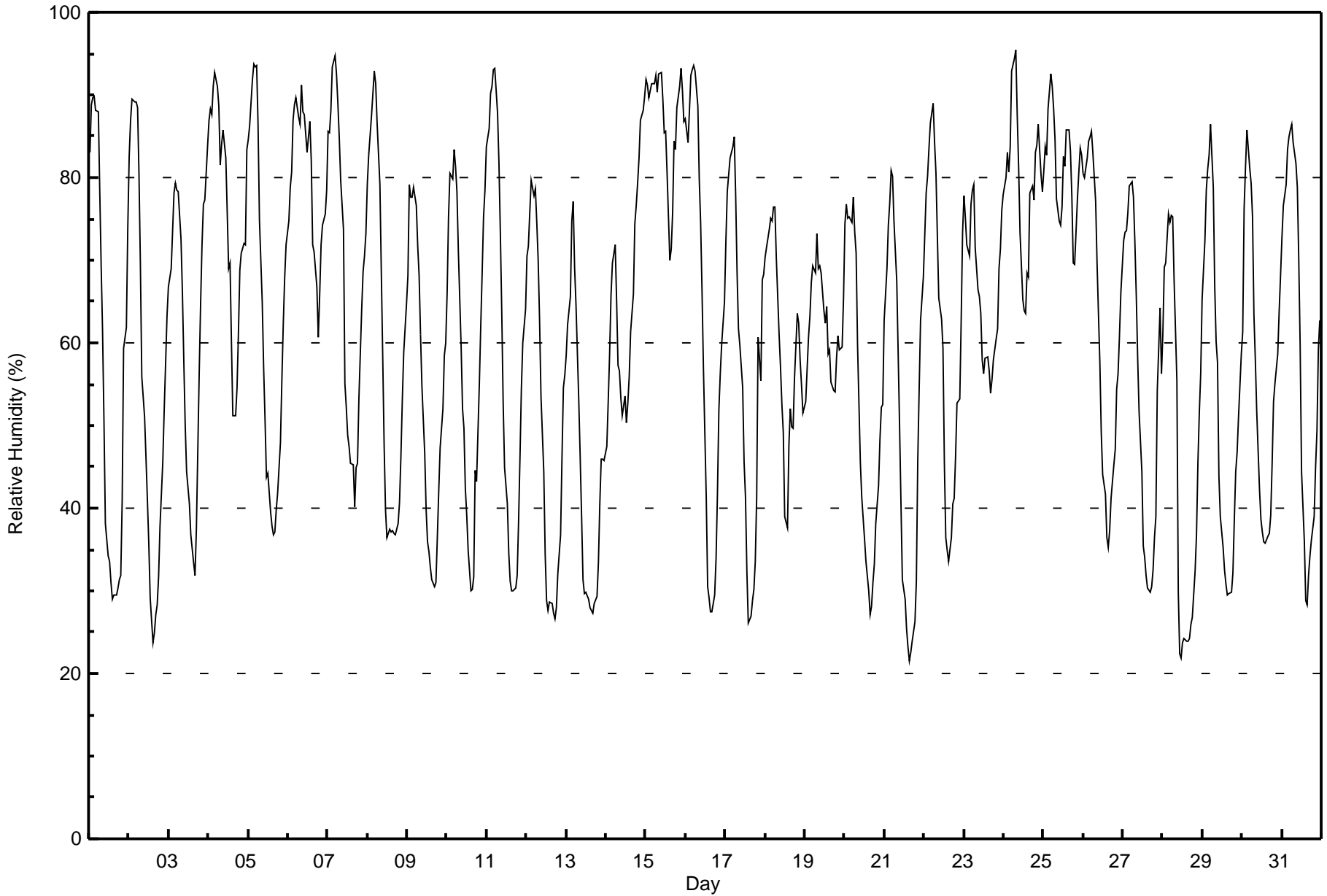
Fort Hills - August 2017

| Maximum Value: 95 % on Aug 24 08:00 Maximum Daily Average: 87.1 % on Aug 15 | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|------|---------------|---------------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|------|--|-----------------|--|
| Minimum Value: 22 % on Aug 21 16:00 Minimum Daily Average: 45.1 % on Aug 13 Maximum Diurnal Average: 83.9 % at hour 6 Minimum Diurnal Average: 40.4 % at hour 16 Monthly Average: 61.2 % Percentiles: P ₁ = 24 P ₁₀ = 31 Q ₁ = 44 Median = 63 O ₃ = 78 P ₉₀ = 87 P ₉₉ = 93 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 83 | 89 | 90 | 90 | 88 | 88 | 78 | 69 | 61 | 51 | 38 | 34 | 34 | 31 | 29 | 30 | 30 | 30 | 31 | 32 | 41 | 59 | 62 | 74 | 55.9 | 90 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 82 | 87 | 89 | 89 | 89 | 89 | 80 | 70 | 56 | 51 | 46 | 41 | 36 | 29 | 24 | 25 | 27 | 28 | 32 | 38 | 46 | 52 | 57 | 63 | 55.2 | 89 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 67 | 69 | 74 | 78 | 79 | 78 | 78 | 72 | 66 | 58 | 50 | 44 | 41 | 37 | 35 | 33 | 32 | 38 | 56 | 65 | 72 | 77 | 77 | 84 | 60.9 | 84 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 87 | 88 | 88 | 91 | 93 | 91 | 89 | 82 | 84 | 86 | 82 | 76 | 69 | 70 | 60 | 51 | 51 | 55 | 61 | 69 | 71 | 72 | 72 | 83 | 75.8 | 93 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 85 | 86 | 92 | 94 | 93 | 94 | 86 | 75 | 65 | 57 | 51 | 44 | 44 | 39 | 38 | 37 | 40 | 42 | 48 | 55 | 62 | 68 | 72 | 62.6 | 94 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 75 | 79 | 81 | 87 | 89 | 90 | 87 | 86 | 91 | 88 | 88 | 83 | 85 | 87 | 82 | 72 | 71 | 67 | 61 | 66 | 72 | 74 | 76 | 78 | 79.7 | 91 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 86 | 85 | 88 | 93 | 95 | 93 | 89 | 85 | 80 | 74 | 55 | 52 | 49 | 47 | 46 | 45 | 40 | 45 | 45 | 53 | 64 | 69 | 70 | 73 | 67.6 | 95 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 79 | 83 | 87 | 90 | 93 | 91 | 87 | 79 | 69 | 58 | 48 | 40 | 36 | 37 | 37 | 37 | 37 | 38 | 41 | 46 | 53 | 59 | 65 | 59.5 | 93 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 68 | 79 | 78 | 78 | 79 | 77 | 72 | 68 | 61 | 55 | 47 | 40 | 36 | 35 | 33 | 31 | 31 | 31 | 36 | 42 | 47 | 52 | 59 | 60 | 53.9 | 79 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 66 | 75 | 81 | 80 | 83 | 81 | 78 | 71 | 59 | 52 | 50 | 42 | 39 | 35 | 30 | 30 | 32 | 45 | 43 | 55 | 62 | 68 | 75 | 78 | 58.8 | 83 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 84 | 86 | 90 | 91 | 93 | 93 | 88 | 82 | 73 | 64 | 53 | 45 | 41 | 35 | 31 | 30 | 30 | 30 | 32 | 38 | 46 | 54 | 60 | 64 | 59.7 | 93 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 71 | 72 | 76 | 80 | 78 | 79 | 75 | 70 | 63 | 53 | 44 | 34 | 29 | 28 | 29 | 29 | 27 | 27 | 28 | 32 | 37 | 46 | 55 | 56 | 50.6 | 80 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 58 | 62 | 66 | 75 | 77 | 69 | 65 | 53 | 46 | 39 | 31 | 30 | 30 | 29 | 28 | 28 | 27 | 28 | 29 | 33 | 40 | 46 | 46 | 46 | 45.1 | 77 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 48 | 53 | 59 | 66 | 70 | 72 | 65 | 57 | 57 | 53 | 51 | 54 | 50 | 53 | 56 | 61 | 66 | 74 | 77 | 79 | 82 | 87 | 88 | 90 | 65.3 | 90 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 92 | 91 | 90 | 91 | 91 | 91 | 92 | 90 | 93 | 93 | 90 | 85 | 86 | 81 | 70 | 71 | 76 | 84 | 83 | 89 | 91 | 93 | 91 | 87 | 87.1 | 93 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 87 | 84 | 88 | 92 | 93 | 94 | 93 | 89 | 80 | 74 | 66 | 57 | 41 | 31 | 29 | 27 | 28 | 30 | 34 | 42 | 52 | 56 | 60 | 65 | 62.1 | 94 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 72 | 78 | 80 | 82 | 84 | 85 | 78 | 69 | 62 | 60 | 55 | 46 | 41 | 32 | 26 | 27 | 29 | 30 | 34 | 41 | 61 | 55 | 68 | 68 | 56.8 | 85 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 70 | 72 | 74 | 75 | 75 | 76 | 76 | 70 | 61 | 57 | 53 | 49 | 39 | 38 | 48 | 52 | 50 | 50 | 56 | 63 | 62 | 58 | 55 | 51 | 59.6 | 76 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 53 | 57 | 61 | 63 | 67 | 69 | 68 | 73 | 69 | 69 | 68 | 64 | 62 | 64 | 59 | 59 | 55 | 54 | 54 | 58 | 61 | 59 | 59 | 65 | 62.2 | 73 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 74 | 77 | 75 | 75 | 75 | 78 | 73 | 71 | 60 | 46 | 41 | 39 | 36 | 34 | 30 | 27 | 28 | 31 | 33 | 38 | 43 | 48 | 52 | 53 | 51.5 | 78 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 63 | 69 | 74 | 77 | 81 | 80 | 75 | 68 | 59 | 50 | 41 | 31 | 29 | 25 | 23 | 22 | 23 | 24 | 26 | 31 | 46 | 54 | 63 | 68 | 50.1 | 81 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 73 | 78 | 80 | 84 | 87 | 89 | 84 | 81 | 73 | 65 | 63 | 59 | 45 | 36 | 35 | 34 | 36 | 40 | 41 | 46 | 53 | 53 | 63 | 73 | 61.4 | 89 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 78 | 75 | 72 | 71 | 77 | 78 | 79 | 71 | 66 | 66 | 64 | 58 | 56 | 58 | 57 | 54 | 56 | 58 | 58 | 61 | 62 | 69 | 71 | 76 | 66.3 | 79 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 78 | 80 | 83 | 81 | 84 | 93 | 94 | 95 | 88 | 81 | 73 | 65 | 64 | 64 | 68 | 68 | 78 | 79 | 77 | 83 | 84 | 87 | 80 | 78 | 79.4 | 95 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 81 | 84 | 83 | 88 | 93 | 91 | 88 | 85 | 77 | 75 | 74 | 76 | 83 | 81 | 86 | 86 | 83 | 78 | 70 | 69 | 77 | 81 | 84 | 83 | 81.4 | 93 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 80 | 80 | 82 | 84 | 85 | 86 | 83 | 77 | 70 | 63 | 58 | 49 | 44 | 42 | 36 | 35 | 37 | 41 | 45 | 47 | 54 | 56 | 61 | 66 | 61.0 | 86 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 72 | 73 | 74 | 76 | 79 | 79 | 78 | 72 | 66 | 58 | 52 | 44 | 35 | 34 | 32 | 30 | 30 | 30 | 33 | 36 | 39 | 54 | 64 | 56 | 54.1 | 79 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 61 | 69 | 70 | 76 | 75 | 75 | 75 | 68 | 55 | 30 | 22 | 22 | 24 | 24 | 24 | 24 | 24 | 26 | 27 | 32 | 37 | 45 | 52 | 56 | 45.5 | 76 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 65 | 72 | 78 | 81 | 83 | 86 | 79 | 67 | 60 | 58 | 44 | 39 | 35 | 33 | 31 | 30 | 30 | 30 | 32 | 39 | 44 | 47 | 51 | 59 | 53.0 | 86 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 61 | 76 | 81 | 86 | 81 | 79 | 75 | 63 | 58 | 52 | 42 | 39 | 37 | 36 | 36 | 37 | 37 | 39 | 45 | 53 | 55 | 59 | 64 | 68 | 56.7 | 86 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 73 | 77 | 79 | 83 | 85 | 86 | 86 | 84 | 82 | 79 | 70 | 60 | 44 | 36 | 29 | 28 | 32 | 34 | 36 | 39 | 45 | 49 | 59 | 63 | 59.9 | 86 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 73.3 | | | | | | | | | | | | | | | | | | 77.0 | | | | | | 79.4 | | 82.2 | | 83.6 | | 83.9 | | 80.5 | | 74.6 | | 68.0 | | 61.7 | | 55.1 | | 49.7 | | 45.8 | | 43.2 | | 41.2 | | 40.4 | | 40.9 | | 42.9 | | 45.1 | | 50.3 | | 56.4 | | 61.2 | | 65.1 | | 68.5 | | Diurnal Average | |
| 92 | | | | | | | | | | | | | | | | | | 91 | | | | | | 92 | | 94 | | 95 | | 94 | | 94 | | 95 | | 93 | | 93 | | 90 | | 85 | | 86 | | 87 | | 86 | | 86 | | 83 | | 84 | | 83 | | 89 | | 91 | | 93 | | 91 | | 90 | | Diurnal Maximum | |



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Fort Hills - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity (RH) - %
Fort Hills - August 2017**

| Concentration Ranges (%) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 0 | 0.00 | 0.00 |
| 20 - 40 | 160 | 21.51 | 21.51 |
| 40 - 60 | 178 | 23.92 | 45.43 |
| 60 - 80 | 243 | 32.66 | 78.09 |
| 80 - 100 | 163 | 21.91 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Speed (WS) - km/h
Fort Hills - August 2017

| | | |
|---|--|--------------------------------|
| Maximum Speed: 35 km/h on Aug 13 12:00 | Maximum Daily Speed Average: 20.2 km/h on Aug 25 | Hours in Service: 744 |
| Minimum Speed Value: 0 km/h on Aug 1 07:00 | Minimum Daily Speed Average: 0.1 km/h on Aug 4 | Hours of Data: 742 |
| Maximum Diurnal Speed Average: 10.1 km/h at hour 14 | Minimum Diurnal Speed Average: 4.6 km/h at hour 3 | Hours of Missing Data: 2 |
| Monthly Average Velocity: 6.3 km/h 216.2 deg | Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 6 Median = 10 Q ₃ = 15 P ₉₀ = 21 P ₉₉ = 32 | Percent Operational Time: 99.7 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | W3 | SSW4 | SSE4 | SSE5 | S3 | SW3 | NNW0 | N5 | NNE6 | N7 | N15 | NNE13 | NNE15 | NNE14 | NNE13 | NNE13 | NNE14 | NNE12 | NNE11 | NE8 | NE4 | N2 | NNW3 | WNW3 | NNE5.7 | NNE15 |
| 2-Aug | NW3 | WSW4 | SSW3 | SSE4 | S4 | S8 | S8 | SSE9 | S8 | SSW6 | SSW7 | S10 | S10 | SSW11 | SW10 | SW12 | SSW14 | SW15 | SW12 | SSW9 | SSW8 | SW7 | SSW7 | SSW8 | SSW7.4 | SW15 |
| 3-Aug | S10 | S8 | SSE8 | SSE9 | S12 | S11 | S12 | SSW13 | SSW11 | S12 | SSW11 | SSW12 | SSW9 | SSW9 | SW10 | SW8 | WSW5 | NNE9 | N19 | N13 | SE1 | SW6 | NNW1 | NNE5 | SSW4.9 | N19 |
| 4-Aug | NNW3 | NNW5 | S3 | NNW2 | WNW2 | WNW2 | N6 | N5 | NNE8 | N5 | NNW6 | WNW3 | NE3 | ESE9 | ESE10 | SE9 | SE10 | S6 | WSW5 | SW7 | SW5 | W5 | N2 | SSE3 | NE0.1 | SE10 |
| 5-Aug | S4 | NNW3 | NNE4 | SW4 | SW4 | SSE5 | SSW5 | SSW5 | SSW6 | SW6 | SW7 | SSW5 | SSW8 | S15 | SSW15 | SSW15 | SSW17 | SSW18 | SW13 | SW10 | S9 | SSW7 | SW9 | SSW10 | SSW7.7 | SSW18 |
| 6-Aug | SW4 | SSE4 | SSE2 | N1 | NE8 | NE11 | NE8 | NNE14 | NNE14 | NNE21 | NNE21 | NNE17 | NNE12 | NNE9 | NNE10 | NNE16 | NNE16 | NE18 | NNE20 | NNE12 | N7 | NNW7 | NNW5 | NNW4 | NNE9.9 | NNE21 |
| 7-Aug | NW5 | NW6 | NNW5 | NNW6 | NW2 | SW2 | SSW4 | SW2 | NW3 | N7 | NNE10 | NW6 | ENE3 | W4 | SSW6 | SSW6 | S5 | SW9 | SW6 | SSW9 | SSW8 | SSW9 | SW11 | WSW11 | WSW3.1 | WSW11 |
| 8-Aug | SW12 | SW9 | SW9 | SSW11 | SSW9 | S9 | S11 | S9 | S8 | S8 | SSW9 | SSW7 | SSW9 | SSW12 | SSW13 | SSW16 | SSW16 | S18 | S18 | S13 | SSE10 | SSE8 | S6 | S9 | SSW10.3 | S18 |
| 9-Aug | SSE6 | WSW3 | S6 | S8 | S7 | S8 | S10 | S10 | SSE9 | S8 | SSW11 | SSW10 | SW13 | SSW13 | SSW12 | SSW12 | S13 | SSW11 | S11 | S8 | SSW8 | SW8 | SSW5 | SE2 | SSW8.5 | S13 |
| 10-Aug | SSW6 | SE6 | S7 | S7 | SSE7 | S6 | S8 | S4 | SE4 | SSE2 | SW1 | SSE5 | SSE7 | NE4 | ENE9 | ENE9 | ENE9 | SSE9 | SSE5 | SSW12 | S5 | SSE2 | SW4 | S5 | SSE4.1 | SSW12 |
| 11-Aug | S5 | S8 | SSE8 | S8 | S9 | S9 | S12 | S12 | S11 | SSW10 | SSW12 | SSW10 | SSW14 | S16 | SSW14 | SSW16 | S18 | S18 | S17 | SSE14 | SSE13 | SSE13 | S11 | SSW4 | S11.4 | S18 |
| 12-Aug | SSW6 | SSW5 | SSW5 | SSW6 | SSW4 | SSE4 | SSW4 | SSW8 | SSW8 | SSW9 | S16 | S24 | S30 | S30 | S29 | S26 | SSW26 | S24 | S22 | SSW15 | S15 | S12 | SSE11 | SSE13 | S14.6 | S30 |
| 13-Aug | SSE11 | SSE6 | SSE4 | ESE1 | SSE2 | SSE4 | NNE1 | S13 | S19 | S24 | S32 | SSE35 | S34 | S32 | S29 | SSE30 | SSE29 | S30 | S31 | S24 | SSE15 | SSE15 | SSE16 | SE13 | S18.6 | SSE35 |
| 14-Aug | SE12 | SSE9 | S4 | S2 | NNW3 | N5 | NNE4 | SSE10 | S14 | SSW7 | S13 | S15 | S16 | S18 | SSW20 | SW24 | WSW18 | SW17 | SW14 | SSW14 | S10 | SSW10 | S11 | S10 | SSW9.7 | SW24 |
| 15-Aug | SSW7 | SSE5 | S4 | E1 | SSE8 | W3 | NW3 | NNE3 | N7 | ENE7 | NE4 | W4 | W4 | NNW2 | NE4 | NE7 | NE9 | ENE10 | ENE8 | N3 | S3 | S3 | W2 | W6 | ENE1.2 | ENE10 |
| 16-Aug | WSW7 | W7 | SSW5 | SSW6 | SSW8 | S7 | SSW8 | S8 | S7 | S10 | S10 | S11 | S12 | SW14 | SW16 | WSW12 | SW17 | SW16 | SW14 | SW11 | SSW8 | SW8 | SW7 | SSW4 | SSW8.9 | WSW17 |
| 17-Aug | SSE5 | S6 | SSW6 | SSE6 | S8 | S7 | SSE8 | S8 | S9 | SSW11 | SSW10 | S8 | ESE4 | ENE5 | WNW10 | NW14 | WNW12 | NW8 | NW6 | NW3 | S3 | SSE3 | SSW4 | SW11 | SSW3.7 | NW14 |
| 18-Aug | SW10 | SSW12 | S8 | SSW12 | SSW15 | SW16 | SW14 | SW17 | SW14 | WSW13 | WSW19 | SW19 | SW24 | WSW30 | SW31 | SW22 | SW23 | SW25 | SSW22 | SSW16 | SSW16 | SW19 | SW15 | SW20 | SW17.6 | SW31 |
| 19-Aug | WSW16 | WSW12 | SW9 | SW10 | SW10 | SW11 | SW15 | SW17 | SW21 | WSW22 | WSW24 | W26 | W26 | W28 | WNW29 | WNW32 | WNW33 | WNW29 | WNW23 | WNW13 | W11 | WNW11 | NW9 | SW7 | W16.3 | WNW33 |
| 20-Aug | SW14 | WSW15 | WSW13 | WSW15 | SW14 | SW15 | SW17 | SSW14 | SW18 | W22 | W23 | W26 | W27 | W29 | WNW26 | NW24 | NW26 | NW23 | WNW21 | WNW17 | WNW13 | W12 | NNW5 | NW4 | W15.4 | W29 |
| 21-Aug | SW6 | SSW11 | SSW8 | SSW9 | S7 | SW13 | SW13 | SW14 | SSW13 | SW16 | SW15 | W19 | W19 | W19 | W17 | WNW18 | WNW14 | NW15 | NW10 | NNW8 | NNE9 | NNE14 | NNE11 | NNE10 | W7.6 | W19 |
| 22-Aug | N8 | N8 | N7 | N6 | N5 | N7 | N8 | N7 | N6 | NE8 | N4 | WSW6 | E4 | ESE4 | SW5 | WSW4 | N3 | ENE9 | NE13 | NE10 | NE7 | ENE8 | N6 | N6 | NNE4.7 | ENE13 |
| 23-Aug | NNW3 | N4 | N5 | NNE4 | N4 | NNW3 | NNW3 | SW2 | SSW8 | SSW9 | SW10 | SSW19 | SSW24 | SSW22 | SSW16 | S25 | S25 | S22 | S16 | SSE14 | S15 | S11 | SSE8 | S3 | S8.9 | S25 |
| 24-Aug | SSE3 | SSE3 | NE2 | SSE4 | S11 | SSW7 | SSE4 | S4 | SSE13 | SSE15 | SSE7 | SE13 | SE6 | S5 | E7 | SE15 | SW3 | NNE6 | NNE7 | NNE6 | ENE3 | S7 | SW16 | SW16 | SSE4.7 | SW16 |
| 25-Aug | SW18 | S15 | SSW20 | SSW17 | SSW16 | SSW18 | SSW20 | SSW21 | SSW20 | SSW22 | SSW24 | SSW22 | SSW21 | WSW29 | SW28 | WSW28 | WSW30 | WSW30 | W32 | WSW21 | SW16 | SW13 | SW14 | SW15 | SW20.2 | W32 |
| 26-Aug | SW17 | SW16 | SW13 | SW14 | SW15 | SW17 | SW19 | SW18 | SW16 | SW17 | SW18 | SW19 | WSW20 | SW21 | WSW21 | WSW19 | WSW20 | WSW14 | SW12 | WSW16 | SW10 | SW13 | SW12 | SW7 | SW15.9 | WSW21 |
| 27-Aug | SW9 | SW12 | SW14 | SW14 | SW12 | SW16 | SW14 | SW11 | SW15 | WSW18 | WSW22 | W21 | W24 | WNW20 | WNW17 | WNW15 | WNW16 | WNW15 | WNW10 | NW7 | NW6 | AF | AF | NNW3 | WSW12.1 | W24 |
| 28-Aug | W3 | SSW6 | WSW6 | S4 | SSW3 | SSW8 | SSW8 | SSW11 | SSW8 | W14 | WNW20 | NW22 | WNW18 | W22 | WNW21 | WNW21 | NW18 | NW17 | NW14 | NNW8 | NNW8 | NNW8 | NNW9 | NNW4 | WNW9.1 | W22 |
| 29-Aug | WNW2 | W3 | SSW2 | SW3 | SSW4 | S3 | S5 | SSE3 | SW3 | WSW3 | SE3 | E5 | S3 | ESE5 | ENE7 | ESE7 | SSE10 | SSE12 | ESE8 | ESE5 | ESE8 | SE12 | SSE8 | S2 | SE3.9 | SE12 |
| 30-Aug | ESE2 | NE2 | NNE2 | N4 | NNE5 | N4 | N7 | N6 | N7 | NNW4 | S18 | S27 | S30 | S30 | S34 | S30 | SSE27 | SSE25 | SSE19 | S15 | SSW16 | SSW17 | SSW15 | SSW13 | S11.3 | S34 |
| 31-Aug | SSW12 | S12 | S13 | S10 | S11 | SSE10 | SSE10 | S12 | S11 | SSW13 | SSW15 | SSW19 | SW22 | WSW23 | W21 | WNW21 | WNW20 | WNW18 | WNW15 | WNW11 | WSW9 | WSW11 | SW8 | SW6 | SW9.7 | WSW23 |

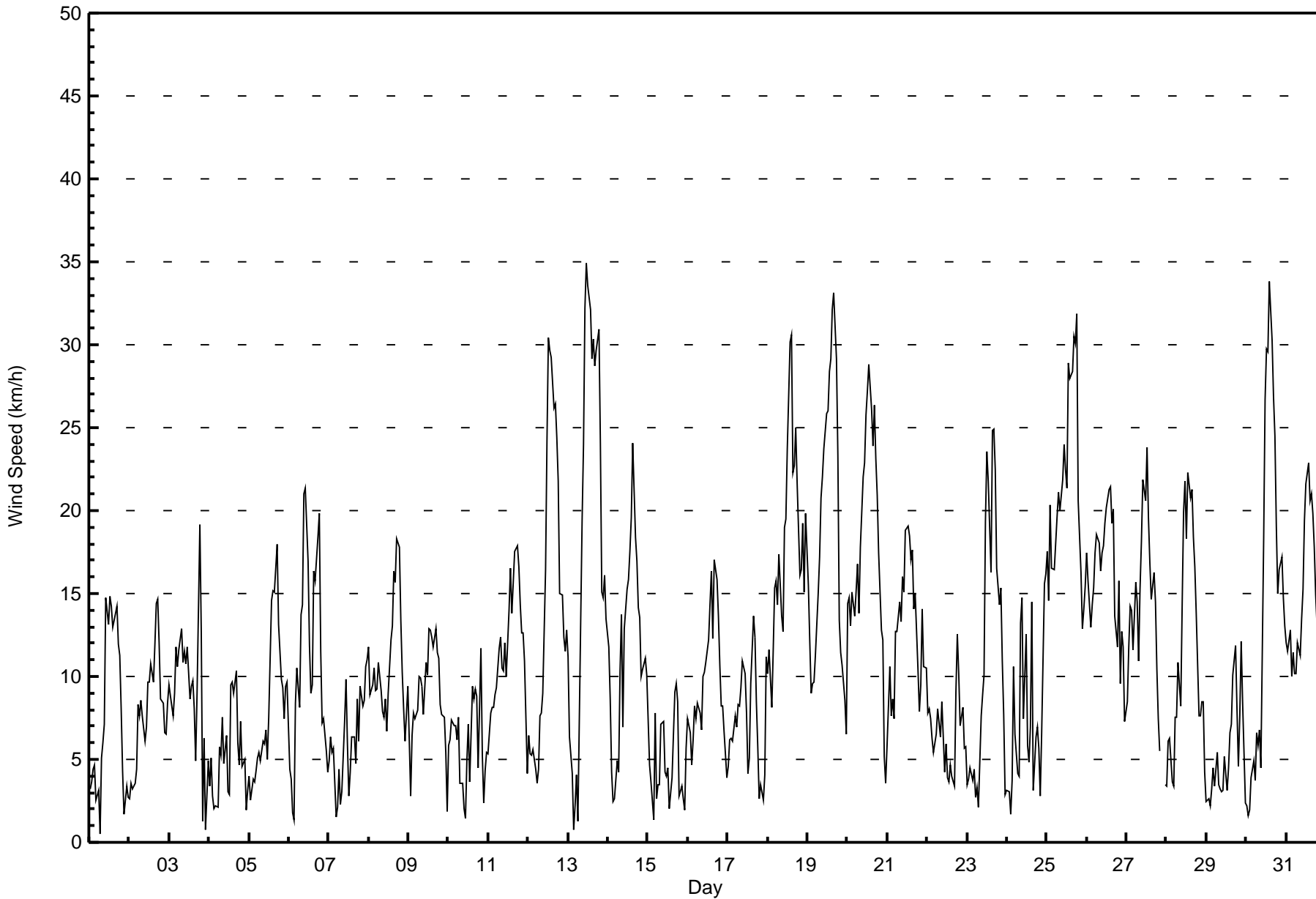
| | |
|---|-----------------|
| SW5.4SSW4.8SSW4.6SSW4.7SSW5.3SSW5.6SSW5.7SSW6.4SSW6.5 SW6.6 SW7.6 SW8.9 SW9.2SW10.1 SW9.5 SW8.2 SW8.0 SW6.8 SW5.0 SW4.7SSW4.9SSW5.2SSW4.8SSW4.8 | Diurnal Average |
| SW18 SW16 SW20 SSW17 SSW16 SSW18 SSW20 SSW21 SW21 S24 S32 SSE35 S34 S32 S34WNW32WNW33WSW30 W32 S24 SSW16 SW19 SSE16 SW20 | Diurnal Maximum |

AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Fort Hills - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Fort Hills - August 2017**

| Wind Speed Ranges (km/h) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 5 | 171 | 23.05 | 23.05 |
| 6 - 11 | 264 | 35.58 | 58.63 |
| 12 - 19 | 209 | 28.17 | 86.79 |
| 20 - 28 | 71 | 9.57 | 96.36 |
| 29 - 38 | 27 | 3.64 | 100.00 |
| > 38 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 742

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Fort Hills - August 2017**

| Wind Speed Ranges (km/h) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-----------------------------|----------------|-----------|-----------|-----------|----------|-----------|-----------|-----------|------------|------------|------------|-----------|-----------|-----------|-----------|-----------|------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 5 | 16 | 8 | 7 | 3 | 3 | 6 | 4 | 24 | 21 | 19 | 13 | 7 | 8 | 6 | 7 | 19 | 171 |
| 6 - 11 | 18 | 13 | 9 | 9 | 1 | 5 | 4 | 25 | 57 | 59 | 35 | 6 | 3 | 4 | 8 | 8 | 264 |
| 12 - 19 | 3 | 15 | 1 | 1 | 0 | 0 | 5 | 12 | 33 | 41 | 59 | 15 | 6 | 13 | 5 | 0 | 209 |
| 20 - 28 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 10 | 9 | 13 | 10 | 11 | 9 | 4 | 0 | 71 |
| 29 - 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 13 | 0 | 1 | 4 | 2 | 4 | 0 | 0 | 27 |
| > 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 37 | 39 | 17 | 13 | 4 | 11 | 13 | 66 | 134 | 128 | 121 | 42 | 30 | 36 | 24 | 27 | 742 |

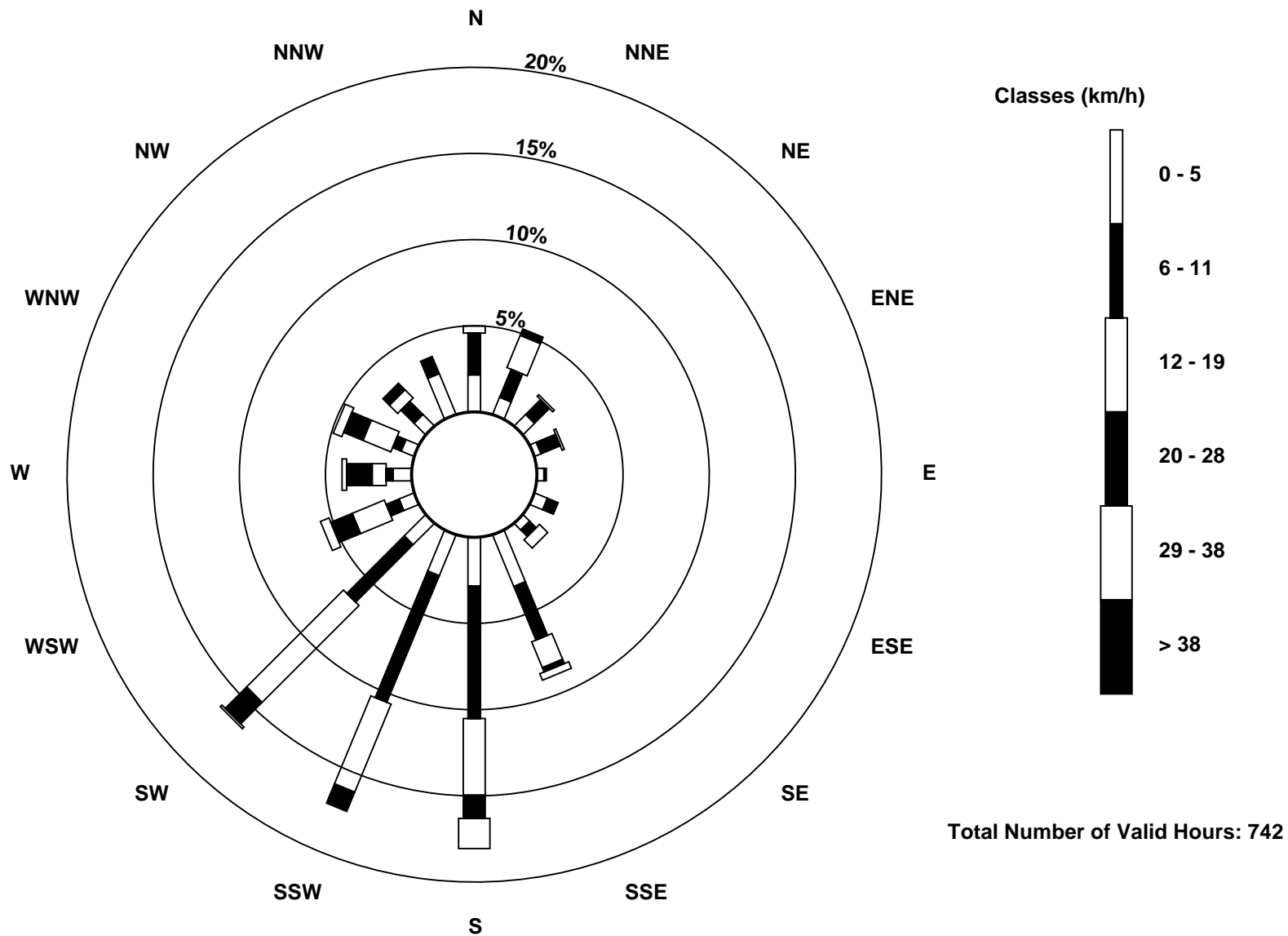
Total Number of Valid Hours: 742

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Wind Speed (WS) - km/h
Fort Hills (AMS 23)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Fort Hills - August 2017

| | |
|--|--|
| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Aug 19 18:00 | Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7 |
| Minimum Value: 1 km/h on Aug 12 05:00 | |
| Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 6 | |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
|--------|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 4 | 5 | 5 | 4 | 4 | 3 | 2 | 2 | 1 | 1 | 1 | 5 |
| 2-Aug | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 4 | 5 | 5 | 5 | 4 | 4 | 3 | 2 | 1 | 1 | 2 | 2 | 1 | 5 |
| 3-Aug | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 4 | 4 | 4 | 4 | 5 | 4 | 6 | 5 | 3 | 4 | 3 | 2 | 3 | 6 | |
| 4-Aug | 2 | 2 | 1 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 1 | 1 | 2 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | 2 | 2 | 1 | 3 | |
| 5-Aug | 2 | 2 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 4 | 4 | 5 | 4 | 4 | 3 | 2 | 2 | 1 | 2 | 1 | 5 | |
| 6-Aug | 2 | 1 | 1 | 1 | 5 | 3 | 3 | 3 | 3 | 4 | 4 | 3 | 3 | 2 | 3 | 3 | 3 | 4 | 4 | 3 | 1 | 1 | 1 | 5 | |
| 7-Aug | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 2 | 3 | |
| 8-Aug | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 3 | 4 | 4 | 6 | 5 | 4 | 4 | 3 | 3 | 2 | 1 | 2 | 3 | 6 | |
| 9-Aug | 2 | 2 | 1 | 1 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 4 | 5 | 5 | 5 | 4 | 4 | 3 | 1 | 2 | 1 | 2 | 2 | 5 | |
| 10-Aug | 4 | 2 | 2 | 1 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 3 | 3 | 3 | 5 | 4 | 6 | 6 | 4 | 4 | 3 | 2 | 2 | 6 | |
| 11-Aug | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 3 | 3 | 4 | 5 | 5 | 5 | 3 | 3 | 2 | 2 | 1 | 1 | 2 | 5 | |
| 12-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 5 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 2 | 2 | 2 | 1 | 5 | |
| 13-Aug | 3 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 2 | 2 | 3 | 6 | |
| 14-Aug | 2 | 2 | 3 | 1 | 1 | 2 | 1 | 3 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 3 | 2 | 3 | 1 | 2 | 2 | 4 | |
| 15-Aug | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 1 | 3 | |
| 16-Aug | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 3 | 4 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 4 | |
| 17-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 5 | 3 | 3 | 2 | 1 | 2 | 1 | 1 | 2 | 5 | |
| 18-Aug | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 4 | 9 | 6 | 8 | 5 | 4 | 5 | 4 | 2 | 2 | 3 | 3 | 9 | |
| 19-Aug | 3 | 2 | 2 | 1 | 2 | 2 | 2 | 3 | 3 | 4 | 6 | 7 | 6 | 6 | 6 | 8 | 8 | 9 | 6 | 5 | 3 | 3 | 3 | 9 | |
| 20-Aug | 2 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 4 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 5 | 4 | 3 | 3 | 3 | 6 | |
| 21-Aug | 1 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 5 | 5 | 5 | 4 | 5 | 4 | 3 | 2 | 2 | 2 | 3 | 2 | 5 | |
| 22-Aug | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 1 | 2 | 1 | 3 | |
| 23-Aug | 1 | 1 | 1 | 2 | 1 | 2 | 1 | 1 | 3 | 4 | 3 | 6 | 4 | 5 | 4 | 4 | 4 | 4 | 2 | 2 | 2 | 1 | 2 | 6 | |
| 24-Aug | 1 | 2 | 1 | 2 | 5 | 4 | 2 | 2 | 3 | 2 | 3 | 4 | 2 | 3 | 5 | 4 | 2 | 2 | 1 | 1 | 1 | 2 | 5 | 5 | |
| 25-Aug | 3 | 2 | 3 | 2 | 3 | 2 | 3 | 3 | 4 | 3 | 4 | 4 | 4 | 4 | 5 | 5 | 6 | 6 | 6 | 5 | 3 | 2 | 3 | 6 | |
| 26-Aug | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 3 | 4 | 4 | 5 | 4 | 4 | 3 | 5 | 4 | 2 | 1 | 2 | 5 | |
| 27-Aug | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 4 | 5 | 5 | 4 | 4 | 4 | 4 | 4 | 1 | 2 | AF | AF | 5 | |
| 28-Aug | 1 | 2 | 2 | 1 | 1 | 2 | 2 | 1 | 1 | 6 | 5 | 5 | 4 | 6 | 5 | 5 | 5 | 4 | 4 | 1 | 1 | 2 | 1 | 6 | |
| 29-Aug | 3 | 1 | 2 | 2 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 1 | 3 | 2 | 2 | 4 | |
| 30-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 6 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 3 | 2 | 2 | 2 | 2 | 6 | |
| 31-Aug | 2 | 2 | 1 | 1 | 2 | 3 | 3 | 4 | 3 | 3 | 2 | 3 | 4 | 4 | 5 | 5 | 5 | 4 | 4 | 4 | 2 | 2 | 1 | 5 | |
| | 4 | 3 | 3 | 3 | 5 | 4 | 3 | 4 | 4 | 6 | 6 | 7 | 9 | 6 | 8 | 8 | 8 | 9 | 6 | 5 | 4 | 3 | 5 | 5 | |

Diurnal Maximum

AF - Analyzer Failure



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Fort Hills - August 2017

| | | | |
|---|--|---------------------------|------|
| Direction of Maximum Speed: 168 deg on Aug 13 12:00 | | Hours in Service: | 744 |
| Direction of Maximum Daily Speed Average: 226.2 deg on Aug 25 | | Hours of Data: | 742 |
| Direction of Minimum Speed: 328 deg on Aug 1 07:00 | | Hours of Missing Data: | 2 |
| Direction of Minimum Daily Speed Average: 0.1 deg on Aug 4 | | Percent Operational Time: | 99.7 |
| Monthly Average Direction: 225.0 deg | | | |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average |
|--------|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 262 | 199 | 157 | 159 | 185 | 214 | 328 | 4 | 14 | 1 | 11 | 22 | 17 | 27 | 30 | 23 | 25 | 33 | 31 | 49 | 40 | 352 | 336 | 303 | 22.5 |
| 2-Aug | 317 | 249 | 199 | 160 | 177 | 185 | 177 | 163 | 179 | 196 | 192 | 172 | 177 | 203 | 234 | 221 | 208 | 225 | 228 | 211 | 201 | 216 | 204 | 213 | 202.7 |
| 3-Aug | 188 | 173 | 162 | 161 | 174 | 185 | 183 | 194 | 212 | 190 | 192 | 206 | 207 | 212 | 230 | 223 | 243 | 18 | 357 | 10 | 144 | 232 | 329 | 26 | 199.1 |
| 4-Aug | 332 | 330 | 191 | 329 | 289 | 302 | 352 | 359 | 32 | 351 | 330 | 298 | 41 | 122 | 123 | 125 | 132 | 183 | 252 | 227 | 234 | 281 | 5 | 162 | 48.2 |
| 5-Aug | 170 | 330 | 12 | 228 | 222 | 160 | 195 | 202 | 211 | 217 | 220 | 200 | 201 | 184 | 205 | 203 | 203 | 196 | 218 | 218 | 191 | 205 | 214 | 224 | 205.0 |
| 6-Aug | 227 | 147 | 155 | 360 | 35 | 37 | 35 | 26 | 13 | 19 | 17 | 15 | 20 | 31 | 20 | 19 | 29 | 37 | 26 | 17 | 349 | 332 | 347 | 333 | 20.2 |
| 7-Aug | 305 | 313 | 342 | 346 | 325 | 229 | 204 | 235 | 311 | 350 | 13 | 320 | 60 | 274 | 204 | 203 | 185 | 223 | 214 | 201 | 205 | 211 | 232 | 242 | 249.6 |
| 8-Aug | 236 | 228 | 222 | 208 | 192 | 183 | 184 | 186 | 188 | 188 | 210 | 210 | 199 | 206 | 198 | 194 | 196 | 189 | 189 | 183 | 165 | 147 | 170 | 179 | 194.1 |
| 9-Aug | 167 | 242 | 191 | 186 | 173 | 177 | 188 | 184 | 166 | 186 | 192 | 207 | 218 | 212 | 212 | 200 | 189 | 193 | 188 | 177 | 197 | 215 | 213 | 137 | 193.7 |
| 10-Aug | 206 | 142 | 180 | 187 | 164 | 171 | 187 | 188 | 137 | 162 | 214 | 160 | 152 | 47 | 59 | 66 | 69 | 158 | 154 | 196 | 171 | 152 | 222 | 180 | 157.4 |
| 11-Aug | 171 | 184 | 165 | 169 | 184 | 185 | 188 | 189 | 182 | 192 | 198 | 193 | 200 | 191 | 204 | 193 | 182 | 176 | 172 | 167 | 159 | 167 | 169 | 211 | 182.7 |
| 12-Aug | 209 | 202 | 196 | 201 | 200 | 165 | 204 | 204 | 208 | 195 | 182 | 187 | 182 | 185 | 182 | 190 | 193 | 188 | 188 | 193 | 187 | 172 | 166 | 167 | 187.0 |
| 13-Aug | 167 | 160 | 160 | 123 | 157 | 167 | 21 | 169 | 176 | 174 | 170 | 168 | 171 | 173 | 175 | 164 | 167 | 171 | 172 | 173 | 161 | 164 | 166 | 145 | 168.8 |
| 14-Aug | 145 | 165 | 171 | 191 | 327 | 3 | 30 | 156 | 184 | 196 | 176 | 191 | 180 | 188 | 206 | 226 | 238 | 235 | 219 | 206 | 188 | 195 | 170 | 187 | 196.8 |
| 15-Aug | 195 | 165 | 185 | 94 | 152 | 279 | 304 | 23 | 4 | 59 | 42 | 275 | 271 | 338 | 37 | 49 | 46 | 75 | 76 | 354 | 179 | 176 | 278 | 272 | 57.8 |
| 16-Aug | 246 | 267 | 211 | 198 | 210 | 179 | 200 | 181 | 179 | 191 | 188 | 169 | 187 | 216 | 228 | 242 | 236 | 233 | 228 | 228 | 211 | 216 | 222 | 206 | 213.7 |
| 17-Aug | 164 | 186 | 197 | 168 | 181 | 178 | 168 | 176 | 175 | 206 | 202 | 186 | 115 | 71 | 303 | 316 | 297 | 309 | 312 | 314 | 182 | 162 | 194 | 217 | 211.0 |
| 18-Aug | 214 | 209 | 180 | 199 | 213 | 214 | 219 | 218 | 223 | 242 | 237 | 226 | 234 | 241 | 227 | 217 | 216 | 222 | 208 | 202 | 208 | 226 | 226 | 226 | 221.1 |
| 19-Aug | 248 | 243 | 230 | 232 | 224 | 224 | 223 | 226 | 233 | 238 | 254 | 273 | 280 | 280 | 285 | 292 | 292 | 298 | 303 | 295 | 276 | 300 | 320 | 215 | 268.7 |
| 20-Aug | 224 | 242 | 242 | 238 | 231 | 220 | 222 | 208 | 231 | 264 | 271 | 271 | 279 | 277 | 290 | 305 | 314 | 309 | 302 | 293 | 286 | 279 | 337 | 307 | 270.8 |
| 21-Aug | 225 | 212 | 195 | 199 | 187 | 228 | 220 | 223 | 210 | 218 | 233 | 259 | 264 | 270 | 274 | 282 | 297 | 309 | 319 | 347 | 18 | 16 | 13 | 21 | 262.1 |
| 22-Aug | 10 | 4 | 4 | 357 | 349 | 359 | 6 | 354 | 2 | 36 | 354 | 240 | 87 | 114 | 225 | 244 | 3 | 63 | 56 | 54 | 41 | 66 | 7 | 359 | 21.1 |
| 23-Aug | 341 | 11 | 9 | 25 | 1 | 348 | 347 | 224 | 210 | 206 | 220 | 202 | 207 | 195 | 193 | 173 | 189 | 174 | 171 | 164 | 170 | 176 | 163 | 172 | 187.5 |
| 24-Aug | 166 | 165 | 34 | 155 | 179 | 196 | 162 | 169 | 159 | 163 | 156 | 133 | 128 | 183 | 95 | 141 | 236 | 24 | 21 | 20 | 58 | 180 | 218 | 220 | 163.3 |
| 25-Aug | 217 | 187 | 218 | 209 | 203 | 205 | 207 | 207 | 219 | 217 | 215 | 213 | 208 | 241 | 236 | 238 | 246 | 253 | 259 | 250 | 234 | 232 | 221 | 219 | 226.2 |
| 26-Aug | 225 | 235 | 231 | 231 | 233 | 232 | 233 | 227 | 224 | 223 | 217 | 234 | 237 | 231 | 245 | 247 | 244 | 246 | 231 | 246 | 222 | 218 | 231 | 222 | 232.7 |
| 27-Aug | 215 | 231 | 236 | 234 | 226 | 229 | 227 | 218 | 217 | 238 | 246 | 261 | 279 | 286 | 286 | 293 | 289 | 292 | 303 | 309 | 321 | AF | AF | 331 | 258.3 |
| 28-Aug | 263 | 198 | 257 | 182 | 196 | 203 | 203 | 206 | 211 | 278 | 301 | 308 | 294 | 279 | 287 | 302 | 311 | 307 | 311 | 333 | 331 | 327 | 331 | 340 | 289.2 |
| 29-Aug | 298 | 273 | 202 | 228 | 196 | 175 | 171 | 147 | 218 | 258 | 125 | 100 | 171 | 104 | 76 | 113 | 152 | 153 | 117 | 106 | 123 | 138 | 165 | 174 | 145.9 |
| 30-Aug | 108 | 35 | 21 | 359 | 13 | 8 | 2 | 4 | 349 | 334 | 181 | 179 | 174 | 173 | 173 | 174 | 166 | 159 | 156 | 181 | 194 | 195 | 203 | 198 | 175.4 |
| 31-Aug | 199 | 185 | 182 | 178 | 186 | 165 | 167 | 183 | 169 | 196 | 193 | 201 | 232 | 249 | 269 | 295 | 289 | 295 | 301 | 291 | 257 | 241 | 220 | 218 | 229.4 |

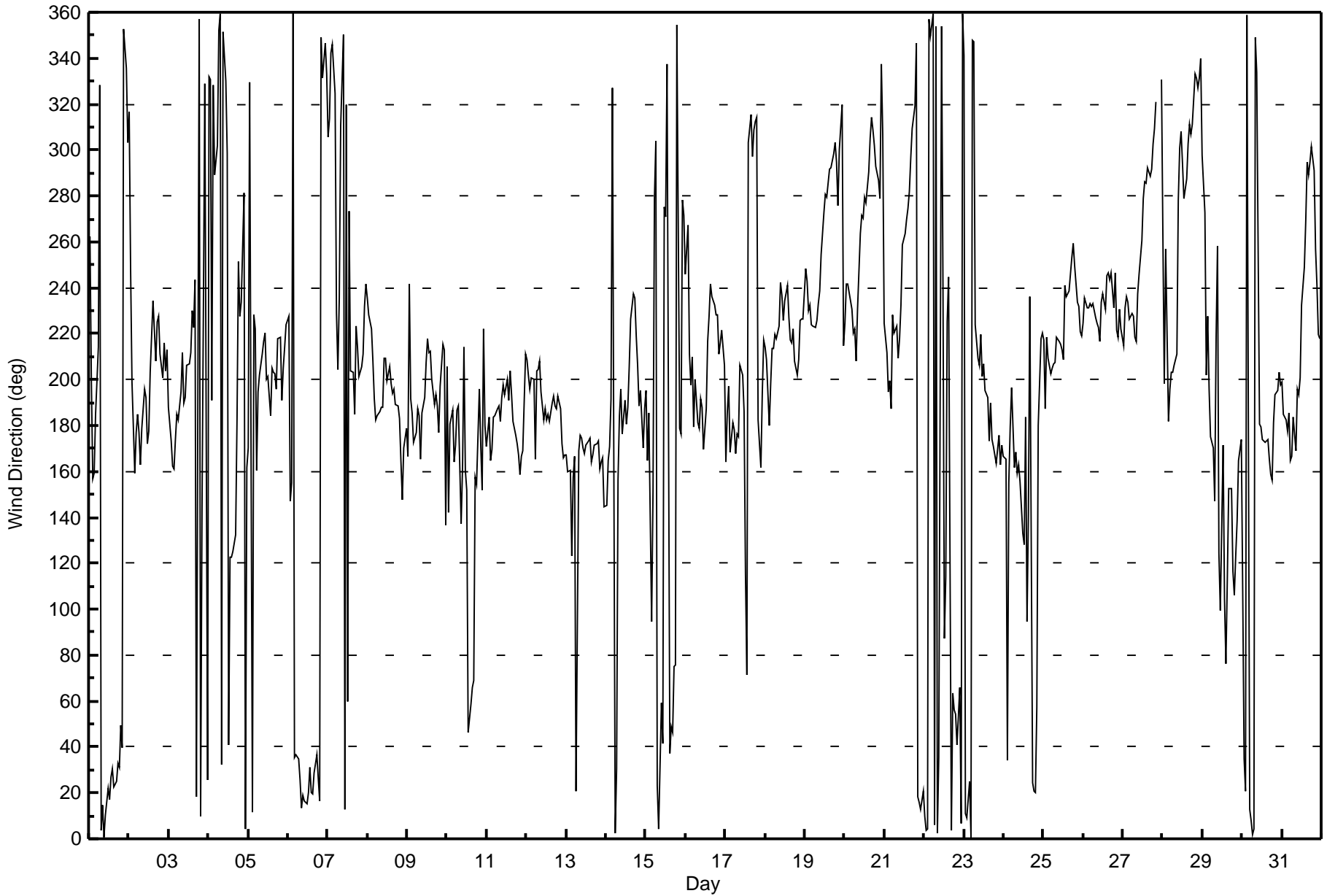
214.3 212.9 207.9 205.2 200.9 203.6 206.2 200.8 204.5 218.4 218.9 216.9 218.7 222.9 228.5 228.4 231.3 226.9 231.6 220.5 202.3 208.2 211.5 212.7
 Diurnal Average

AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Fort Hills - August 2017





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Fort Hills - August 2017

| | |
|---|--------------------------------|
| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | Hours in Service: 744 |
| Maximum Value: 97 deg on Aug 10 11:00 | Hours of Data: 742 |
| Minimum Value: 4 deg on Aug 12 23:00 | Hours of Missing Data: 2 |
| Percentiles: P ₁ = 6 P ₁₀ = 9 Q ₁ = 11 Median = 16 Q ₃ = 27 P ₉₀ = 49 P ₉₉ = 85 | Hours of Calibration: 0 |
| | Percent Operational Time: 99.7 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
|--------|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 37 | 15 | 16 | 27 | 54 | 26 | 86 | 23 | 25 | 32 | 17 | 23 | 25 | 25 | 27 | 25 | 21 | 23 | 17 | 12 | 18 | 42 | 15 | 31 | 86 |
| 2-Aug | 40 | 27 | 22 | 17 | 23 | 11 | 19 | 15 | 15 | 26 | 35 | 30 | 36 | 38 | 35 | 29 | 19 | 12 | 9 | 7 | 6 | 10 | 15 | 17 | 40 |
| 3-Aug | 12 | 12 | 11 | 9 | 10 | 9 | 8 | 10 | 14 | 19 | 27 | 23 | 42 | 31 | 34 | 33 | 43 | 37 | 16 | 20 | 86 | 47 | 76 | 74 | 86 |
| 4-Aug | 59 | 24 | 52 | 74 | 46 | 52 | 13 | 20 | 17 | 35 | 21 | 53 | 61 | 25 | 27 | 30 | 18 | 42 | 9 | 12 | 35 | 19 | 51 | 54 | 74 |
| 5-Aug | 35 | 69 | 23 | 76 | 27 | 29 | 15 | 19 | 16 | 24 | 32 | 60 | 47 | 18 | 24 | 21 | 18 | 12 | 13 | 12 | 6 | 10 | 8 | 9 | 76 |
| 6-Aug | 74 | 36 | 73 | 81 | 55 | 11 | 15 | 15 | 17 | 12 | 11 | 12 | 13 | 13 | 16 | 12 | 12 | 14 | 12 | 10 | 16 | 8 | 11 | 20 | 81 |
| 7-Aug | 10 | 16 | 16 | 17 | 82 | 76 | 24 | 46 | 61 | 18 | 30 | 46 | 85 | 72 | 49 | 41 | 38 | 20 | 29 | 11 | 7 | 6 | 9 | 7 | 85 |
| 8-Aug | 12 | 11 | 9 | 11 | 12 | 8 | 10 | 11 | 12 | 16 | 29 | 48 | 44 | 33 | 22 | 24 | 16 | 12 | 9 | 6 | 22 | 19 | 25 | 17 | 48 |
| 9-Aug | 26 | 42 | 11 | 9 | 14 | 13 | 9 | 11 | 16 | 25 | 19 | 30 | 22 | 26 | 26 | 26 | 21 | 20 | 7 | 7 | 12 | 13 | 25 | 80 | 80 |
| 10-Aug | 72 | 37 | 20 | 18 | 9 | 17 | 18 | 38 | 54 | 89 | 97 | 52 | 47 | 83 | 44 | 38 | 41 | 42 | 37 | 19 | 47 | 60 | 29 | 17 | 97 |
| 11-Aug | 17 | 9 | 8 | 12 | 14 | 12 | 8 | 9 | 16 | 13 | 15 | 27 | 21 | 18 | 21 | 25 | 19 | 12 | 7 | 7 | 5 | 5 | 5 | 33 | 33 |
| 12-Aug | 13 | 12 | 10 | 22 | 17 | 19 | 16 | 16 | 19 | 32 | 17 | 16 | 14 | 15 | 11 | 13 | 14 | 12 | 11 | 9 | 6 | 10 | 4 | 5 | 32 |
| 13-Aug | 8 | 11 | 15 | 58 | 51 | 16 | 80 | 12 | 11 | 10 | 9 | 10 | 11 | 9 | 13 | 11 | 13 | 9 | 7 | 7 | 8 | 6 | 7 | 8 | 80 |
| 14-Aug | 8 | 11 | 56 | 49 | 48 | 16 | 37 | 16 | 14 | 38 | 23 | 16 | 17 | 19 | 14 | 12 | 9 | 9 | 13 | 12 | 11 | 10 | 10 | 8 | 56 |
| 15-Aug | 15 | 29 | 37 | 93 | 18 | 63 | 39 | 36 | 22 | 11 | 38 | 32 | 29 | 76 | 85 | 27 | 14 | 11 | 19 | 79 | 55 | 63 | 81 | 20 | 93 |
| 16-Aug | 12 | 16 | 30 | 25 | 8 | 13 | 14 | 18 | 16 | 17 | 14 | 21 | 21 | 29 | 20 | 27 | 15 | 11 | 8 | 13 | 9 | 6 | 8 | 41 | 41 |
| 17-Aug | 21 | 14 | 17 | 18 | 12 | 19 | 12 | 20 | 23 | 18 | 14 | 24 | 54 | 49 | 57 | 23 | 17 | 13 | 13 | 70 | 18 | 53 | 58 | 8 | 70 |
| 18-Aug | 7 | 9 | 16 | 18 | 7 | 7 | 8 | 8 | 12 | 14 | 14 | 11 | 19 | 13 | 11 | 12 | 9 | 9 | 10 | 9 | 9 | 10 | 7 | 8 | 19 |
| 19-Aug | 16 | 11 | 12 | 9 | 12 | 11 | 8 | 10 | 9 | 11 | 13 | 14 | 13 | 13 | 14 | 14 | 14 | 14 | 14 | 17 | 22 | 24 | 26 | 50 | 50 |
| 20-Aug | 7 | 16 | 15 | 9 | 10 | 7 | 7 | 8 | 10 | 14 | 12 | 13 | 19 | 15 | 21 | 17 | 15 | 13 | 13 | 13 | 11 | 12 | 43 | 29 | 43 |
| 21-Aug | 12 | 8 | 17 | 21 | 19 | 7 | 7 | 7 | 11 | 11 | 24 | 18 | 23 | 20 | 17 | 19 | 23 | 13 | 16 | 14 | 12 | 12 | 12 | 8 | 24 |
| 22-Aug | 12 | 9 | 10 | 12 | 14 | 15 | 16 | 14 | 18 | 27 | 53 | 24 | 68 | 70 | 35 | 62 | 64 | 12 | 9 | 10 | 11 | 11 | 20 | 18 | 70 |
| 23-Aug | 31 | 19 | 19 | 37 | 30 | 46 | 31 | 59 | 17 | 20 | 16 | 14 | 11 | 10 | 14 | 12 | 10 | 8 | 6 | 7 | 13 | 10 | 7 | 13 | 59 |
| 24-Aug | 32 | 64 | 62 | 46 | 12 | 35 | 59 | 83 | 10 | 11 | 27 | 22 | 23 | 53 | 69 | 21 | 53 | 15 | 14 | 23 | 58 | 24 | 22 | 9 | 83 |
| 25-Aug | 12 | 9 | 9 | 9 | 10 | 8 | 8 | 9 | 15 | 10 | 10 | 10 | 14 | 12 | 10 | 10 | 10 | 10 | 11 | 13 | 11 | 13 | 9 | 9 | 15 |
| 26-Aug | 7 | 9 | 9 | 9 | 9 | 7 | 8 | 8 | 9 | 9 | 10 | 16 | 14 | 14 | 13 | 17 | 15 | 9 | 14 | 9 | 12 | 9 | 8 | 11 | 17 |
| 27-Aug | 10 | 11 | 9 | 9 | 12 | 9 | 9 | 13 | 17 | 14 | 12 | 19 | 12 | 18 | 21 | 19 | 18 | 14 | 12 | 10 | 11 | AF | AF | 31 | 31 |
| 28-Aug | 40 | 18 | 18 | 29 | 46 | 18 | 27 | 8 | 11 | 30 | 16 | 17 | 20 | 18 | 19 | 18 | 15 | 14 | 15 | 9 | 10 | 13 | 9 | 77 | 77 |
| 29-Aug | 73 | 34 | 29 | 39 | 19 | 50 | 27 | 27 | 42 | 41 | 60 | 47 | 79 | 59 | 43 | 39 | 30 | 19 | 27 | 28 | 21 | 10 | 29 | 76 | 79 |
| 30-Aug | 44 | 32 | 41 | 14 | 12 | 19 | 11 | 12 | 14 | 33 | 20 | 10 | 10 | 11 | 9 | 8 | 12 | 6 | 6 | 11 | 8 | 8 | 9 | 10 | 44 |
| 31-Aug | 10 | 11 | 12 | 8 | 7 | 13 | 21 | 18 | 22 | 16 | 10 | 17 | 12 | 13 | 18 | 16 | 15 | 15 | 16 | 12 | 15 | 12 | 9 | 20 | 22 |
| | 74 | 69 | 73 | 93 | 82 | 76 | 86 | 83 | 61 | 89 | 97 | 60 | 85 | 83 | 85 | 62 | 64 | 42 | 37 | 79 | 86 | 63 | 81 | 80 | |
| | Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | |

AF - Analyzer Failure



Wood Buffalo Environmental Association

SO₂ Calibration Summary

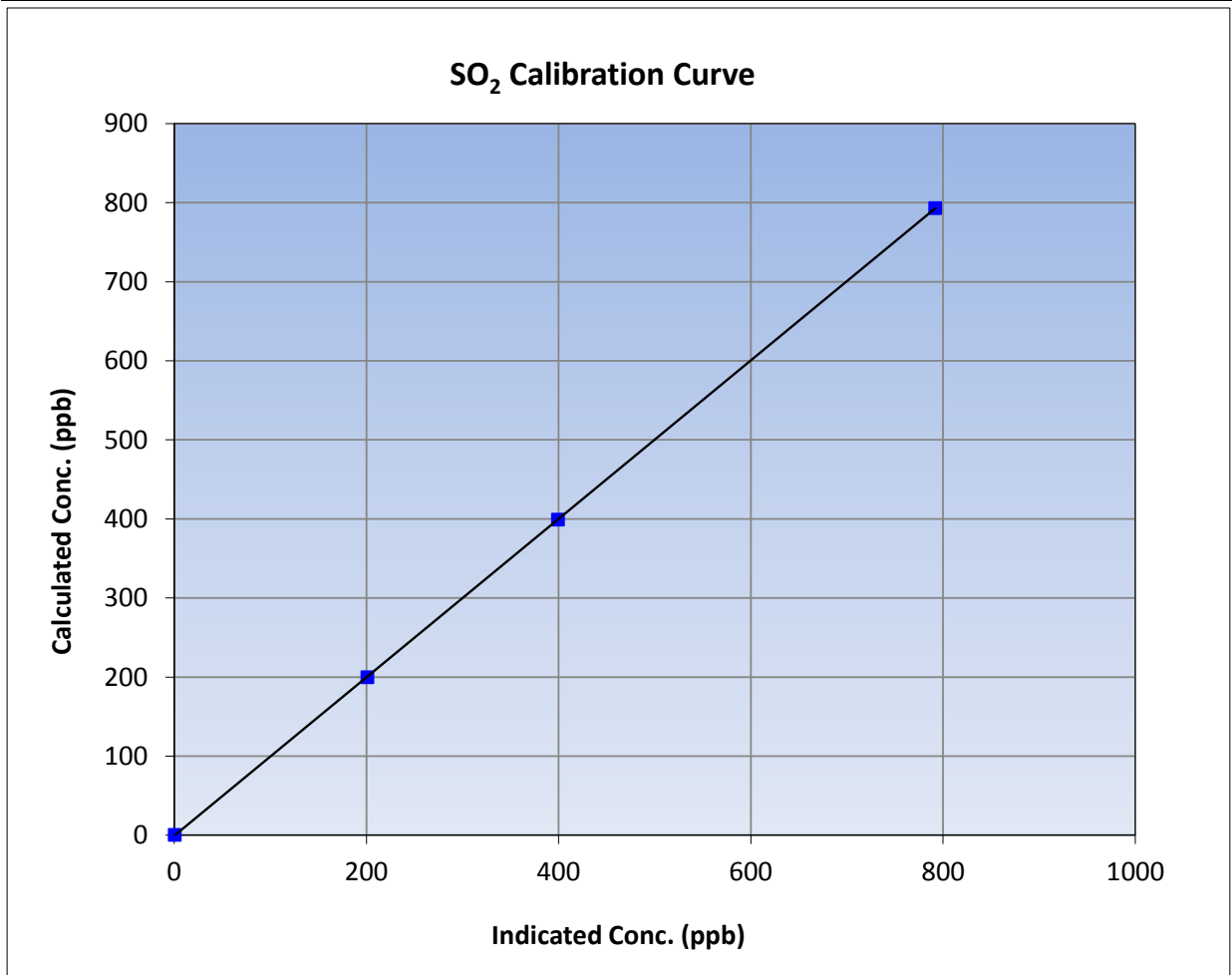
Version-03-2017

Station Information

| | | | |
|------------------|----------------|----------------------|---------------|
| Calibration Date | August 2, 2017 | Previous Calibration | July 11, 2017 |
| Station Name | Fort Hills | Station Number | AMS 23 |
| Start Time (MST) | 10:22 | End Time (MST) | 13:53 |
| Analyzer make | Thermo 43i | Analyzer serial # | 1160290012 |

Calibration Data

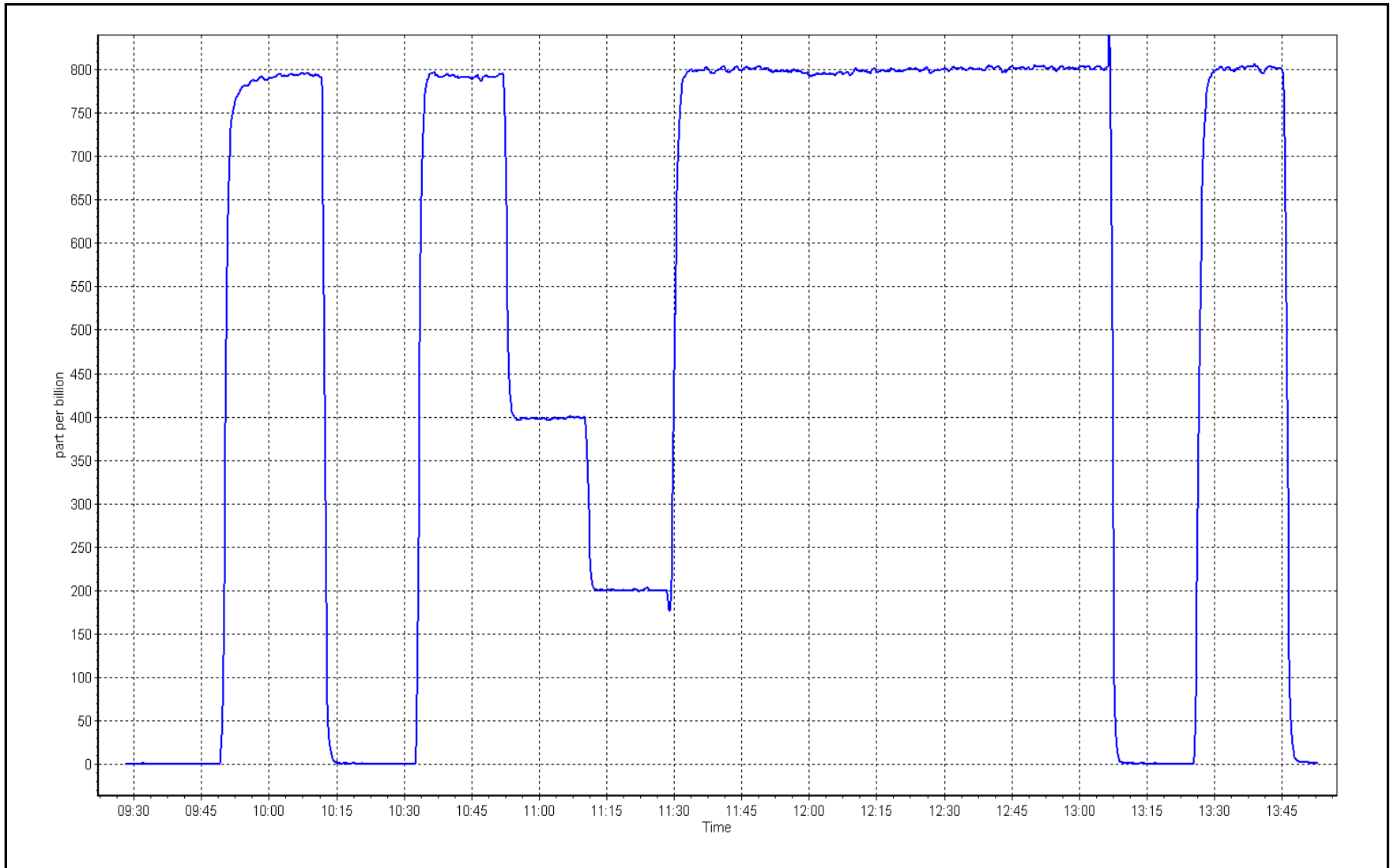
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|-------------|
| 0.0 | 0.3 | ---- | Correlation Coefficient | 0.999998 | ≥0.995 |
| 792.7 | 791.5 | 1.0015 | | | |
| 398.8 | 399.1 | 0.9993 | Slope | 1.002236 | 0.90 - 1.10 |
| 199.6 | 200.5 | 0.9956 | | | |
| | | | Intercept | -0.838816 | +/-30 |



SO2 Calibration Plot

Date: August 2, 2017

Location: Fort Hills





Wood Buffalo Environmental Association

TRS Calibration Summary

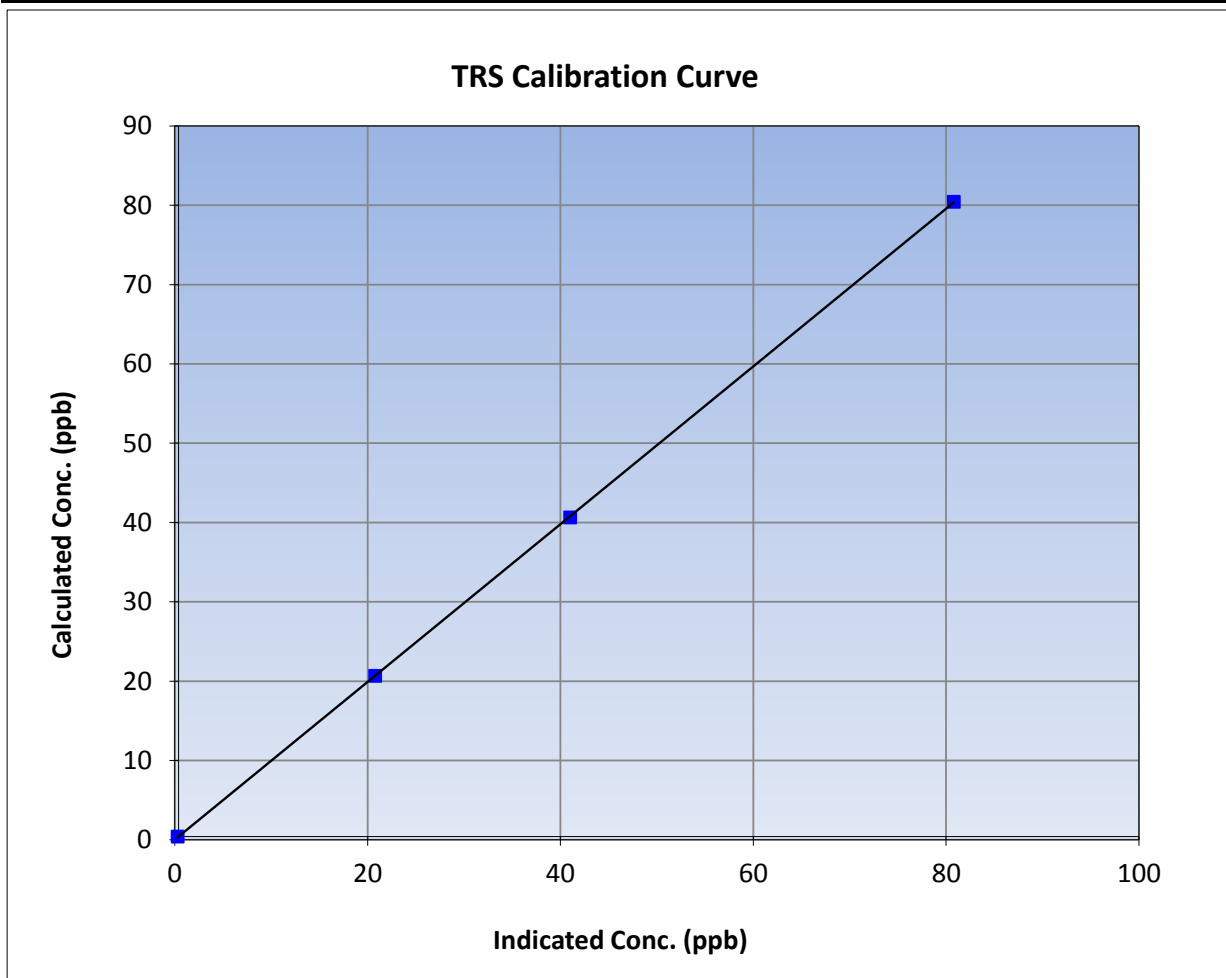
Version-03-2017

Station Information

| | | | |
|------------------|----------------|----------------------|---------------|
| Calibration Date | August 4, 2017 | Previous Calibration | July 10, 2017 |
| Station Name | Fort Hills | Station Number | AMS 23 |
| Start Time (MST) | 9:24 | End Time (MST) | 12:31 |
| Analyzer make | Thermo 43iTLE | Analyzer serial # | 1150840012 |

Calibration Data

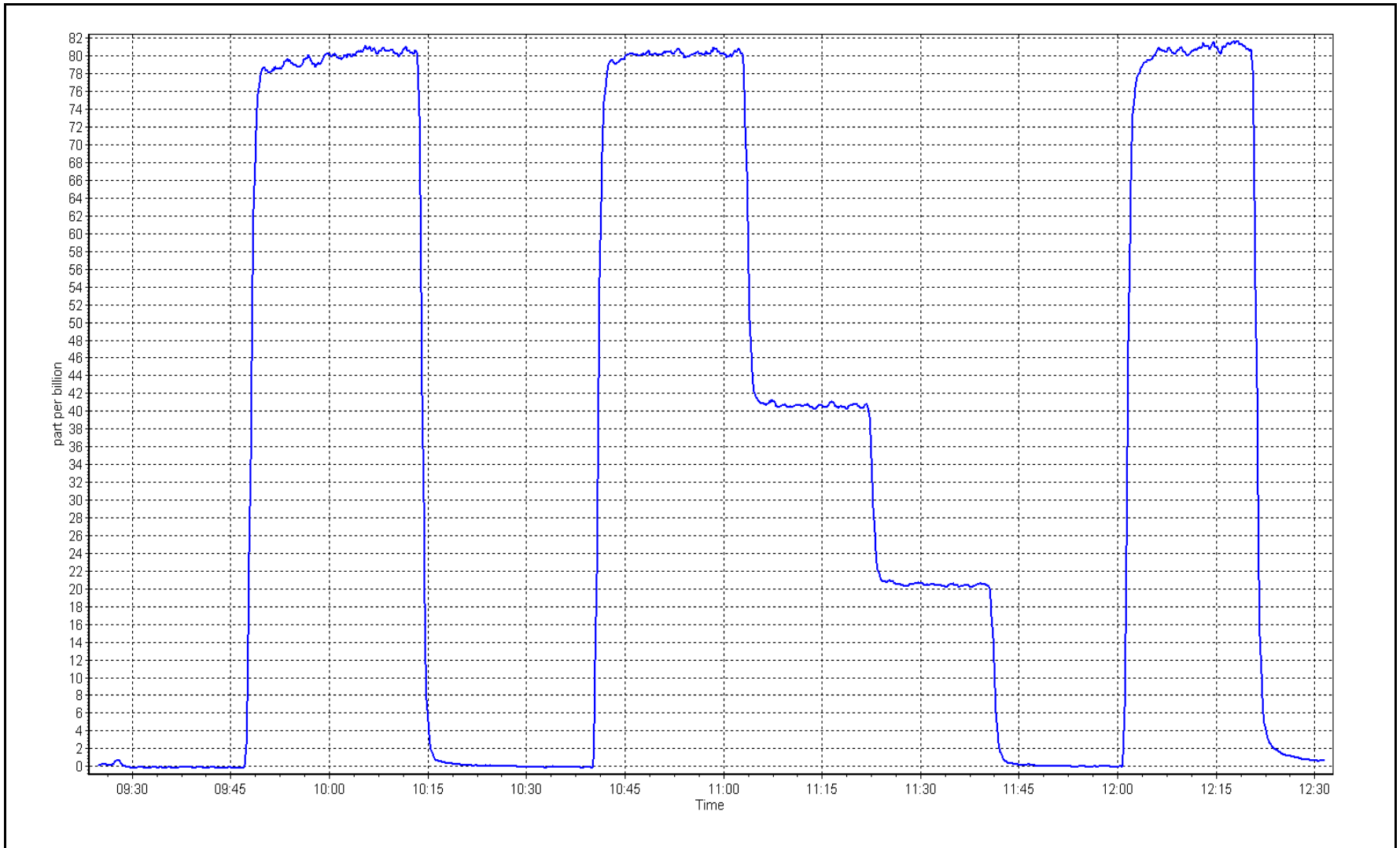
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|-------------|
| 0.0 | -0.1 | ---- | Correlation Coefficient | 0.999989 | ≥0.995 |
| 80.0 | 80.4 | 0.9956 | | | |
| 40.2 | 40.6 | 0.9910 | Slope | 0.994515 | 0.90 - 1.10 |
| 20.3 | 20.4 | 0.9936 | | | |
| | | | Intercept | 0.007000 | +/-3 |



TRS Calibration Plot

Date: August 4, 2017

Location: Fort Hills





Wood Buffalo Environmental Association

TRS Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|----------------|
| Station Name: | Fort Hills | Station number: | AMS 23 |
| Calibration Date: | August 15, 2017 | Last Cal Date: | August 4, 2017 |
| Start time (MST): | 9:23 | End time (MST): | 13:57 |
| Reason: | Maintenance | | |

Calibration Standards

| | | | | |
|-----------------------|------------------|-----|------------------|------------------|
| Cal Gas Concentration | <u>5.11</u> | ppm | Cal Gas Exp Date | December 7, 2017 |
| Cal Gas Cylinder # | <u>DR0000390</u> | | | |
| Calibrator Make/Model | API T700 | | Serial Number | 451 |
| ZAG Make/Model | API 701 | | Serial Number | 4522 |

Analyzer Information

| | | | | | |
|----------------------|---------------|--------------------|--------------|---------------|-------|
| Analyzer make: | Thermo 43iTLE | Analyzer serial #: | 1150840012 | | |
| | <u>Start</u> | <u>Finish</u> | <u>Start</u> | <u>Finish</u> | |
| Analyzer Range | 0 - 100 ppb | PMT voltage | -688 | -689 | |
| Calculated slope | 0.994515 | 1.001665 | Lamp voltage | 927 | 926 |
| Calculated intercept | 0.007000 | -0.093313 | Pressure | 667.5 | 681.1 |
| Analyzer Background | 1.4 | 1.3 | Flow | 0.473 | 0.482 |
| Analyzer Coefficient | 1.026 | 0.990 | Intensity | 91 | 90 |

TRS Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|----------------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5006 | 0.0 | 0.0 | 0.1 | ---- |
| as found span | 4938 | 78.6 | 80.1 | 79.3 | 1.010 |
| calibrator zero | 5012 | 0.0 | 0.0 | 0.1 | ---- |
| high point | 4939 | 78.6 | 80.0 | 80.0 | 1.001 |
| second point | 4976 | 39.5 | 40.2 | 40.3 | 0.999 |
| third point | 4997 | 19.9 | 20.3 | 20.3 | 0.998 |
| as left zero | 5012 | 0.0 | 0.0 | 0.0 | ---- |
| as left span | 4939 | 78.6 | 80.0 | 80.9 | 0.989 |
| SO2 Scrubber Check | 4997 | 20.4 | 203.3 | 0.1 | ---- |
| Average Correction Factor | | | | | 0.999 |

| | | | | | |
|--------------------|-------|-------------------|-------|-----------|------|
| Corrected As found | 79.20 | Previous response | 80.50 | *% change | 1.6% |
|--------------------|-------|-------------------|-------|-----------|------|

* = > +/-5% change initiates investigation

Notes: Maintenance Calibration. Scrubber check after asfinds. Changed Sox scrubber, completed scrubber check. Adjusted the span

Calibration Performed By: Jayme Marcoux



Wood Buffalo Environmental Association

TRS Calibration Summary

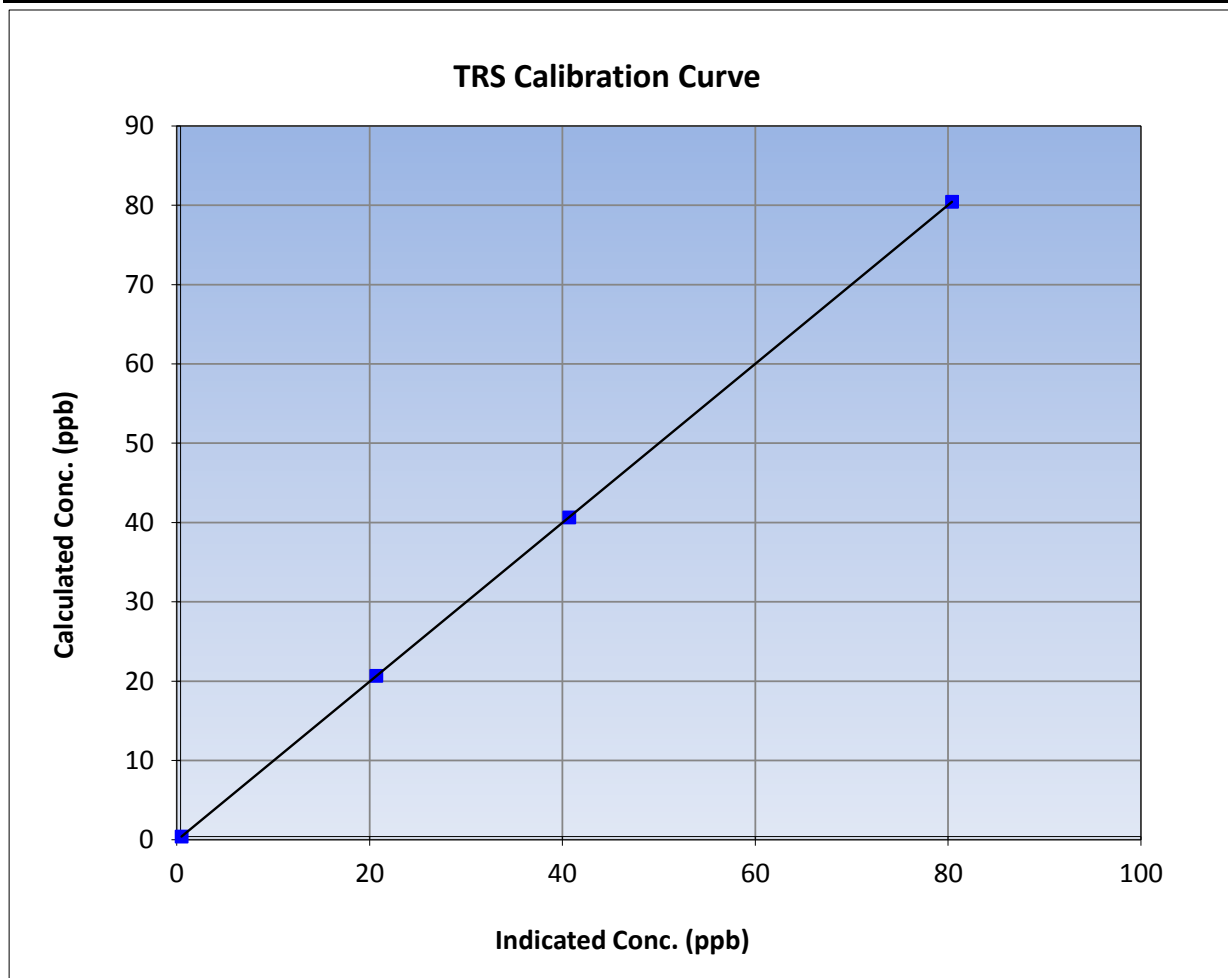
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|----------------|
| Calibration Date | August 15, 2017 | Previous Calibration | August 4, 2017 |
| Station Name | Fort Hills | Station Number | AMS 23 |
| Start Time (MST) | 9:23 | End Time (MST) | 13:57 |
| Analyzer make | Thermo 43iTLE | Analyzer serial # | 1150840012 |

Calibration Data

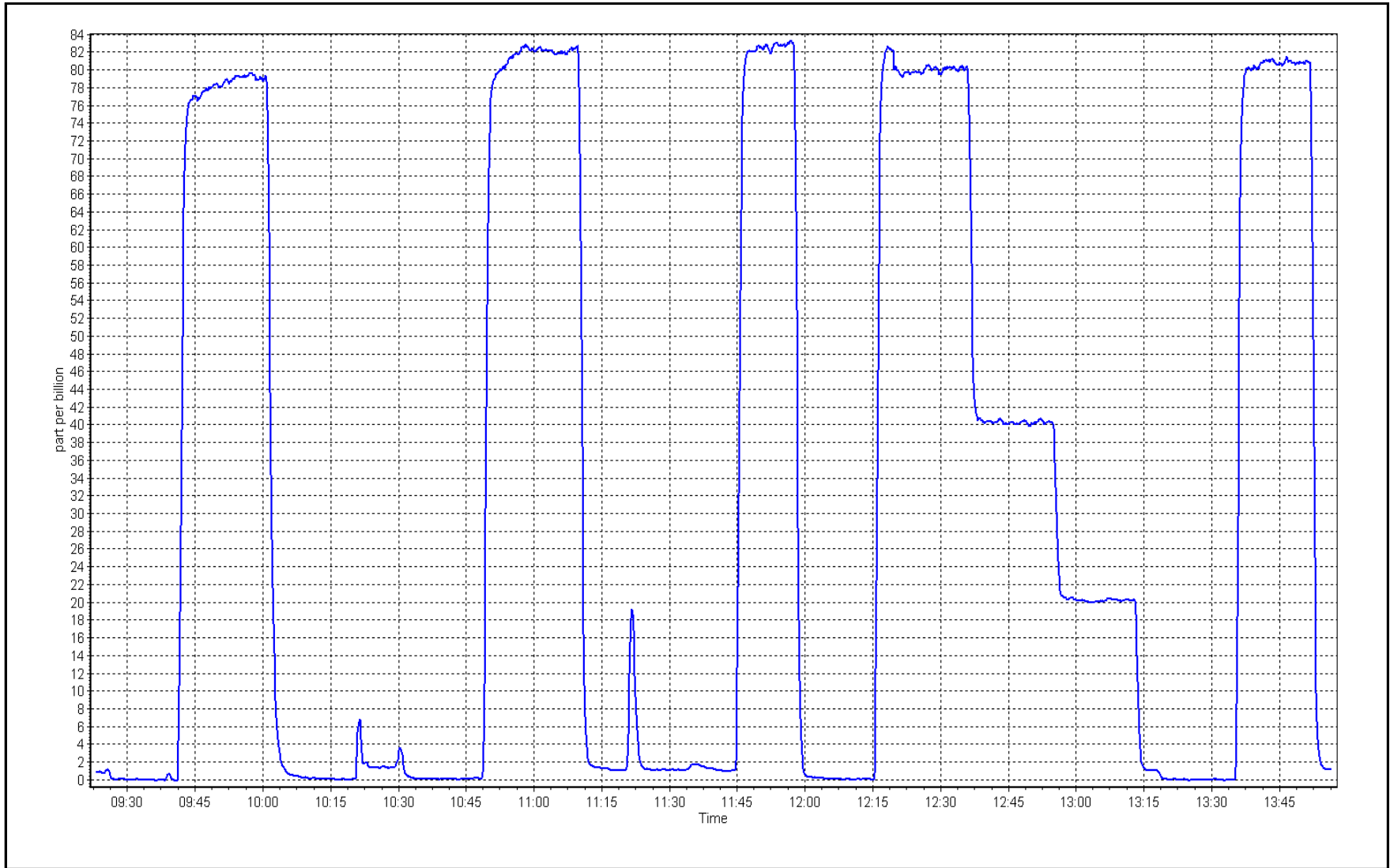
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|-------------|
| 0.0 | 0.1 | ---- | Correlation Coefficient | 0.999999 | ≥0.995 |
| 80.0 | 80.0 | 1.0006 | | | |
| 40.2 | 40.3 | 0.9986 | Slope | 1.001665 | 0.90 - 1.10 |
| 20.3 | 20.3 | 0.9985 | | | |
| | | | Intercept | -0.093313 | +/-3 |



TRS Calibration Plot

Date: August 15, 2017

Location: Fort Hills





Wood Buffalo Environmental Association

THC Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|----------------|-----------------|---------------|
| Station Name: | Fort Hills | Station number: | AMS 23 |
| Calibration Date: | August 2, 2017 | Last Cal Date: | July 11, 2017 |
| Start time (MST): | 9:27 | End time (MST): | 13:48 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|-----------------------|-------------------|---------------------|------------------|
| Gas Cert Reference | EY0000688 | Cal Gas Expiry Date | November 4, 2017 |
| CH4 Cal Gas Conc. | <u>514.0</u> ppm | CH4 Equiv Conc. | 1061.3 ppm |
| C3H8 Cal Gas Conc. | <u>199.0</u> ppm | Station temp. | 24 Deg C |
| Calibrator Make/Model | Teledyne API T700 | Serial Number | 451 |
| ZAG Make/Model | Teledyne API 701 | Serial Number | 4522 |

Analyzer Information

| | | | |
|----------------------|---------------|---------------------|--------------|
| Analyzer make: | Thermo 51i-LT | Analyzer serial #: | 1218153580 |
| | <u>Start</u> | <u>Finish</u> | <u>Start</u> |
| Analyzer Range | 0 - 25 ppm | Bias voltage supply | -299 |
| Calculated slope | 0.991056 | Sample pressure | 8.2 |
| Calculated intercept | -0.000522 | Fuel pressure | 24.2 |
| Analyzer Background | 2.340 | Air pressure | 37.8 |
| Analyzer Coefficient | 4.955 | Flame temperature | 159.9 |

THC Calibration Data

| Set Point | Total air flow rate (sccm) | Source gas flow rate (sccm) | Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|---------------------------|----------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5007 | 0.0 | 0.00 | 0.10 | ---- |
| as found span | 4935 | 80.5 | 17.03 | 17.92 | 0.951 |
| calibrator zero | 5011 | 0.0 | 0.00 | 0.01 | ---- |
| high point | 4936 | 80.5 | 17.03 | 16.94 | 1.005 |
| second point | 4977 | 40.5 | 8.57 | 8.57 | 0.999 |
| third point | 4997 | 20.4 | 4.31 | 4.25 | 1.015 |
| as left zero | 5009 | 0.0 | 0.00 | -0.11 | ---- |
| as left span | 4928 | 80.5 | 17.06 | 16.84 | 1.013 |
| Average Correction Factor | | | | | 1.007 |
| Corrected As found | 17.82 | Previous response | 17.19 | *% change | -3.5% |

* = > +/-5% change initiates investigation

Notes: Changed inlet filter after asfound. Adjusted the zero and the span

Calibration Performed By: Jayme Marcoux



Wood Buffalo Environmental Association

THC Calibration Summary

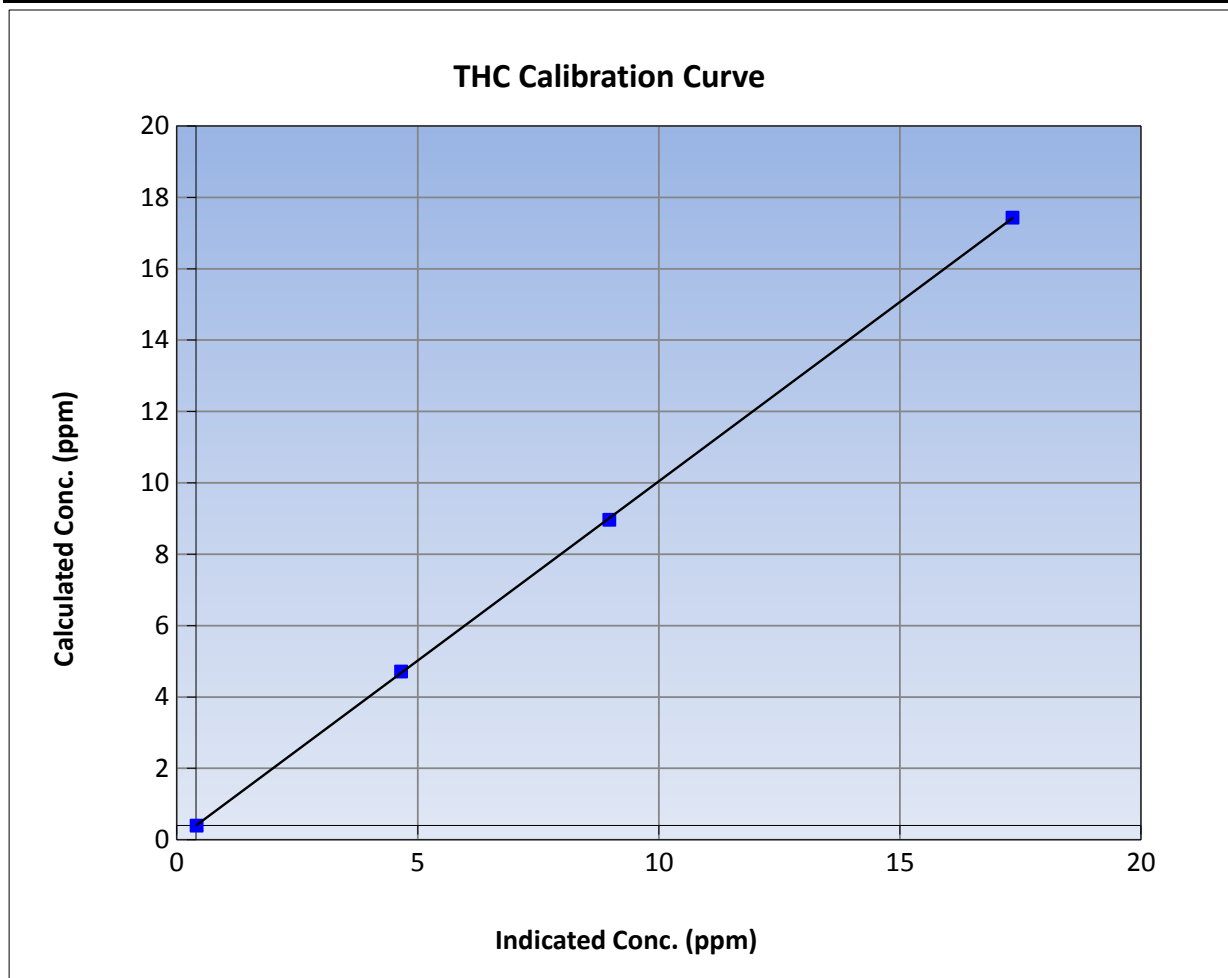
Version-03-2017

Station Information

| | | | |
|------------------|----------------|----------------------|---------------|
| Calibration Date | August 2, 2017 | Previous Calibration | July 11, 2017 |
| Station Name | Fort Hills | Station Number | AMS 23 |
| Start Time (MST) | 9:27 | End Time (MST) | 13:48 |
| Analyzer make | Thermo 51i-LT | Analyzer serial # | 1218153580 |

Calibration Data

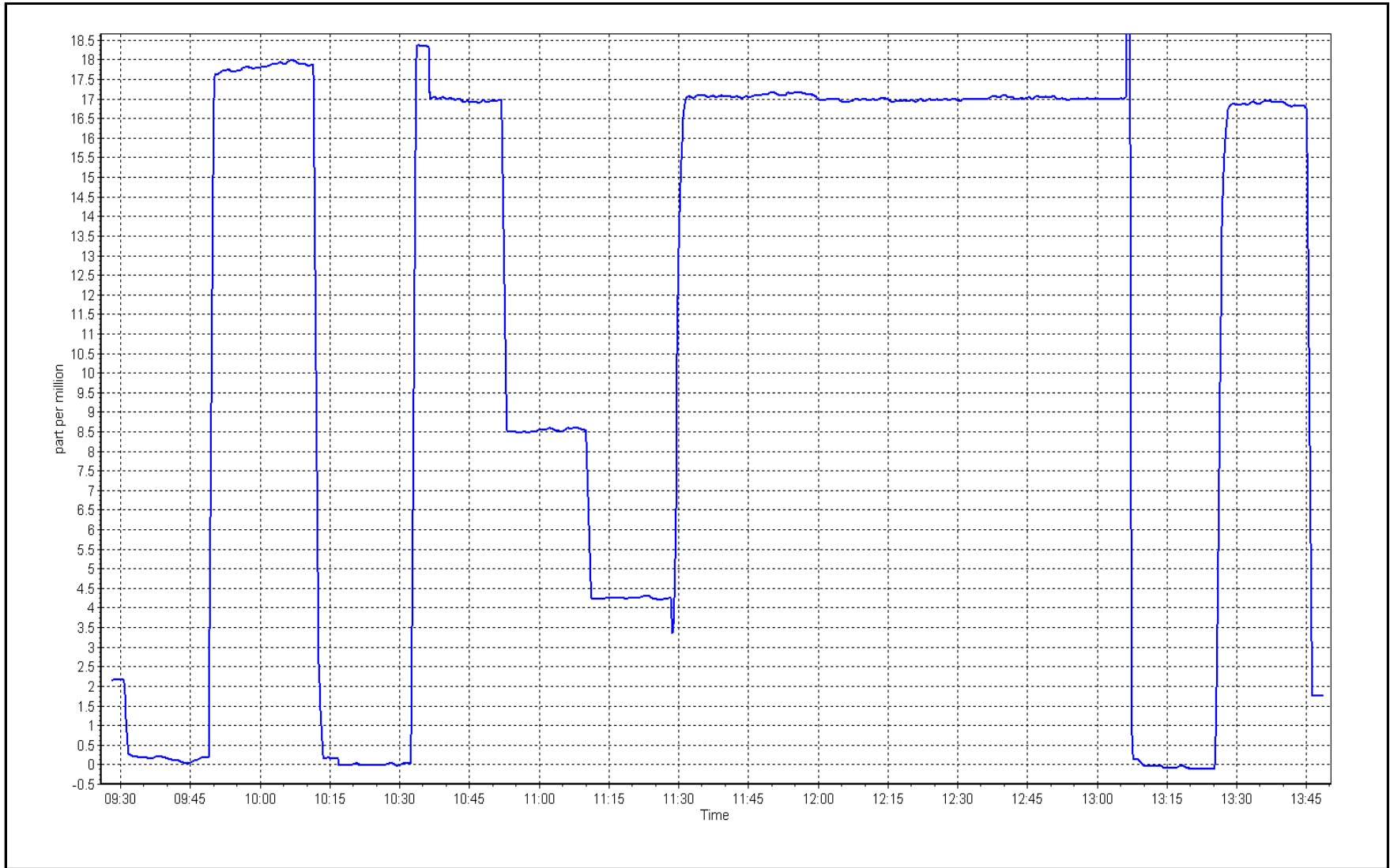
| Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (lc) | Correction factor (Cc/lc) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | 0.999973 | |
| 17.0 | 16.9 | 1.0054 | | | ≥0.995 |
| 8.6 | 8.6 | 0.9994 | Slope | 1.004799 | |
| 4.3 | 4.3 | 1.0150 | | | 0.90 - 1.10 |
| | | | Intercept | -0.000979 | +/-1.5 |



THC Calibration Plot

Date: August 2, 2017

Location: Fort Hills





Wood Buffalo Environmental Association

THC Calibration Report

Version-03-2017

Station Information

Station Name: Fort Hills Station number: AMS 23
 Calibration Date: August 9, 2017 Last Cal Date: August 2, 2017
 Start time (MST): 13:00 End time (MST): 14:50
 Reason: Maintenance - Sensitivity adjustment

Calibration Standards

Gas Cert Reference EY0000688 Cal Gas Expiry Date November 4, 2017
 CH4 Cal Gas Conc. 514.0 ppm CH4 Equiv Conc. 1061.3 ppm
 C3H8 Cal Gas Conc. 199.0 ppm Station temp. 24 Deg C
 Calibrator Make/Model Teledyne API T700 Serial Number 451
 ZAG Make/Model Teledyne API 701 Serial Number 4522

Analyzer Information

Analyzer make: Thermo 51i-LT Analyzer serial #: 1218153580

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|----------------------|--------------|---------------|---------------------|--------------|---------------|
| Analyzer Range | 0 - 25 ppm | | Bias voltage supply | -298 | -298 |
| Calculated slope | 1.004799 | 1.001030 | Sample pressure | 8.2 | 8.2 |
| Calculated intercept | -0.000979 | 0.014561 | Fuel pressure | 24.2 | 24.2 |
| Analyzer Background | 2.350 | 2.450 | Air pressure | 37.8 | 37.8 |
| Analyzer Coefficient | 4.711 | 4.903 | Flame temperature | 158.9 | 159.5 |

THC Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|-----------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5007 | 0.0 | 0.00 | -0.10 | ---- |
| as found span | 4935 | 80.5 | 17.03 | 16.41 | 1.038 |
| calibrator zero | 5011 | 0.0 | 0.00 | -0.01 | ---- |
| high point | 4936 | 80.5 | 17.03 | 17.00 | 1.002 |
| second point | 4977 | 40.5 | 8.57 | 8.54 | 1.004 |
| third point | 4997 | 20.4 | 4.31 | 4.30 | 1.005 |
| as left zero | 5009 | 0.0 | 0.00 | -0.04 | ---- |
| as left span | 4928 | 80.5 | 17.06 | | |

| Average Correction Factor | | | | 1.003 |
|---------------------------|-------|-------------------|-------|----------------|
| Corrected As found | 16.51 | Previous response | 16.95 | *% change 2.7% |

** = > +/-5% change initiates investigation*

Notes: Span adjustment following site audit. Adjusted the span, completed 3 points to ensure linearity.

Calibration Performed By: Kelly Baragar



Wood Buffalo Environmental Association

THC Calibration Summary

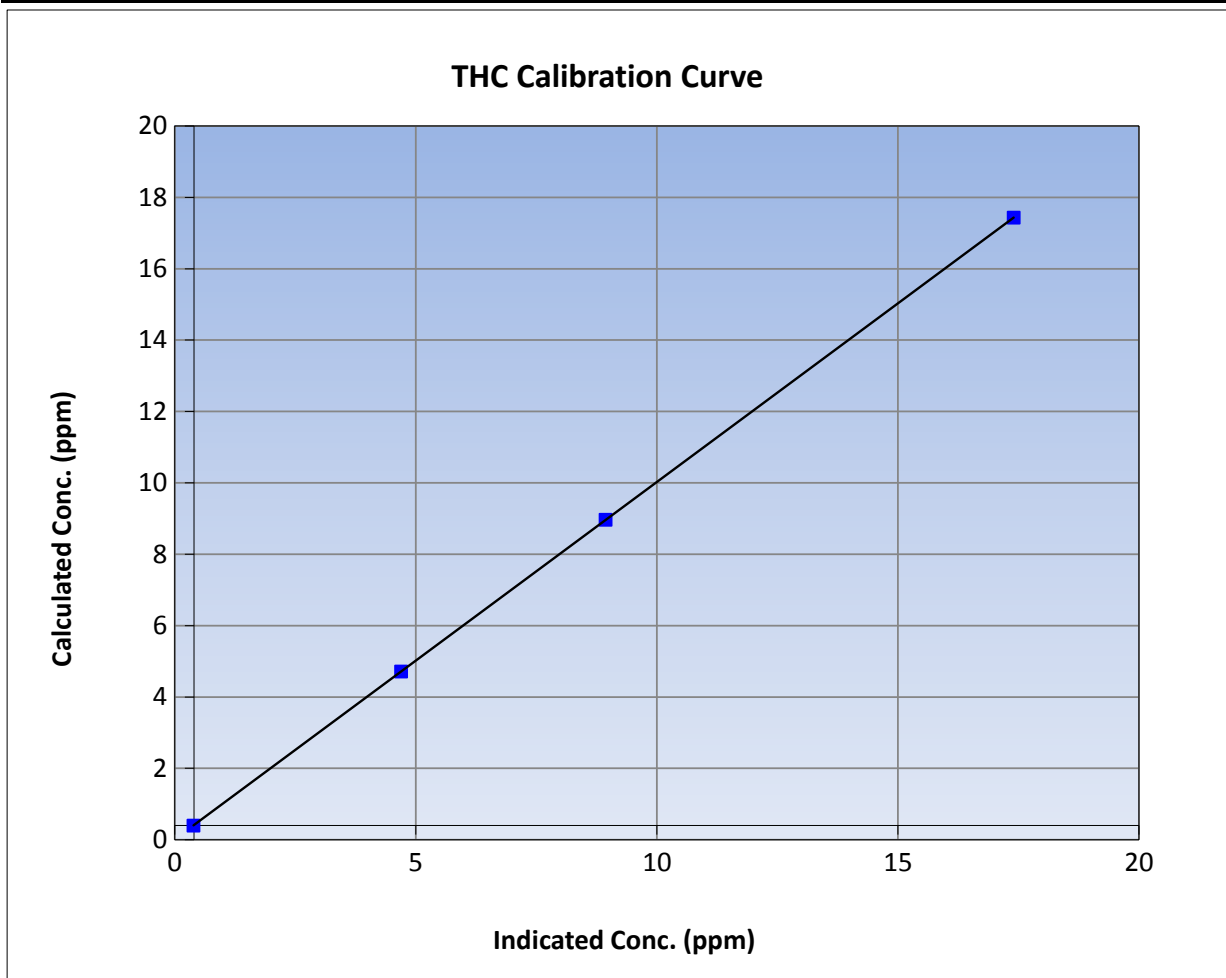
Version-03-2017

Station Information

| | | | |
|------------------|----------------|----------------------|----------------|
| Calibration Date | August 9, 2017 | Previous Calibration | August 2, 2017 |
| Station Name | Fort Hills | Station Number | AMS 23 |
| Start Time (MST) | 13:00 | End Time (MST) | 14:50 |
| Analyzer make | Thermo 51i-LT | Analyzer serial # | 1218153580 |

Calibration Data

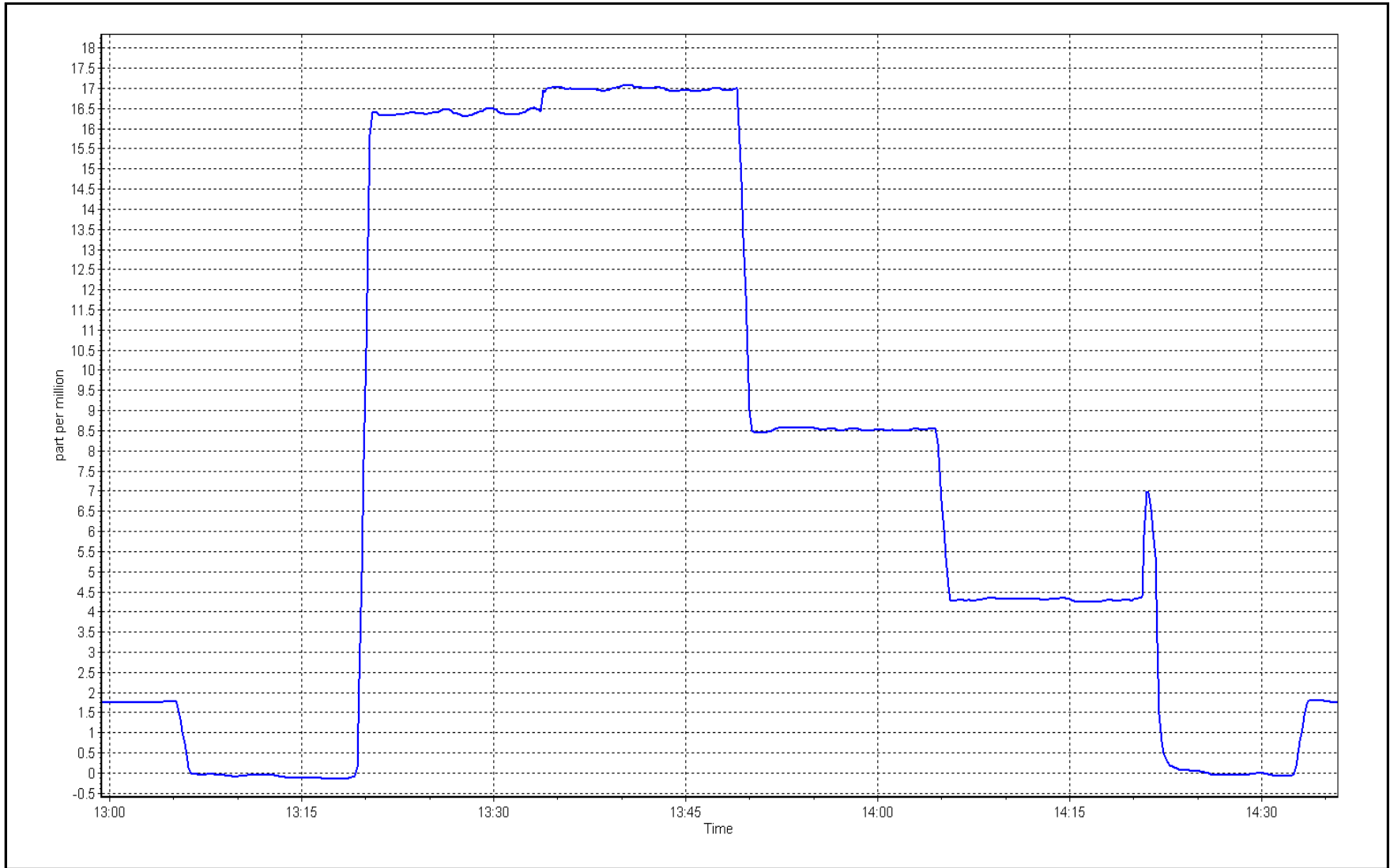
| Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (lc) | Correction factor (Cc/lc) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|-------------|
| 0.00 | -0.01 | ---- | Correlation Coefficient | 0.999999 | ≥0.995 |
| 17.03 | 17.00 | 1.0016 | | | |
| 8.57 | 8.54 | 1.0036 | Slope | 1.001030 | 0.90 - 1.10 |
| 4.31 | 4.30 | 1.0046 | | | |
| | | | Intercept | 0.014561 | +/-1.5 |



THC Calibration Plot

Date: August 9, 2017

Location: Fort Hills





Wood Buffalo Environmental Association

THC Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|----------------|
| Station Name: | Fort Hills | Station number: | AMS 23 |
| Calibration Date: | August 22, 2017 | Last Cal Date: | August 9, 2017 |
| Start time (MST): | 10:24 | End time (MST): | 13:06 |
| Reason: | Maintenance | | |

Calibration Standards

| | | | |
|-----------------------|-------------------|---------------------|------------------|
| Gas Cert Reference | EY0000688 | Cal Gas Expiry Date | November 4, 2017 |
| CH4 Cal Gas Conc. | <u>514.0</u> ppm | CH4 Equiv Conc. | 1061.3 ppm |
| C3H8 Cal Gas Conc. | <u>199.0</u> ppm | Station temp. | 24 Deg C |
| Calibrator Make/Model | Teledyne API T700 | Serial Number | 451 |
| ZAG Make/Model | Teledyne API 701 | Serial Number | 4522 |

Analyzer Information

| | | | |
|----------------------|---------------|---------------------|---------------|
| Analyzer make: | Thermo 51i-LT | Analyzer serial #: | 1218153580 |
| | <u>Start</u> | <u>Finish</u> | <u>Start</u> |
| Analyzer Range | 0 - 25 ppm | Bias voltage supply | -299 |
| Calculated slope | 1.001030 | Sample pressure | 8.2 |
| Calculated intercept | 0.014561 | Fuel pressure | 24.2 |
| Analyzer Background | 2.45 | Air pressure | 37.8 |
| Analyzer Coefficient | 4.903 | Flame temperature | 159.7 |
| | | | <u>Finish</u> |

THC Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5007 | 0.0 | 0.00 | -0.05 | ---- |
| as found span | 4936 | 80.5 | 17.03 | 17.46 | 0.976 |
| calibrator zero | 5011 | 0.0 | 0.00 | 0.02 | ---- |
| high point | 4937 | 80.5 | 17.03 | 17.04 | 0.999 |
| second point | 4977 | 40.5 | 8.57 | 8.54 | 1.003 |
| third point | 4997 | 20.4 | 4.31 | 4.33 | 0.996 |
| as left zero | 5009 | 0.0 | 0.00 | 0.00 | ---- |
| as left span | 4937 | 80.5 | 17.03 | 17.26 | 0.986 |
| Average Correction Factor | | | | | 0.999 |
| Corrected As found | 17.51 | Previous response | 17.00 | *% change | -2.9% |

* = > +/-5% change initiates investigation

Notes: Recalibration due to low baseline. Adjusted the zero and the span.

Calibration Performed By: Jayme Marcoux



Wood Buffalo Environmental Association

THC Calibration Summary

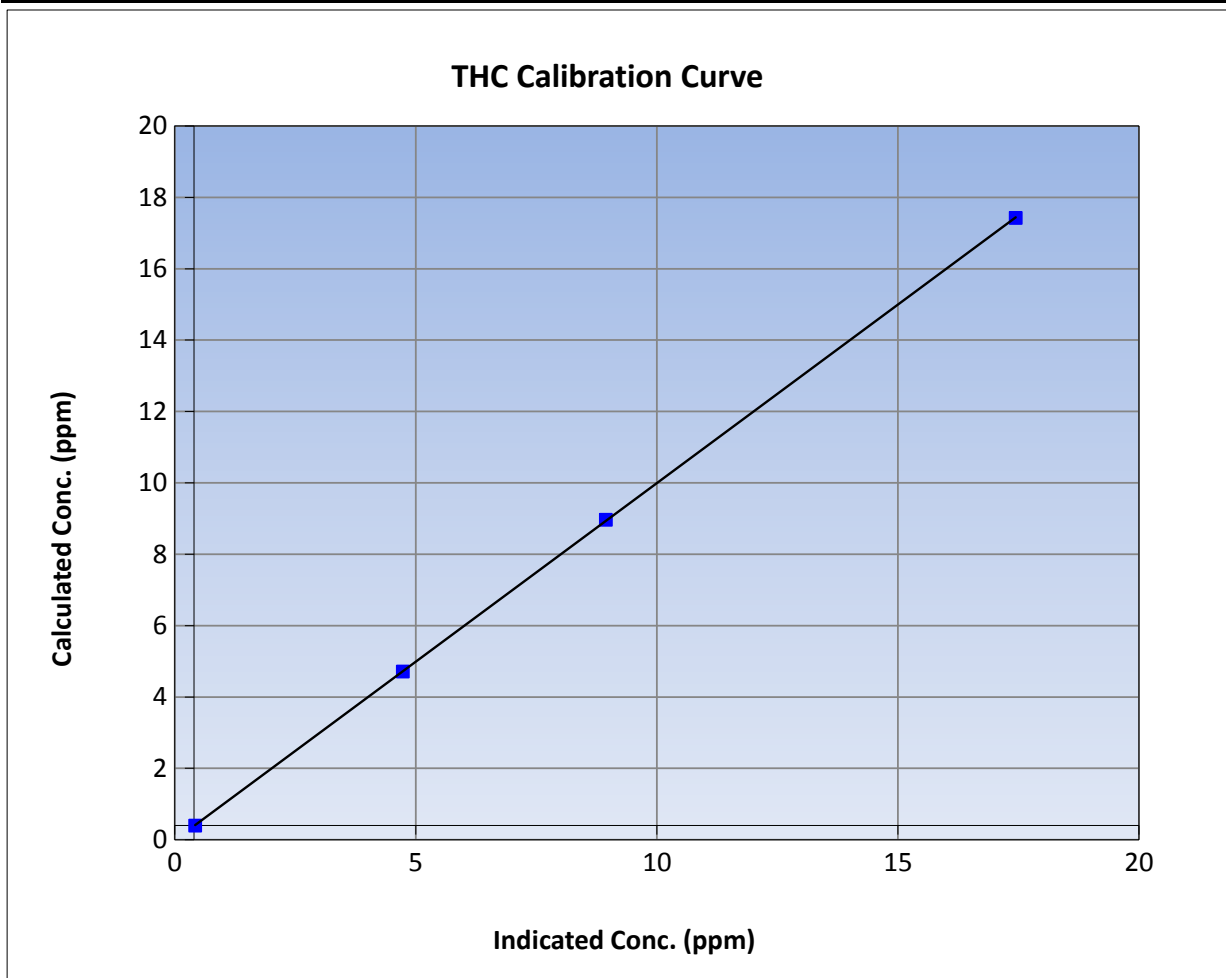
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|----------------|
| Calibration Date | August 22, 2017 | Previous Calibration | August 9, 2017 |
| Station Name | Fort Hills | Station Number | AMS 23 |
| Start Time (MST) | 10:24 | End Time (MST) | 13:06 |
| Analyzer make | Thermo 51i-LT | Analyzer serial # | 1218153580 |

Calibration Data

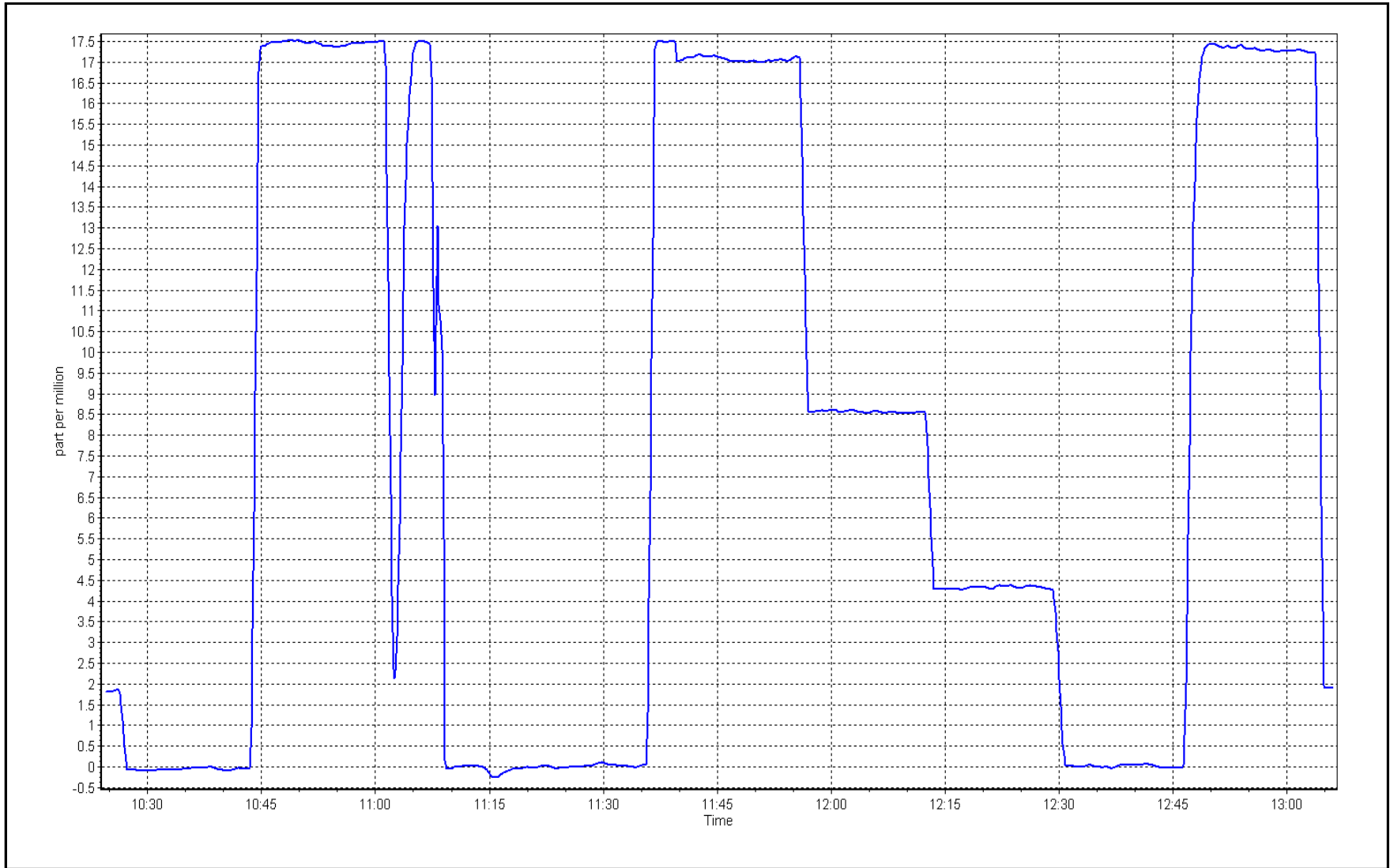
| Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (lc) | Correction factor (Cc/lc) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|-------------|
| 0.00 | 0.02 | ---- | Correlation Coefficient | 0.999992 | ≥0.995 |
| 17.03 | 17.04 | 0.9990 | | | |
| 8.57 | 8.54 | 1.0026 | Slope | 1.000546 | 0.90 - 1.10 |
| 4.31 | 4.33 | 0.9963 | | | |
| | | | Intercept | -0.012950 | +/-1.5 |



THC Calibration Plot

Date: August 22, 2017

Location: Fort Hills





Wood Buffalo Environmental Association

NO_x - NO - NO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|----------------|-----------------|---------------|
| Station Name: | Fort Hills | Station number: | AMS 23 |
| Calibration Date: | August 2, 2017 | Last Cal Date: | July 11, 2017 |
| Start time (MST): | 9:27 | End time (MST): | 13:49 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|-------------------|-------------------|---------------------|------------------|
| NO Gas Cylinder # | EY0000688 | Cal Gas Expiry Date | November 4, 2019 |
| NOX Cal Gas Conc. | <u>49.9</u> ppb | NO Cal Gas Conc. | <u>49.9</u> ppb |
| Calibrator Model | Teledyne API T700 | Serial Number | 451 |
| ZAG make/model | Teledyne API 701 | Serial Number | 4522 |

Analyzer Information

| | | | | |
|-----------------|--------------|--------------------|---------------------|---------------|
| Analyzer make: | Thermo 42i | Analyzer serial #: | 115243007 | |
| | <u>Start</u> | <u>Finish</u> | <u>Start</u> | <u>Finish</u> |
| NO coefficient | 1.021 | 1.013 | NOX Range (ppb) | 0 - 1000 ppb |
| NOX coefficient | 1.000 | 1.000 | PMT Temperature | -3.0 -3.2 |
| NO2 coefficient | 1.000 | 1.000 | Reaction cell Press | 168.7 167.2 |
| NO bkgrnd | 1.6 | 1.6 | Sample Flow | 0.783 0.766 |
| NOX bkgrnd | 1.7 | 1.7 | PMT Voltage | -802.9 -803.3 |

Calibration Statistics

| | | |
|----------------------------|--------------|---------------|
| | <u>Start</u> | <u>Finish</u> |
| NO _x Cal Slope | 0.997803 | 0.995585 |
| NO _x Cal Offset | -1.738547 | -1.242502 |
| NO Cal Slope | 0.997986 | 0.995831 |
| NO Cal Offset | -1.579622 | -1.281029 |
| NO ₂ Cal Slope | 0.999467 | 1.006775 |
| NO ₂ Cal Offset | -1.226430 | -1.675270 |



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Version-03-2017

Dilution Calibration Data

| Set Point | Total flow rate (sccm) | Total flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|----------------------------------|------------------------|------------------------|---|--|---|--|---------------------------------------|--|---|--|
| as found zero | 5008 | 0.0 | 0.0 | 0.0 | 0.0 | -0.2 | -0.2 | 0.0 | ---- | ---- |
| as found span | 4937 | 80.5 | 813.6 | 813.6 | 0.0 | 818.8 | 817.3 | 1.5 | 0.9937 | 0.9955 |
| calibrator zero | 5008 | 0.0 | 0.0 | 0.0 | 0.0 | -0.2 | -0.2 | 0.0 | ---- | ---- |
| high point | 4937 | 80.5 | 813.6 | 813.6 | 0.0 | 817.3 | 817.0 | 0.3 | 0.9955 | 0.9959 |
| second point | 4976 | 40.5 | 406.1 | 406.1 | 0.0 | 411.3 | 411.6 | -0.3 | 0.9875 | 0.9867 |
| third point | 4997 | 20.4 | 203.7 | 203.7 | 0.0 | 206.4 | 206.2 | 0.2 | 0.9870 | 0.9879 |
| as left zero | 5008 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | -0.1 | 0.0 | ---- | ---- |
| as left span | 4936 | 80.4 | 812.8 | 413.5 | 399.3 | 834.0 | 417.0 | 519.9 | 0.9746 | 0.9916 |
| Average Correction Factor | | | | | | | | | 0.9900 | 0.9902 |

| | | | | | |
|--|-----------------------------|----------------|--|-----------------|-------------------------|
| Corrected As found | NO _x = 819.0 ppb | NO = 817.5 ppb | | *Percent Change | NO _x = -0.2% |
| Previous Response | NO _x = 817.2 ppb | NO = 816.9 ppb | | *Percent Change | NO = -0.1% |
| <i>* = > +/-5% change initiates investigation</i> | | | | | |

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO drop conc (ppb) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | Converter Efficiency <i>Limit = 96-104%</i> |
|----------------------------------|------------------------------|---|--|---------------------------------------|--|---|--|---|--|
| 1st NO ref point | | 0.0 | 837.1 | 834.1 | 3.0 | 0.9720 | 0.9755 | ---- | ---- |
| 1st NO2 (400 ppb O3) | 413.5 | 420.6 | 832.2 | 413.5 | 418.7 | 0.9777 | ---- | 1.0045 | 99.5% |
| 2nd NO2 (200 ppb O3) | 624.8 | 209.3 | 834.7 | 624.8 | 210.0 | 0.9748 | ---- | 0.9967 | 100.3% |
| 3rd NO2 (100 ppb O3) | 727.5 | 106.6 | 837.1 | 727.5 | 109.5 | 0.9720 | ---- | 0.9735 | 102.7% |
| 2nd NO ref point | ---- | 0.0 | 837.1 | 834.1 | 3.0 | 0.9720 | 0.9755 | ---- | ---- |
| Average Correction Factor | | | | | | 0.9741 | 0.9755 | 0.9916 | 100.9% |

Notes: Changed inlet filter after asfinds. Adjusted the span. Used second NO ref point due to drift

Calibration Performed By: Jayme Marcoux



Wood Buffalo Environmental Association

NO_x Calibration Summary

Version-03-2017

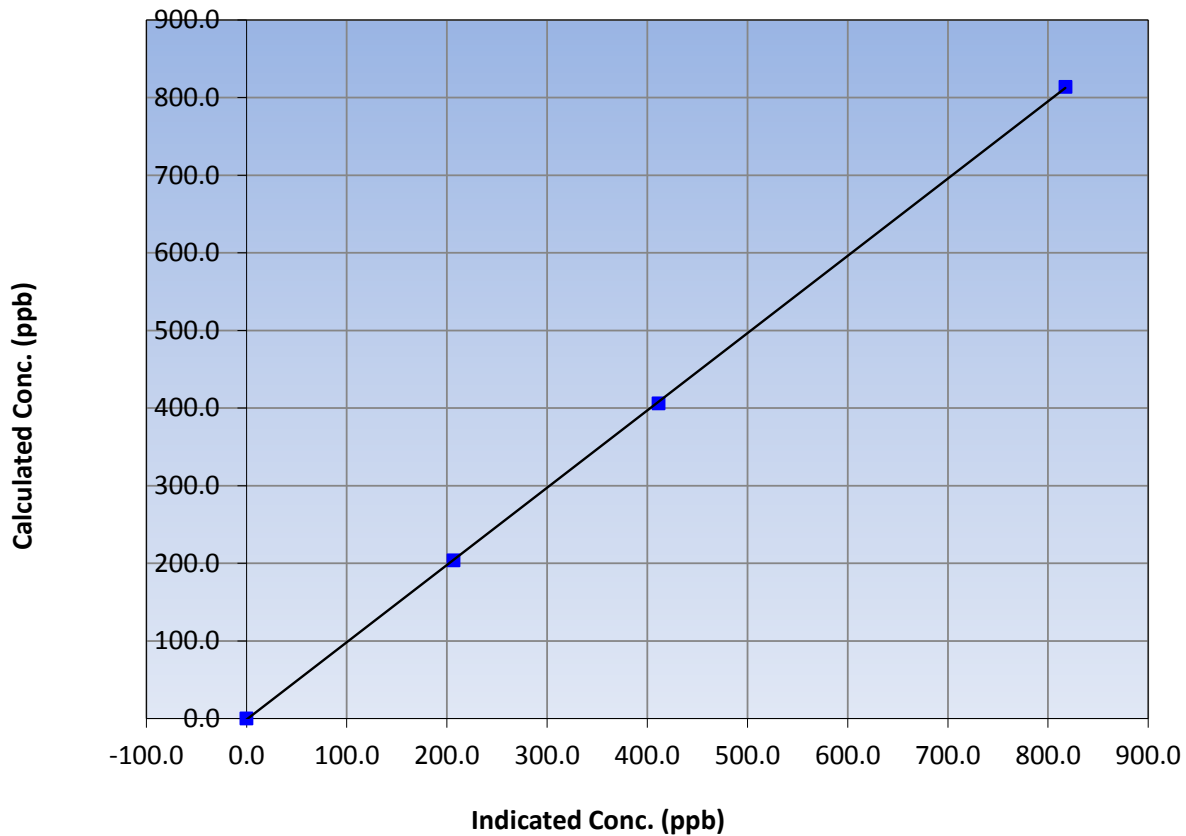
Station Information

| | | | |
|------------------|----------------|----------------------|---------------|
| Calibration Date | August 2, 2017 | Previous Calibration | July 11, 2017 |
| Station Name | Fort Hills | Station Number | AMS 23 |
| Start Time (MST) | 9:27 | End Time (MST) | 13:49 |
| Analyzer make | Thermo 42i | Analyzer serial # | 115243007 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | -0.2 | ---- | Correlation Coefficient | ≥0.995 | |
| 813.6 | 817.3 | 0.9955 | | | |
| 406.1 | 411.3 | 0.9875 | | | |
| 203.7 | 206.4 | 0.9870 | | | |
| | | | Slope | 0.995585 | 0.90 - 1.10 |
| | | | Intercept | -1.242502 | +/-20 |

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

Version-03-2017

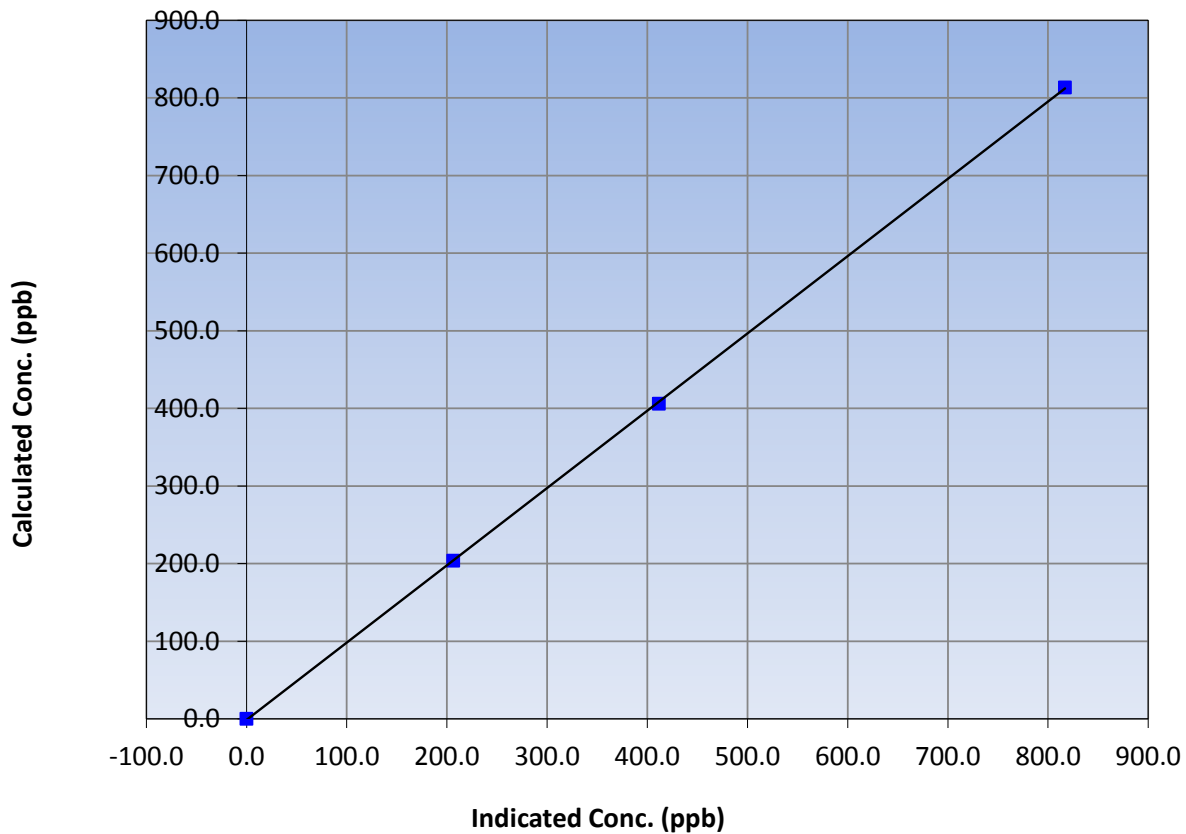
Station Information

| | | | |
|------------------|----------------|----------------------|---------------|
| Calibration Date | August 2, 2017 | Previous Calibration | July 11, 2017 |
| Station Name | Fort Hills | Station Number | AMS 23 |
| Start Time (MST) | 9:27 | End Time (MST) | 13:49 |
| Analyzer make | Thermo 42i | Analyzer serial # | 115243007 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | -0.2 | ---- | Correlation Coefficient | ≥0.995 | |
| 813.6 | 817.0 | 0.9959 | | | |
| 406.1 | 411.6 | 0.9867 | | | |
| 203.7 | 206.2 | 0.9879 | | | |
| | | | Slope | 0.995831 | 0.90 - 1.10 |
| | | | Intercept | -1.281029 | +/-20 |

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

Version-03-2017

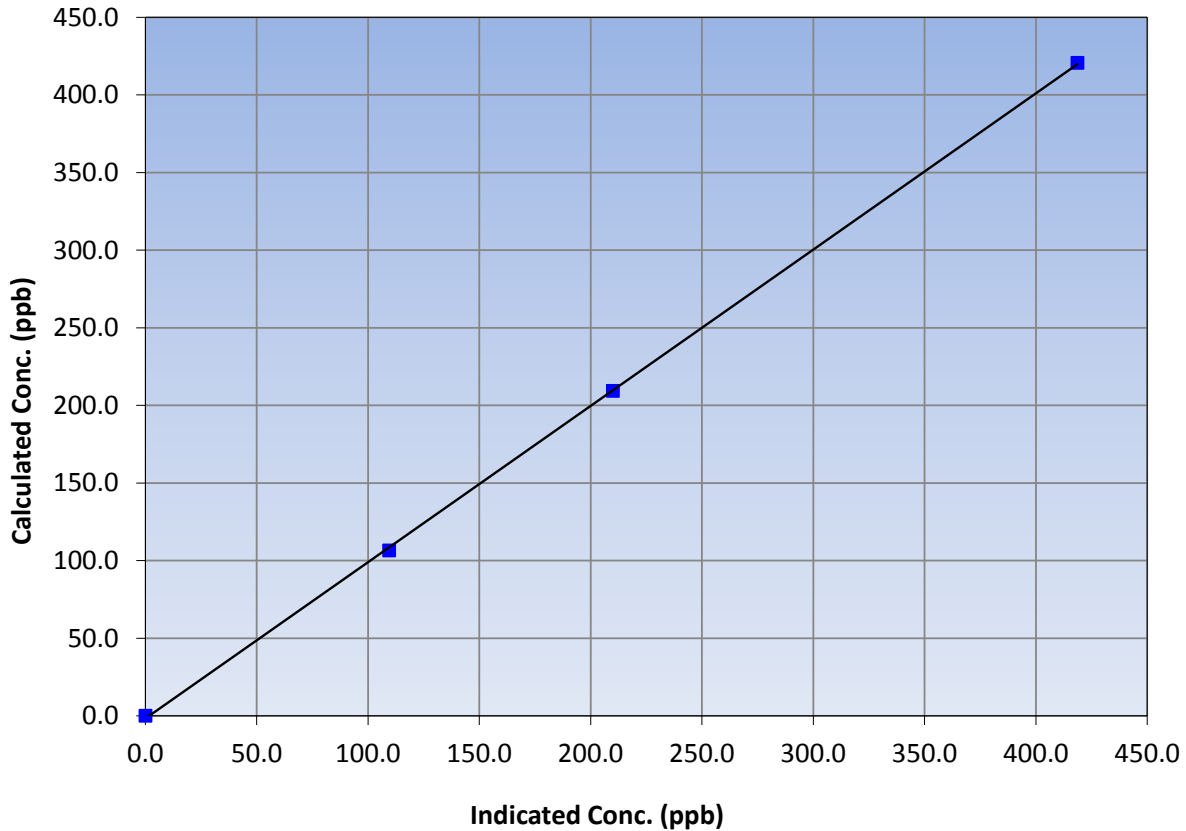
Station Information

| | | | |
|------------------|----------------|----------------------|---------------|
| Calibration Date | August 2, 2017 | Previous Calibration | July 11, 2017 |
| Station Name | Fort Hills | Station Number | AMS 23 |
| Start Time (MST) | 9:27 | End Time (MST) | 13:49 |
| Analyzer make | Thermo 42i | Analyzer serial # | 115243007 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | ≥0.995 | |
| 420.6 | 418.7 | 1.0045 | | | |
| 209.3 | 210.0 | 0.9967 | | | |
| 106.6 | 109.5 | 0.9735 | | | |
| | | | Slope | 1.006775 | 0.90 - 1.10 |
| | | | Intercept | -1.675270 | +/-20 |

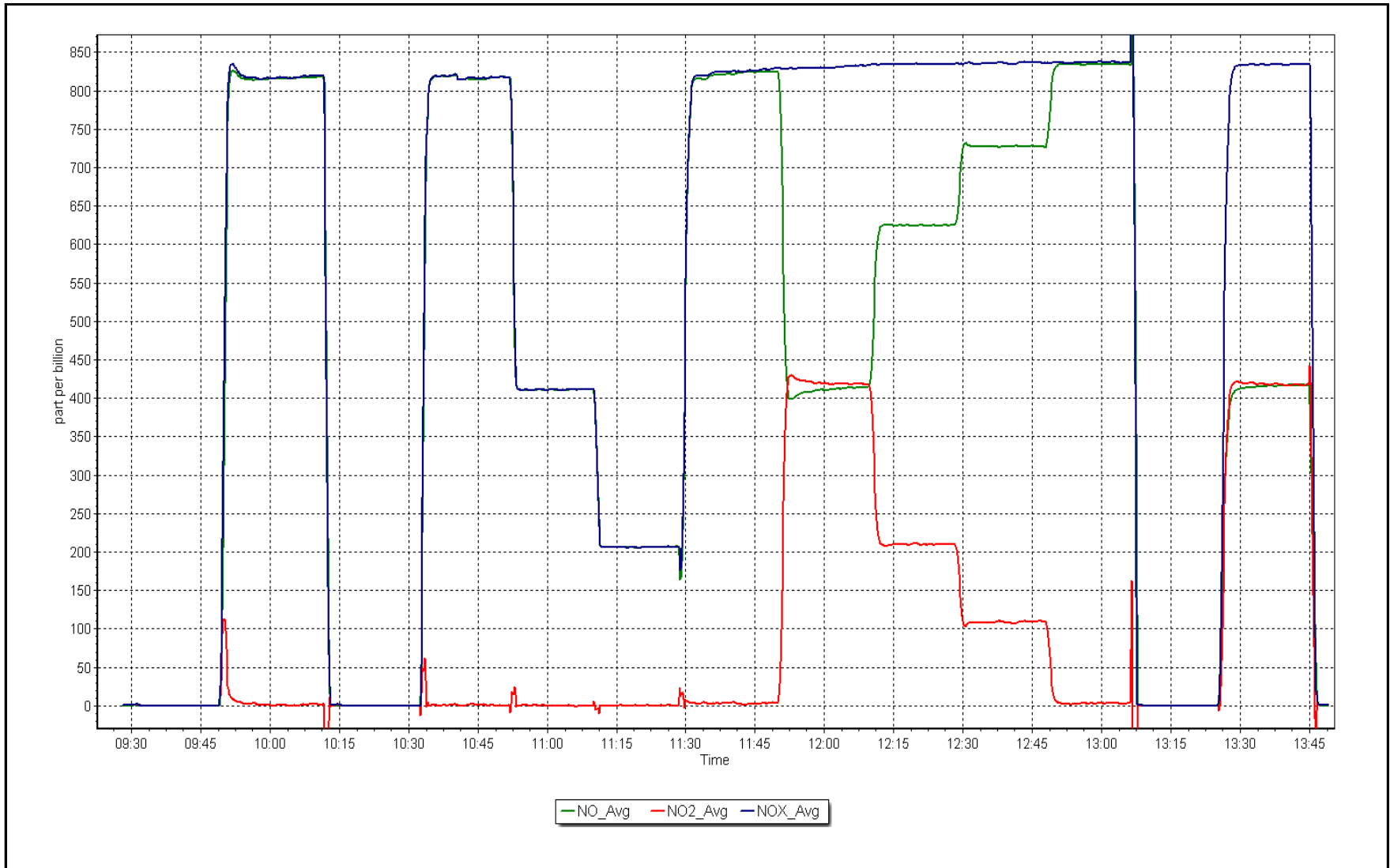
NO₂ Calibration Curve



NO_x Calibration Plot

Date: August 2, 2017

Location: Fort Hills





Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-02-2017

Station Information

| | | | |
|------------------------|----------------|-----------------|---------------|
| Station Name: | Fort Hills | Station number: | AMS 23 |
| Calibration Date: | August 4, 2017 | Last Cal Date: | July 10, 2017 |
| Start time (MST): | 9:32 | End time (MST): | 10:44 |
| Sharp Model: | 5030 | S/N: | E-802 |
| Particulate Fraction: | PM2.5 | C14 Source S/N: | 4153 |
| Flow Meter Make/Model: | DeltaCAL | S/N: | 1451 |
| Temp/RH standard: | | S/N: | |

Monthly Calibration Test

| <u>Parameter</u> | <u>As found</u> | <u>Measured</u> | <u>As left</u> | <u>Adjusted</u> | (Limits) |
|-----------------------------|-----------------|-------------------------------------|----------------|-------------------------------------|-----------------|
| T1 (°C) | 16 | 16.7 | 16 | <input type="checkbox"/> | +/- 2 °C |
| P3 (hPa) | 983 | 981 | 983 | <input type="checkbox"/> | +/- 13 hPa |
| flow (LPH) | 1000 | 989.4 | 1000 | <input checked="" type="checkbox"/> | +/- 50 LPH |
| Nephelometer zero | 3.5 | ----- | 0 | <input checked="" type="checkbox"/> | +/- 0.5 ug/m3 |
| Instrument Clock: | Verified | <input type="checkbox"/> | | | |
| Cyclone cleaning : | PM10 Cyclone | <input checked="" type="checkbox"/> | PM2.5 Cyclone | <input checked="" type="checkbox"/> | |
| Date Filter Tape Installed: | | | | | |

Quarterly Calibration Test

| | | | | |
|------------|-------------------|------------|------------------|---------------|
| Leak Test: | Date of check: | _____ | Last Cal Date: | July 10, 2017 |
| | Flow w/o adaptor: | _____ 17.8 | Flow w/ adaptor: | _____ 17.66 |

(Limit) 0.4 LPM

| <u>Adjusted</u> | <u>Current Test</u> | <u>Previous Test</u> | <u>% Change</u> |
|-----------------------------------|--------------------------|-------------------------------|-----------------|
| <input type="checkbox"/> | Foil S/N: _____ | Foil S/N: 2198 | |
| Foil Calibration | Foil Mass: _____ | Foil Mass: 1463 | |
| | Calibration Date: _____ | Calibration Date: May 5, 2017 | |
| (Limit) +/- 5% of previous | Correction Factor: _____ | Correction Factor: 6969 | --- |

Annual Calibration Test

| <u>Parameter</u> | <u>As found</u> | <u>Measured</u> | <u>As left</u> | <u>Adjusted</u> | (Limits) |
|-----------------------------|-----------------|-----------------|----------------|--------------------------|-----------------|
| T2 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| T3 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| T4 (°C) | | | | <input type="checkbox"/> | +/- 2 °C |
| RH (%) | | | | <input type="checkbox"/> | +/- 10% |
| Date Sample Tube Cleaned: | | | | | |
| Date Pump Rebuilt/Replaced: | | | | | |

Notes: Cleaned cyclone head. Adjusted the Flow and the Nephelometer.

Calibration by: Jayme Marcoux



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 25
WASKŌW OHCI PIMÂTISIWIN
AUGUST 2017

Operations, Data Collection,
QA/QC, Data Validation and Reporting by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

September 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WASKOW OCHI PIMATISIWIN (AMS 25)
AUGUST 2017

MONTHLY SUMMARY for
AMD SECTION III.B.1(c)

| Parameter | Hours of Data | Hours of Calibration | Hours without Data | Operational Time | Maximum 1-Hour Value | 1-Hour Exceedances | Maximum 24-Hour Value | 24-Hour Exceedances |
|-----------------------------------|---------------|----------------------|--------------------|------------------|----------------------|--------------------|-----------------------|---------------------|
| SO2(ppb) Average | 709 | 35 | 35 | 100 | 37 | 0 | 4 | 0 |
| H2S(ppb) Average | 707 | 36 | 37 | 99.87 | 2 | 0 | 1 | 0 |
| Temperature 2 m (C) Average | 744 | 0 | 0 | 100 | 19 | - | 9 | - |
| Relative Humidity (%) Average | 744 | 0 | 0 | 100 | 0 | - | 0 | - |
| Wind Speed 10 m (km/h) Average | 744 | 0 | 0 | 100 | 31.5 | - | 24 | - |
| Wind Direction 10 m (deg) Average | 744 | 0 | 0 | 100 | - | - | - | - |

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WASKOW OHCI PIMATISIWIN (AMS 25)
AUGUST 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

| Parameter | Number | Mean | StnDev | Total | Percentile | | | | | | |
|-----------------------------------|--------|------|--------|-------|------------|-----|------|--------|------|------|------|
| | | | | | Min | P10 | Q1 | Median | Q3 | P90 | Max |
| SO2 (ppb) Average | 709 | 0.9 | 3 | - | 0 | 0 | 0 | 0 | 0 | 2 | 37 |
| H2S (ppb) Average | 707 | 0.4 | 0 | - | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| Wind Speed 10 m (km/h) Average | 744 | 5.3 | 3 | - | 0 | 2 | 3 | 4 | 7 | 10 | 19 |
| Wind Direction 10 m (deg) Average | 744 | - | - | - | - | - | - | - | - | - | - |
| Temperature 2 m (C) Average | 744 | 17.9 | 5.6 | - | 4.4 | 11 | 13.7 | 17.2 | 22.5 | 25.8 | 31.5 |
| Relative Humidity (%) Average | 744 | 62.1 | 22 | - | 0 | 30 | 43 | 64 | 80 | 91 | 98 |

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WASKOW OHCI PIMATISIWIN (AMS 25)
AUGUST 2017

OPERATIONAL NOTES

| Parameter | Period Start | Period End | Duration (Hours) | Notes |
|-----------|-------------------|-------------------|------------------|---------------------------------|
| H2S | 11 Aug 2017 10:00 | 11 Aug 2017 10:00 | 1 | Maintenance - manifold cleaning |



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Waskow ohci Pimatisiwin - August 2017

| | | | | |
|---|---|----------|---------------------------|-------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 37 ppb on Aug 29 12:00 | Maximum Daily Average: 3.8 ppb on Aug 5 | | Hours of Data: | 709 |
| Minimum Value: 0 ppb on Aug 1 01:00 | Minimum Daily Average: 0.0 ppb on Aug 20 | | Hours of Missing Data: | 35 |
| Maximum Diurnal Average: 3.4 ppb at hour 12 | Minimum Diurnal Average: 0.1 ppb at hour 6 | | Hours of Calibration: | 35 |
| Monthly Average: 0.9 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 2 P ₉₉ = 12 | | Percent Operational Time: | 100.0 |

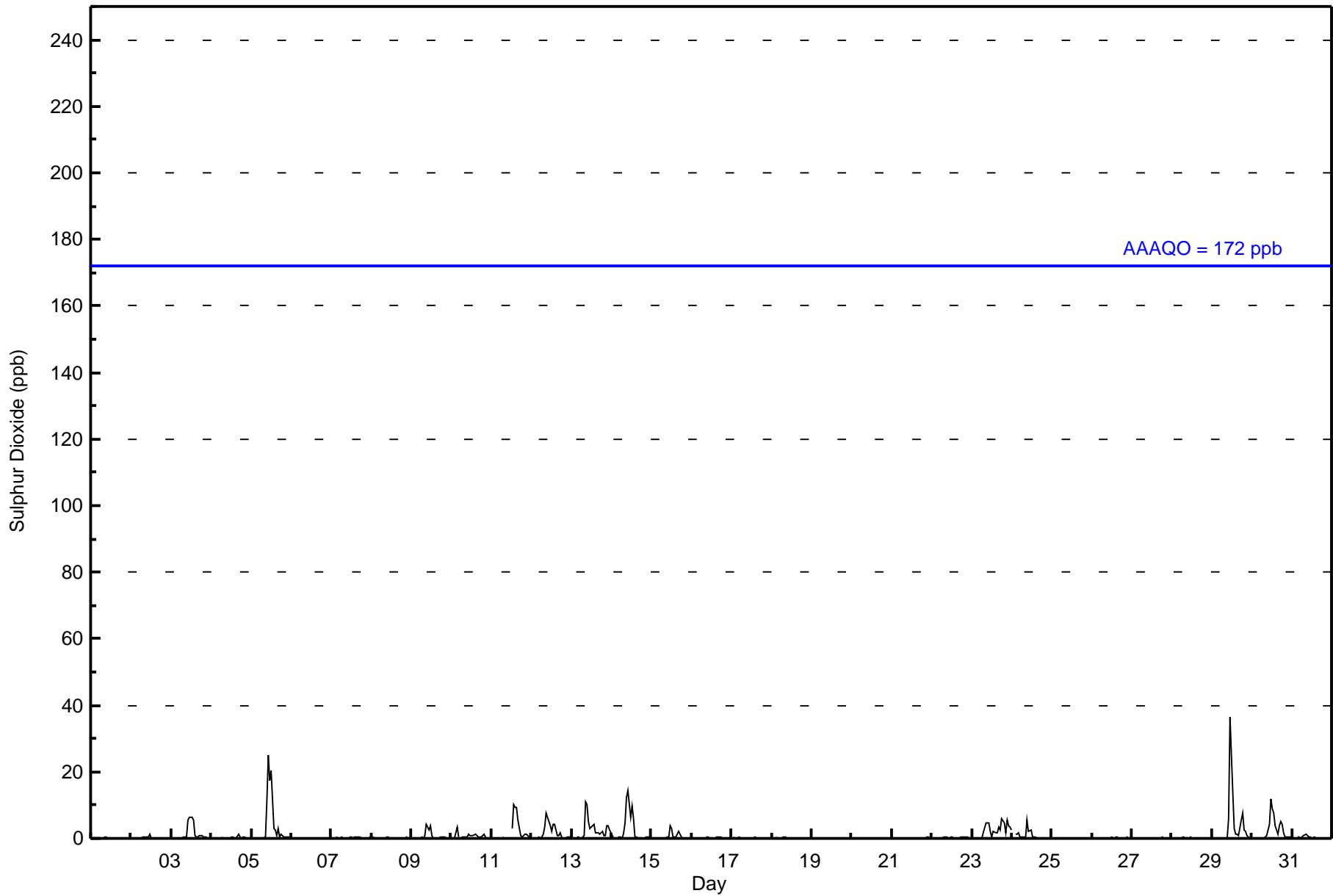
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 2-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 |
| 3-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 6 | 7 | 6 | 5 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1.3 | 7 |
| 4-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 5-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 25 | 17 | 21 | 3 | 3 | 1 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3.8 | 25 |
| 6-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 7-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 8-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 9-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 4 | 2 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0.7 | 4 |
| 10-Aug | 0 | 0 | 0 | 3 | 1 | Z | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0.6 | 3 |
| 11-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | C | C | C | C | 3 | 10 | 9 | 9 | 6 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 2.3 | 10 |
| 12-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 8 | 5 | 4 | 2 | 4 | 4 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1.7 | 8 |
| 13-Aug | 1 | 1 | Z | 1 | 0 | 0 | 0 | 1 | 11 | 10 | 5 | 3 | 3 | 4 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 4 | 4 | 3 | 2.6 | 11 |
| 14-Aug | 1 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 5 | 12 | 15 | 6 | 10 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.5 | 15 |
| 15-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 3 | 1 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 4 |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 17-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 18-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 19-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 20-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 21-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 22-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 23-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 5 | 5 | 4 | 2 | 0 | 2 | 2 | 2 | 3 | 3 | 6 | 5 | 2 | 6 | 4 | 4 | 2.4 | 6 |
| 24-Aug | 3 | Z | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 5 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.8 | 5 |
| 25-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 26-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 27-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 29-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 37 | 13 | 3 | 1 | 1 | 1 | 6 | 7 | 2 | 2 | 1 | 0 | 0 | 3.5 | 37 |
| 30-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 12 | 9 | 8 | 4 | 1 | 4 | 5 | 4 | 2 | 1 | 1 | 1 | 0 | 2.4 | 12 |
| 31-Aug | 0 | 0 | Z | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |

Z - zerospan C - Calibration
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Waskow ohci Pimatisiwin - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Waskow ohci Pimatisiwin - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 10 | 699 | 98.59 | 98.59 |
| 11 - 20 | 7 | 0.99 | 99.58 |
| 21 - 60 | 3 | 0.42 | 100.00 |
| 61 - 110 | 0 | 0.00 | 100.00 |
| 111 - 172 | 0 | 0.00 | 100.00 |
| > 172 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Waskow ohci Pimatisiwin - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 10 | 32 | 17 | 9 | 7 | 7 | 12 | 35 | 121 | 99 | 73 | 74 | 63 | 43 | 59 | 29 | 19 | 699 |
| 11 - 20 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| 21 - 60 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 61 - 110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 111 - 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 32 | 17 | 9 | 7 | 8 | 15 | 36 | 126 | 99 | 73 | 74 | 63 | 43 | 59 | 29 | 19 | 709 |

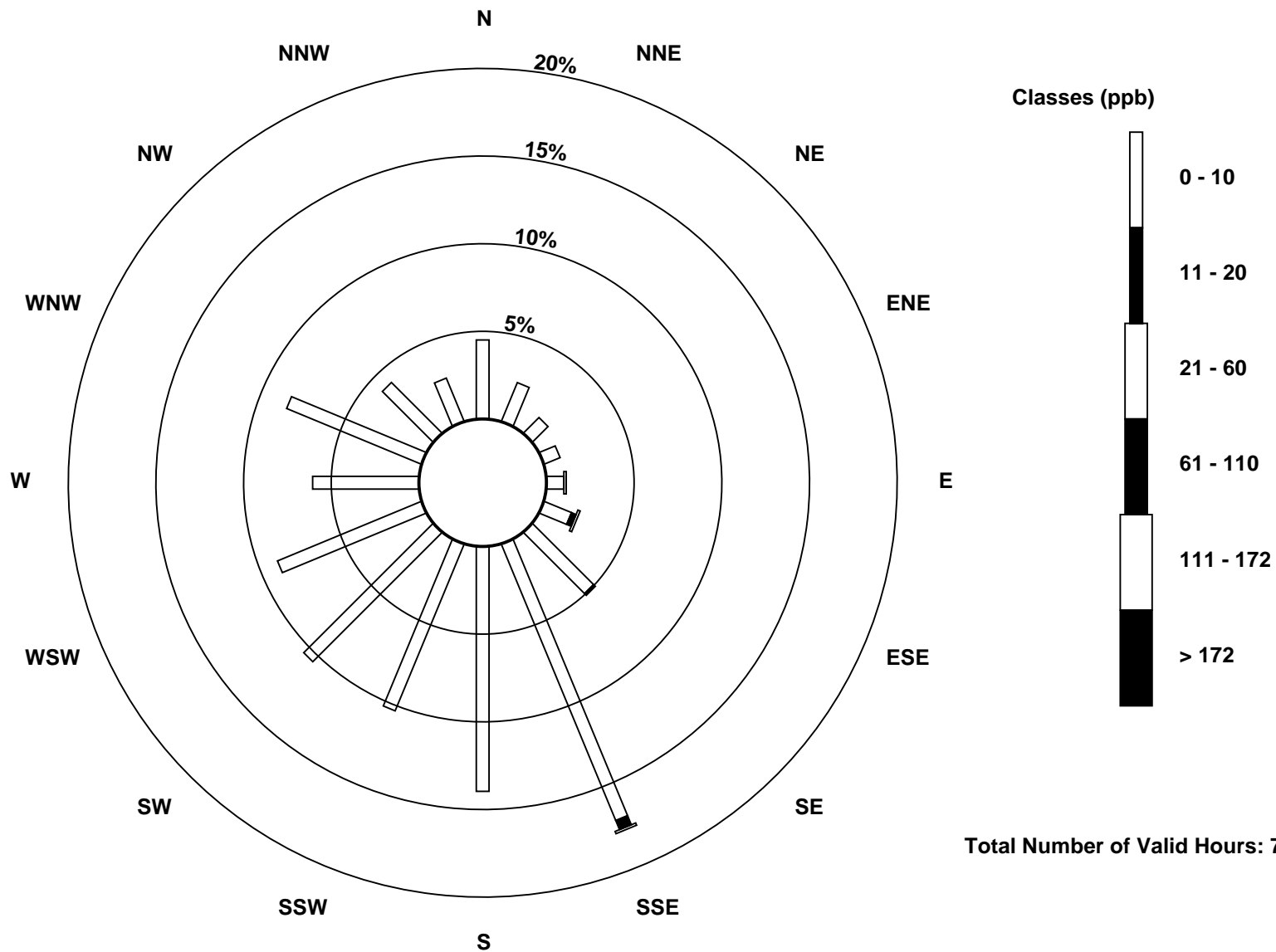
Total Number of Valid Hours: 709

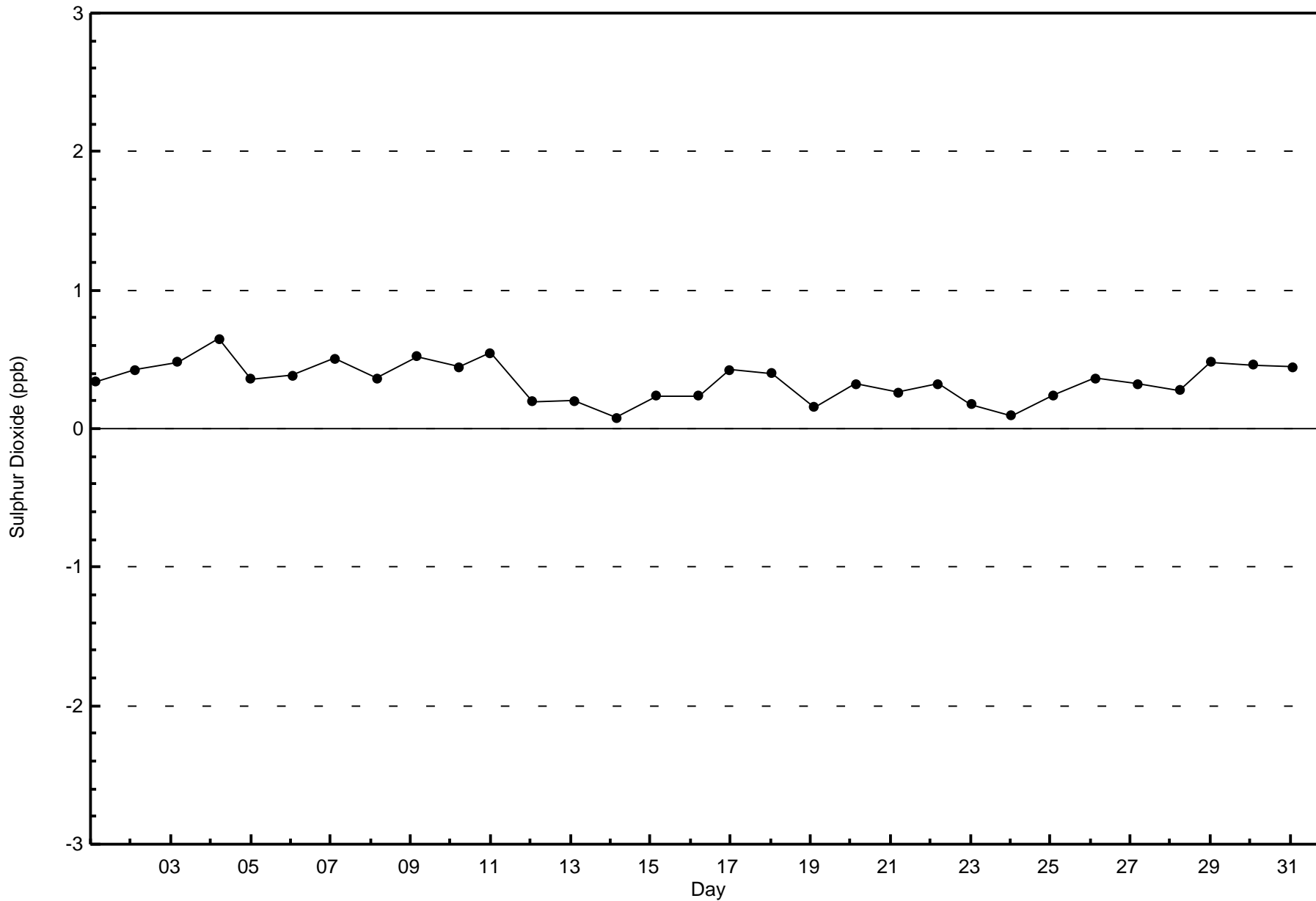
Total Number of Hours: 744

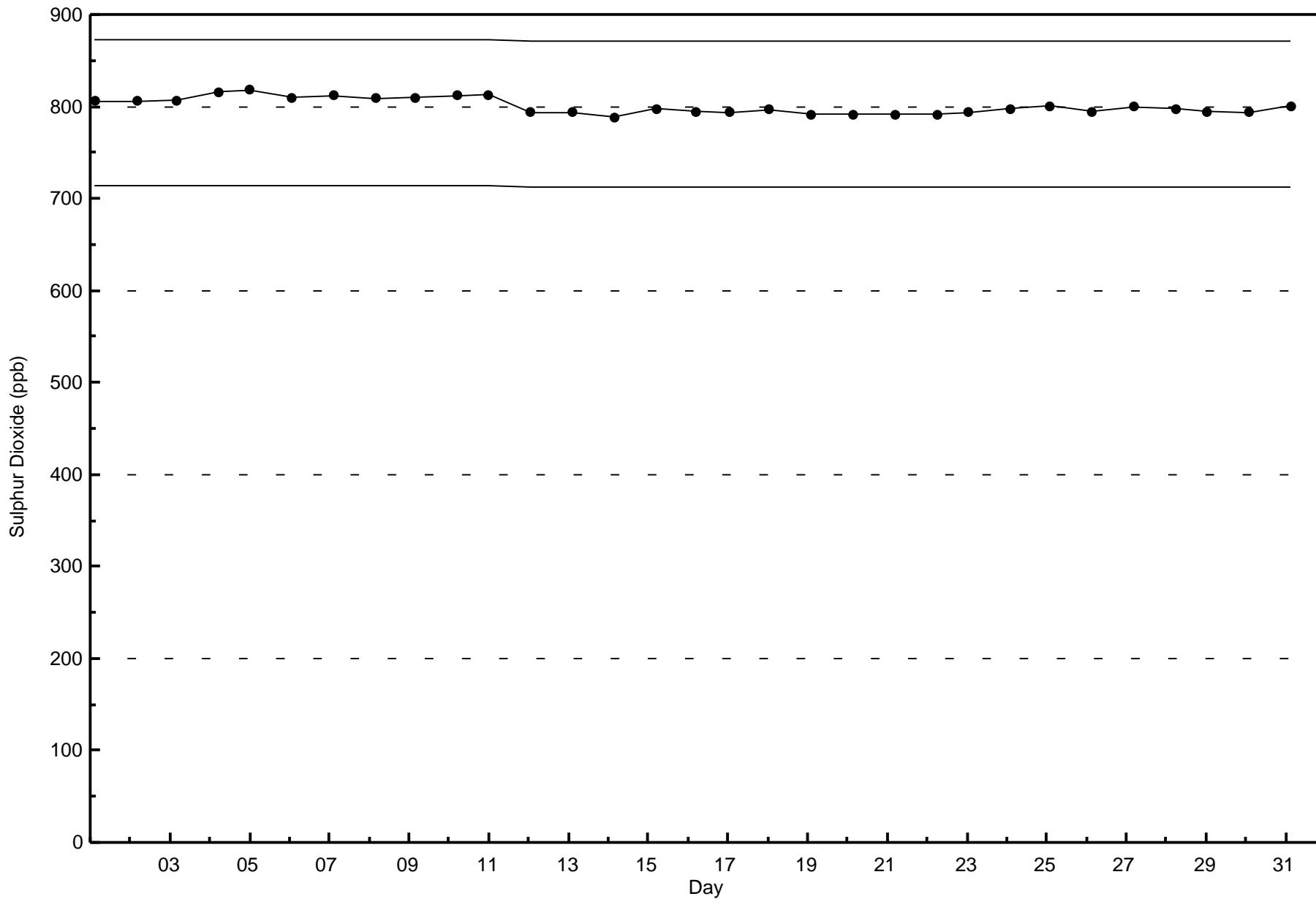


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Sulphur Dioxide (SO₂) - ppb
Waskow ohci Pimatisiwin (AMS 25)









Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H₂S) - ppb

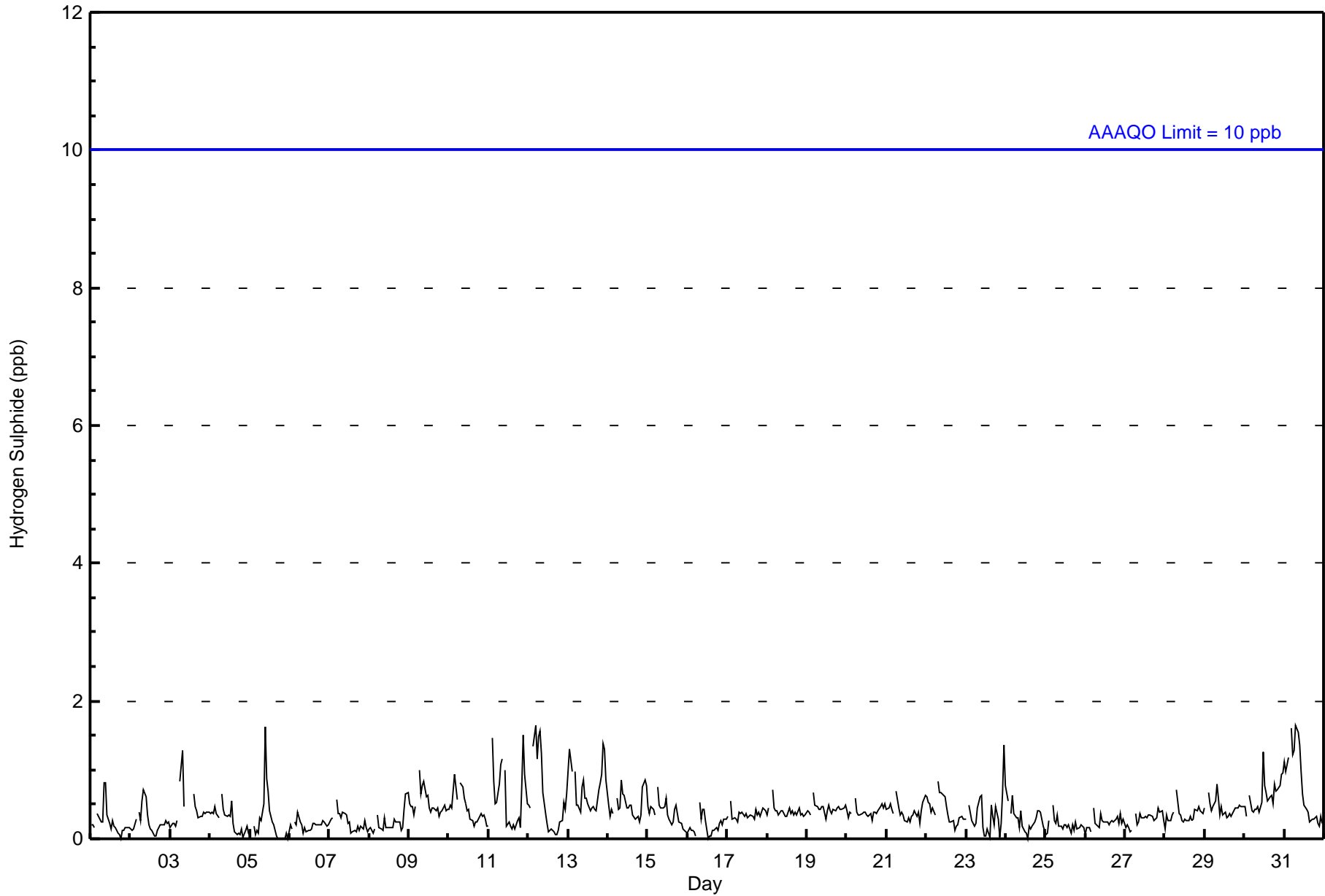
Waskow ohci Pimatisiwin - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 2 ppb on Aug 31 08:00 Maximum Daily Average: 0.7 ppb on Aug 31 | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 707 Hours of Missing Data: 37 Hours of Calibration: 36 Percent Operational Time: 99.9 | | | | | | | | | |
|--|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|--|----|----|----|----|----|----|-----------------|---------------|---------------|
| Minimum Value: 0 ppb on Aug 1 19:00 Minimum Daily Average: 0.2 ppb on Aug 16 Maximum Diurnal Average: 0.6 ppb at hour 8 Minimum Diurnal Average: 0.3 ppb at hour 17 Monthly Average: 0.4 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 O ₃ = 0 P ₉₀ = 1 P ₉₉ = 1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 2-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | Z | 1 | 1 | 0 | C | C | C | C | C | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | |
| 4-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | |
| 5-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 2 | |
| 6-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | |
| 7-Aug | 0 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | |
| 8-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.2 | 1 |
| 9-Aug | 1 | 0 | 0 | 0 | 0 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 1 | |
| 10-Aug | 0 | 0 | 0 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | |
| 11-Aug | 0 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | M | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 0.6 | 2 |
| 12-Aug | 0 | 0 | Z | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0.6 | 2 |
| 13-Aug | 1 | 1 | 1 | Z | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0.7 | 1 |
| 14-Aug | 0 | 0 | 0 | 0 | Z | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0.5 | 1 |
| 15-Aug | 0 | 0 | 0 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 17-Aug | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 18-Aug | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 19-Aug | 0 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 20-Aug | 0 | 0 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0.4 | 1 |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.4 | 1 |
| 22-Aug | 1 | 1 | 1 | 0 | 0 | 0 | Z | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 23-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.3 | 1 |
| 24-Aug | 1 | 1 | Z | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 25-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 26-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 29-Aug | 0 | Z | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 1 |
| 30-Aug | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.6 | 1 |
| 31-Aug | 1 | 1 | 1 | Z | 2 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 2 |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| Z - zerospan C - Calibration M - Maintenance Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Waskow ohci Pimatisiwin - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Waskow ohci Pimatisiwin - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2 | 707 | 100.00 | 100.00 |
| 3 - 4 | 0 | 0.00 | 100.00 |
| 5 - 7 | 0 | 0.00 | 100.00 |
| 8 - 11 | 0 | 0.00 | 100.00 |
| > 11 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Waskow ohci Pimatisiwin - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2 | 32 | 17 | 9 | 7 | 8 | 15 | 33 | 127 | 96 | 77 | 75 | 61 | 44 | 61 | 27 | 18 | 707 |
| 3 - 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 - 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 - 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 32 | 17 | 9 | 7 | 8 | 15 | 33 | 127 | 96 | 77 | 75 | 61 | 44 | 61 | 27 | 18 | 707 |

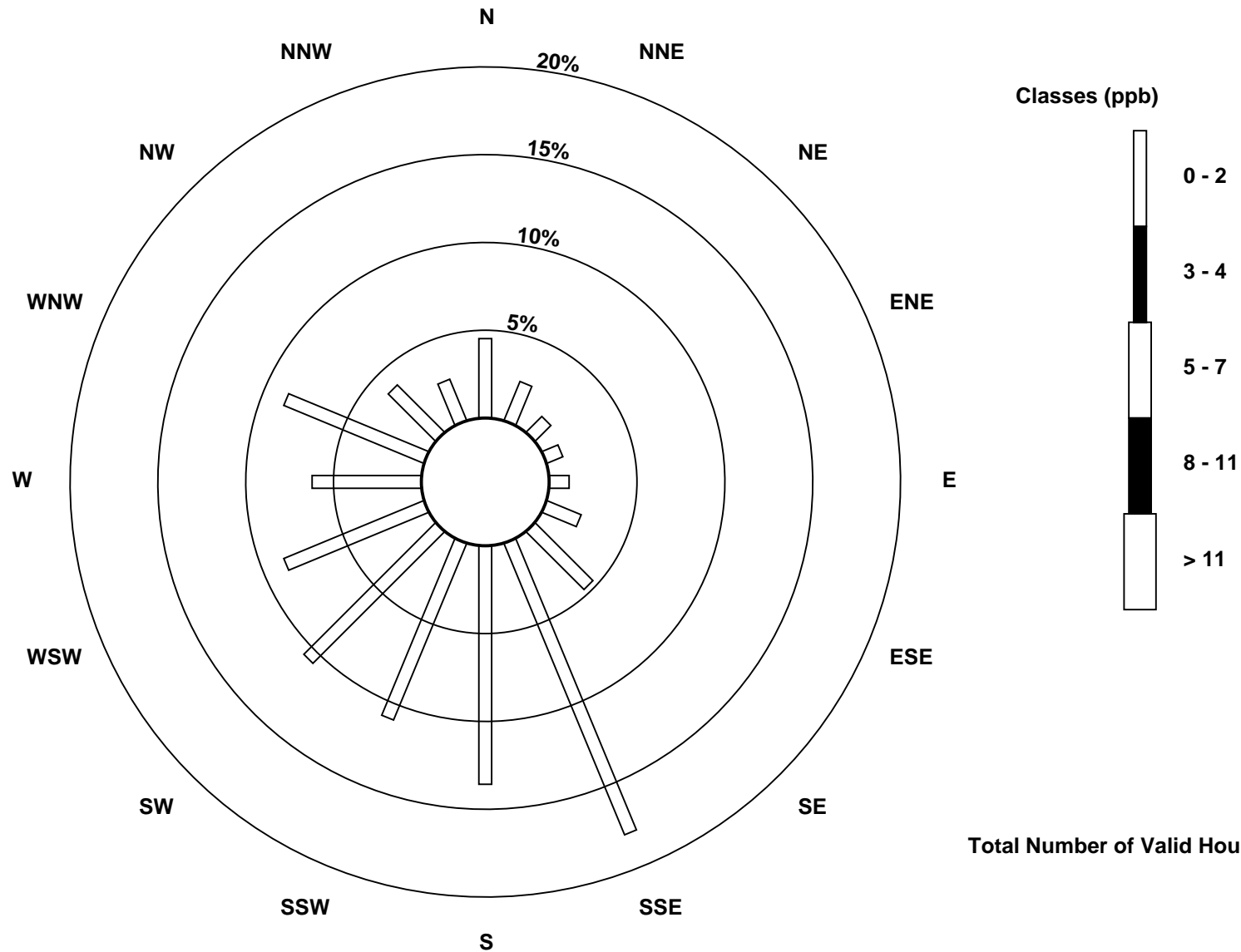
Total Number of Valid Hours: 707

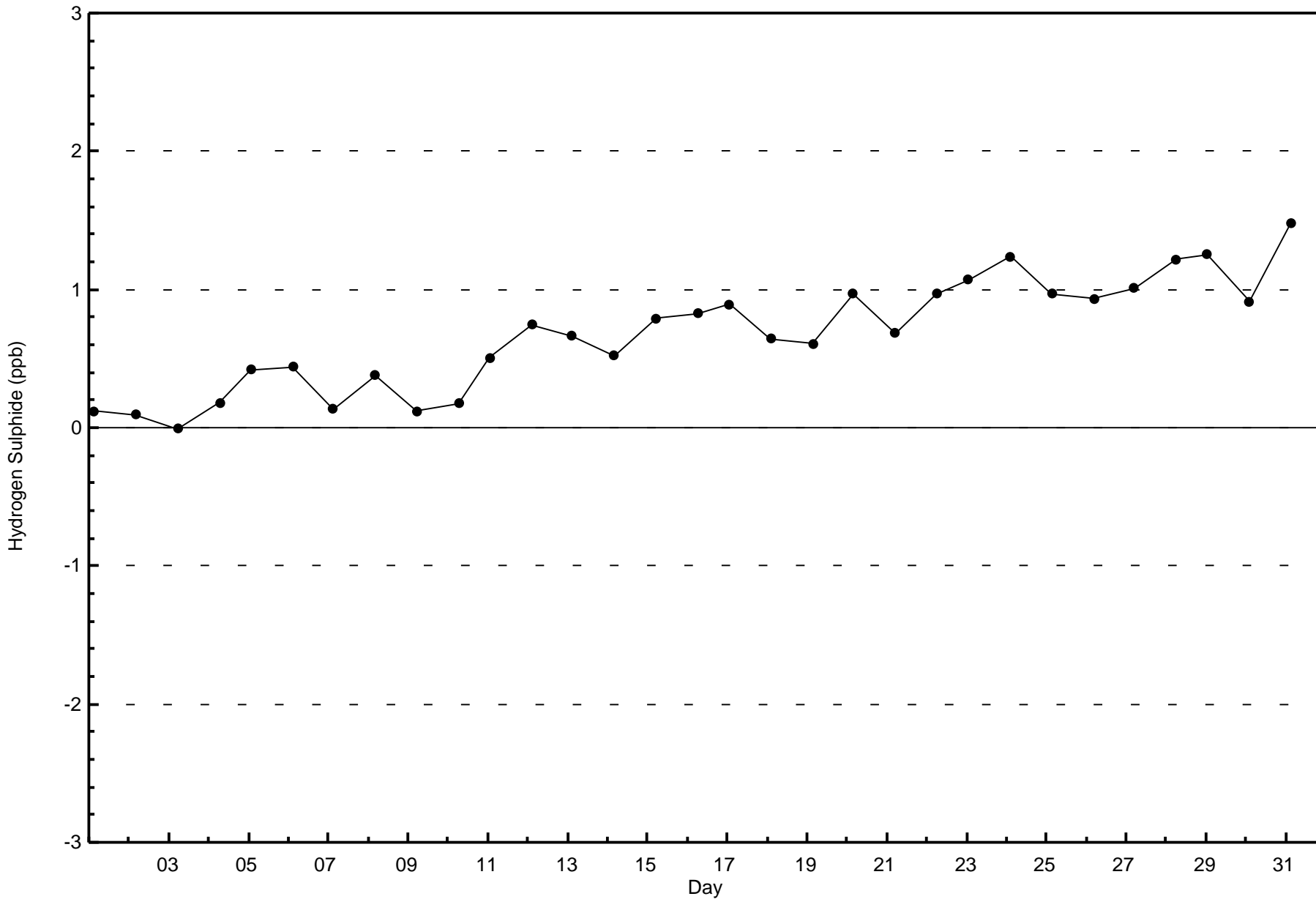
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Hydrogen Sulphide (H₂S) - ppb
Waskow ohci Pimatisiwin (AMS 25)

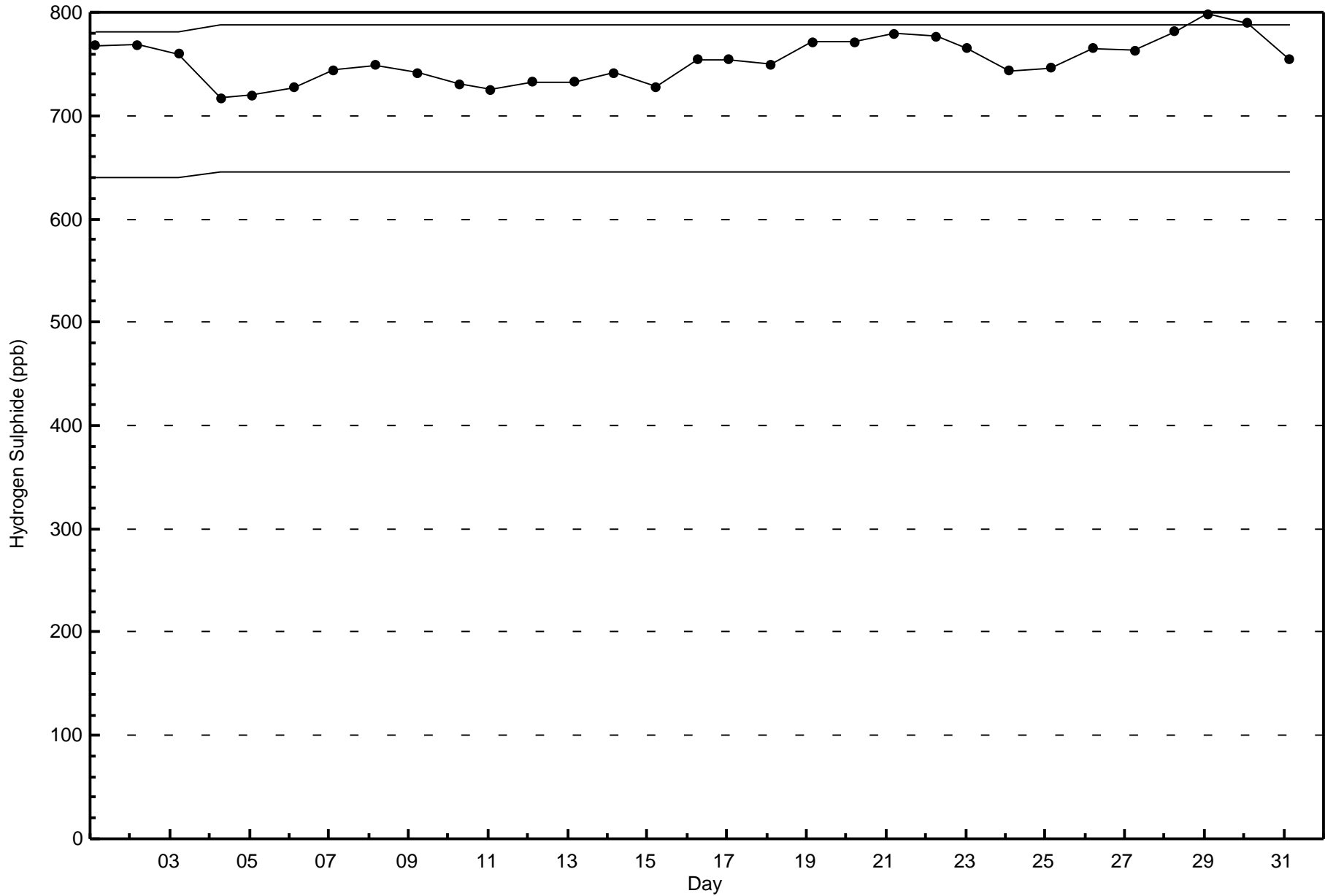






Wood Buffalo Environmental Association
Span Responses

Hydrogen Sulphide (H₂S) - ppb
Waskow ohci Pimatisiwin - August 2017



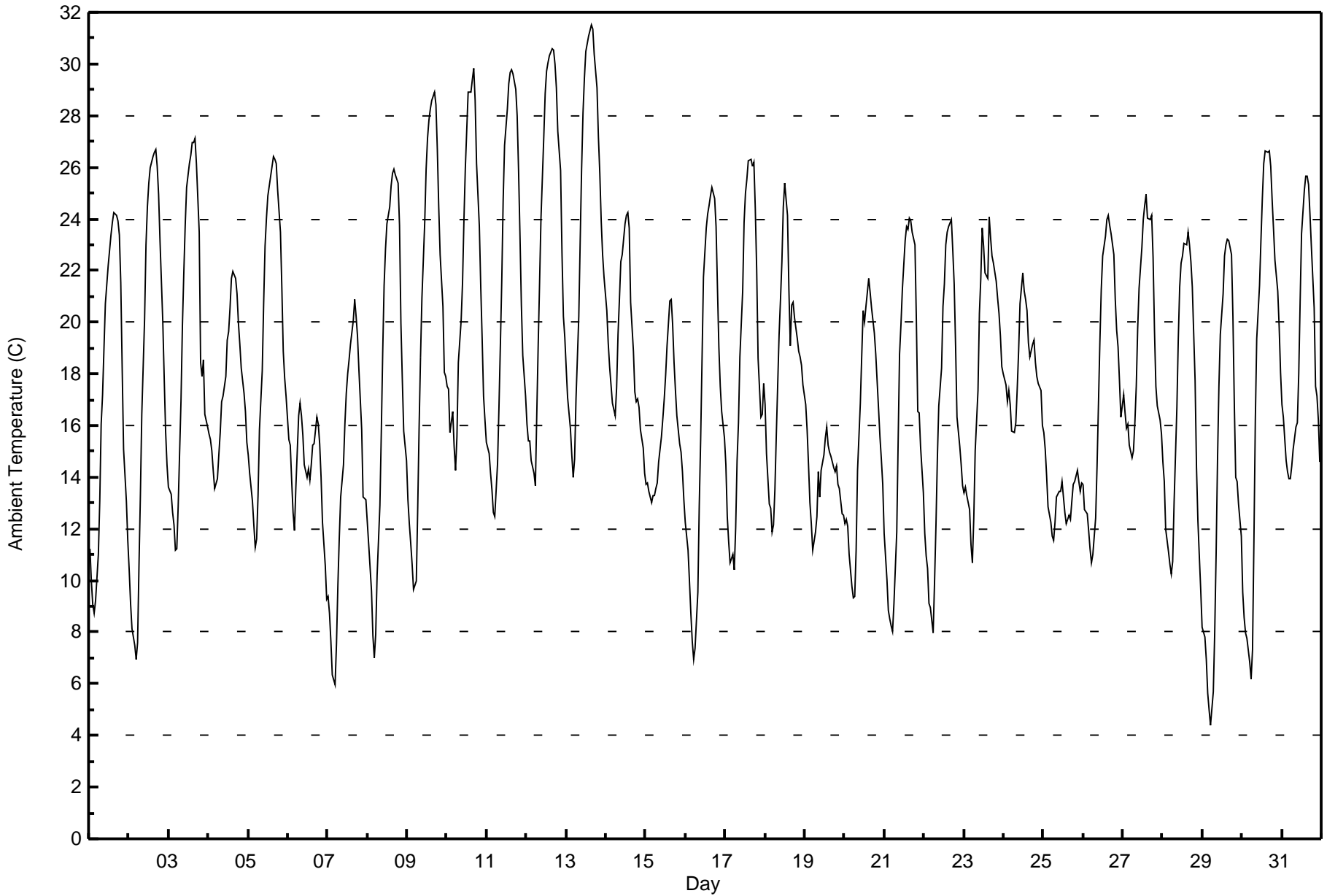


| Maximum Value: 31.5 C on Aug 13 16:00 Maximum Daily Average: 24.0 C on Aug 13 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: | 744 | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------------------|-------|------|---------------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|--|
| Minimum Value: 4.4 C on Aug 29 06:00 Minimum Daily Average: 13.3 C on Aug 25 | | | | | | | | | | | | | | | | | | | | | | Hours of Data: | 744 | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 23.7 C at hour 16 Minimum Diurnal Average: 11.1 C at hour 6 | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 17.89 C Percentiles: P ₁ = 6.8 P ₁₀ = 11.0 Q ₁ = 13.7 Median = 17.2 Q ₃ = 22.5 P ₉₀ = 25.8 P ₉₉ = 30.5 | | | | | | | | | | | | | | | | | | | | | | Hours of Calibration: | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: | 100.0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 11.2 | 10.0 | 9.1 | 8.7 | 9.2 | 11.0 | 13.1 | 16.1 | 17.2 | 19.0 | 20.7 | 22.2 | 22.8 | 23.4 | 23.8 | 24.2 | 24.1 | 23.9 | 23.4 | 21.5 | 18.2 | 15.1 | 13.1 | 11.6 | 17.2 | 24.2 | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 10.4 | 9.1 | 8.1 | 7.5 | 6.9 | 7.6 | 10.6 | 13.3 | 16.4 | 20.1 | 23.0 | 24.5 | 25.4 | 26.0 | 26.4 | 26.6 | 26.7 | 26.0 | 24.9 | 23.1 | 20.0 | 17.8 | 15.8 | 14.5 | 18.0 | 26.7 | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 13.6 | 13.3 | 12.6 | 12.1 | 11.2 | 11.2 | 12.9 | 17.0 | 19.8 | 21.9 | 23.7 | 25.2 | 26.1 | 26.4 | 27.0 | 26.9 | 27.1 | 26.1 | 23.5 | 18.4 | 17.9 | 18.5 | 16.5 | 15.9 | 19.4 | 27.1 | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 15.7 | 15.4 | 15.0 | 14.3 | 13.5 | 13.9 | 14.9 | 15.7 | 16.9 | 17.1 | 17.9 | 19.3 | 19.6 | 20.5 | 21.7 | 22.0 | 21.7 | 21.1 | 20.0 | 19.1 | 18.2 | 17.3 | 16.6 | 15.3 | 17.6 | 22.0 | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 14.9 | 14.1 | 13.1 | 12.1 | 11.3 | 11.6 | 13.3 | 15.9 | 18.1 | 20.7 | 23.0 | 24.0 | 24.9 | 25.7 | 26.1 | 26.4 | 26.3 | 26.1 | 25.1 | 23.5 | 21.3 | 18.9 | 17.8 | 17.1 | 19.6 | 26.4 | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 15.5 | 15.2 | 13.9 | 12.6 | 11.9 | 13.6 | 16.4 | 16.9 | 16.4 | 15.6 | 14.5 | 14.0 | 14.3 | 13.9 | 14.5 | 15.2 | 15.3 | 16.3 | 16.0 | 15.3 | 14.0 | 12.2 | 10.6 | 9.3 | 14.3 | 16.9 | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 9.4 | 8.7 | 7.7 | 6.4 | 6.0 | 7.5 | 9.8 | 11.7 | 13.3 | 14.5 | 16.1 | 17.2 | 18.0 | 18.6 | 19.1 | 20.1 | 20.9 | 20.2 | 19.5 | 18.2 | 15.8 | 13.2 | 13.2 | 13.1 | 14.1 | 20.9 | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 12.3 | 11.4 | 9.6 | 7.9 | 7.0 | 7.9 | 10.2 | 12.9 | 15.7 | 18.8 | 21.4 | 22.8 | 23.8 | 24.5 | 25.3 | 25.8 | 25.9 | 25.7 | 25.4 | 23.8 | 20.0 | 17.8 | 15.8 | 14.7 | 17.8 | 25.9 | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 13.1 | 12.2 | 11.4 | 10.6 | 9.6 | 10.0 | 12.8 | 16.0 | 18.7 | 20.9 | 23.9 | 25.9 | 27.1 | 27.8 | 28.3 | 28.6 | 28.9 | 28.4 | 26.7 | 24.5 | 22.6 | 20.6 | 18.1 | 17.9 | 20.2 | 28.9 | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 17.5 | 17.4 | 15.7 | 16.6 | 15.2 | 14.3 | 15.6 | 18.5 | 20.1 | 21.6 | 24.0 | 26.0 | 27.5 | 28.9 | 28.9 | 29.4 | 29.9 | 28.6 | 26.2 | 23.7 | 21.4 | 19.3 | 17.2 | 16.2 | 21.6 | 29.9 | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 15.3 | 14.9 | 14.1 | 13.5 | 12.6 | 12.5 | 14.5 | 16.7 | 19.1 | 21.6 | 24.7 | 26.8 | 28.3 | 29.2 | 29.7 | 29.8 | 29.6 | 29.0 | 28.0 | 25.9 | 23.4 | 20.7 | 18.7 | 17.1 | 21.5 | 29.8 | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 16.0 | 15.4 | 15.4 | 14.6 | 14.2 | 13.7 | 16.4 | 19.1 | 21.5 | 24.0 | 27.2 | 28.9 | 29.7 | 30.1 | 30.3 | 30.6 | 30.6 | 30.0 | 29.1 | 27.4 | 25.9 | 22.7 | 20.2 | 19.4 | 23.0 | 30.6 | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 18.2 | 17.1 | 15.9 | 14.9 | 14.0 | 14.7 | 17.0 | 20.2 | 23.2 | 25.9 | 28.1 | 29.4 | 30.5 | 31.1 | 31.3 | 31.5 | 31.3 | 30.4 | 29.1 | 27.2 | 25.8 | 23.9 | 22.6 | 21.7 | 24.0 | 31.5 | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 20.4 | 19.2 | 18.3 | 17.6 | 16.9 | 16.4 | 17.4 | 19.5 | 20.9 | 22.4 | 22.6 | 23.8 | 24.1 | 24.2 | 23.6 | 20.8 | 18.9 | 17.3 | 16.9 | 17.0 | 16.7 | 15.9 | 15.1 | 14.2 | 19.2 | 24.2 | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 13.7 | 13.8 | 13.4 | 13.0 | 13.3 | 13.3 | 13.5 | 13.8 | 14.6 | 15.6 | 16.3 | 17.0 | 17.9 | 19.1 | 20.8 | 20.9 | 19.9 | 18.4 | 17.4 | 16.4 | 15.3 | 15.0 | 14.2 | 13.1 | 15.8 | 20.9 | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 12.3 | 11.1 | 10.0 | 8.7 | 7.7 | 7.0 | 7.4 | 9.6 | 12.9 | 15.5 | 18.6 | 21.7 | 23.6 | 24.2 | 24.5 | 24.9 | 25.2 | 24.8 | 23.7 | 21.3 | 19.0 | 17.5 | 16.6 | 15.5 | 16.8 | 25.2 | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 14.5 | 12.5 | 11.5 | 10.7 | 11.0 | 10.4 | 12.0 | 14.7 | 16.1 | 18.7 | 21.2 | 23.9 | 25.0 | 25.6 | 26.3 | 26.3 | 26.0 | 26.2 | 24.4 | 22.0 | 18.6 | 16.3 | 16.4 | 17.6 | 18.7 | 26.3 | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 16.8 | 14.9 | 12.9 | 12.8 | 11.9 | 12.2 | 13.5 | 15.6 | 19.5 | 20.9 | 22.3 | 24.5 | 25.4 | 24.1 | 21.3 | 19.1 | 20.6 | 20.8 | 20.2 | 19.4 | 18.9 | 18.6 | 18.4 | 17.6 | 18.4 | 25.4 | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 16.8 | 15.9 | 14.5 | 13.0 | 12.2 | 11.2 | 11.9 | 12.4 | 14.2 | 13.3 | 14.3 | 14.9 | 15.5 | 15.9 | 15.3 | 15.0 | 14.8 | 14.4 | 14.2 | 14.4 | 13.7 | 13.5 | 12.6 | 12.5 | 14.0 | 16.8 | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 12.2 | 12.4 | 12.1 | 11.0 | 9.8 | 9.3 | 9.4 | 11.2 | 14.3 | 16.9 | 18.7 | 20.4 | 20.0 | 20.6 | 21.7 | 21.2 | 20.5 | 20.1 | 19.6 | 18.8 | 16.6 | 15.6 | 14.7 | 13.7 | 15.9 | 21.7 | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 11.8 | 10.0 | 8.9 | 8.5 | 8.2 | 8.0 | 9.1 | 11.9 | 15.4 | 18.8 | 19.9 | 21.3 | 23.1 | 23.7 | 23.6 | 24.0 | 23.9 | 23.5 | 23.0 | 20.1 | 16.5 | 16.5 | 15.2 | 13.4 | 16.6 | 24.0 | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 11.8 | 11.0 | 10.5 | 9.1 | 8.9 | 8.0 | 10.0 | 12.2 | 14.8 | 16.8 | 18.2 | 20.6 | 21.5 | 23.0 | 23.5 | 23.7 | 24.0 | 22.8 | 21.5 | 19.1 | 16.3 | 15.2 | 14.5 | 13.7 | 16.3 | 24.0 | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 13.4 | 13.6 | 13.3 | 12.8 | 11.4 | 10.7 | 12.4 | 15.0 | 17.3 | 20.4 | 21.7 | 23.6 | 23.0 | 21.9 | 21.7 | 24.1 | 23.3 | 22.6 | 22.3 | 21.6 | 20.9 | 20.3 | 19.4 | 18.3 | 18.5 | 24.1 | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 18.0 | 17.6 | 16.9 | 17.4 | 16.8 | 15.8 | 15.7 | 16.1 | 17.4 | 18.9 | 20.7 | 21.9 | 21.2 | 20.9 | 20.4 | 19.2 | 18.7 | 19.2 | 19.3 | 18.4 | 17.9 | 17.6 | 17.4 | 16.0 | 18.3 | 21.9 | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 15.7 | 15.1 | 14.0 | 12.8 | 12.3 | 11.7 | 11.6 | 12.2 | 13.2 | 13.4 | 13.5 | 13.8 | 13.2 | 12.7 | 12.2 | 12.5 | 12.4 | 13.1 | 13.7 | 13.8 | 14.2 | 13.9 | 13.5 | 13.8 | 13.3 | 15.7 | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 13.7 | 12.8 | 12.6 | 11.9 | 11.2 | 10.7 | 11.0 | 12.4 | 14.4 | 16.8 | 19.2 | 21.3 | 22.6 | 23.3 | 24.0 | 24.2 | 23.7 | 23.4 | 22.6 | 20.9 | 19.7 | 19.0 | 17.7 | 16.3 | 17.7 | 24.2 | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 17.2 | 16.5 | 15.9 | 16.0 | 15.2 | 14.7 | 15.0 | 16.1 | 17.5 | 19.7 | 21.3 | 22.9 | 24.0 | 24.5 | 25.0 | 24.0 | 24.0 | 24.1 | 22.5 | 19.7 | 17.5 | 16.7 | 16.2 | 15.7 | 19.3 | 25.0 | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 14.6 | 13.8 | 12.0 | 11.1 | 10.6 | 10.2 | 10.7 | 13.0 | 16.7 | 19.4 | 21.4 | 22.3 | 22.6 | 23.0 | 23.0 | 23.5 | 23.0 | 22.4 | 21.4 | 17.8 | 14.4 | 12.3 | 11.0 | 9.7 | 16.7 | 23.5 | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 8.2 | 7.8 | 7.0 | 5.6 | 5.0 | 4.4 | 5.7 | 8.0 | 11.0 | 14.6 | 17.5 | 19.5 | 21.1 | 22.6 | 23.0 | 23.2 | 23.1 | 22.6 | 20.3 | 16.8 | 14.0 | 13.8 | 13.0 | 11.7 | 14.1 | 23.2 | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 9.5 | 8.6 | 8.0 | 7.8 | 6.8 | 6.2 | 7.3 | 11.5 | 16.2 | 19.3 | 21.4 | 23.2 | 24.8 | 26.2 | 26.7 | 26.6 | 26.6 | 26.0 | 24.7 | 23.6 | 22.4 | 21.2 | 19.8 | 18.1 | 18.0 | 26.7 | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 16.8 | 16.3 | 14.7 | 14.2 | 13.9 | 14.0 | 14.4 | 15.1 | 16.0 | 16.1 | 18.0 | 20.8 | 23.4 | 25.1 | 25.7 | 25.6 | 25.3 | 24.2 | 23.0 | 20.6 | 17.5 | 17.1 | 16.2 | 14.6 | 18.7 | 25.7 | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | 14.2 | 13.5 | 12.5 | 11.8 | 11.2 | 11.1 | 12.4 | 14.5 | 16.7 | 18.7 | 20.5 | 22.1 | 22.9 | 23.4 | 23.7 | 23.7 | 23.6 | 23.2 | 22.2 | 20.4 | 18.5 | 17.2 | 16.1 | 15.1 | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | | | | | 20.4 | 19.2 | 18.3 | 17.6 | 16.9 | 16.4 | 17.4 | 20.2 | 23.2 | 25.9 | 28.1 | 29.4 | 30.5 | 31.1 | 31.3 | 31.5 | 31.3 | 30.4 | 29.1 | 27.4 | 25.9 | 23.9 | 22.6 | 21.7 | Diurnal Maximum | |



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Waskow ohci Pimatisiwin - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Waskow ohci Pimatisiwin - August 2017**

| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 57 | 7.66 | 7.66 |
| 10 - 20 | 419 | 56.32 | 63.98 |
| > 20 | 268 | 36.02 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



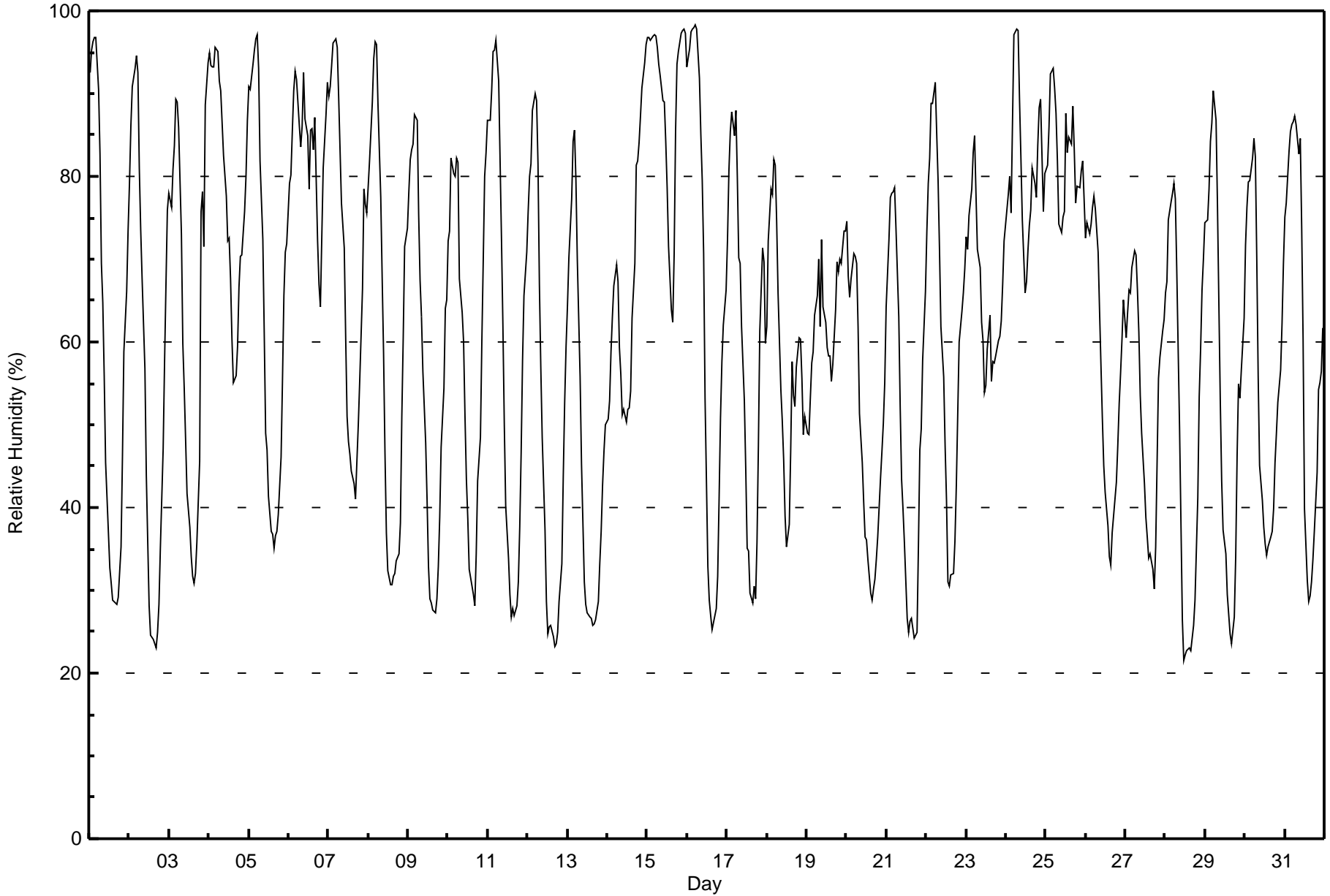
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Waskow ohci Pimatisiwin - August 2017

| Maximum Value: 98 % on Aug 16 06:00 Maximum Daily Average: 89.0 % on Aug 15 | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|-----------------|------|---------------|---------------|
| Minimum Value: 22 % on Aug 28 12:00 Minimum Daily Average: 47.0 % on Aug 13 Maximum Diurnal Average: 86.5 % at hour 6 Minimum Diurnal Average: 40.0 % at hour 16 Monthly Average: 62.1 % Percentiles: P ₁ = 23 P ₁₀ = 30 Q ₁ = 43 Median = 64 O ₃ = 80 P ₉₀ = 91 P ₉₉ = 98 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 93 | 95 | 96 | 97 | 97 | 91 | 83 | 70 | 65 | 56 | 45 | 37 | 33 | 31 | 29 | 29 | 28 | 29 | 32 | 35 | 46 | 59 | 66 | 73 | 58.9 | 97 |
| 2-Aug | 79 | 86 | 91 | 93 | 95 | 93 | 81 | 74 | 68 | 57 | 44 | 36 | 28 | 25 | 24 | 24 | 23 | 25 | 28 | 35 | 47 | 58 | 67 | 76 | 56.4 | 95 |
| 3-Aug | 78 | 76 | 81 | 84 | 89 | 89 | 86 | 73 | 60 | 54 | 48 | 42 | 38 | 34 | 32 | 31 | 32 | 36 | 46 | 76 | 78 | 72 | 89 | 94 | 63.2 | 94 |
| 4-Aug | 95 | 93 | 93 | 93 | 96 | 95 | 92 | 90 | 87 | 83 | 78 | 72 | 73 | 68 | 60 | 55 | 56 | 59 | 67 | 70 | 71 | 76 | 80 | 87 | 78.6 | 96 |
| 5-Aug | 91 | 91 | 94 | 95 | 97 | 97 | 93 | 82 | 72 | 61 | 49 | 47 | 41 | 37 | 37 | 35 | 37 | 37 | 39 | 46 | 55 | 66 | 71 | 72 | 64.2 | 97 |
| 6-Aug | 79 | 80 | 85 | 90 | 93 | 92 | 86 | 83 | 86 | 93 | 87 | 85 | 78 | 86 | 86 | 83 | 87 | 72 | 67 | 64 | 73 | 81 | 87 | 91 | 83.2 | 93 |
| 7-Aug | 90 | 91 | 93 | 96 | 97 | 96 | 90 | 83 | 77 | 71 | 61 | 51 | 48 | 46 | 44 | 43 | 41 | 46 | 50 | 55 | 66 | 79 | 77 | 76 | 69.4 | 97 |
| 8-Aug | 79 | 82 | 89 | 94 | 96 | 96 | 89 | 77 | 68 | 59 | 47 | 37 | 32 | 31 | 31 | 32 | 32 | 33 | 34 | 38 | 51 | 61 | 72 | 74 | 59.7 | 96 |
| 9-Aug | 78 | 82 | 83 | 84 | 87 | 87 | 75 | 67 | 63 | 56 | 48 | 41 | 33 | 29 | 28 | 28 | 27 | 29 | 33 | 39 | 47 | 54 | 64 | 65 | 55.4 | 87 |
| 10-Aug | 72 | 73 | 82 | 80 | 80 | 82 | 82 | 68 | 64 | 60 | 51 | 43 | 39 | 33 | 31 | 30 | 28 | 34 | 43 | 48 | 60 | 70 | 80 | 83 | 59.0 | 83 |
| 11-Aug | 87 | 87 | 90 | 95 | 95 | 96 | 92 | 82 | 72 | 62 | 50 | 40 | 34 | 30 | 27 | 28 | 27 | 28 | 31 | 38 | 47 | 58 | 66 | 71 | 59.6 | 96 |
| 12-Aug | 76 | 80 | 82 | 88 | 90 | 89 | 81 | 67 | 57 | 48 | 37 | 29 | 25 | 26 | 26 | 24 | 23 | 23 | 25 | 29 | 33 | 44 | 53 | 59 | 50.6 | 90 |
| 13-Aug | 64 | 70 | 77 | 84 | 86 | 80 | 70 | 56 | 45 | 38 | 31 | 28 | 27 | 27 | 26 | 26 | 26 | 29 | 33 | 37 | 43 | 47 | 50 | 47.0 | 86 | |
| 14-Aug | 51 | 53 | 59 | 63 | 67 | 69 | 67 | 59 | 56 | 51 | 52 | 50 | 52 | 52 | 54 | 63 | 70 | 81 | 82 | 84 | 87 | 91 | 94 | 96 | 66.8 | 96 |
| 15-Aug | 97 | 97 | 96 | 97 | 97 | 97 | 96 | 94 | 92 | 89 | 89 | 84 | 79 | 72 | 64 | 62 | 71 | 86 | 94 | 95 | 97 | 98 | 98 | 97 | 89.0 | 98 |
| 16-Aug | 93 | 95 | 97 | 98 | 98 | 98 | 98 | 92 | 85 | 79 | 71 | 53 | 33 | 29 | 27 | 25 | 26 | 28 | 32 | 41 | 51 | 58 | 62 | 66 | 64.0 | 98 |
| 17-Aug | 72 | 81 | 85 | 88 | 85 | 88 | 80 | 70 | 69 | 62 | 53 | 45 | 35 | 35 | 30 | 29 | 30 | 29 | 36 | 47 | 61 | 71 | 70 | 60 | 58.8 | 88 |
| 18-Aug | 62 | 72 | 79 | 78 | 82 | 81 | 75 | 66 | 54 | 51 | 46 | 39 | 35 | 38 | 47 | 58 | 54 | 52 | 57 | 61 | 60 | 56 | 49 | 51 | 58.4 | 82 |
| 19-Aug | 49 | 49 | 53 | 57 | 59 | 63 | 66 | 70 | 62 | 72 | 64 | 62 | 59 | 58 | 58 | 55 | 57 | 64 | 70 | 68 | 70 | 69 | 73 | 73 | 62.7 | 73 |
| 20-Aug | 75 | 68 | 65 | 68 | 71 | 70 | 69 | 62 | 51 | 45 | 41 | 37 | 36 | 34 | 30 | 29 | 30 | 31 | 34 | 36 | 44 | 47 | 50 | 55 | 49.1 | 75 |
| 21-Aug | 64 | 72 | 78 | 78 | 78 | 79 | 74 | 63 | 52 | 43 | 40 | 36 | 27 | 25 | 26 | 27 | 25 | 24 | 25 | 35 | 47 | 49 | 58 | 66 | 49.6 | 79 |
| 22-Aug | 73 | 79 | 82 | 89 | 89 | 91 | 85 | 79 | 71 | 62 | 56 | 48 | 41 | 31 | 30 | 32 | 32 | 36 | 43 | 51 | 60 | 64 | 66 | 69 | 60.8 | 91 |
| 23-Aug | 73 | 71 | 75 | 78 | 83 | 85 | 78 | 71 | 69 | 62 | 60 | 54 | 55 | 59 | 63 | 55 | 58 | 57 | 58 | 60 | 61 | 63 | 67 | 72 | 66.2 | 85 |
| 24-Aug | 74 | 78 | 80 | 76 | 86 | 97 | 98 | 98 | 89 | 82 | 75 | 66 | 67 | 71 | 74 | 76 | 81 | 79 | 77 | 84 | 88 | 89 | 76 | 80 | 80.9 | 98 |
| 25-Aug | 81 | 81 | 86 | 92 | 93 | 91 | 88 | 82 | 74 | 73 | 75 | 76 | 88 | 83 | 85 | 84 | 88 | 83 | 77 | 79 | 79 | 81 | 82 | 77 | 82.4 | 93 |
| 26-Aug | 73 | 74 | 73 | 74 | 76 | 78 | 76 | 71 | 64 | 57 | 51 | 45 | 42 | 38 | 34 | 33 | 37 | 39 | 43 | 47 | 53 | 56 | 60 | 65 | 56.6 | 78 |
| 27-Aug | 61 | 64 | 66 | 66 | 69 | 71 | 70 | 66 | 61 | 54 | 49 | 43 | 39 | 36 | 34 | 34 | 33 | 30 | 35 | 45 | 56 | 58 | 61 | 63 | 52.7 | 71 |
| 28-Aug | 66 | 67 | 75 | 77 | 78 | 79 | 77 | 69 | 50 | 38 | 26 | 22 | 22 | 23 | 23 | 23 | 24 | 26 | 29 | 41 | 53 | 59 | 66 | 70 | 49.3 | 79 |
| 29-Aug | 74 | 75 | 79 | 84 | 86 | 90 | 87 | 77 | 65 | 53 | 43 | 37 | 34 | 30 | 27 | 25 | 24 | 27 | 34 | 46 | 55 | 53 | 57 | 63 | 55.2 | 90 |
| 30-Aug | 72 | 76 | 79 | 79 | 82 | 85 | 82 | 70 | 56 | 45 | 41 | 38 | 36 | 34 | 35 | 36 | 37 | 40 | 46 | 49 | 53 | 57 | 62 | 69 | 56.7 | 85 |
| 31-Aug | 75 | 77 | 83 | 85 | 86 | 87 | 87 | 86 | 83 | 85 | 74 | 60 | 40 | 31 | 29 | 29 | 31 | 34 | 37 | 44 | 54 | 55 | 56 | 62 | 61.3 | 87 |
| | | | | | | | | | | | | | | | | | | | 75.6 78.0 81.6 83.9 85.9 86.5 82.3 74.7 67.3 61.4 54.2 47.8 43.5 41.3 40.4 40.0 41.2 42.8 46.2 52.4 59.4 64.2 68.5 71.8 | | | | Diurnal Average | | | |
| | | | | | | | | | | | | | | | | | | | 97 97 97 98 98 98 98 98 98 92 93 89 85 88 86 86 84 88 86 94 95 97 98 98 97 | | | | Diurnal Maximum | | | |





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Waskow ohci Pimatisiwin - August 2017

| Concentration Ranges (%) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 0 | 0.00 | 0.00 |
| 20 - 40 | 169 | 22.72 | 22.72 |
| 40 - 60 | 156 | 20.97 | 43.68 |
| 60 - 80 | 230 | 30.91 | 74.60 |
| 80 - 100 | 189 | 25.40 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744

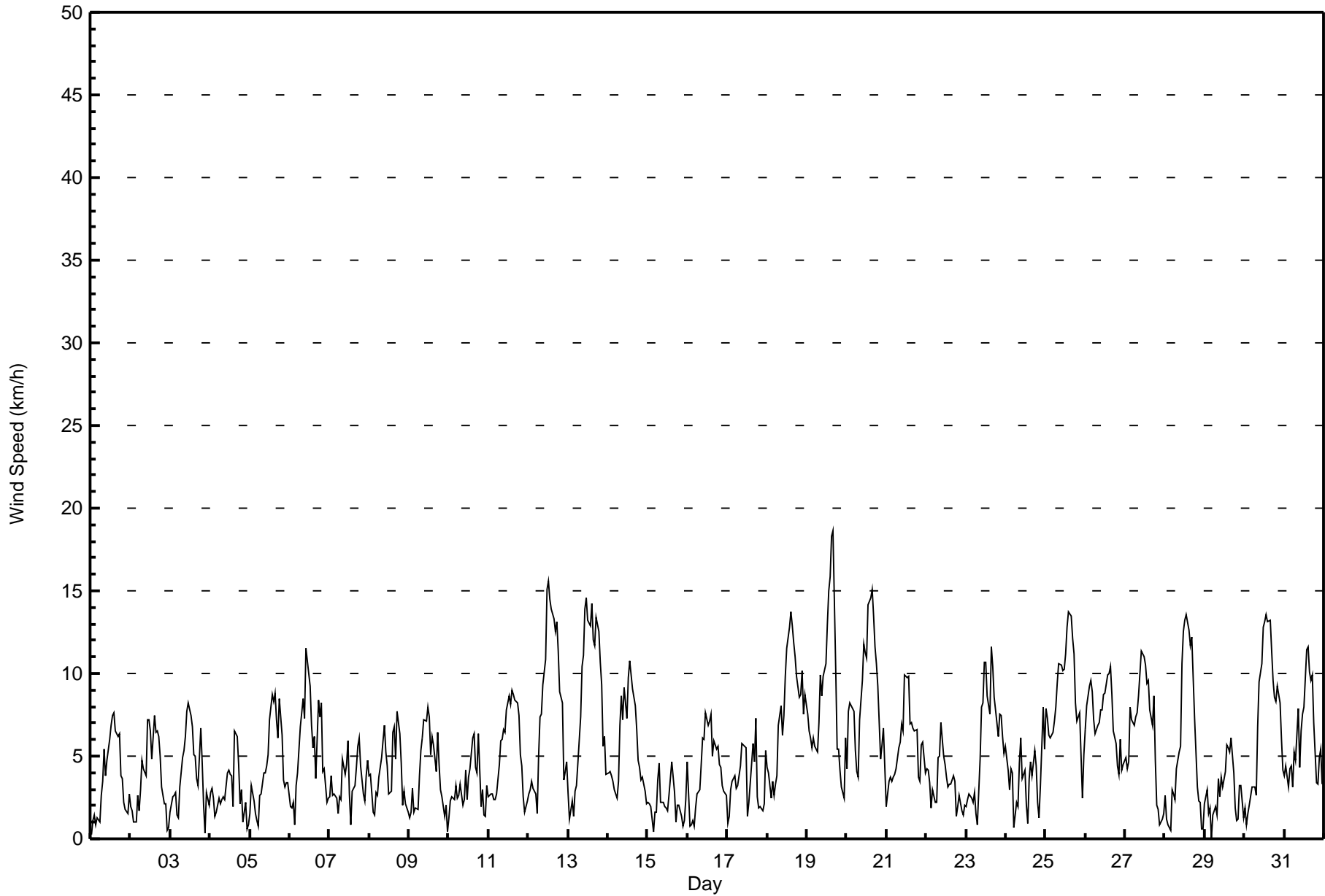


| | | |
|--|--|---------------------------------|
| Maximum Speed: 19 km/h on Aug 19 17:00 | Maximum Daily Speed Average: 8.3 km/h on Aug 13 | Hours in Service: 744 |
| Minimum Speed Value: 0 km/h on Aug 29 05:00 | Minimum Daily Speed Average: 0.2 km/h on Aug 4 | Hours of Data: 744 |
| Maximum Diurnal Speed Average: 3.8 km/h at hour 16 | Minimum Diurnal Speed Average: 1.9 km/h at hour 2 | Hours of Missing Data: 0 |
| Monthly Average Velocity: 2.6 km/h 206.4 deg | Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 4 Q ₃ = 7 P ₉₀ = 10 P ₉₉ = 15 | Percent Operational Time: 100.0 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
|--------|-------------------------------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|------|------|---------------|---------------|-------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | SW0 | SW1 | SW1 | WNW1 | SW1 | NW1 | NNW3 | N3 | N5 | N4 | NNE5 | NE6 | NE7 | NNE7 | NE8 | NNE6 | NNE6 | NNE6 | ENE4 | NE4 | NW2 | W2 | W2 | WNW3 | NNE2.8 | NE8 | |
| 2-Aug | W2 | WSW2 | W1 | SW1 | SW3 | SSW2 | SSE3 | S5 | SSE4 | SE4 | SE7 | SSE7 | SSW7 | SW5 | SSW7 | WSW6 | SW6 | SSW6 | SSW5 | SW3 | SW2 | SW2 | E0 | SSW1 | SSW3.1 | SSW7 | |
| 3-Aug | WSW2 | WSW3 | SW3 | SSW3 | SSW1 | S1 | S3 | SSE5 | SSW5 | SSE6 | SE8 | SSE8 | SE7 | SE7 | S5 | WSW5 | S4 | S3 | NNW7 | N5 | S2 | WNW0 | NNW3 | NW2 | S2.2 | SSE8 | |
| 4-Aug | W3 | WNW3 | WNW2 | WSW1 | WNW2 | WNW2 | NW2 | WNW2 | NE3 | NNE2 | NNW4 | NNE4 | ENE4 | E4 | E2 | SSE7 | SSE6 | S4 | S2 | S3 | SSW1 | NNW2 | W1 | SW1 | WSW0.2 | SSE7 | |
| 5-Aug | SSW2 | NW3 | WSW2 | W2 | W1 | WSW1 | S3 | SSE3 | SSE4 | ESE4 | ESE4 | ESE4 | SSE7 | SSE9 | SSE8 | SSE9 | S7 | SW6 | S8 | S6 | SSW4 | S3 | SSE3 | SSW3 | S3.6 | SSE9 | |
| 6-Aug | SW2 | WNW2 | WSW2 | W1 | WNW3 | N4 | N7 | N8 | N9 | N7 | N12 | N10 | N9 | N7 | N6 | NNW6 | NNW4 | NNE8 | NNE7 | N8 | NW4 | NW4 | NNW2 | W2 | N5.0 | N12 | |
| 7-Aug | NW3 | WNW4 | WNW3 | W3 | W2 | W2 | WNW3 | WNW2 | N5 | NNE4 | NE4 | NNE6 | N3 | NNW1 | N3 | ESE3 | SE4 | S6 | SSW6 | SSW4 | SW3 | WSW2 | SW4 | WSW5 | W0.9 | SSW6 | |
| 8-Aug | WSW4 | SW4 | WSW2 | SW1 | W3 | SW3 | S4 | SSW5 | S6 | SE7 | S5 | W4 | S3 | S3 | S6 | S7 | SSW5 | S8 | SSW6 | S5 | S2 | SSE3 | SSE2 | SSW2 | SSW3.6 | S8 | |
| 9-Aug | WSW1 | SSW2 | S3 | SW2 | WSW2 | S2 | S4 | S5 | SSE6 | SE7 | SE7 | SSE8 | S7 | SW5 | SSW6 | S6 | S4 | SSE6 | SSE4 | S3 | S3 | SSE1 | SSW2 | WNW0 | S3.6 | SSE8 | |
| 10-Aug | S1 | SSW2 | WSW3 | WSW2 | S3 | S2 | SSE3 | SSE3 | SSE2 | SE2 | ESE4 | NE2 | SSE4 | NE4 | N6 | N6 | NE4 | E4 | SSE6 | S2 | SSW3 | SW1 | SW1 | S3 | SE1.1 | SSE6 | |
| 11-Aug | SSE3 | S3 | S3 | S2 | SSW2 | S3 | SSE5 | SSE6 | SE6 | SSE7 | SSE6 | S8 | SSE9 | SSE8 | SSE9 | SSE9 | SSE8 | SSE8 | SSE7 | SSE5 | SSE4 | SSE3 | S2 | S2 | SSE5.2 | SSE9 | |
| 12-Aug | SSW3 | S3 | SSE3 | SSE3 | S3 | SE2 | SSE5 | SSE7 | SSE8 | SSE9 | SSE11 | SSE15 | SSE16 | SSE15 | SSE14 | S13 | S13 | SSE13 | S11 | S9 | S8 | SE4 | SSE4 | SSE5 | SSE8.0 | SSE16 | |
| 13-Aug | SSE3 | SSE1 | SE2 | SE1 | SE3 | SE3 | SSE5 | SSE7 | SSE10 | SSE11 | SSE14 | SE15 | SE13 | SSE13 | SSE14 | SSE12 | SE12 | SE13 | SSE13 | SSE11 | SSE9 | SSE6 | SSE6 | SSE4 | SSE8.3 | SE15 | |
| 14-Aug | SE4 | SE4 | SE4 | SSE3 | SE3 | SSE2 | ESE3 | SSE7 | SSE9 | SE7 | SSE9 | SE7 | S10 | S11 | SSW10 | SW9 | SW8 | SSW7 | SSW5 | SSE4 | SSE4 | SE4 | SSE3 | SE2 | S4.9 | S11 | |
| 15-Aug | SSE2 | SE2 | NW2 | NW0 | S2 | WNW2 | NNW4 | NW5 | NNW2 | N2 | NW2 | W2 | W2 | WSW3 | ESE5 | ENE4 | ENE3 | ESE1 | ENE2 | WSW2 | WSW1 | N1 | SSW1 | WNW2 | NW0.5 | ESE5 | |
| 16-Aug | WNW5 | NNE1 | ENE1 | SSW1 | SSW1 | SSW2 | S3 | SSE3 | SSE4 | SSE6 | SSE6 | SSE8 | SSW7 | SW7 | SW8 | SW5 | SW6 | SW5 | SW6 | SW5 | SW4 | SSW3 | SW3 | WSW3 | SSW3.4 | SSE8 | |
| 17-Aug | SSW1 | SSW1 | S3 | S3 | S4 | S3 | S3 | S4 | SSE4 | S6 | S6 | SSE6 | SSW1 | SE2 | N3 | WNW6 | WNW5 | NW7 | W3 | WSW2 | SW2 | W2 | SW2 | WSW5 | SSW1.9 | NW7 | |
| 18-Aug | SW4 | SSE4 | S2 | SSW3 | SSW3 | S3 | SSW4 | SSW7 | S8 | SW6 | SW7 | WSW10 | SW12 | WSW13 | SSW14 | SSW13 | S12 | SSW11 | SSW10 | SSW9 | SSW9 | SSW10 | SSW8 | SSW9 | SSW7.5 | SSW14 | |
| 19-Aug | SW8 | WSW7 | W6 | WSW6 | WSW6 | SW6 | SW5 | SSW7 | WSW10 | SW9 | WSW10 | W11 | WNW13 | WNW15 | WNW16 | WNW18 | WNW19 | WNW10 | WSW5 | WSW5 | SW4 | W3 | WSW2 | SW6 | W7.6 | WNW19 | |
| 20-Aug | WSW4 | WSW8 | W8 | W8 | W8 | W5 | WSW4 | WSW4 | W7 | W10 | W12 | WNW11 | WNW11 | WNW14 | WNW15 | WNW15 | WNW14 | NW12 | NW11 | WNW9 | WNW5 | WNW6 | WNW7 | NNW4 | WNW8.3 | WNW15 | |
| 21-Aug | SSW2 | S3 | S4 | SSW3 | SW4 | WSW4 | SW4 | SSW5 | SSW6 | SW7 | SW7 | SW10 | WSW10 | WSW10 | WSW7 | WSW7 | WSW7 | WNW7 | NW7 | WNW4 | NW3 | N6 | NNW6 | NW4 | WSW4.2 | SW10 | |
| 22-Aug | NW4 | NW4 | NW3 | W2 | WNW3 | WNW2 | NNW2 | N5 | N5 | NNE7 | NNE5 | ENE4 | NNE4 | ESE3 | E3 | SSE3 | SE4 | SSW4 | S1 | NNE2 | WNW3 | N2 | N1 | N2 | N1.4 | NNE7 | |
| 23-Aug | NNW2 | NNW2 | NNW3 | WNW2 | WNW2 | W3 | WNW2 | SSW1 | SSE5 | SSE8 | SSE8 | S11 | S11 | S9 | SSE8 | SSE12 | SSE10 | SSE9 | SSE8 | SSE6 | SSE8 | SSE7 | SSE6 | S5 | SSE4.9 | SSE12 | |
| 24-Aug | SSE6 | SE4 | SE3 | SSE4 | S4 | ESE1 | NNW2 | ESE2 | SSE5 | SSE6 | SE4 | ESE4 | SSE2 | WSW1 | E4 | ESE5 | NW4 | N5 | NNW4 | WNW2 | WSW1 | S3 | SSW8 | S5 | SSE1.7 | SSW8 | |
| 25-Aug | S8 | S7 | SSW6 | S6 | S6 | SSW7 | S8 | S9 | SSW11 | SSW10 | SSW10 | S10 | SSW11 | SSW13 | SW14 | SW13 | SW12 | WSW11 | WSW8 | SW7 | SSW8 | SSW5 | WNW2 | SW5 | SSW8.1 | SW14 | |
| 26-Aug | WSW7 | WSW8 | WSW9 | W10 | WSW9 | WSW7 | SW6 | SW7 | SSW7 | SW8 | SSW8 | SSW9 | SW9 | SW10 | SW10 | SW10 | SW9 | SW6 | SW6 | SW4 | SSW4 | SSW6 | SSW4 | S5 | SW7.1 | SW10 | |
| 27-Aug | SSW5 | SSW4 | SW5 | WSW8 | WSW7 | SW7 | SW7 | W8 | WSW9 | W10 | WSW11 | WSW11 | W11 | W9 | W10 | W8 | W7 | W9 | W5 | SW2 | W2 | NNW1 | S1 | NW2 | WSW6.1 | WSW11 | |
| 28-Aug | NW3 | WNW1 | SW1 | N1 | SSW3 | SSE3 | SSE2 | S4 | NNW5 | WNW6 | WNW11 | NW13 | WNW13 | NW14 | WNW13 | NW12 | NW12 | NW10 | NW7 | WNW3 | W2 | WNW2 | WSW1 | NE1 | WNW4.9 | NW14 | |
| 29-Aug | WNW2 | WNW3 | W2 | WNW2 | SSE0 | S1 | S2 | S1 | SSE4 | SE3 | E4 | E3 | ESE4 | ESE6 | SE5 | SSE5 | SSE6 | SSE4 | SE2 | SW1 | S1 | S3 | S3 | SE1 | SSE1.9 | SSE6 | |
| 30-Aug | WNW2 | W1 | SW2 | WNW2 | W3 | W3 | WNW3 | N3 | SE7 | SSE9 | SSE11 | SSE13 | SSE13 | SSE14 | SSE13 | SSE13 | SSE13 | SSE11 | SSE10 | SSE9 | S8 | S9 | S8 | S6 | S4 | SSE6.1 | SSE14 |
| 31-Aug | S4 | S4 | S3 | S4 | S4 | SSE3 | SSE5 | SSE5 | SSE8 | SSE4 | SSE7 | SSE8 | SW8 | WSW11 | WSW12 | WSW10 | WNW10 | WNW10 | WNW7 | W3 | SW3 | SW5 | WSW5 | WSW3 | SW4.1 | WSW12 | |

| | |
|---|-----------------|
| SW2.1 SW1.9 SW1.9 SW2.1 SW2.3 SW1.9SSW2.0 S2.6 S3.2 S3.2 S3.2 S3.4SSW3.7 SW3.4SSW3.7 SW3.8 SW3.3 SW2.9SSW2.7SSW2.4SSW2.8SSW1.9SSW1.9 SW2.0 S8 WSW8 WSW9 W10 WSW9 WSW7 S8 S9 SSW11 SSE11 SSE14 SSE15 SSE16WNW15WNW16WNW18WNW19 SE13 SSE13 SSE11 SSE9 SSW10 SSW8 SSW9 | Diurnal Average |
| | Diurnal Maximum |

All monthly, daily, and diurnal averages have been calculated using vector methods





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Waskow ohci Pimatisiwin - August 2017**

| Wind Speed Ranges (km/h) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 5 | 438 | 58.87 | 58.87 |
| 6 - 11 | 256 | 34.41 | 93.28 |
| 12 - 19 | 50 | 6.72 | 100.00 |
| 20 - 28 | 0 | 0.00 | 100.00 |
| 29 - 38 | 0 | 0.00 | 100.00 |
| > 38 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Waskow ohci Pimatisiwin - August 2017**

| Wind Speed Ranges (km/h) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-----------------------------|----------------|-----|----|-----|---|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 5 | 19 | 9 | 6 | 7 | 8 | 14 | 24 | 55 | 68 | 44 | 43 | 34 | 31 | 40 | 19 | 17 | 438 |
| 6 - 11 | 12 | 8 | 3 | 0 | 0 | 1 | 11 | 62 | 32 | 32 | 31 | 28 | 15 | 13 | 5 | 3 | 256 |
| 12 - 19 | 1 | 0 | 0 | 0 | 0 | 0 | 4 | 16 | 3 | 2 | 4 | 3 | 1 | 11 | 5 | 0 | 50 |
| 20 - 28 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29 - 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 32 | 17 | 9 | 7 | 8 | 15 | 39 | 133 | 103 | 78 | 78 | 65 | 47 | 64 | 29 | 20 | 744 |

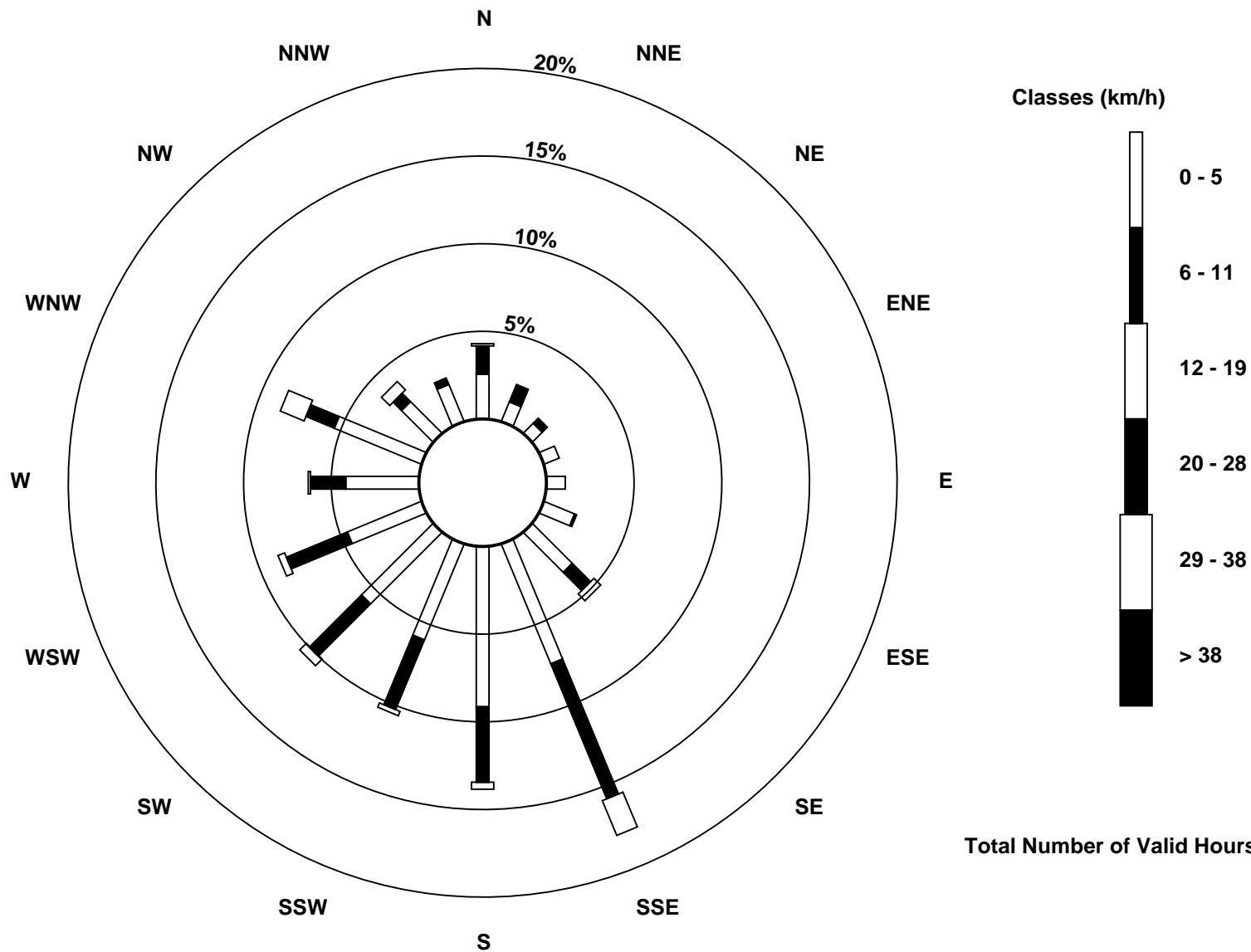
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Wind Speed (WS) - km/h
Waskow ohci Pimatisiwin (AMS 25)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Waskow ohci Pimatisiwin - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Aug 3 19:00 Minimum Value: 0 km/h on Aug 4 19:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6 | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | |
|---|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 2 | 2 | 0 | 1 | 1 | 1 | 4 |
| 2-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 4 |
| 3-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 8 | 4 | 2 | 1 | 2 | 1 | 8 |
| 4-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 3 | 2 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 3 |
| 5-Aug | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 1 | 1 | 1 | 1 | 3 |
| 6-Aug | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 4 | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 1 | 1 | 1 | 1 | 4 |
| 7-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 2 |
| 8-Aug | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 3 |
| 9-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 3 |
| 10-Aug | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 3 |
| 11-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 3 |
| 12-Aug | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 3 | 4 | 5 | 6 | 5 | 5 | 5 | 5 | 4 | 4 | 3 | 3 | 1 | 1 | 1 | 6 |
| 13-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 4 | 4 | 6 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 3 | 2 | 2 | 1 | 6 |
| 14-Aug | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 4 |
| 15-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 2 |
| 16-Aug | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 3 |
| 17-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 2 | 1 | 1 | 1 | 1 | 2 | 3 |
| 18-Aug | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 3 | 3 | 3 | 4 | 5 | 6 | 6 | 5 | 4 | 4 | 4 | 3 | 3 | 4 | 3 | 3 | 6 |
| 19-Aug | 3 | 3 | 2 | 2 | 3 | 2 | 2 | 3 | 4 | 3 | 5 | 5 | 6 | 6 | 7 | 7 | 7 | 5 | 3 | 2 | 1 | 2 | 1 | 3 | 7 |
| 20-Aug | 2 | 3 | 3 | 4 | 3 | 3 | 2 | 2 | 3 | 4 | 4 | 5 | 5 | 5 | 6 | 6 | 5 | 4 | 4 | 3 | 2 | 3 | 3 | 2 | 6 |
| 21-Aug | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 2 | 2 | 2 | 4 |
| 22-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| 23-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 4 | 3 | 3 | 4 | 4 | 3 | 3 | 4 | 4 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 4 |
| 24-Aug | 2 | 1 | 1 | 2 | 3 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 3 | 4 | 2 | 4 |
| 25-Aug | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 6 | 6 | 5 | 5 | 4 | 3 | 3 | 3 | 2 | 2 | 6 |
| 26-Aug | 3 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 3 | 2 | 2 | 1 | 2 | 1 | 1 | 4 |
| 27-Aug | 2 | 1 | 2 | 4 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 5 | 5 | 4 | 4 | 3 | 3 | 4 | 3 | 1 | 1 | 1 | 1 | 2 | 5 |
| 28-Aug | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 4 | 5 | 4 | 5 | 5 | 4 | 5 | 4 | 3 | 1 | 1 | 1 | 1 | 1 | 5 |
| 29-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| 30-Aug | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 3 | 3 | 4 | 5 | 5 | 5 | 5 | 5 | 4 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 5 |
| 31-Aug | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 2 | 2 | 3 | 4 | 5 | 5 | 4 | 4 | 4 | 3 | 2 | 1 | 2 | 2 | 2 | 5 |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |



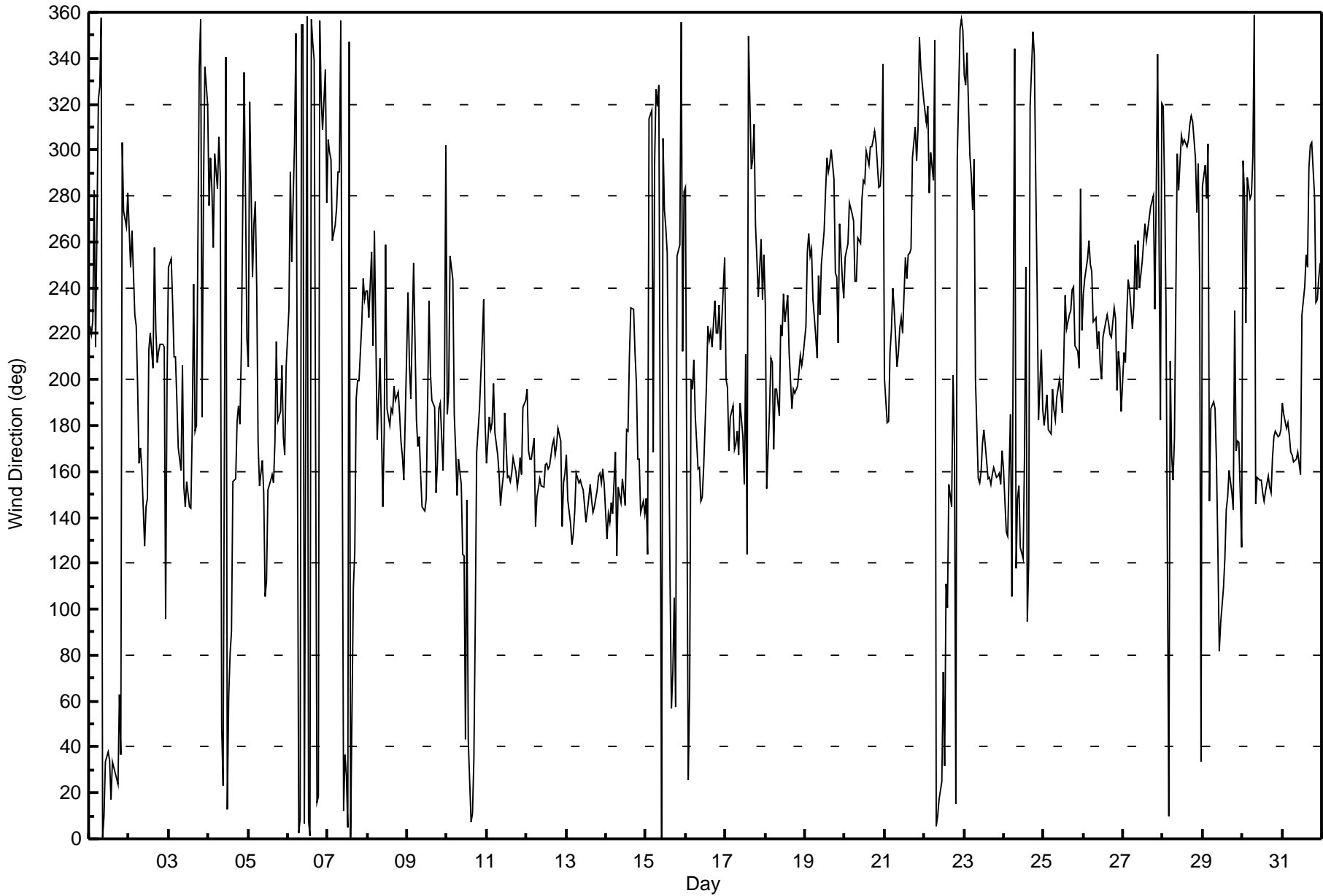
Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Waskow ohci Pimatisiwin - August 2017

| Direction of Maximum Speed: 301 deg on Aug 19 17:00 | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 | | | | | | | |
|---|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|--------------------------|-----|-----|-----|---------------------------------|---------------|--|--|
| Direction of Maximum Daily Speed Average: 150.3 deg on Aug 13 | | | | | | | | | | | | | | | | | | | | Hours of Data: 744 | | | | | | | |
| Direction of Minimum Speed: 147 deg on Aug 29 05:00 | | | | | | | | | | Direction of Minimum Daily Speed Average: 0.2 deg on Aug 4 | | | | | | | | | | Hours of Missing Data: 0 | | | | | | | |
| Monthly Average Direction: 230.4 deg | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 224 | 220 | 226 | 282 | 214 | 322 | 328 | 358 | 0 | 10 | 33 | 38 | 34 | 17 | 34 | 31 | 27 | 24 | 63 | 37 | 304 | 273 | 267 | 282 | 15.9 | | |
| 2-Aug | 265 | 249 | 265 | 228 | 223 | 197 | 163 | 170 | 161 | 128 | 145 | 148 | 213 | 221 | 205 | 258 | 221 | 208 | 213 | 215 | 215 | 214 | 96 | 199 | 198.8 | | |
| 3-Aug | 249 | 252 | 233 | 210 | 210 | 191 | 170 | 160 | 206 | 153 | 144 | 155 | 145 | 144 | 179 | 242 | 177 | 180 | 336 | 357 | 183 | 282 | 336 | 320 | 179.5 | | |
| 4-Aug | 276 | 297 | 283 | 257 | 298 | 283 | 306 | 289 | 49 | 23 | 340 | 13 | 61 | 81 | 90 | 156 | 157 | 182 | 188 | 180 | 211 | 334 | 281 | 218 | 250.1 | | |
| 5-Aug | 206 | 321 | 244 | 268 | 278 | 239 | 172 | 154 | 165 | 151 | 105 | 112 | 152 | 156 | 159 | 155 | 172 | 217 | 182 | 186 | 206 | 175 | 167 | 205 | 171.0 | | |
| 6-Aug | 231 | 291 | 252 | 278 | 303 | 351 | 2 | 8 | 354 | 355 | 7 | 358 | 8 | 1 | 357 | 347 | 339 | 16 | 18 | 356 | 323 | 309 | 335 | 277 | 352.7 | | |
| 7-Aug | 305 | 299 | 296 | 260 | 267 | 274 | 290 | 290 | 356 | 12 | 36 | 27 | 5 | 347 | 1 | 110 | 125 | 191 | 199 | 199 | 225 | 244 | 235 | 239 | 277.7 | | |
| 8-Aug | 238 | 227 | 256 | 215 | 265 | 220 | 174 | 209 | 180 | 145 | 177 | 259 | 187 | 180 | 187 | 186 | 197 | 191 | 195 | 185 | 172 | 167 | 156 | 211 | 193.9 | | |
| 9-Aug | 238 | 206 | 191 | 222 | 251 | 182 | 171 | 175 | 159 | 144 | 143 | 148 | 191 | 234 | 202 | 191 | 188 | 151 | 164 | 187 | 190 | 160 | 196 | 302 | 177.2 | | |
| 10-Aug | 185 | 195 | 254 | 243 | 185 | 169 | 150 | 166 | 154 | 124 | 123 | 43 | 148 | 43 | 7 | 11 | 35 | 95 | 168 | 188 | 202 | 217 | 235 | 181 | 141.8 | | |
| 11-Aug | 164 | 183 | 178 | 181 | 198 | 177 | 167 | 159 | 145 | 152 | 158 | 185 | 158 | 158 | 156 | 159 | 166 | 160 | 153 | 158 | 166 | 158 | 188 | 191 | 163.2 | | |
| 12-Aug | 196 | 169 | 165 | 165 | 174 | 136 | 149 | 153 | 157 | 154 | 153 | 163 | 164 | 161 | 162 | 171 | 174 | 167 | 171 | 179 | 173 | 136 | 155 | 159 | 163.9 | | |
| 13-Aug | 167 | 147 | 137 | 128 | 133 | 143 | 159 | 155 | 156 | 154 | 152 | 145 | 138 | 148 | 154 | 148 | 142 | 145 | 152 | 158 | 159 | 155 | 161 | 154 | 150.3 | | |
| 14-Aug | 131 | 141 | 138 | 147 | 141 | 168 | 123 | 153 | 150 | 146 | 157 | 145 | 178 | 177 | 210 | 232 | 230 | 212 | 198 | 165 | 165 | 142 | 147 | 141 | 170.7 | | |
| 15-Aug | 148 | 124 | 314 | 317 | 169 | 295 | 327 | 319 | 328 | 0 | 305 | 274 | 266 | 255 | 113 | 57 | 73 | 105 | 57 | 254 | 258 | 356 | 213 | 282 | 324.5 | | |
| 16-Aug | 284 | 26 | 65 | 200 | 196 | 209 | 184 | 161 | 162 | 147 | 149 | 161 | 198 | 223 | 217 | 221 | 214 | 234 | 220 | 220 | 232 | 213 | 226 | 253 | 203.9 | | |
| 17-Aug | 200 | 197 | 169 | 184 | 189 | 170 | 172 | 177 | 167 | 190 | 175 | 154 | 211 | 124 | 350 | 292 | 296 | 311 | 267 | 253 | 236 | 261 | 235 | 255 | 214.8 | | |
| 18-Aug | 233 | 152 | 186 | 209 | 208 | 170 | 196 | 196 | 184 | 224 | 219 | 238 | 225 | 237 | 212 | 199 | 187 | 196 | 194 | 197 | 203 | 211 | 206 | 210 | 206.8 | | |
| 19-Aug | 224 | 256 | 264 | 254 | 257 | 235 | 219 | 209 | 246 | 228 | 250 | 265 | 282 | 297 | 291 | 294 | 301 | 287 | 247 | 245 | 216 | 268 | 243 | 235 | 265.0 | | |
| 20-Aug | 253 | 256 | 260 | 277 | 272 | 269 | 243 | 243 | 261 | 259 | 279 | 287 | 286 | 300 | 293 | 302 | 301 | 304 | 308 | 303 | 284 | 284 | 294 | 337 | 285.7 | | |
| 21-Aug | 201 | 182 | 182 | 212 | 221 | 240 | 230 | 205 | 212 | 222 | 227 | 220 | 253 | 244 | 254 | 255 | 257 | 296 | 310 | 296 | 310 | 349 | 335 | 322 | 250.3 | | |
| 22-Aug | 317 | 312 | 319 | 281 | 299 | 287 | 348 | 5 | 9 | 17 | 25 | 73 | 32 | 111 | 100 | 155 | 145 | 202 | 171 | 15 | 296 | 353 | 357 | 352 | 4.8 | | |
| 23-Aug | 333 | 329 | 342 | 298 | 289 | 274 | 296 | 200 | 157 | 155 | 160 | 172 | 178 | 171 | 157 | 157 | 154 | 159 | 162 | 158 | 158 | 159 | 154 | 169 | 165.9 | | |
| 24-Aug | 161 | 133 | 132 | 160 | 185 | 105 | 344 | 118 | 149 | 154 | 127 | 122 | 166 | 249 | 95 | 121 | 319 | 352 | 342 | 288 | 240 | 182 | 213 | 187 | 158.0 | | |
| 25-Aug | 180 | 186 | 193 | 178 | 176 | 196 | 187 | 183 | 192 | 200 | 193 | 185 | 208 | 237 | 222 | 228 | 230 | 239 | 240 | 215 | 212 | 205 | 283 | 222 | 207.9 | | |
| 26-Aug | 237 | 244 | 253 | 260 | 250 | 247 | 225 | 227 | 213 | 221 | 207 | 200 | 218 | 225 | 228 | 224 | 219 | 219 | 231 | 227 | 195 | 212 | 205 | 186 | 226.3 | | |
| 27-Aug | 212 | 207 | 229 | 244 | 239 | 222 | 232 | 259 | 239 | 261 | 240 | 252 | 260 | 268 | 260 | 265 | 275 | 277 | 280 | 230 | 281 | 341 | 183 | 320 | 251.3 | | |
| 28-Aug | 319 | 283 | 232 | 10 | 208 | 167 | 156 | 174 | 299 | 282 | 295 | 306 | 303 | 304 | 302 | 304 | 311 | 315 | 312 | 296 | 272 | 294 | 245 | 34 | 298.5 | | |
| 29-Aug | 284 | 293 | 279 | 303 | 147 | 187 | 190 | 187 | 164 | 127 | 82 | 94 | 109 | 122 | 144 | 149 | 160 | 151 | 144 | 230 | 169 | 173 | 173 | 127 | 150.8 | | |
| 30-Aug | 295 | 281 | 225 | 288 | 279 | 281 | 298 | 359 | 146 | 158 | 156 | 156 | 151 | 147 | 151 | 158 | 153 | 151 | 166 | 175 | 178 | 175 | 175 | 178 | 163.3 | | |
| 31-Aug | 190 | 185 | 179 | 181 | 176 | 168 | 167 | 164 | 165 | 168 | 163 | 159 | 228 | 240 | 255 | 249 | 292 | 302 | 303 | 280 | 234 | 235 | 244 | 251 | 223.9 | | |
| 224.7 226.6 228.3 229.5 227.6 219.6 199.7 188.3 183.5 177.7 175.6 180.4 200.8 213.9 210.8 215.5 216.1 216.8 209.1 208.6 204.9 207.1 211.5 220.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Diurnal Average | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| All monthly, daily, and diurnal averages have been calculated using vector methods | | | | | | | | | | | | | | | | | | | | | | | | | | | |





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Waskow ohci Pimatisiwin - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 111 deg on Aug 28 04:00 | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|---|----|-----|-----|----|----|----|----|----|----|----|----|-----|----|----|----|----|----|----|----|----|----|----|---------------|
| Minimum Value: 11 deg on Aug 23 06:00 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Percentiles: P ₁ = 15 P ₁₀ = 25 Q ₁ = 31 Median = 40 Q ₃ = 54 P ₉₀ = 70 P ₉₉ = 98 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 88 | 53 | 52 | 83 | 57 | 82 | 34 | 60 | 41 | 74 | 57 | 57 | 54 | 60 | 44 | 45 | 47 | 46 | 58 | 47 | 41 | 35 | 19 | 16 | 88 |
| 2-Aug | 33 | 58 | 21 | 67 | 33 | 57 | 28 | 30 | 36 | 52 | 41 | 42 | 66 | 81 | 57 | 59 | 50 | 39 | 29 | 25 | 44 | 46 | 95 | 75 | 95 |
| 3-Aug | 64 | 44 | 39 | 57 | 47 | 47 | 21 | 27 | 42 | 37 | 33 | 39 | 42 | 42 | 68 | 57 | 66 | 42 | 86 | 50 | 56 | 95 | 80 | 57 | 95 |
| 4-Aug | 21 | 56 | 44 | 90 | 67 | 49 | 50 | 46 | 55 | 53 | 38 | 57 | 40 | 42 | 81 | 40 | 34 | 26 | 23 | 26 | 72 | 46 | 88 | 91 | 91 |
| 5-Aug | 86 | 58 | 56 | 68 | 74 | 89 | 22 | 55 | 43 | 45 | 48 | 44 | 42 | 33 | 38 | 38 | 47 | 48 | 27 | 26 | 31 | 27 | 30 | 28 | 89 |
| 6-Aug | 59 | 68 | 56 | 89 | 27 | 34 | 26 | 24 | 24 | 27 | 24 | 23 | 25 | 25 | 28 | 23 | 38 | 29 | 31 | 23 | 16 | 14 | 49 | 20 | 89 |
| 7-Aug | 66 | 13 | 18 | 23 | 20 | 53 | 28 | 37 | 30 | 68 | 47 | 50 | 83 | 106 | 90 | 76 | 49 | 37 | 28 | 18 | 34 | 48 | 38 | 47 | 106 |
| 8-Aug | 61 | 40 | 53 | 56 | 18 | 38 | 20 | 39 | 37 | 31 | 58 | 86 | 92 | 96 | 46 | 50 | 79 | 29 | 28 | 23 | 27 | 31 | 38 | 54 | 96 |
| 9-Aug | 70 | 68 | 44 | 42 | 32 | 37 | 18 | 23 | 26 | 30 | 34 | 34 | 61 | 65 | 65 | 61 | 70 | 34 | 33 | 33 | 43 | 72 | 52 | 93 | 93 |
| 10-Aug | 86 | 78 | 60 | 61 | 32 | 48 | 42 | 44 | 84 | 70 | 56 | 85 | 71 | 69 | 50 | 51 | 60 | 60 | 40 | 72 | 46 | 78 | 82 | 34 | 86 |
| 11-Aug | 37 | 53 | 26 | 24 | 21 | 29 | 20 | 32 | 34 | 26 | 41 | 43 | 38 | 42 | 36 | 38 | 33 | 31 | 31 | 30 | 26 | 27 | 38 | 24 | 53 |
| 12-Aug | 19 | 31 | 21 | 21 | 23 | 33 | 30 | 34 | 33 | 29 | 33 | 28 | 32 | 34 | 34 | 34 | 33 | 32 | 29 | 28 | 24 | 27 | 23 | 22 | 34 |
| 13-Aug | 32 | 60 | 28 | 22 | 27 | 23 | 22 | 27 | 30 | 35 | 34 | 35 | 41 | 38 | 35 | 36 | 39 | 38 | 35 | 31 | 28 | 28 | 24 | 26 | 60 |
| 14-Aug | 35 | 26 | 31 | 32 | 38 | 36 | 44 | 32 | 30 | 35 | 31 | 61 | 35 | 35 | 38 | 42 | 44 | 33 | 38 | 24 | 29 | 31 | 35 | 25 | 61 |
| 15-Aug | 27 | 36 | 54 | 91 | 66 | 68 | 39 | 20 | 64 | 58 | 69 | 73 | 90 | 77 | 47 | 46 | 44 | 90 | 45 | 98 | 73 | 85 | 62 | 38 | 98 |
| 16-Aug | 41 | 63 | 36 | 40 | 34 | 33 | 33 | 28 | 27 | 31 | 34 | 35 | 53 | 57 | 46 | 75 | 52 | 54 | 33 | 26 | 28 | 36 | 38 | 65 | 75 |
| 17-Aug | 100 | 64 | 35 | 25 | 25 | 20 | 25 | 36 | 34 | 39 | 42 | 52 | 99 | 87 | 78 | 47 | 38 | 32 | 44 | 40 | 47 | 39 | 73 | 51 | 100 |
| 18-Aug | 51 | 21 | 29 | 25 | 32 | 26 | 32 | 35 | 33 | 51 | 42 | 45 | 43 | 43 | 41 | 35 | 31 | 34 | 34 | 32 | 31 | 32 | 36 | 32 | 51 |
| 19-Aug | 33 | 53 | 50 | 50 | 49 | 39 | 42 | 42 | 46 | 49 | 52 | 54 | 51 | 40 | 41 | 33 | 29 | 48 | 53 | 47 | 35 | 67 | 39 | 34 | 67 |
| 20-Aug | 47 | 52 | 53 | 59 | 55 | 73 | 63 | 76 | 55 | 53 | 44 | 44 | 45 | 38 | 37 | 35 | 30 | 28 | 26 | 29 | 52 | 54 | 41 | 39 | 76 |
| 21-Aug | 56 | 20 | 22 | 51 | 64 | 67 | 58 | 41 | 40 | 44 | 50 | 38 | 58 | 52 | 63 | 55 | 51 | 36 | 21 | 14 | 32 | 18 | 20 | 30 | 67 |
| 22-Aug | 15 | 15 | 16 | 22 | 20 | 38 | 66 | 29 | 34 | 32 | 52 | 59 | 70 | 84 | 61 | 62 | 55 | 32 | 63 | 60 | 18 | 49 | 70 | 53 | 84 |
| 23-Aug | 53 | 27 | 28 | 27 | 25 | 11 | 54 | 93 | 64 | 30 | 29 | 36 | 34 | 29 | 34 | 30 | 32 | 31 | 29 | 29 | 30 | 28 | 30 | 24 | 93 |
| 24-Aug | 25 | 33 | 29 | 27 | 79 | 92 | 66 | 47 | 37 | 32 | 60 | 45 | 55 | 87 | 61 | 65 | 28 | 17 | 21 | 65 | 93 | 53 | 44 | 31 | 93 |
| 25-Aug | 29 | 30 | 29 | 27 | 27 | 32 | 28 | 31 | 33 | 32 | 35 | 30 | 33 | 50 | 40 | 43 | 48 | 49 | 47 | 34 | 37 | 59 | 68 | 41 | 68 |
| 26-Aug | 57 | 49 | 48 | 51 | 50 | 56 | 52 | 57 | 45 | 42 | 42 | 41 | 46 | 43 | 50 | 42 | 38 | 40 | 42 | 35 | 26 | 32 | 25 | 19 | 57 |
| 27-Aug | 31 | 27 | 44 | 45 | 47 | 39 | 44 | 56 | 53 | 51 | 43 | 53 | 57 | 55 | 55 | 49 | 52 | 48 | 47 | 28 | 32 | 80 | 71 | 81 | 81 |
| 28-Aug | 41 | 98 | 90 | 111 | 53 | 52 | 38 | 29 | 61 | 57 | 41 | 36 | 35 | 33 | 41 | 33 | 31 | 26 | 20 | 18 | 17 | 38 | 91 | 77 | 111 |
| 29-Aug | 69 | 56 | 77 | 57 | 101 | 68 | 66 | 90 | 38 | 61 | 51 | 68 | 51 | 38 | 44 | 47 | 34 | 42 | 58 | 59 | 63 | 28 | 33 | 71 | 101 |
| 30-Aug | 24 | 74 | 44 | 59 | 11 | 14 | 27 | 46 | 36 | 26 | 32 | 33 | 36 | 37 | 35 | 32 | 32 | 35 | 26 | 25 | 28 | 27 | 27 | 26 | 74 |
| 31-Aug | 28 | 26 | 26 | 22 | 26 | 80 | 32 | 43 | 34 | 51 | 26 | 38 | 50 | 51 | 51 | 51 | 42 | 30 | 34 | 43 | 26 | 36 | 37 | 45 | 80 |
| | 100 | 98 | 90 | 111 | 101 | 92 | 66 | 93 | 84 | 74 | 69 | 86 | 99 | 106 | 90 | 76 | 79 | 90 | 86 | 98 | 93 | 95 | 95 | 93 | |
| | Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association

SO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-------------------------|-----------------|--------------|
| Station Name: | Waskow Ohci Pimatisiwin | Station number: | AMS 25 |
| Calibration Date: | August 11, 2017 | Last Cal Date: | July 5, 2017 |
| Start time (MST): | 8:34 | End time (MST): | 11:33 |
| Reason: | Routine | | |

Calibration Standards

| | | | | |
|-----------------------|------------------|-----|------------------|----------------|
| Cal Gas Concentration | <u>50.2</u> | ppm | Cal Gas Exp Date | April 19, 2021 |
| Cal Gas Cylinder # | <u>EY0000817</u> | | | |
| Calibrator Make/Model | API T700 | | Serial Number | 747 |
| ZAG Make/Model | API 701 | | Serial Number | 261 |

Analyzer Information

| | | | | | |
|----------------------|--------------|---------------|--------------------|--------------|---------------|
| Analyzer make: | Thermo 43i | | Analyzer serial #: | 1160290014 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Analyzer Range | 0 - 1000 ppb | | PMT voltage | -610 | -610 |
| Calculated slope | 0.997721 | 1.000683 | Lamp voltage | 840 | 839 |
| Calculated intercept | 0.042305 | -0.054806 | Pressure | 731.4 | 732.6 |
| Analyzer Background | 14.3 | 14.2 | Flow | 0.458 | 0.458 |
| Analyzer Coefficient | 0.728 | 0.710 | Intensity | 91 | 90 |

SO₂ Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|----------------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 4999 | 0.0 | 0.0 | 0.4 | ---- |
| as found span | 4931 | 79.8 | 799.5 | 816.0 | 0.980 |
| calibrator zero | 4999 | 0.0 | 0.0 | 0.2 | ---- |
| high point | 4931 | 79.8 | 799.5 | 798.7 | 1.001 |
| second point | 4972 | 39.8 | 398.7 | 399.4 | 0.998 |
| third point | 4992 | 20.0 | 200.3 | 199.4 | 1.005 |
| as left zero | 4999 | 0.0 | 0.0 | 0.1 | ---- |
| as left span | 4931 | 79.8 | 799.5 | 798.3 | 1.001 |
| Average Correction Factor | | | | | 1.001 |
| Corrected As found | 815.60 | Previous response | 801.25 | *% change | -1.8% |

* = > +/-5% change initiates investigation

Notes:

Changed inlet filter after as founds. Adjusted the zero and the span.

Calibration Performed By: Jayme Marcoux



Wood Buffalo Environmental Association

SO₂ Calibration Summary

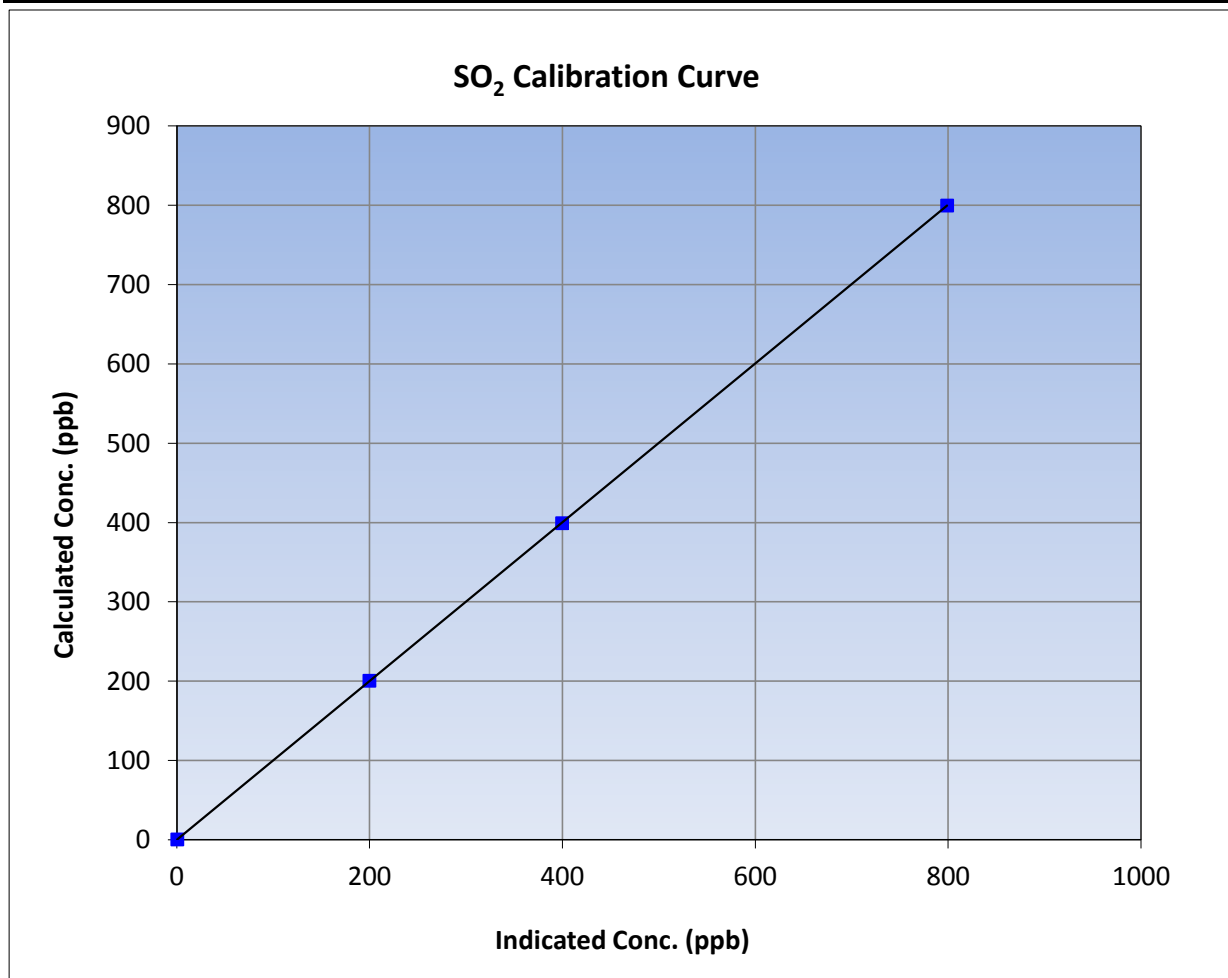
Version-03-2017

Station Information

| | | | |
|------------------|-------------------------|----------------------|--------------|
| Calibration Date | August 11, 2017 | Previous Calibration | July 5, 2017 |
| Station Name | Waskow Ochi Pimatisiwin | Station Number | AMS 25 |
| Start Time (MST) | 8:34 | End Time (MST) | 11:33 |
| Analyzer make | Thermo 43i | Analyzer serial # | 1160290014 |

Calibration Data

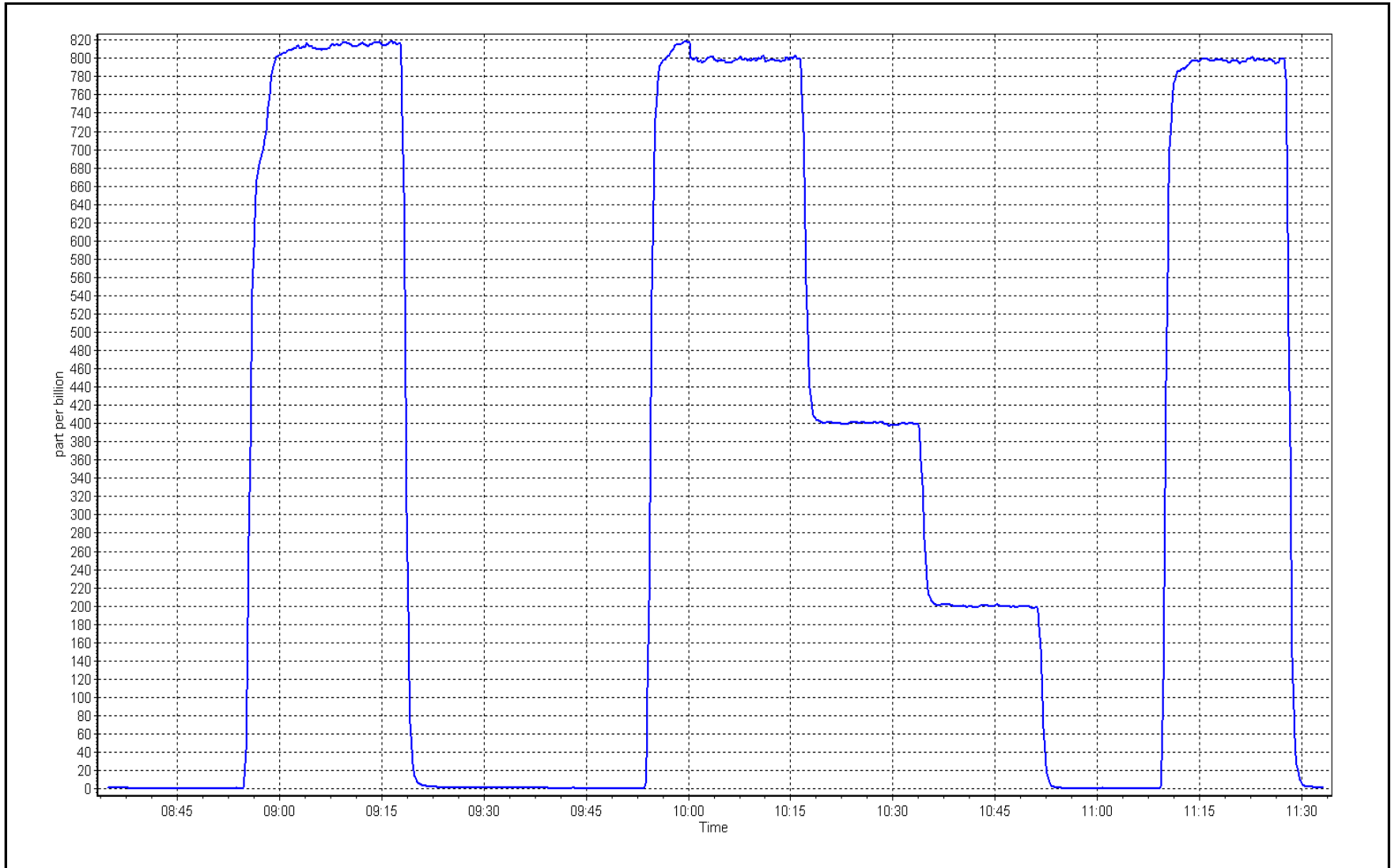
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-------------|
| 0.0 | 0.2 | ---- | Correlation Coefficient | ≥0.995 |
| 799.5 | 798.7 | 1.0010 | | |
| 398.7 | 399.4 | 0.9981 | Slope | 0.90 - 1.10 |
| 200.3 | 199.4 | 1.0046 | | |
| | | | Intercept | +/-30 |



SO2 Calibration Plot

Date: August 11, 2017

Location: Waskow Ochi Pimatisiwin





Wood Buffalo Environmental Association

H₂S Calibration Report

Version-06-2017

Station Information

| | | | |
|-------------------|-------------------------|-----------------|---------------|
| Station Name: | Waskow Ohci Pimatisiwin | Station number: | AMS 25 |
| Calibration Date: | August 3, 2017 | Last Cal Date: | July 14, 2017 |
| Start time (MST): | 9:16 | End time (MST): | 13:15 |
| Reason: | Routine | | |

Calibration Standards

| | | | | |
|-----------------------|-----------------|-----|------------------|---------------|
| Cal Gas Concentration | <u>50.50</u> | ppm | Cal Gas Exp Date | June 12, 2020 |
| Cal Gas Cylinder # | <u>CC262665</u> | | | |
| Calibrator Make/Model | API T700 | | Serial Number | 747 |
| ZAG Make/Model | API 701 | | Serial Number | 261 |

Analyzer Information

| | | | |
|----------------------|--------------|--------------------|---------------|
| Analyzer make: | Thermo 450i | Analyzer serial #: | 822436967 |
| | <u>Start</u> | <u>Finish</u> | |
| Analyzer Range | 0 - 100 ppb | PMT voltage | -666 |
| Calculated slope | 0.993347 | Lamp voltage | 877 |
| Calculated intercept | -4.179868 | Pressure | 613.1 |
| Analyzer Background | 30.0 | Flow | 1.049 |
| Analyzer Coefficient | 1.141 | Intensity | 84 |
| | | | <u>Start</u> |
| | | | <u>Finish</u> |

H₂S Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5000 | 0.0 | 0.0 | 0.2 | ---- |
| as found span | 4931 | 79.3 | 799.3 | 786.9 | 1.016 |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.2 | ---- |
| high point | 4931 | 79.3 | 799.3 | 802.4 | 0.996 |
| second point | 4971 | 39.6 | 399.1 | 404.8 | 0.986 |
| third point | 4992 | 19.8 | 199.5 | 205.4 | 0.971 |
| as left zero | 5000 | 0.0 | 0.0 | 1.3 | ---- |
| as left span | 4931 | 79.3 | 799.3 | 820.8 | 0.974 |
| SO2 Scrubber Check | 4991 | 19.9 | 198.6 | 0.5 | ---- |
| Average Correction Factor | | | | | 0.984 |
| Corrected As found | 786.70 | Previous response | 808.82 | % change | 2.8% |

* = > +/-5% change initiates investigation

Notes:

Changed out inlet filter after as founds. Adjusted the span

Calibration Performed By: Jayme Marcoux



Wood Buffalo Environmental Association

H₂S Calibration Summary

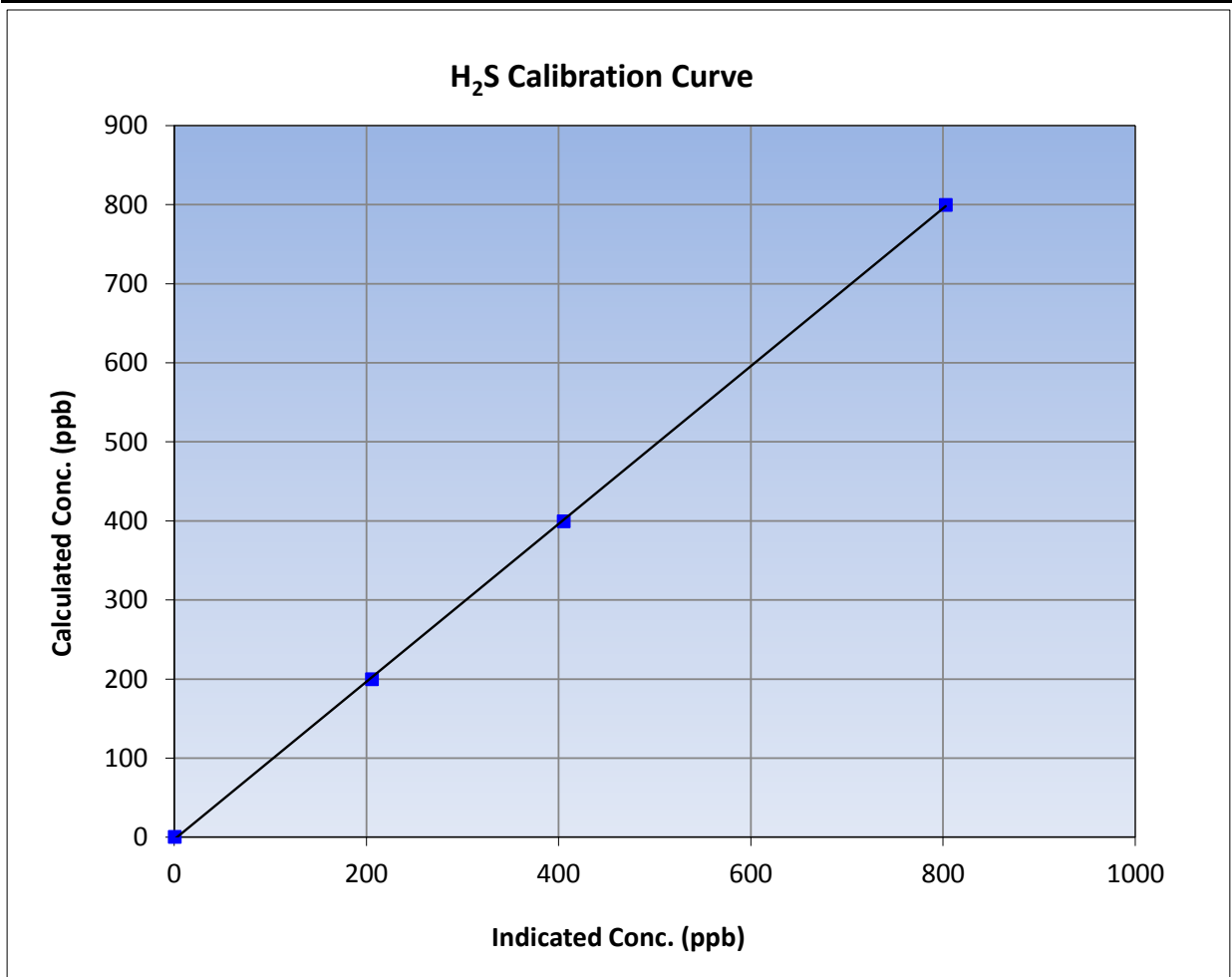
Version-03-2017

Station Information

| | | | |
|------------------|-------------------------|----------------------|---------------|
| Calibration Date | August 3, 2017 | Previous Calibration | July 14, 2017 |
| Station Name | Waskow Ohci Pimatisiwin | Station Number | AMS 25 |
| Start Time (MST) | 9:16 | End Time (MST) | 13:15 |
| Analyzer make | Thermo 450i | Analyzer serial # | 822436967 |

Calibration Data

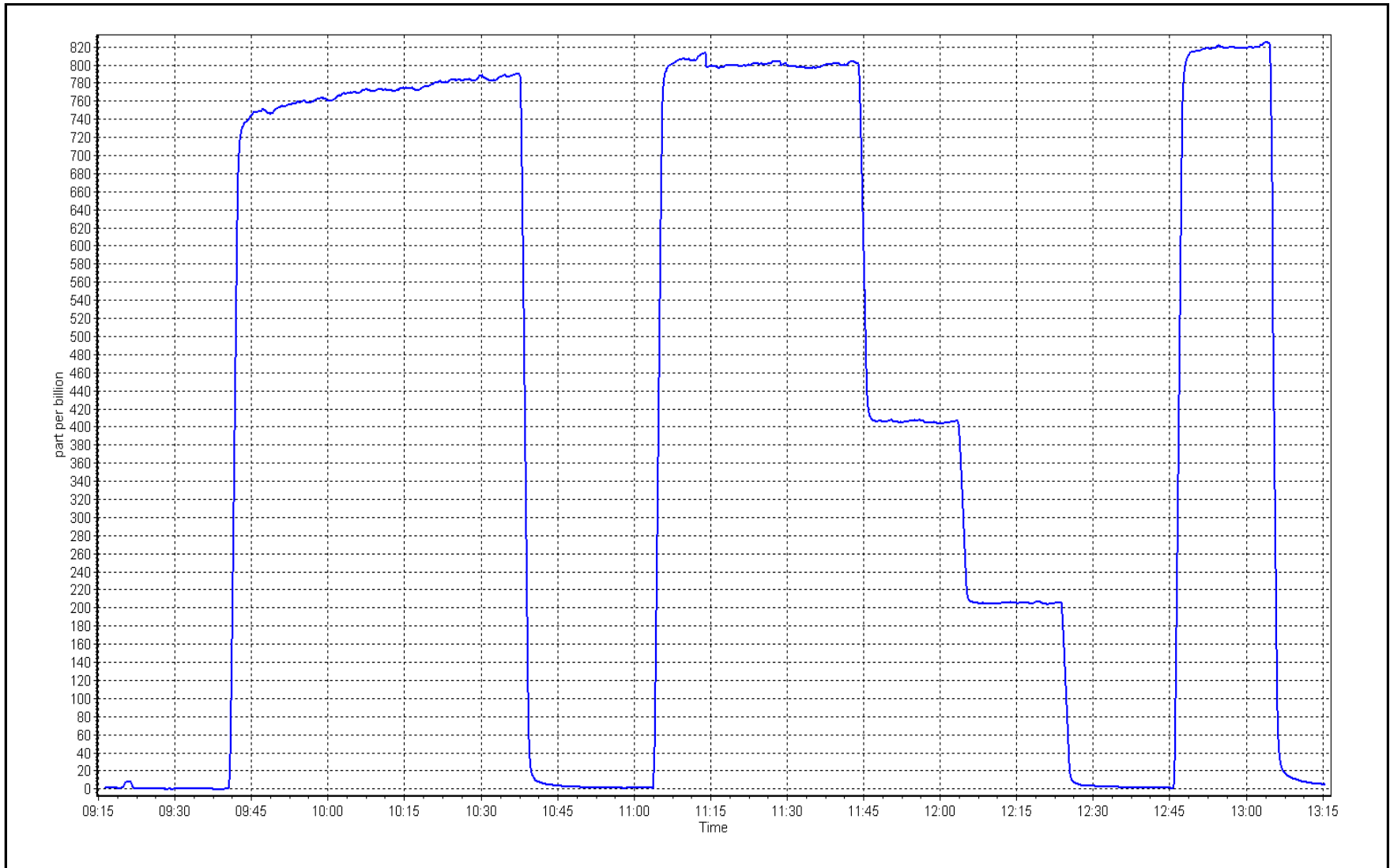
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|--------------|
| 0.0 | 0.2 | ---- | Correlation Coefficient | 0.999944 | ≥ 0.995 |
| 799.3 | 802.4 | 0.9961 | Slope | 0.997857 | 0.90 - 1.10 |
| 399.1 | 404.8 | 0.9860 | Intercept | -2.966356 | +/-10 |
| 199.5 | 205.4 | 0.9713 | | | |



H₂S Calibration Plot

Date: August 3, 2017

Location: Waskow Ohci Pimatisiwin





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 500
CENOVUS
CHRISTINA LAKE
AUGUST 2017**

Operations, Data Collection,
QA/QC, Data Validation and Reporting by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

September 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CHRISTINA LAKE (AMS 500)
AUGUST 2017

MONTHLY SUMMARY for
AMD SECTION III.B.1(c)

| Parameter | Hours of Data | Hours of Calibration | Hours without Data | Operational Time | Maximum 1-Hour Value | 1-Hour Exceedances | Maximum 24-Hour Value | 24-Hour Exceedances |
|-----------------------------------|---------------|----------------------|--------------------|------------------|----------------------|--------------------|-----------------------|---------------------|
| SO2 (ppb) Average | 708 | 36 | 36 | 100 | 28 | 0 | 5 | 0 |
| H2S (ppb) Average | 710 | 33 | 34 | 99.87 | 1 | 0 | 0 | 0 |
| NO2 (ppb) Average | 708 | 36 | 36 | 100 | 11 | 0 | 5 | - |
| NO (ppb) Average | 708 | 36 | 36 | 100 | 9 | - | 3 | - |
| NOX (ppb) Average | 708 | 36 | 36 | 100 | 20 | - | 8 | - |
| Temperature 2 m (C) Average | 744 | 0 | 0 | 100 | 26.9 | - | 21.5 | - |
| Relative Humidity (%) Average | 744 | 0 | 0 | 100 | 98 | - | 88 | - |
| Wind Speed 10 m (km/h) Average | 744 | 0 | 0 | 100 | 25 | - | 16 | - |
| Wind Direction 10 m (deg) Average | 744 | 0 | 0 | 100 | - | - | - | - |

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CHRISTINA LAKE (AMS 500)
AUGUST 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

| Parameter | Number | Mean | StnDev | Total | Percentile | | | | | | |
|-----------------------------------|--------|-------|--------|-------|------------|------|------|--------|------|------|------|
| | | | | | Min | P10 | Q1 | Median | Q3 | P90 | Max |
| SO2 (ppb) Average | 708 | 0.8 | 2 | - | 0 | 0 | 0 | 0 | 0 | 1 | 28 |
| H2S (ppb) Average | 710 | 0.1 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| NO2 (ppb) Average | 708 | 1.3 | 2 | - | 0 | 0 | 0 | 1 | 2 | 3 | 11 |
| NO (ppb) Average | 708 | 0.7 | 1 | - | 0 | 0 | 0 | 0 | 1 | 2 | 9 |
| NOX (ppb) Average | 708 | 2 | 3 | - | 0 | 0 | 0 | 1 | 2 | 4 | 20 |
| Temperature 2 m (C) Average | 744 | 16.43 | 4.4 | - | 3.9 | 10.7 | 13.2 | 16.1 | 19.8 | 22.1 | 26.9 |
| Relative Humidity (%) Average | 744 | 67.2 | 18 | - | 27 | 42 | 52 | 67 | 83 | 93 | 98 |
| Wind Speed 10 m (km/h) Average | 744 | 8.9 | 5 | - | 0 | 3 | 5 | 8 | 12 | 16 | 25 |
| Wind Direction 10 m (deg) Average | 744 | - | - | - | - | - | - | - | - | - | - |

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CHRISTINA LAKE (AMS 500)
AUGUST 2017

OPERATIONAL NOTES

| Parameter | Period Start | Period End | Duration (Hours) | Notes |
|-----------|-------------------|-------------------|------------------|---------------------------------------|
| H2S | 15 Aug 2017 15:00 | 15 Aug 2017 15:00 | 1 | Maintenance - sample manifold cleaned |



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Christina Lake - August 2017

| | | | | |
|---|---|----------|---------------------------|-------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 28 ppb on Aug 16 00:00 | Maximum Daily Average: 4.5 ppb on Aug 15 | | Hours of Data: | 708 |
| Minimum Value: 0 ppb on Aug 1 15:00 | Minimum Daily Average: 0.1 ppb on Aug 6 | | Hours of Missing Data: | 36 |
| Maximum Diurnal Average: 1.7 ppb at hour 16 | Minimum Diurnal Average: 0.1 ppb at hour 4 | | Hours of Calibration: | 36 |
| Monthly Average: 0.8 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 11 | | Percent Operational Time: | 100.0 |

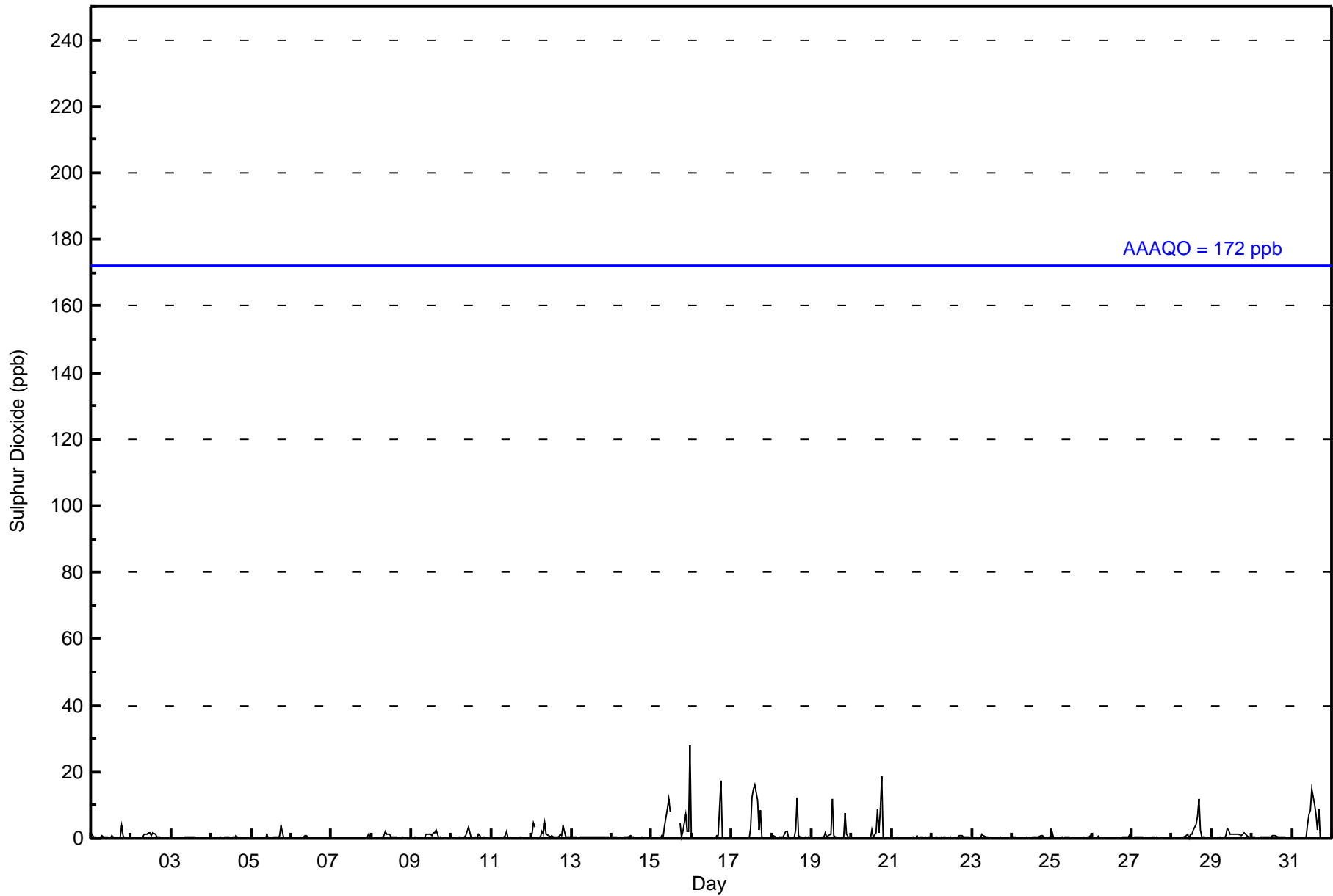
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|---|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----------------|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 1 | 1 | 0 | 0 | Z | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 0.5 | 4 |
| 2-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 1 | 1 | 1 | 2 | 2 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 2 |
| 3-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 4-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 |
| 5-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 0.3 | 4 |
| 6-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 |
| 7-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.1 | 1 |
| 8-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 2 |
| 9-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 2 |
| 10-Aug | 0 | Z | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 | 3 | 2 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 3 |
| 11-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 2 |
| 12-Aug | 1 | 4 | 3 | Z | 0 | 1 | 2 | 1 | 4 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 4 | 1 | 0 | 0 | 0 | 1.3 | 4 |
| 13-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 14-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 15-Aug | Z | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 4 | 9 | 12 | 8 | C | C | C | C | C | 5 | 0 | 2 | 7 | 2 | 2 | 28 | 4.5 | 28 |
| 16-Aug | 1 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.9 | 17 |
| 17-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 12 | 15 | 16 | 11 | 3 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.0 | 16 |
| 18-Aug | 0 | 1 | 0 | Z | 0 | 1 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 3 | 12 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1.1 | 12 |
| 19-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 2 | 1 | 1 | 1 | 12 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 1 | 0 | 0 | 1.3 | 12 |
| 20-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 9 | 2 | 8 | 19 | 0 | 0 | 0 | 0 | 0 | 1.9 | 19 |
| 21-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.2 | 1 |
| 22-Aug | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 23-Aug | 0 | 0 | Z | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 24-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0.3 | 1 |
| 25-Aug | 2 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0.3 | 2 |
| 26-Aug | 0 | 0 | 0 | 0 | 1 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0.3 | 1 |
| 27-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 28-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 2 | 4 | 7 | 12 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 1.5 | 12 |
| 29-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0.9 | 3 |
| 30-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0.5 | 1 |
| 31-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 4 | 7 | 9 | 15 | 10 | 7 | 2 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.9 | 15 |
| 0.3 0.3 0.3 0.1 0.1 0.2 0.3 0.3 0.8 1.1 1.1 1.1 1.1 1.7 1.3 1.4 1.7 1.1 1.6 1.1 0.4 0.6 0.2 0.3 1.1 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| 2 4 3 0 1 1 2 1 4 9 12 9 15 15 16 12 12 17 19 4 8 2 2 28 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |

Z - zerospan C - Calibration
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Christina Lake - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Christina Lake - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 10 | 696 | 98.31 | 98.31 |
| 11 - 20 | 11 | 1.55 | 99.86 |
| 21 - 60 | 1 | 0.14 | 100.00 |
| 61 - 110 | 0 | 0.00 | 100.00 |
| 111 - 172 | 0 | 0.00 | 100.00 |
| > 172 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Christina Lake - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 10 | 14 | 28 | 8 | 12 | 20 | 36 | 61 | 77 | 83 | 65 | 109 | 116 | 34 | 14 | 13 | 6 | 696 |
| 11 - 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 6 | 0 | 0 | 11 |
| 21 - 60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 61 - 110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 111 - 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 14 | 28 | 8 | 12 | 20 | 36 | 61 | 77 | 83 | 65 | 109 | 116 | 39 | 21 | 13 | 6 | 708 |

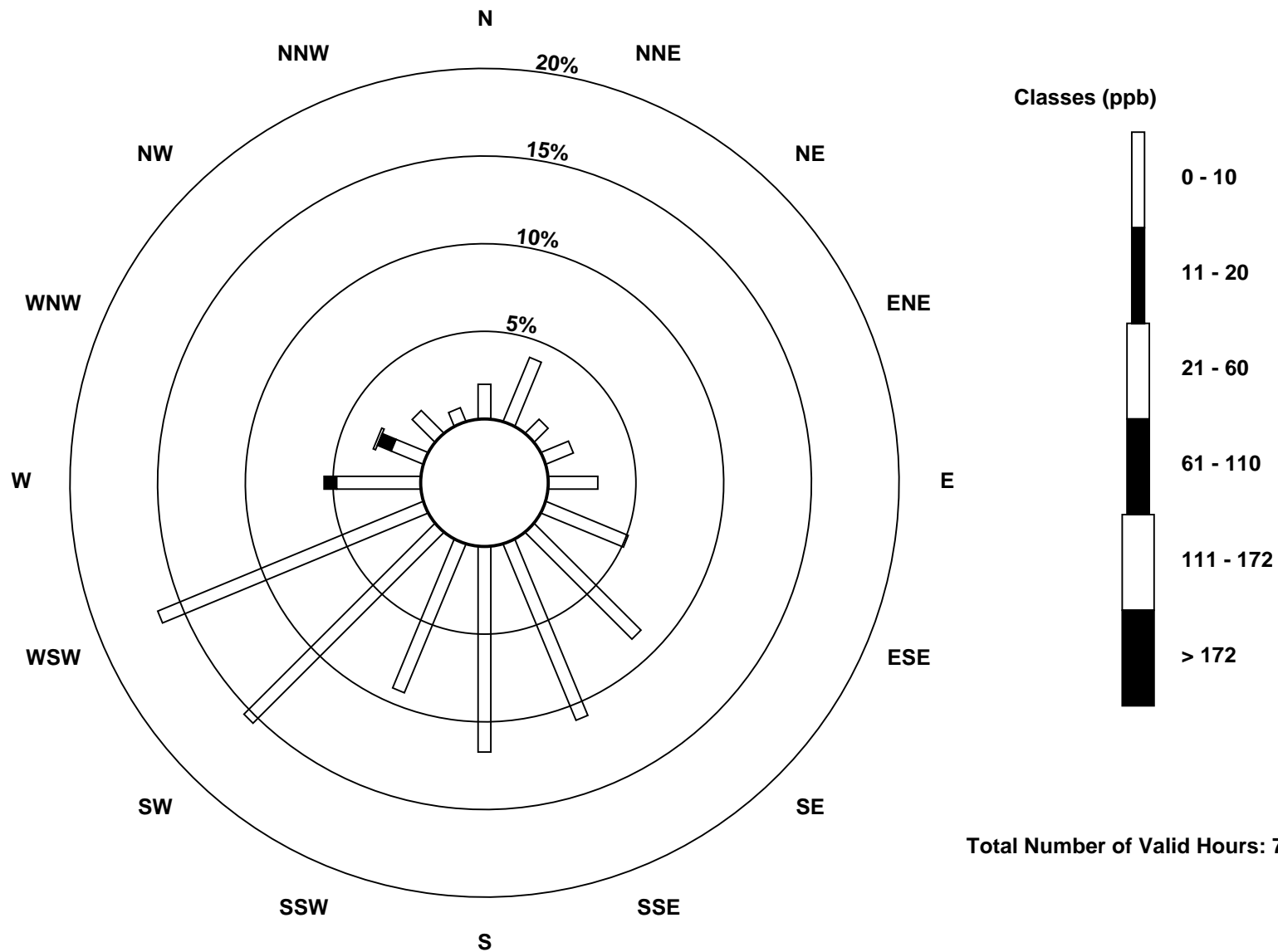
Total Number of Valid Hours: 708

Total Number of Hours: 744

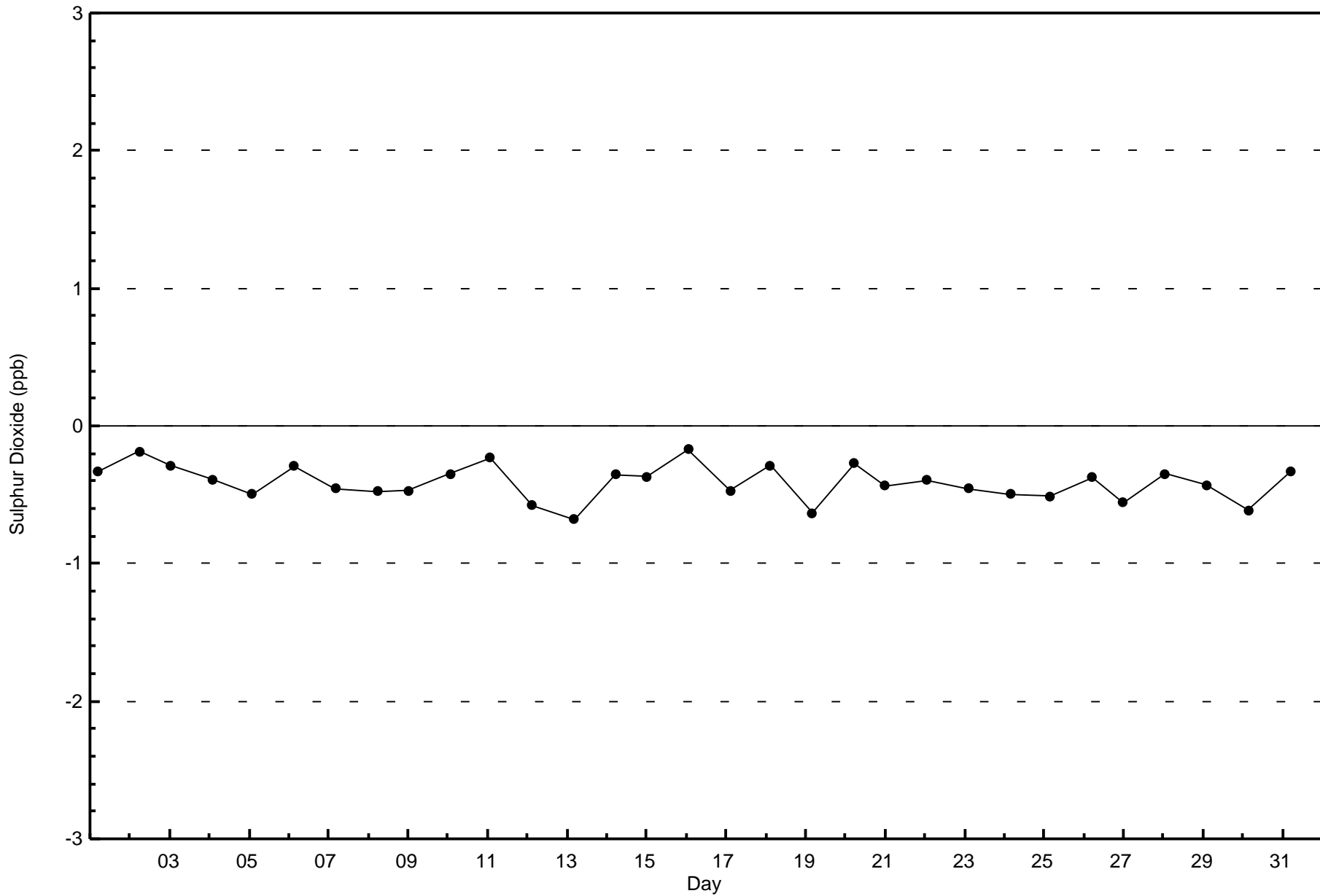


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Sulphur Dioxide (SO₂) - ppb
Christina Lake (AMS 500)



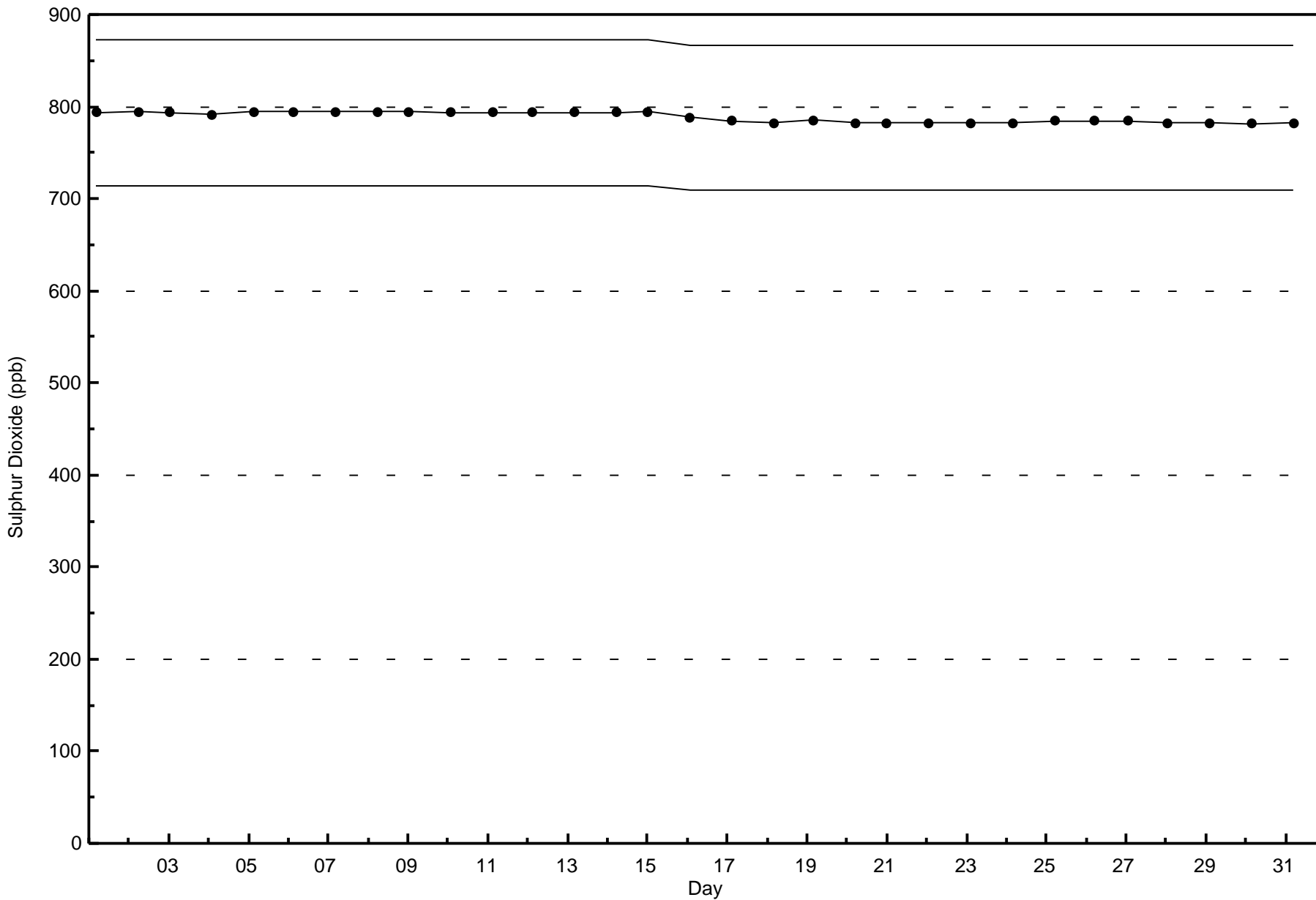
Total Number of Valid Hours: 708





Wood Buffalo Environmental Association
Span Responses

Sulphur Dioxide (SO₂) - ppb
Christina Lake - August 2017



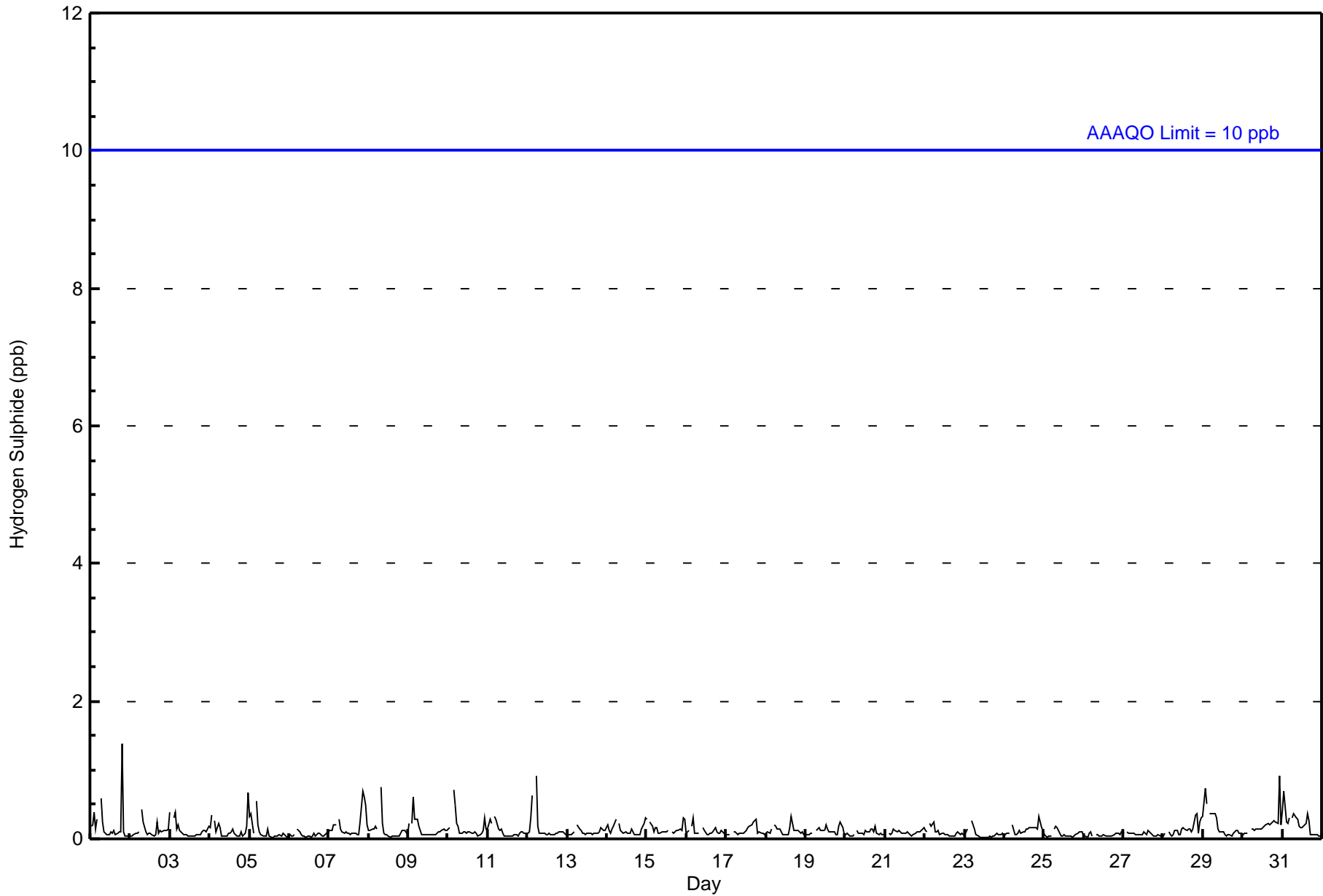


| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|-----|-----------------|-----|-----|-----|-----|-----|-----|--|-------------|-----|-----|-----|-----|-----|-----|-----|-----|--------------------------------|-----|-----|-----|-----|---------------|-----------------|--|--|
| Maximum Value: 1 ppb on Aug 1 20:00 | | | | | | | | | | Maximum Daily Average: 0.2 ppb on Aug 31 | | | | | | | | | | Hours of Data: 710 | | | | | | | | |
| Minimum Value: 0 ppb on Aug 23 13:00 | | | | | | | | | | Minimum Daily Average: 0.1 ppb on Aug 26 | | | | | | | | | | Hours of Missing Data: 34 | | | | | | | | |
| Maximum Diurnal Average: 0.2 ppb at hour 6 | | | | | | | | | | Minimum Diurnal Average: 0.1 ppb at hour 11 | | | | | | | | | | Hours of Calibration: 33 | | | | | | | | |
| Monthly Average: 0.1 ppb | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 O ₃ = 0 P ₉₀ = 0 P ₉₉ = 1 | | | | | | | | | | Percent Operational Time: 99.9 | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | |
| 1-Aug | 0 | 0 | 0 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0.2 | 1 | | |
| 2-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | |
| 3-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | |
| 4-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.1 | 1 | | |
| 5-Aug | 0 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 | | |
| 6-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | |
| 7-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0.2 | 1 | | |
| 8-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 | | |
| 9-Aug | 0 | Z | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 | | |
| 10-Aug | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | |
| 11-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | |
| 12-Aug | 0 | 0 | 0 | 1 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | |
| 13-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | |
| 14-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | |
| 15-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | |
| 16-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | |
| 17-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | |
| 18-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | |
| 19-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | |
| 20-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | |
| 21-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | |
| 22-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | |
| 23-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | |
| 24-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | |
| 25-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | |
| 26-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | |
| 27-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | |
| 28-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | |
| 29-Aug | 0 | 1 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | |
| 30-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0.2 | 1 | | |
| 31-Aug | 0 | 1 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | |
| | 0.1 | 0.2 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | Diurnal Average | | |
| | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | Diurnal Maximum | | |
| Z - zerospan | C - Calibration | | M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): | 1-hr 10 ppb | | | | | | | | | | 24-hr 3 ppb | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Christina Lake - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Christina Lake - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2 | 710 | 100.00 | 100.00 |
| 3 - 4 | 0 | 0.00 | 100.00 |
| 5 - 7 | 0 | 0.00 | 100.00 |
| 8 - 11 | 0 | 0.00 | 100.00 |
| > 11 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Christina Lake - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2 | 16 | 27 | 9 | 12 | 17 | 37 | 64 | 77 | 81 | 66 | 107 | 117 | 39 | 20 | 15 | 6 | 710 |
| 3 - 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 - 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 - 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 16 | 27 | 9 | 12 | 17 | 37 | 64 | 77 | 81 | 66 | 107 | 117 | 39 | 20 | 15 | 6 | 710 |

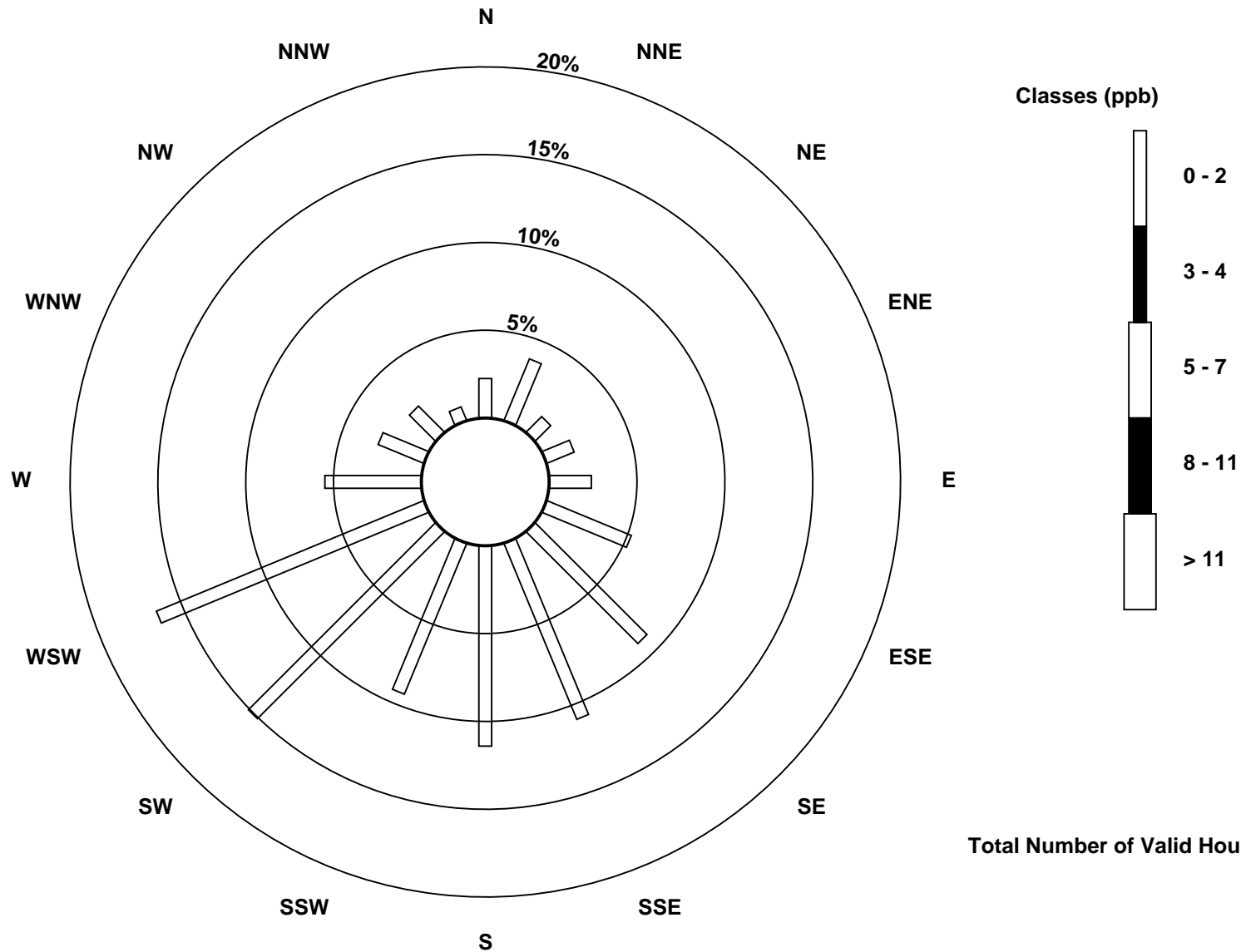
Total Number of Valid Hours: 710

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Hydrogen Sulphide (H₂S) - ppb
Christina Lake (AMS 500)

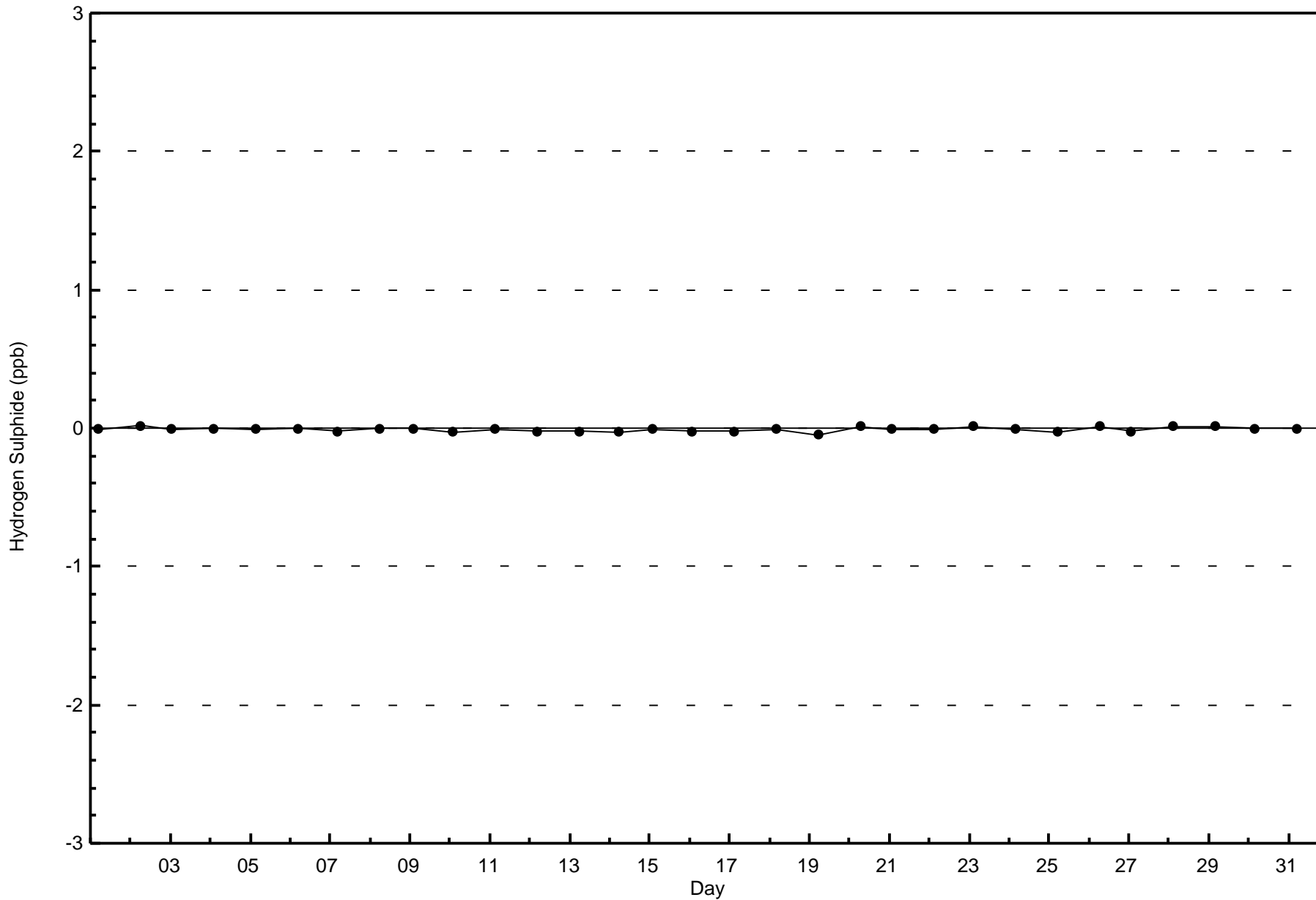


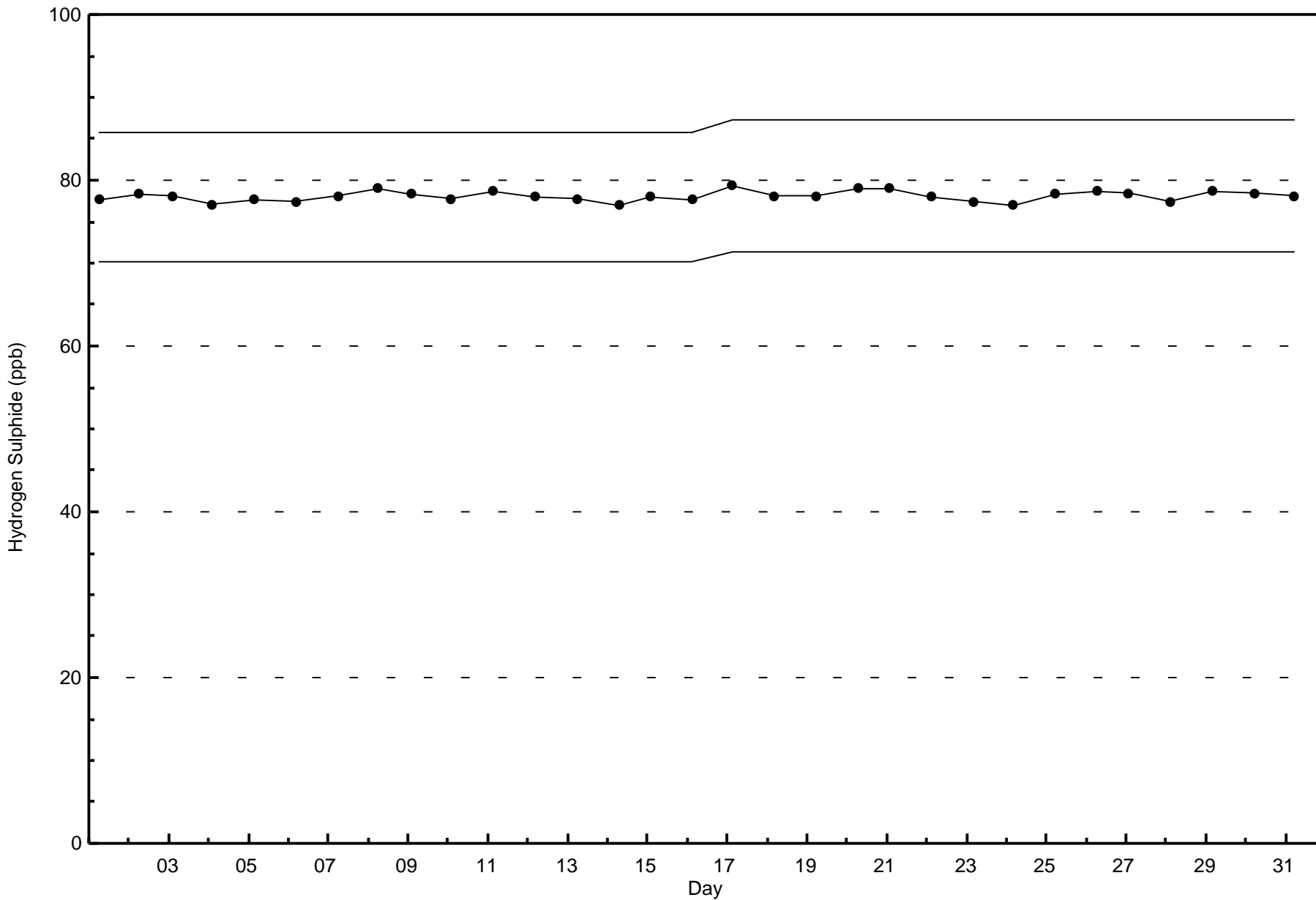
Total Number of Valid Hours: 710



Wood Buffalo Environmental Association
Zero Responses

Hydrogen Sulphide (H₂S) - ppb
Christina Lake - August 2017





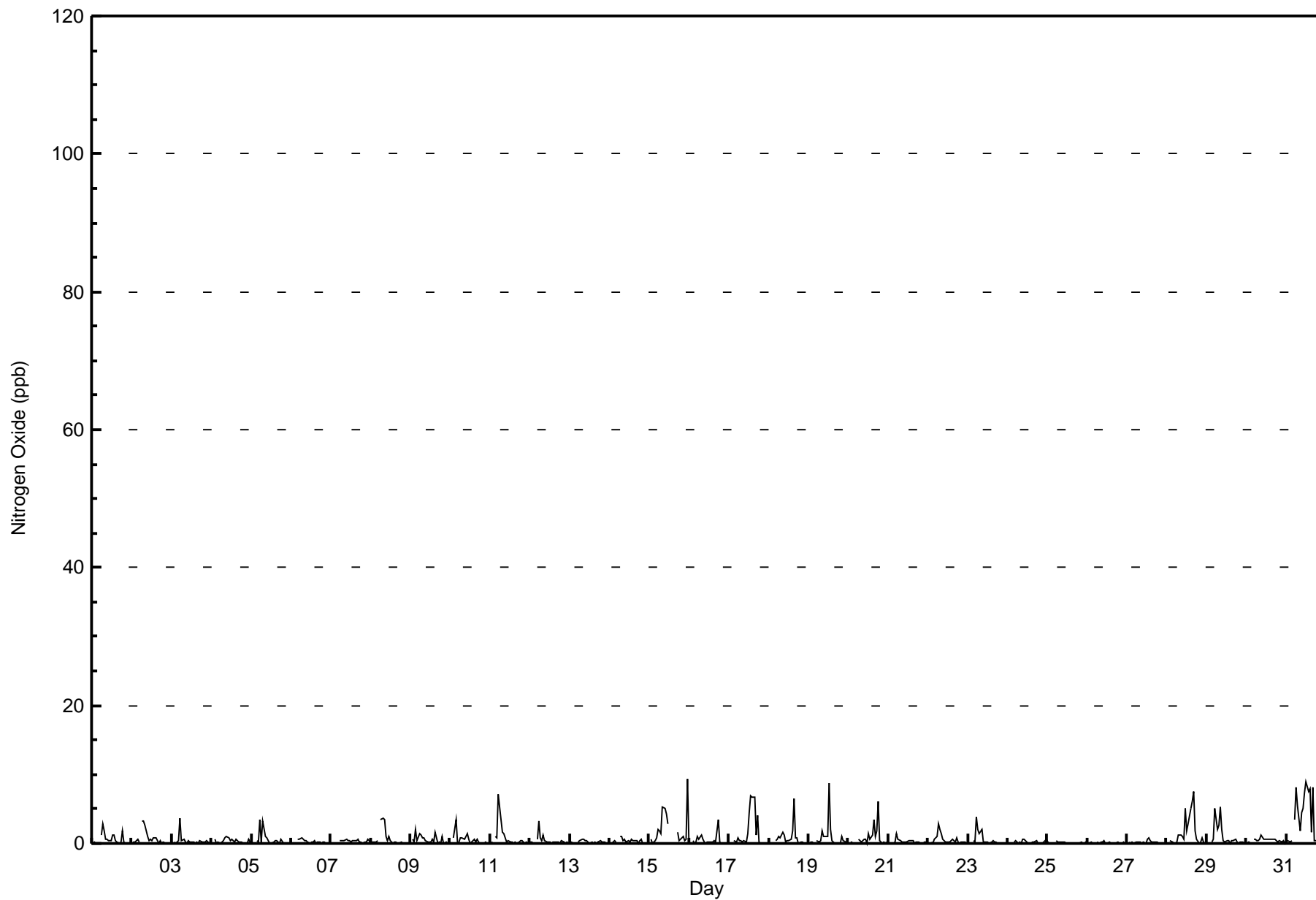


| Maximum Value: 9 ppb on Aug 16 00:00 | | | | | | | | | | | | | | | | | Maximum Daily Average: 3.2 ppb on Aug 31 | | | | | | | | | | | | | | | | | Hours in Service: 744 | |
|---|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|--|----|-----------------|----|----|----|----|----|---------------|---------------|--|--|--|--|--|--|--|---------------------------|--|
| Minimum Value: 0 ppb on Aug 1 01:00 | | | | | | | | | | | | | | | | | Minimum Daily Average: 0.1 ppb on Aug 26 | | | | | | | | | | | | | | | | | Hours of Data: 708 | |
| Maximum Diurnal Average: 1.7 ppb at hour 6 | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 0.1 ppb at hour 1 | | | | | | | | | | | | | | | | | Hours of Missing Data: 36 | |
| Monthly Average: 0.7 ppb | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 7 | | | | | | | | | | | | | | | | | Hours of Calibration: 36 | |
| | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | |
| 1-Aug | 0 | 0 | 0 | 0 | Z | 1 | 3 | 2 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0.6 | 3 | | | | | | | | | |
| 2-Aug | 0 | 0 | 0 | 1 | 0 | Z | 3 | 3 | 3 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 3 | | | | | | | | | |
| 3-Aug | Z | 0 | 0 | 0 | 0 | 4 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 4 | | | | | | | | | |
| 4-Aug | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0.4 | 1 | | | | | | | | | |
| 5-Aug | 0 | 0 | Z | 0 | 0 | 4 | 0 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0.5 | 4 | | | | | | | | | |
| 6-Aug | 0 | 0 | 0 | Z | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | |
| 7-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0.3 | 1 | | | | | | | | | |
| 8-Aug | 0 | 0 | 0 | 0 | 0 | Z | 3 | 4 | 3 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 4 | | | | | | | | | |
| 9-Aug | Z | 1 | 0 | 2 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0.5 | 2 | | | | | | | | | |
| 10-Aug | 0 | Z | 1 | 3 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 3 | | | | | | | | | |
| 11-Aug | 0 | 0 | Z | 1 | 1 | 7 | 3 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0.8 | 7 | | | | | | | | | |
| 12-Aug | 0 | 0 | 0 | Z | 1 | 3 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 3 | | | | | | | | | |
| 13-Aug | 0 | 0 | 0 | 0 | Z | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | |
| 14-Aug | 0 | 0 | 0 | 0 | 0 | Z | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | |
| 15-Aug | Z | 1 | 0 | 0 | 1 | 2 | 2 | 1 | 5 | 5 | 4 | 3 | C | C | C | C | C | 2 | 0 | 1 | 1 | 0 | 1 | 9 | 2.2 | 9 | | | | | | | | | |
| 16-Aug | 0 | Z | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 3 | | | | | | | | | |
| 17-Aug | 0 | 0 | Z | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 7 | 7 | 7 | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 1.5 | 7 | | | | | | | | | |
| 18-Aug | 0 | 0 | 0 | Z | 0 | 1 | 1 | 1 | 2 | 1 | 0 | 0 | 1 | 2 | 7 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.8 | 7 | | | | | | | | | |
| 19-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 2 | 1 | 1 | 1 | 9 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0.9 | 9 | | | | | | | | | |
| 20-Aug | 0 | 0 | 0 | 0 | 0 | Z | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 3 | 1 | 2 | 6 | 0 | 0 | 0 | 0 | 0 | 0.8 | 6 | | | | | | | | | |
| 21-Aug | Z | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | |
| 22-Aug | 0 | Z | 0 | 0 | 1 | 1 | 3 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 3 | | | | | | | | | |
| 23-Aug | 0 | 0 | Z | 0 | 0 | 4 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 4 | | | | | | | | | |
| 24-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0.2 | 1 | | | | | | | | | |
| 25-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | |
| 26-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | |
| 27-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | |
| 28-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 5 | 2 | 3 | 5 | 6 | 8 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 1.6 | 8 | | | | | | | | | |
| 29-Aug | 0 | 0 | Z | 0 | 1 | 5 | 2 | 3 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.9 | 5 | | | | | | | | | |
| 30-Aug | 0 | 0 | 0 | Z | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 1 | | | | | | | | | |
| 31-Aug | 0 | 0 | 0 | 0 | Z | 4 | 8 | 6 | 2 | 4 | 5 | 7 | 9 | 8 | 8 | 2 | 8 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3.2 | 9 | | | | | | | | | |
| | | | | | | | | | | | | | | | | | Diurnal Average | | Diurnal Maximum | | | | | | | | | | | | | | | | |
| 0.1 0.1 0.2 0.4 0.3 1.7 1.3 1.2 1.2 0.9 0.7 0.8 1.1 1.0 1.0 1.1 0.8 0.6 0.4 0.2 0.2 0.1 0.2 0.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 1 1 3 1 7 8 6 5 5 5 7 9 8 8 7 8 4 6 1 1 1 1 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Z - zerospan C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxide (NO) - ppb
Christina Lake - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Christina Lake - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 708 | 100.00 | 100.00 |
| 21 - 40 | 0 | 0.00 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Christina Lake - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 14 | 28 | 8 | 12 | 20 | 36 | 61 | 77 | 83 | 65 | 109 | 116 | 39 | 21 | 13 | 6 | 708 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 41 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 14 | 28 | 8 | 12 | 20 | 36 | 61 | 77 | 83 | 65 | 109 | 116 | 39 | 21 | 13 | 6 | 708 |

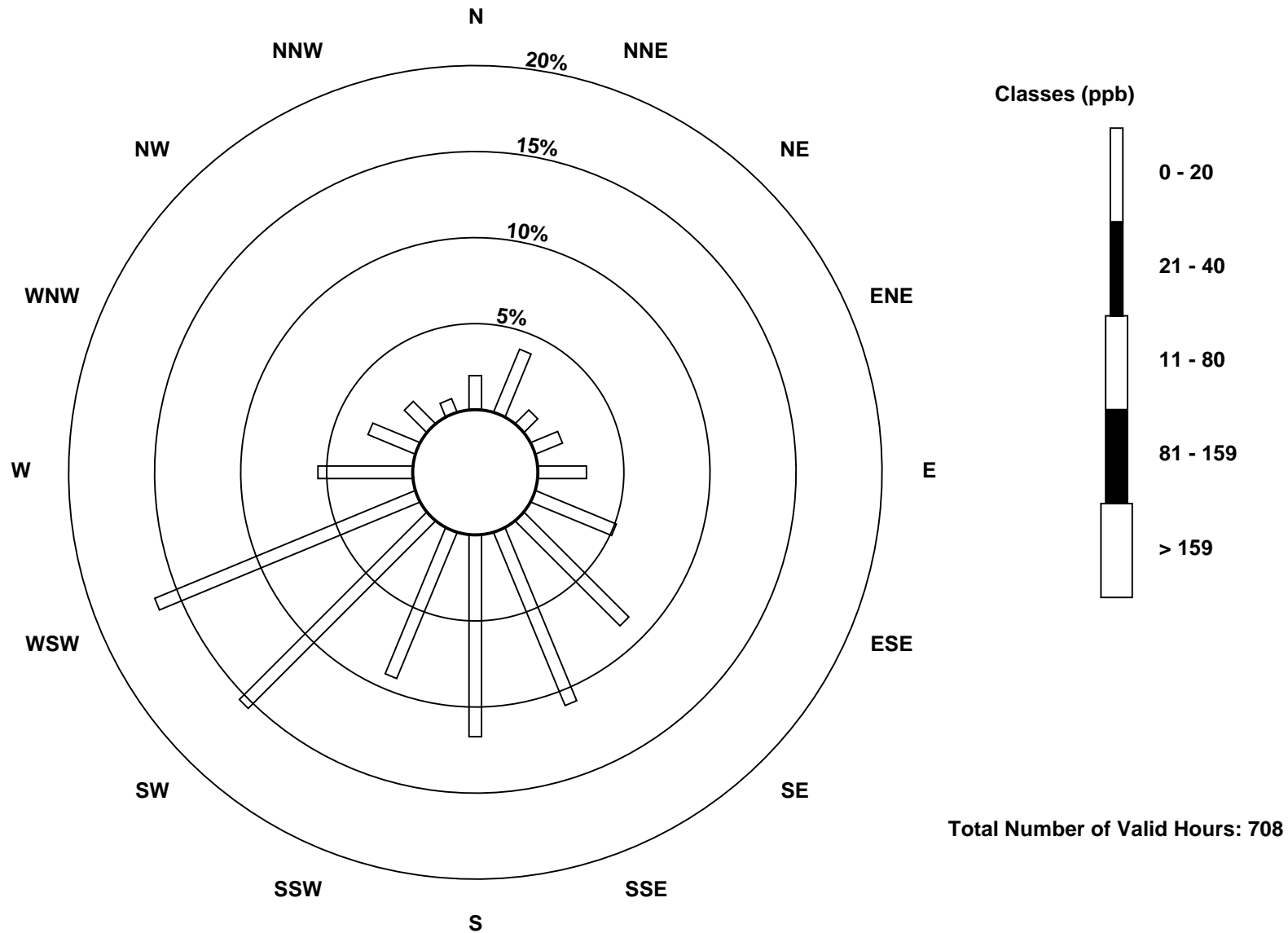
Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

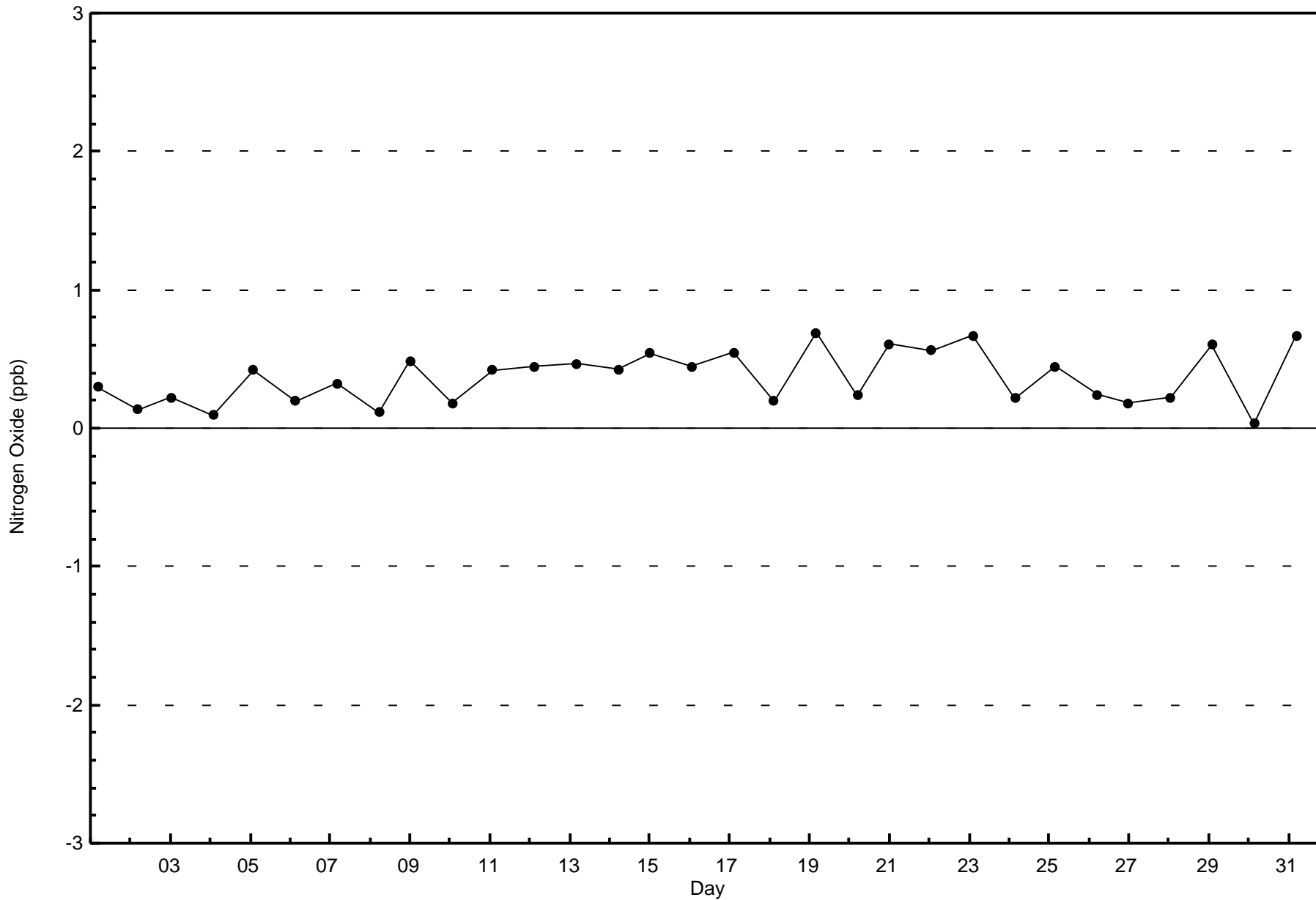
Nitrogen Oxide (NO) - ppb
Christina Lake (AMS 500)

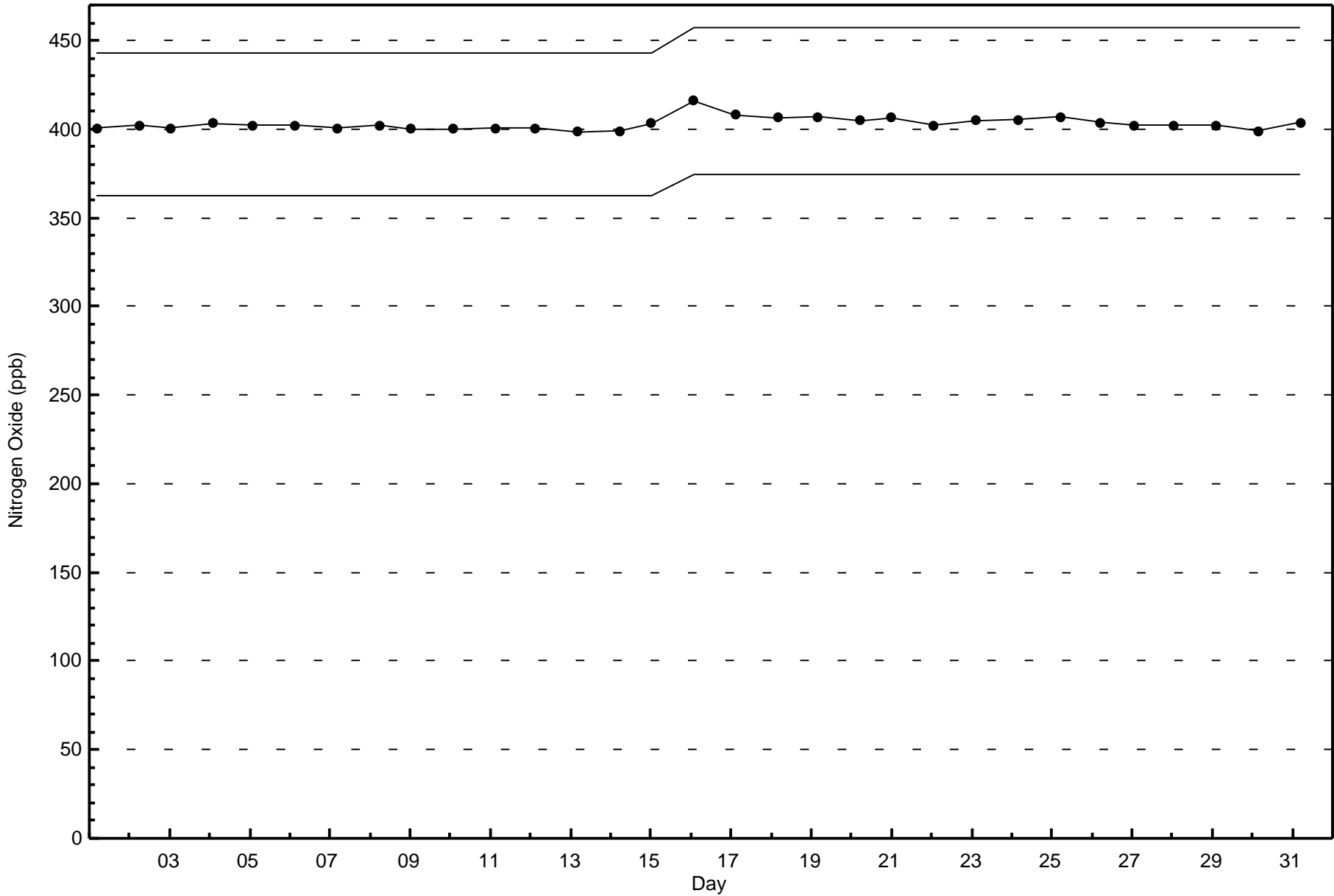




Wood Buffalo Environmental Association
Zero Responses

Nitrogen Oxide (NO) - ppb
Christina Lake - August 2017







Wood Buffalo Environmental Association
Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb
Christina Lake - August 2017

| | | | | |
|--|--|----------|---------------------------|-------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 11 ppb on Aug 31 17:00 | Maximum Daily Average: 4.5 ppb on Aug 31 | | Hours of Data: | 708 |
| Minimum Value: 0 ppb on Aug 1 16:00 | Minimum Daily Average: 0.4 ppb on Aug 27 | | Hours of Missing Data: | 36 |
| Maximum Diurnal Average: 2.2 ppb at hour 6 | Minimum Diurnal Average: 0.7 ppb at hour 1 | | Hours of Calibration: | 36 |
| Monthly Average: 1.3 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 2 P ₉₀ = 3 P ₉₉ = 8 | | Percent Operational Time: | 100.0 |

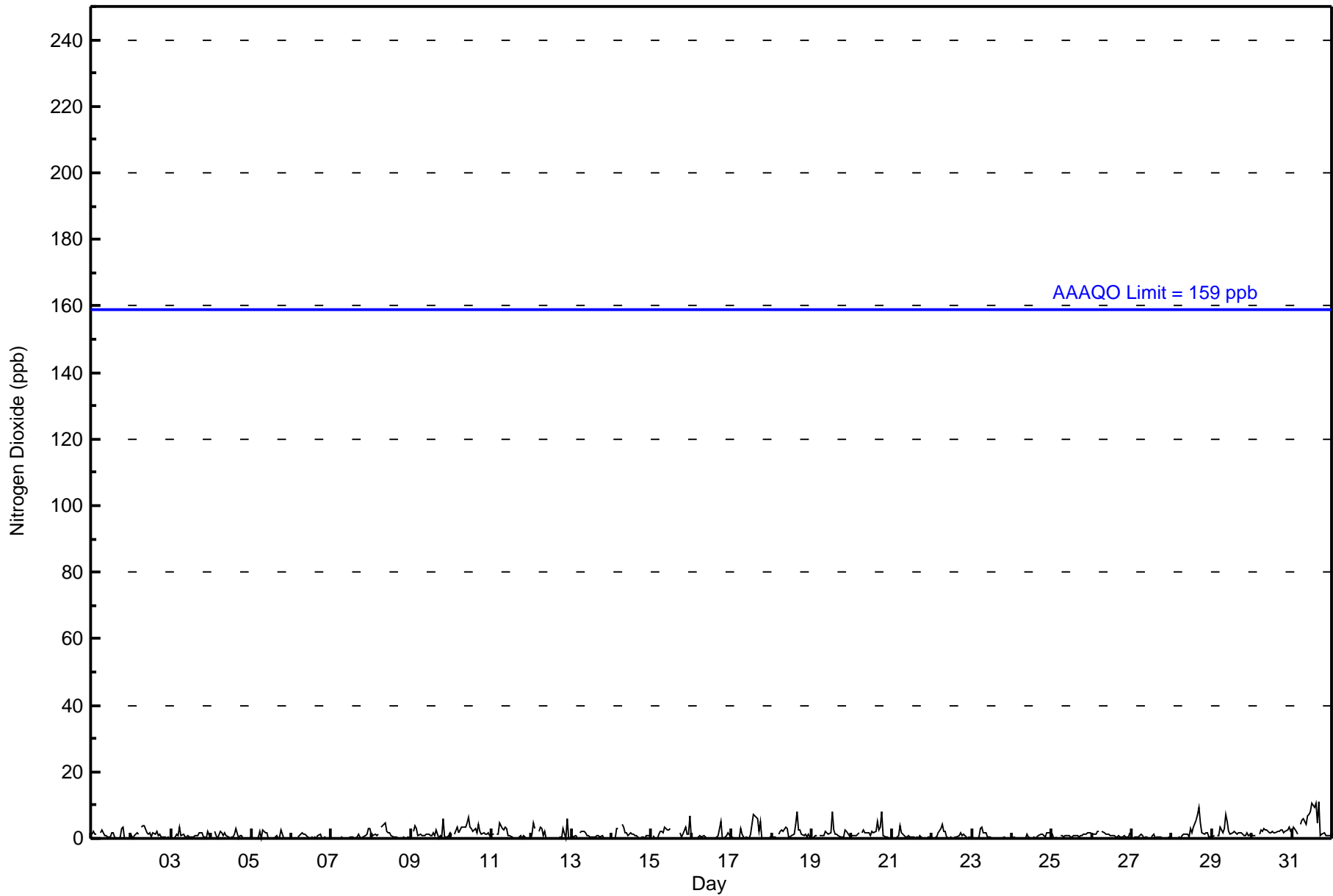
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 1 | 2 | 1 | 1 | Z | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 2 | 2 | 1 | 0 | 0 | 0 | 3 | 3 | 0 | 0 | 0 | 0 | 1.1 | 3 |
| 2-Aug | 1 | 0 | 1 | 2 | 1 | Z | 4 | 4 | 4 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1.3 | 4 |
| 3-Aug | Z | 0 | 0 | 1 | 1 | 3 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 2 | 2 | 0 | 1 | 0 | 2 | 0 | 0.8 | 3 |
| 4-Aug | 0 | Z | 2 | 1 | 0 | 2 | 2 | 1 | 2 | 1 | 0 | 0 | 1 | 0 | 1 | 3 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0.7 | 3 |
| 5-Aug | 1 | 0 | Z | 0 | 0 | 2 | 0 | 3 | 2 | 2 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0.6 | 3 |
| 6-Aug | 0 | 0 | 0 | Z | 0 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 2 |
| 7-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 3 | 3 | 0.6 | 3 |
| 8-Aug | 1 | 1 | 1 | 1 | 1 | Z | 3 | 4 | 5 | 2 | 2 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.2 | 5 |
| 9-Aug | Z | 2 | 4 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 3 | 0 | 1 | 1 | 6 | 1 | 1 | 1 | 2 | 1.5 | 6 |
| 10-Aug | 1 | Z | 1 | 3 | 2 | 3 | 4 | 3 | 3 | 5 | 6 | 3 | 3 | 2 | 3 | 2 | 4 | 2 | 1 | 2 | 1 | 1 | 2 | 1 | 2.6 | 6 |
| 11-Aug | 1 | 1 | Z | 1 | 1 | 5 | 3 | 3 | 3 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1.1 | 5 |
| 12-Aug | 1 | 5 | 3 | Z | 2 | 4 | 3 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 6 | 0 | 0 | 1.3 | 6 |
| 13-Aug | 1 | 0 | 1 | 1 | Z | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0.7 | 2 |
| 14-Aug | 0 | 0 | 0 | 3 | 3 | Z | 4 | 3 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1.2 | 4 |
| 15-Aug | Z | 1 | 0 | 0 | 1 | 2 | 2 | 2 | 4 | 3 | 3 | 3 | C | C | C | C | C | 2 | 1 | 1 | 3 | 1 | 1 | 7 | 2.0 | 7 |
| 16-Aug | 0 | Z | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 0 | 0 | 0 | 1 | 2 | 0 | 0.6 | 5 | |
| 17-Aug | 0 | 0 | Z | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 1 | 4 | 7 | 7 | 6 | 2 | 5 | 0 | 0 | 0 | 0 | 0 | 1 | 1.7 | 7 |
| 18-Aug | 0 | 1 | 0 | Z | 1 | 2 | 3 | 2 | 4 | 3 | 1 | 0 | 1 | 1 | 4 | 8 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 0 | 1.8 | 8 |
| 19-Aug | 0 | 0 | 1 | 1 | Z | 1 | 1 | 1 | 2 | 2 | 1 | 2 | 8 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 2 | 1 | 0 | 1.4 | 8 |
| 20-Aug | 1 | 1 | 1 | 1 | 2 | Z | 2 | 3 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 5 | 3 | 3 | 8 | 1 | 0 | 0 | 0 | 0 | 1.8 | 8 |
| 21-Aug | Z | 0 | 0 | 0 | 1 | 4 | 2 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0.6 | 4 |
| 22-Aug | 1 | Z | 1 | 1 | 2 | 3 | 4 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 1.0 | 4 |
| 23-Aug | 1 | 0 | Z | 0 | 0 | 3 | 4 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 4 |
| 24-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 0.6 | 2 |
| 25-Aug | 1 | 0 | 0 | 0 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 0.9 | 2 |
| 26-Aug | 1 | 1 | 1 | 2 | 2 | Z | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 2 | 1.1 | 2 |
| 27-Aug | Z | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 28-Aug | 0 | Z | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 3 | 2 | 4 | 5 | 7 | 10 | 5 | 2 | 1 | 2 | 2 | 0 | 0 | 2.1 | 10 |
| 29-Aug | 0 | 1 | Z | 1 | 1 | 3 | 2 | 3 | 7 | 5 | 2 | 1 | 2 | 2 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 1.9 | 7 |
| 30-Aug | 1 | 1 | 1 | Z | 1 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 2.0 | 3 |
| 31-Aug | 2 | 3 | 2 | 1 | Z | 4 | 6 | 6 | 4 | 7 | 7 | 8 | 11 | 9 | 11 | 5 | 11 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 4.5 | 11 |
| | 0.7 | 0.8 | 0.9 | 1.0 | 1.0 | 2.2 | 2.0 | 1.9 | 2.0 | 1.6 | 1.2 | 1.1 | 1.5 | 1.5 | 1.6 | 1.8 | 1.6 | 1.4 | 1.1 | 1.0 | 0.7 | 0.8 | 0.8 | 0.8 | Diurnal Average | |
| | 2 | 5 | 4 | 3 | 3 | 5 | 6 | 6 | 7 | 7 | 7 | 8 | 11 | 9 | 11 | 8 | 11 | 5 | 8 | 6 | 3 | 6 | 3 | 7 | Diurnal Maximum | |

Z - zerospan C - Calibration
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Christina Lake - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Christina Lake - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 708 | 100.00 | 100.00 |
| 21 - 40 | 0 | 0.00 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Christina Lake - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 14 | 28 | 8 | 12 | 20 | 36 | 61 | 77 | 83 | 65 | 109 | 116 | 39 | 21 | 13 | 6 | 708 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 41 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 14 | 28 | 8 | 12 | 20 | 36 | 61 | 77 | 83 | 65 | 109 | 116 | 39 | 21 | 13 | 6 | 708 |

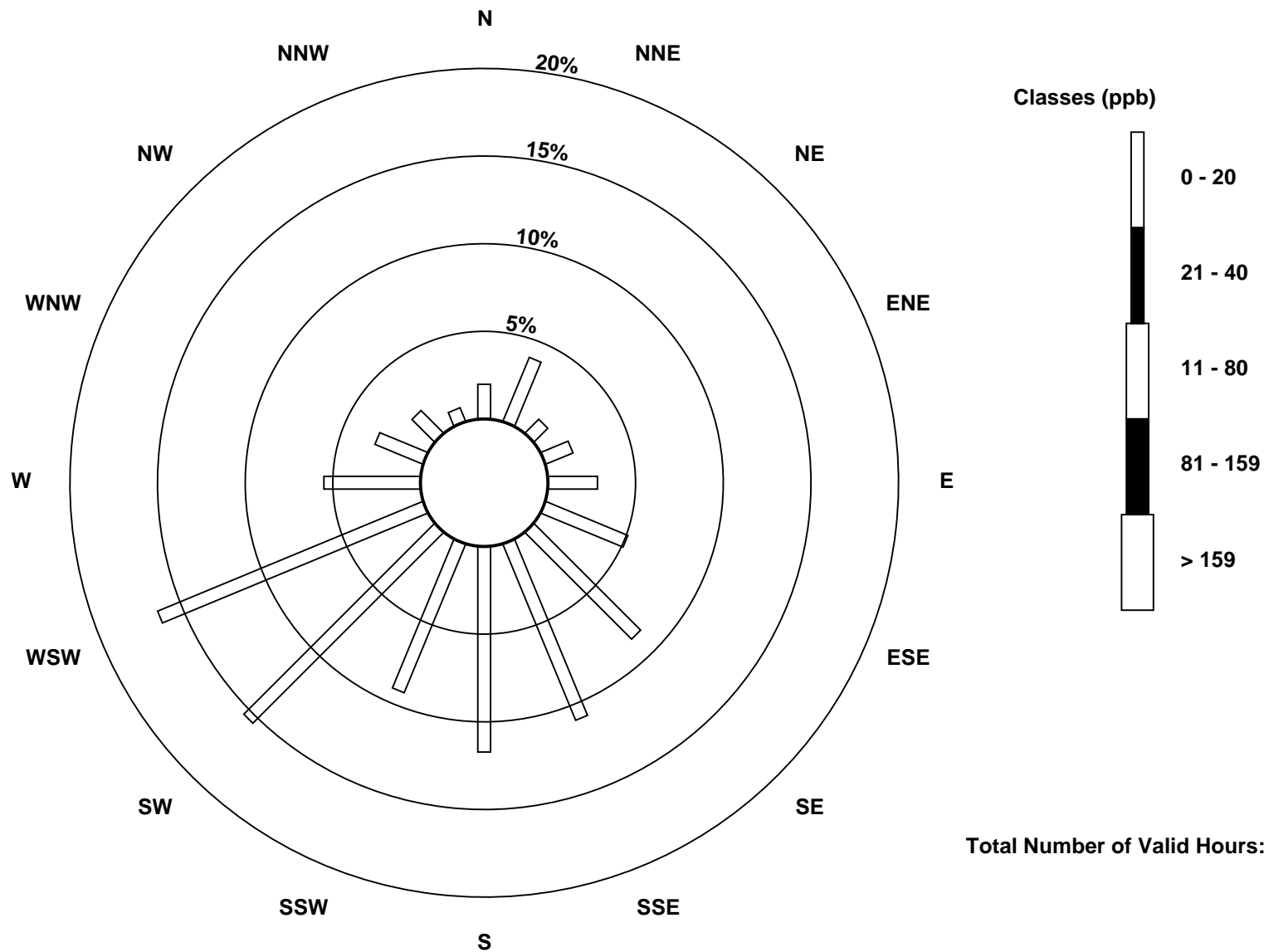
Total Number of Valid Hours: 708

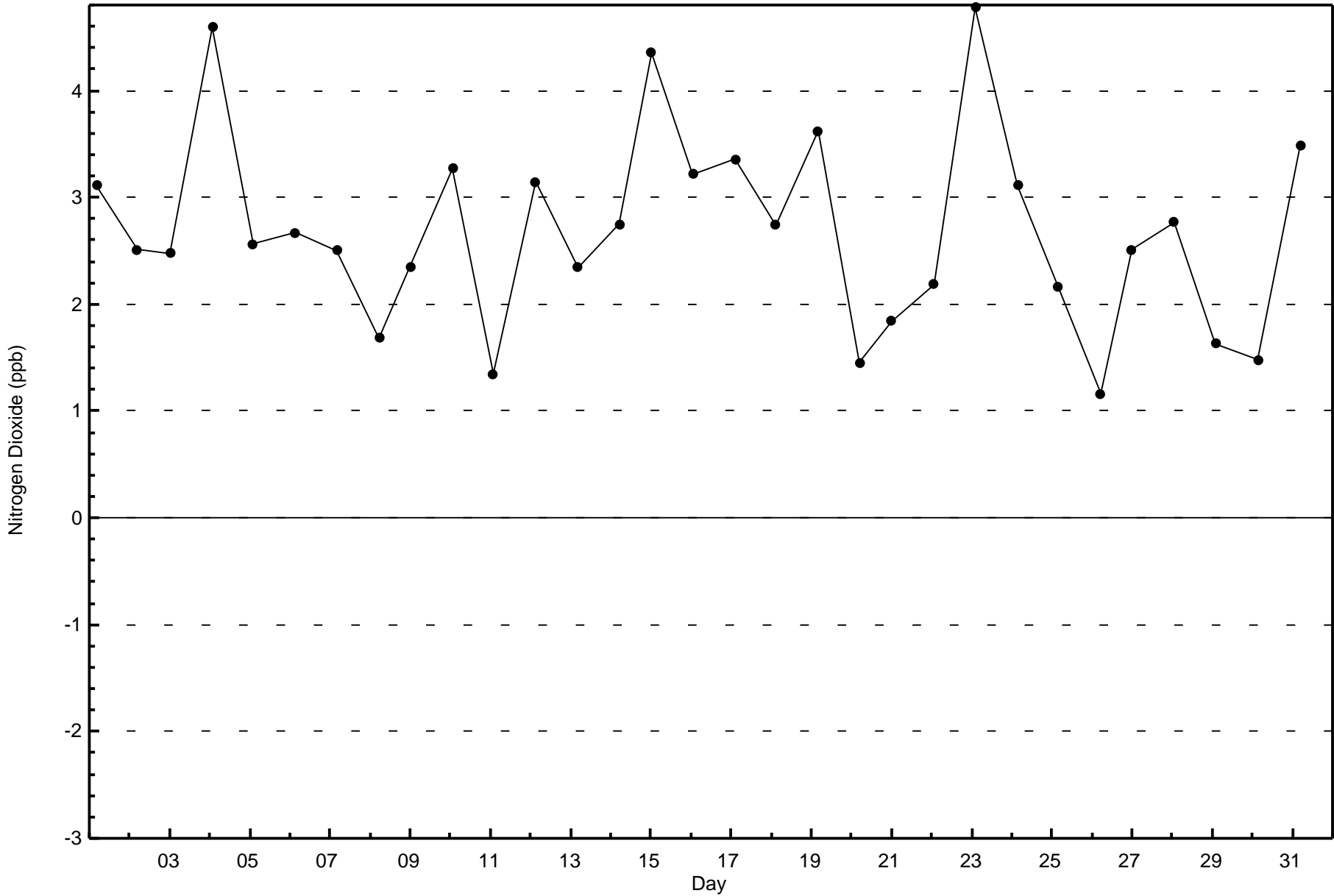
Total Number of Hours: 744

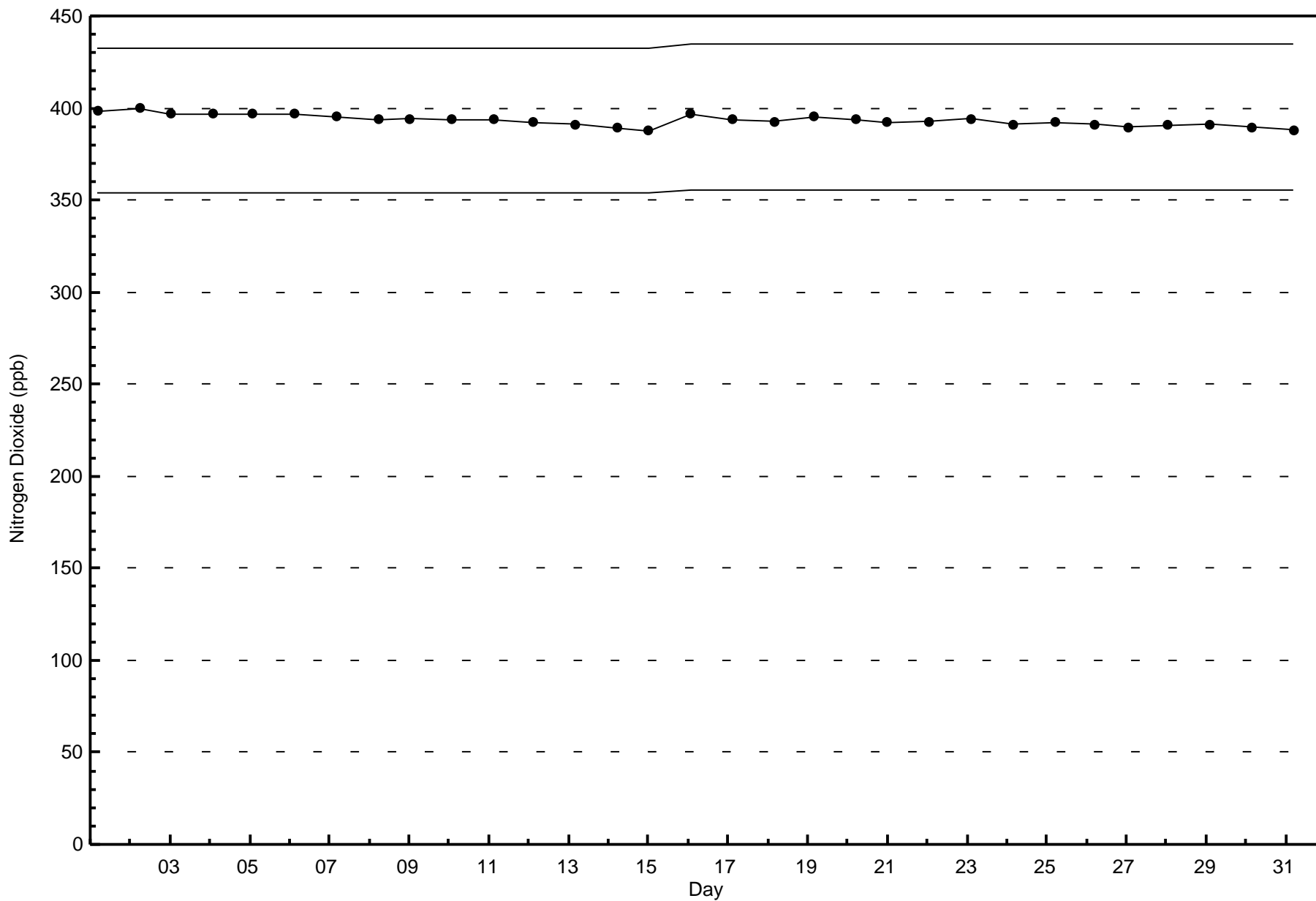


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Dioxide (NO₂) - ppb
Christina Lake (AMS 500)









Wood Buffalo Environmental Association
Summary of Hour Averages

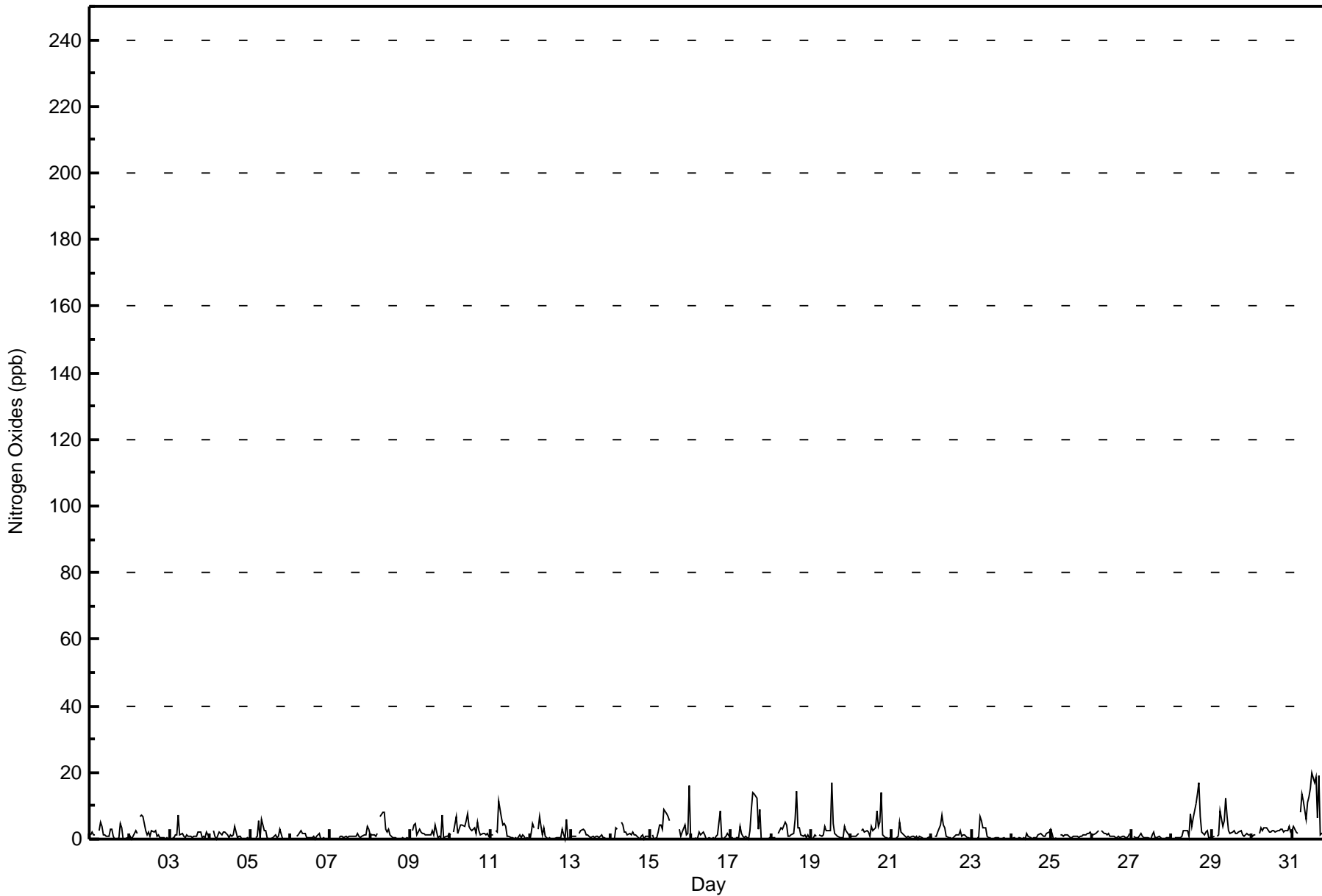
Nitrogen Oxides (NO_x) - ppb
Christina Lake - August 2017

| Maximum Value: 20 ppb on Aug 31 13:00 | | Maximum Daily Average: 7.8 ppb on Aug 31 | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|---|---|---------------------------------|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----------------|---------------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|
| Minimum Value: 0 ppb on Aug 1 21:00 | | Minimum Daily Average: 0.6 ppb on Aug 27 | | Hours of Data: 708 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 3.8 ppb at hour 6 | | Minimum Diurnal Average: 0.7 ppb at hour 1 | | Hours of Missing Data: 36 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 2.0 ppb | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 2 P ₉₀ = 4 P ₉₉ = 16 | | Hours of Calibration: 36 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 1 | 2 | 1 | 1 | Z | 3 | 5 | 4 | 1 | 1 | 1 | 1 | 3 | 3 | 1 | 0 | 0 | 1 | 5 | 4 | 0 | 0 | 0 | 1 | 1.7 | 5 | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 1 | 0 | 1 | 2 | 2 | Z | 7 | 7 | 7 | 2 | 1 | 2 | 1 | 3 | 2 | 3 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 2.0 | 7 | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | Z | 0 | 0 | 1 | 1 | 7 | 1 | 2 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 0 | 2 | 0 | 1.2 | 7 | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 0 | Z | 3 | 1 | 0 | 2 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 4 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1.1 | 4 | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 1 | 0 | Z | 0 | 1 | 6 | 0 | 6 | 2 | 2 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 1.1 | 6 | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 0 | 0 | 0 | Z | 1 | 1 | 3 | 2 | 2 | 2 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0.7 | 3 | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 0 | 0 | 0 | 0 | Z | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 4 | 3 | 0.9 | 4 | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 1 | 1 | 1 | 1 | 2 | Z | 7 | 8 | 8 | 3 | 2 | 3 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1.8 | 8 | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | Z | 3 | 4 | 5 | 1 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 4 | 0 | 1 | 1 | 7 | 1 | 1 | 1 | 2 | 2.0 | 7 | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 1 | Z | 2 | 7 | 2 | 3 | 4 | 4 | 4 | 6 | 8 | 4 | 3 | 2 | 3 | 2 | 5 | 3 | 1 | 2 | 2 | 1 | 2 | 1 | 3.1 | 8 | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 1 | 1 | Z | 2 | 2 | 12 | 6 | 4 | 5 | 4 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1.9 | 12 | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 2 | 5 | 3 | Z | 3 | 7 | 4 | 1 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 6 | 0 | 0 | 1.7 | 7 | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 1 | 1 | 1 | 1 | Z | 2 | 2 | 3 | 2 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1.0 | 3 | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 0 | 0 | 0 | 4 | 3 | Z | 5 | 4 | 2 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1.5 | 5 | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | Z | 1 | 0 | 0 | 2 | 4 | 4 | 3 | 9 | 8 | 7 | 6 | C | C | C | C | C | 3 | 1 | 2 | 4 | 1 | 2 | 16 | 4.1 | 16 | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 0 | Z | 0 | 0 | 1 | 2 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 8 | 0 | 0 | 0 | 1 | 2 | 0 | 1.0 | 8 | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 0 | 0 | Z | 0 | 0 | 4 | 2 | 1 | 0 | 1 | 0 | 3 | 9 | 14 | 14 | 12 | 3 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 3.2 | 14 | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 0 | 0 | 0 | Z | 2 | 3 | 3 | 3 | 5 | 4 | 1 | 1 | 1 | 2 | 6 | 14 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 0 | 2.5 | 14 | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 0 | 0 | 1 | 1 | Z | 1 | 1 | 1 | 4 | 3 | 2 | 3 | 17 | 5 | 2 | 1 | 1 | 1 | 1 | 1 | 4 | 2 | 1 | 0 | 2.3 | 17 | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 1 | 1 | 1 | 1 | 2 | Z | 2 | 3 | 2 | 2 | 2 | 1 | 4 | 2 | 3 | 9 | 4 | 5 | 14 | 1 | 0 | 0 | 0 | 0 | 2.7 | 14 | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | Z | 0 | 0 | 0 | 1 | 5 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0.8 | 5 | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 0 | Z | 1 | 1 | 2 | 4 | 7 | 4 | 3 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 1.5 | 7 | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 1 | 0 | Z | 1 | 0 | 7 | 6 | 3 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.1 | 7 | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 0 | 0 | 0 | Z | 0 | 1 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 3 | 0.8 | 3 | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 2 | 0 | 0 | 0 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 1.0 | 2 | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 1 | 1 | 2 | 2 | 2 | Z | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 2 | 1.2 | 2 | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | Z | 1 | 0 | 1 | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 2 | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 0 | Z | 1 | 0 | 0 | 0 | 1 | 3 | 3 | 2 | 1 | 8 | 4 | 7 | 11 | 13 | 17 | 7 | 2 | 1 | 2 | 3 | 1 | 0 | 3.7 | 17 | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 0 | 1 | Z | 1 | 1 | 8 | 4 | 5 | 12 | 7 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 2.8 | 12 | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 1 | 1 | 1 | Z | 2 | 3 | 3 | 3 | 3 | 4 | 2 | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 4 | 2 | 2.5 | 4 | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 3 | 4 | 2 | 2 | Z | 8 | 14 | 12 | 6 | 11 | 13 | 15 | 20 | 17 | 19 | 6 | 19 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 7.8 | 20 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.7 | 1.0 | 1.0 | 1.4 | 1.3 | 3.8 | 3.3 | 3.1 | 3.2 | 2.5 | 1.8 | 2.0 | 2.6 | 2.4 | 2.6 | 2.9 | 2.3 | 2.1 | 1.5 | 1.2 | 0.9 | 0.9 | 1.0 | 1.2 | Diurnal Average |
| | | | | | | | | | | | | | | | | | | | | | | | | 3 | 5 | 4 | 7 | 3 | 12 | 14 | 12 | 12 | 11 | 13 | 15 | 20 | 17 | 19 | 14 | 19 | 9 | 14 | 7 | 4 | 6 | 4 | 16 | Diurnal Maximum |
| Z - zerospan | | | | | | | | | | | | | | | | | | | | | | | | C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Christina Lake - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Christina Lake - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 708 | 100.00 | 100.00 |
| 21 - 40 | 0 | 0.00 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Christina Lake - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 14 | 28 | 8 | 12 | 20 | 36 | 61 | 77 | 83 | 65 | 109 | 116 | 39 | 21 | 13 | 6 | 708 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 14 | 28 | 8 | 12 | 20 | 36 | 61 | 77 | 83 | 65 | 109 | 116 | 39 | 21 | 13 | 6 | 708 |

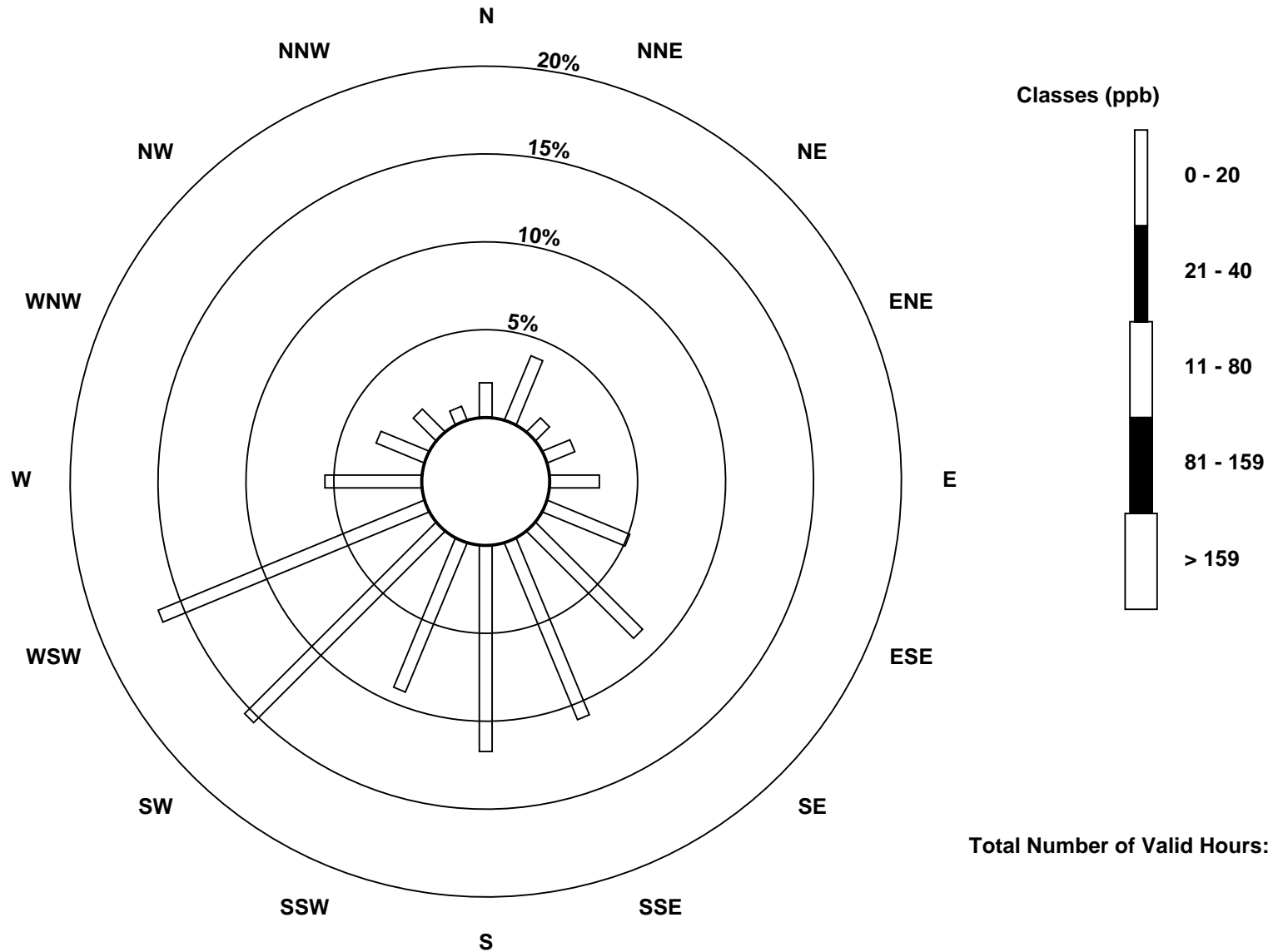
Total Number of Valid Hours: 708

Total Number of Hours: 744

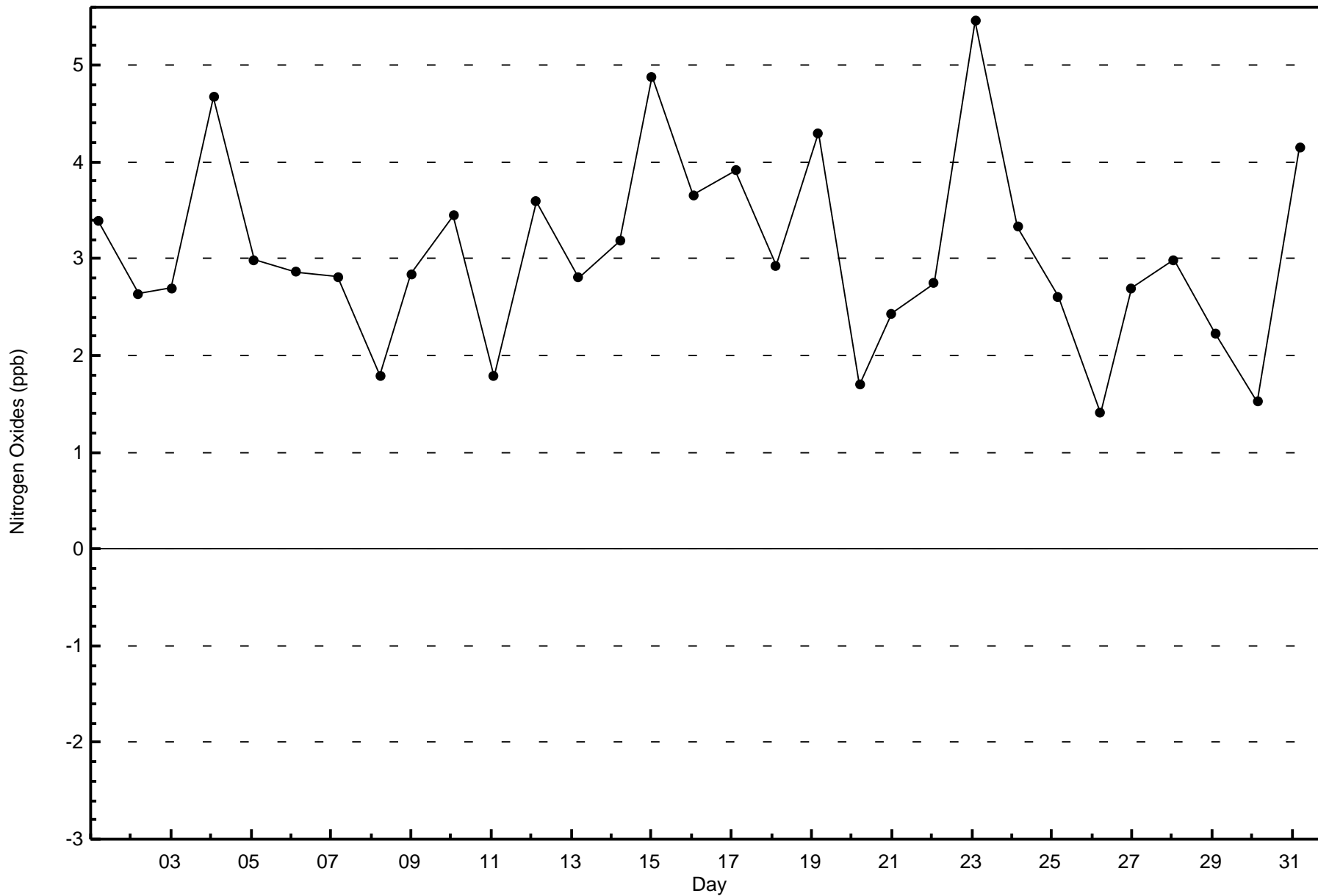


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Oxides (NO_x) - ppb
Christina Lake (AMS 500)



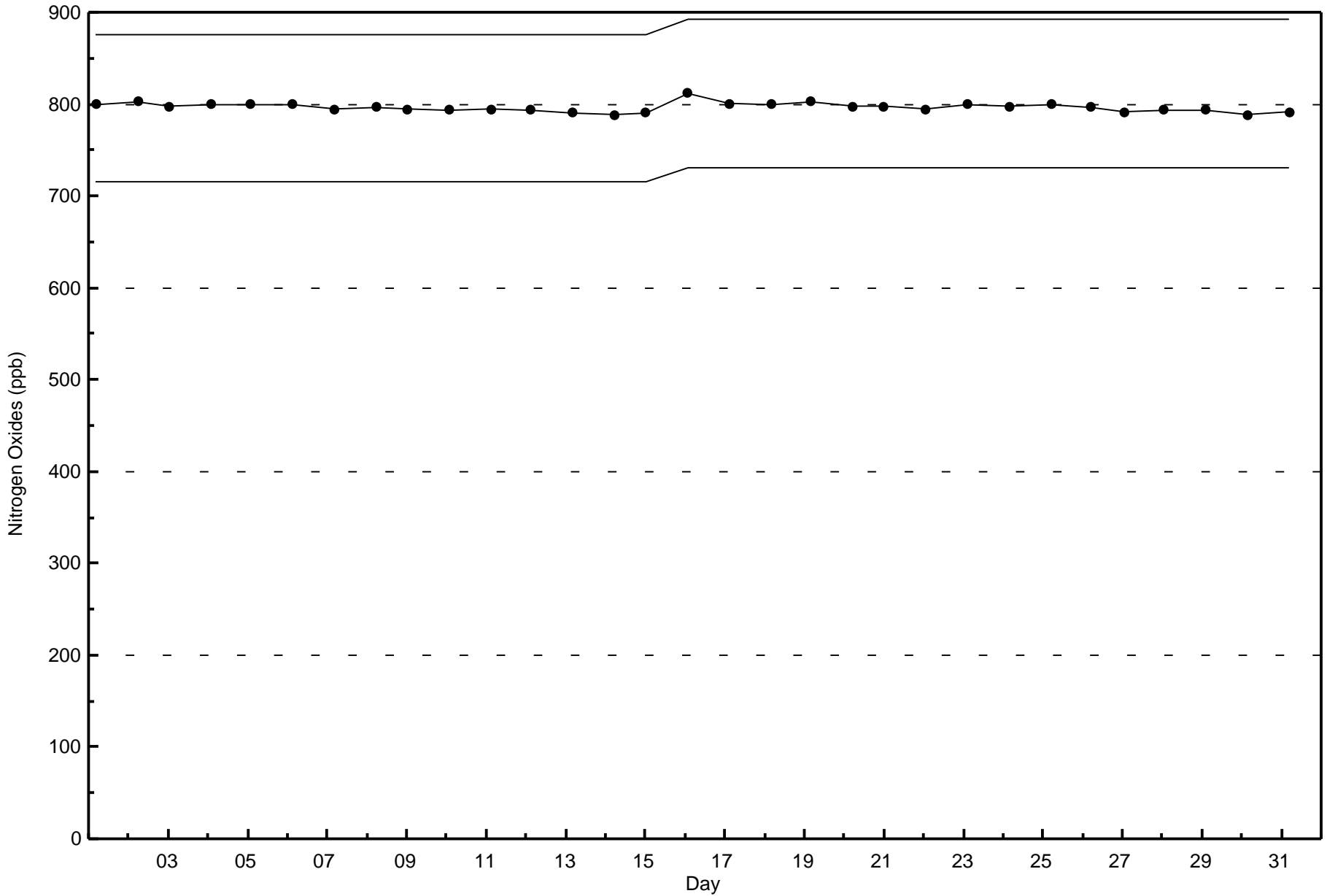
Total Number of Valid Hours: 708





Wood Buffalo Environmental Association
Span Responses

Nitrogen Oxides (NO_x) - ppb
Christina Lake - August 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

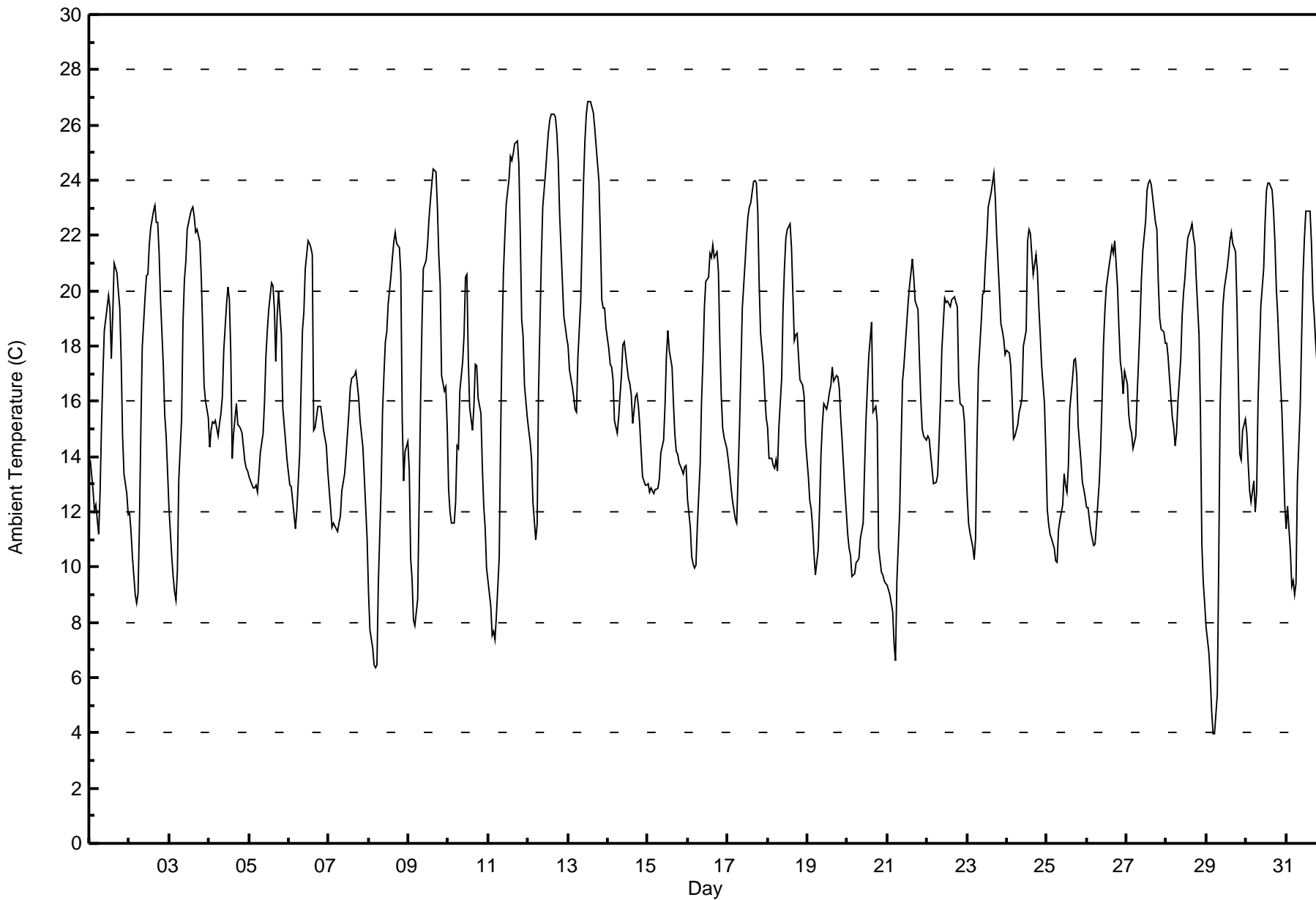
Christina Lake - August 2017

| Maximum Value: 26.9 C on Aug 13 14:00 Maximum Daily Average: 21.5 C on Aug 13 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: | 744 | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------------------|-------|------|---------------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|--|
| Minimum Value: 3.9 C on Aug 29 06:00 Minimum Daily Average: 12.4 C on Aug 20 | | | | | | | | | | | | | | | | | | | | | | Hours of Data: | 744 | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 20.9 C at hour 15 Minimum Diurnal Average: 11.2 C at hour 5 | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 16.43 C Percentiles: P ₁ = 6.4 P ₁₀ = 10.7 Q ₁ = 13.2 Median = 16.1 Q ₃ = 19.8 P ₉₀ = 22.1 P ₉₉ = 26.4 | | | | | | | | | | | | | | | | | | | | | | Hours of Calibration: | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: | 100.0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 13.9 | 13.3 | 12.7 | 12.1 | 12.2 | 11.2 | 12.7 | 15.1 | 17.0 | 18.6 | 19.0 | 19.8 | 19.4 | 17.6 | 19.1 | 21.0 | 20.6 | 20.0 | 19.4 | 17.5 | 14.8 | 13.4 | 12.7 | 11.9 | 16.0 | 21.0 | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 12.0 | 11.3 | 10.4 | 9.0 | 8.7 | 9.0 | 11.6 | 15.0 | 18.0 | 19.8 | 20.5 | 20.6 | 21.7 | 22.3 | 22.9 | 23.1 | 22.5 | 22.5 | 21.4 | 19.7 | 17.3 | 15.5 | 14.8 | 13.5 | 16.8 | 23.1 | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 12.1 | 10.4 | 9.7 | 9.1 | 8.8 | 9.9 | 13.2 | 15.4 | 18.9 | 20.4 | 21.1 | 22.2 | 22.8 | 23.0 | 23.1 | 22.7 | 22.1 | 22.2 | 21.8 | 20.5 | 18.6 | 16.6 | 16.0 | 15.4 | 17.3 | 23.1 | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 14.3 | 14.9 | 15.2 | 15.2 | 15.3 | 14.7 | 15.2 | 15.6 | 16.2 | 17.8 | 19.5 | 20.1 | 19.7 | 17.8 | 13.9 | 14.9 | 15.9 | 15.1 | 15.1 | 15.0 | 14.8 | 13.8 | 13.6 | 13.5 | 15.7 | 20.1 | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 13.3 | 13.1 | 12.8 | 12.9 | 12.9 | 12.7 | 13.4 | 14.2 | 14.8 | 16.0 | 17.7 | 18.5 | 19.3 | 20.3 | 20.2 | 19.4 | 17.4 | 19.1 | 20.0 | 18.4 | 15.8 | 15.1 | 14.5 | 13.9 | 16.1 | 20.3 | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 13.0 | 12.9 | 12.4 | 11.9 | 11.4 | 12.0 | 14.1 | 16.4 | 18.6 | 19.2 | 20.8 | 21.8 | 21.7 | 21.6 | 21.3 | 14.9 | 15.0 | 15.8 | 15.8 | 15.8 | 15.4 | 14.9 | 14.4 | 13.5 | 16.0 | 21.8 | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 12.8 | 12.1 | 11.4 | 11.6 | 11.4 | 11.3 | 11.6 | 11.8 | 12.8 | 13.4 | 14.1 | 14.8 | 15.6 | 16.5 | 16.8 | 17.0 | 17.1 | 16.6 | 16.1 | 15.3 | 14.3 | 13.2 | 12.1 | 11.0 | 13.8 | 17.1 | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 9.1 | 7.8 | 7.1 | 6.4 | 6.3 | 6.4 | 9.4 | 12.9 | 15.7 | 17.0 | 18.1 | 18.5 | 19.5 | 20.5 | 21.2 | 21.8 | 22.1 | 21.7 | 21.5 | 20.6 | 15.3 | 13.1 | 14.2 | 14.5 | 15.0 | 22.1 | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 13.5 | 10.3 | 9.6 | 8.1 | 7.9 | 8.8 | 12.3 | 15.8 | 18.7 | 20.8 | 21.1 | 21.6 | 22.6 | 23.3 | 23.8 | 24.4 | 24.3 | 23.1 | 21.3 | 20.3 | 17.0 | 16.4 | 16.6 | 15.1 | 17.4 | 24.4 | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 12.8 | 12.0 | 11.6 | 11.6 | 12.3 | 14.4 | 14.3 | 16.4 | 17.5 | 18.4 | 20.5 | 20.6 | 17.5 | 15.7 | 15.0 | 15.8 | 17.3 | 17.3 | 16.1 | 15.6 | 13.7 | 12.2 | 11.4 | 10.0 | 15.0 | 20.6 | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 9.5 | 8.6 | 7.5 | 7.7 | 7.4 | 8.2 | 10.3 | 14.7 | 18.2 | 20.6 | 22.0 | 23.1 | 24.1 | 24.8 | 24.7 | 25.0 | 25.3 | 25.4 | 24.5 | 22.0 | 19.0 | 18.4 | 16.6 | 15.4 | 17.6 | 25.4 | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 15.0 | 14.5 | 14.0 | 12.3 | 11.0 | 11.5 | 16.4 | 18.7 | 21.2 | 23.1 | 24.3 | 25.1 | 25.7 | 26.2 | 26.4 | 26.4 | 26.3 | 25.7 | 24.7 | 22.8 | 20.3 | 19.0 | 18.7 | 18.3 | 20.3 | 26.4 | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 18.0 | 17.2 | 16.5 | 16.2 | 15.7 | 15.6 | 17.6 | 19.6 | 21.9 | 23.9 | 25.4 | 26.4 | 26.8 | 26.9 | 26.7 | 26.5 | 25.9 | 25.2 | 23.9 | 22.0 | 19.7 | 19.4 | 19.4 | 18.7 | 21.5 | 26.9 | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 17.9 | 17.3 | 17.3 | 16.8 | 15.3 | 14.8 | 15.4 | 16.2 | 16.9 | 18.1 | 18.2 | 17.2 | 16.8 | 16.7 | 16.2 | 15.2 | 16.2 | 16.3 | 15.9 | 15.1 | 14.2 | 13.3 | 12.9 | 13.0 | 16.0 | 18.2 | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 13.0 | 12.7 | 12.9 | 12.7 | 12.8 | 12.8 | 12.9 | 13.2 | 14.1 | 14.6 | 15.9 | 17.7 | 18.6 | 17.8 | 17.3 | 15.9 | 14.8 | 14.2 | 14.1 | 13.8 | 13.5 | 13.4 | 13.6 | 13.7 | 14.4 | 18.6 | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 12.5 | 11.4 | 10.4 | 10.1 | 10.0 | 10.1 | 11.5 | 13.7 | 16.0 | 17.5 | 19.4 | 20.3 | 20.5 | 21.3 | 21.2 | 21.7 | 21.2 | 21.4 | 20.7 | 18.2 | 16.2 | 15.0 | 14.7 | 14.3 | 16.2 | 21.7 | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 13.9 | 13.4 | 12.9 | 12.4 | 11.8 | 11.6 | 13.3 | 15.0 | 17.2 | 19.4 | 21.0 | 22.0 | 22.7 | 23.1 | 23.2 | 24.0 | 24.0 | 23.9 | 22.9 | 20.3 | 18.5 | 17.3 | 16.2 | 15.4 | 18.1 | 24.0 | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 15.1 | 13.9 | 13.9 | 13.7 | 13.6 | 13.9 | 13.5 | 15.1 | 16.8 | 19.4 | 20.9 | 21.9 | 22.2 | 22.4 | 21.6 | 19.9 | 18.2 | 18.4 | 18.5 | 16.8 | 16.7 | 16.6 | 16.2 | 14.5 | 17.2 | 22.4 | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 13.3 | 12.4 | 12.1 | 11.4 | 10.5 | 9.7 | 10.6 | 12.2 | 14.1 | 15.2 | 15.9 | 15.7 | 16.0 | 16.3 | 16.6 | 17.2 | 16.8 | 16.9 | 16.9 | 16.5 | 15.4 | 14.6 | 12.8 | 12.0 | 14.2 | 17.2 | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 11.2 | 10.7 | 10.4 | 9.7 | 9.7 | 10.2 | 10.2 | 10.3 | 11.0 | 11.6 | 13.6 | 15.3 | 16.5 | 17.7 | 18.9 | 15.6 | 15.7 | 15.8 | 15.2 | 10.7 | 9.8 | 9.7 | 9.5 | 9.4 | 12.4 | 18.9 | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 9.4 | 9.0 | 8.7 | 8.4 | 7.2 | 6.6 | 9.5 | 12.0 | 14.4 | 16.7 | 17.3 | 18.0 | 19.6 | 20.2 | 20.6 | 21.1 | 20.5 | 19.6 | 19.3 | 17.6 | 16.1 | 15.0 | 14.8 | 14.6 | 14.8 | 21.1 | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 14.7 | 14.7 | 14.1 | 13.6 | 13.0 | 13.1 | 13.3 | 14.6 | 16.0 | 17.9 | 19.7 | 19.6 | 19.6 | 19.5 | 19.4 | 19.7 | 19.8 | 19.6 | 19.4 | 16.7 | 15.9 | 15.8 | 15.3 | 13.9 | 16.6 | 19.8 | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 12.6 | 11.6 | 11.2 | 10.7 | 10.3 | 11.1 | 14.6 | 17.2 | 18.9 | 19.9 | 19.9 | 21.1 | 21.9 | 23.0 | 23.5 | 23.9 | 24.3 | 23.4 | 22.0 | 20.0 | 18.8 | 18.6 | 18.3 | 17.7 | 18.1 | 24.3 | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 17.8 | 17.8 | 17.3 | 16.1 | 14.7 | 14.7 | 15.1 | 15.6 | 15.8 | 16.1 | 18.0 | 18.6 | 21.8 | 22.2 | 22.1 | 21.3 | 20.6 | 21.3 | 20.7 | 19.4 | 18.4 | 17.3 | 15.9 | 14.2 | 18.0 | 22.2 | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 12.1 | 11.5 | 11.2 | 11.0 | 10.7 | 10.2 | 10.2 | 11.4 | 11.7 | 12.3 | 13.4 | 12.9 | 12.7 | 13.6 | 15.7 | 16.8 | 17.5 | 17.6 | 16.9 | 15.1 | 13.8 | 13.0 | 12.8 | 12.5 | 13.2 | 17.6 | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 12.2 | 12.1 | 11.3 | 11.0 | 10.8 | 10.8 | 11.6 | 13.1 | 14.3 | 16.1 | 18.1 | 19.3 | 20.2 | 20.9 | 21.3 | 21.6 | 21.4 | 21.8 | 20.1 | 18.6 | 17.4 | 17.0 | 16.3 | 17.1 | 16.4 | 21.8 | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 16.7 | 15.5 | 15.1 | 14.9 | 14.3 | 14.7 | 16.3 | 17.5 | 18.8 | 20.4 | 21.5 | 22.5 | 23.6 | 23.9 | 24.0 | 23.8 | 22.9 | 22.5 | 22.2 | 20.4 | 19.0 | 18.6 | 18.5 | 18.1 | 19.4 | 24.0 | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 18.1 | 17.6 | 16.8 | 15.4 | 15.0 | 14.4 | 14.9 | 16.0 | 17.5 | 19.1 | 19.9 | 20.5 | 21.3 | 21.9 | 22.2 | 22.4 | 22.0 | 21.7 | 20.5 | 18.4 | 15.6 | 10.9 | 9.5 | 8.7 | 17.5 | 22.4 | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 7.8 | 6.9 | 6.0 | 4.8 | 4.0 | 3.9 | 5.4 | 10.1 | 15.7 | 17.9 | 19.5 | 20.1 | 20.8 | 21.3 | 21.8 | 22.1 | 21.7 | 21.4 | 19.5 | 16.8 | 14.1 | 13.9 | 14.9 | 15.4 | 14.4 | 22.1 | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 14.9 | 13.7 | 12.7 | 12.3 | 13.1 | 12.0 | 12.7 | 16.0 | 17.8 | 19.5 | 20.8 | 22.5 | 23.7 | 23.9 | 23.9 | 23.6 | 22.9 | 21.8 | 20.1 | 19.1 | 17.8 | 15.6 | 14.0 | 12.3 | 17.8 | 23.9 | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 11.4 | 12.2 | 10.6 | 9.3 | 9.5 | 9.0 | 9.4 | 13.1 | 15.8 | 18.3 | 20.6 | 21.9 | 22.9 | 22.9 | 22.9 | 21.7 | 19.8 | 19.1 | 18.1 | 16.5 | 15.6 | 14.9 | 13.5 | 12.8 | 15.9 | 22.9 | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | 13.3 | 12.7 | 12.1 | 11.6 | 11.2 | 11.3 | 12.7 | 14.6 | 16.5 | 18.0 | 19.3 | 20.0 | 20.6 | 20.8 | 20.9 | 20.7 | 20.4 | 20.2 | 19.5 | 17.9 | 16.2 | 15.2 | 14.7 | 14.0 | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | | | | | 18.1 | 17.8 | 17.3 | 16.8 | 15.7 | 15.6 | 17.6 | 19.6 | 21.9 | 23.9 | 25.4 | 26.4 | 26.8 | 26.9 | 26.7 | 26.5 | 26.3 | 25.7 | 24.7 | 22.8 | 20.3 | 19.4 | 19.4 | 18.7 | Diurnal Maximum | |



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Christina Lake - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Christina Lake - August 2017**

| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 53 | 7.12 | 7.12 |
| 10 - 20 | 515 | 69.22 | 76.34 |
| > 20 | 176 | 23.66 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

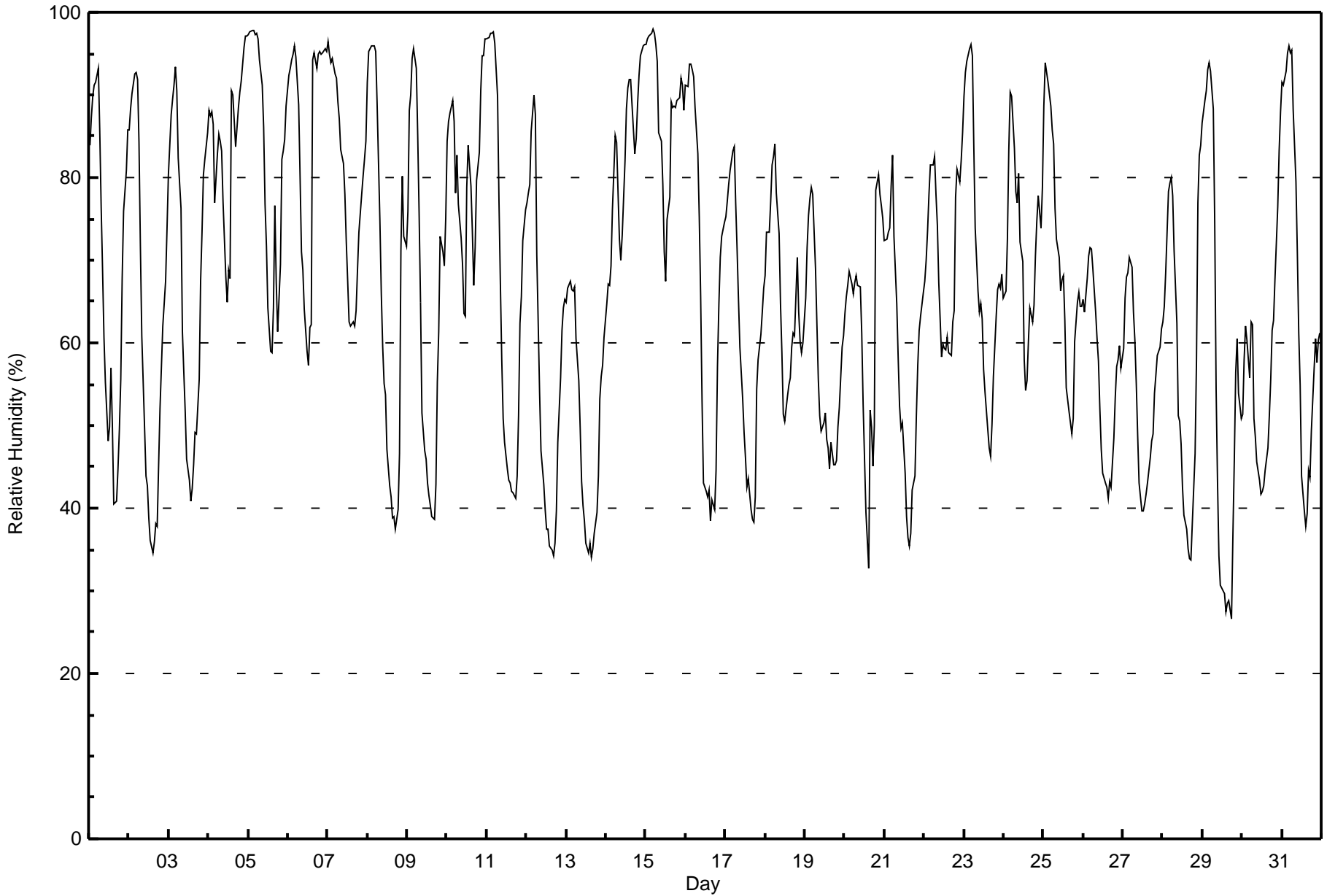
Christina Lake - August 2017

| Maximum Value: 98 % on Aug 15 05:00 | | | | | | | | | | | | | | | | | Maximum Daily Average: 88.2 % on Aug 15 | | | | | | | | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | |
|---|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|------|---------------|---------------|------|------|------|------|------|------|------|---------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|--|
| Minimum Value: 27 % on Aug 29 18:00 | | | | | | | | | | | | | | | | | Minimum Daily Average: 50.4 % on Aug 13 | | | | | | | | | | | | | | | | | Hours of Data: 744 | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 85.6 % at hour 5 | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 50.1 % at hour 15 | | | | | | | | | | | | | | | | | Hours of Missing Data: 0 | | | | | | | | | | | | | | | |
| Monthly Average: 67.2 % | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 33 P ₁₀ = 42 Q ₁ = 52 Median = 67 O ₃ = 83 P ₉₀ = 93 P ₉₉ = 98 | | | | | | | | | | | | | | | | | Hours of Calibration: 0 | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 84 | 87 | 90 | 91 | 92 | 93 | 86 | 76 | 69 | 61 | 55 | 48 | 50 | 57 | 50 | 41 | 41 | 45 | 50 | 56 | 68 | 76 | 81 | 86 | 67.9 | 93 | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 86 | 88 | 90 | 93 | 93 | 92 | 84 | 72 | 61 | 50 | 44 | 43 | 39 | 36 | 34 | 36 | 38 | 38 | 45 | 52 | 62 | 65 | 68 | 74 | 61.7 | 93 | | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 80 | 88 | 90 | 91 | 93 | 90 | 82 | 76 | 61 | 56 | 52 | 46 | 43 | 41 | 42 | 45 | 49 | 49 | 56 | 67 | 73 | 80 | 82 | 85 | 67.5 | 93 | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 88 | 88 | 88 | 86 | 77 | 83 | 85 | 84 | 83 | 77 | 68 | 65 | 69 | 68 | 91 | 90 | 84 | 86 | 88 | 90 | 92 | 96 | 97 | 97 | 84.2 | 97 | | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 97 | 98 | 98 | 98 | 97 | 98 | 97 | 94 | 91 | 86 | 77 | 72 | 64 | 59 | 59 | 64 | 77 | 67 | 61 | 69 | 82 | 83 | 85 | 89 | 81.7 | 98 | | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 92 | 93 | 94 | 95 | 96 | 95 | 89 | 80 | 71 | 69 | 64 | 59 | 57 | 62 | 62 | 94 | 95 | 93 | 95 | 95 | 95 | 95 | 96 | 95 | 84.7 | 96 | | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 96 | 95 | 94 | 94 | 93 | 92 | 89 | 87 | 83 | 82 | 78 | 72 | 67 | 63 | 62 | 62 | 62 | 64 | 69 | 73 | 78 | 80 | 82 | 84 | 79.3 | 96 | | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 92 | 95 | 96 | 96 | 96 | 95 | 89 | 75 | 66 | 59 | 55 | 54 | 47 | 43 | 41 | 39 | 39 | 37 | 40 | 47 | 71 | 80 | 73 | 72 | 66.5 | 96 | | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 76 | 88 | 90 | 94 | 96 | 93 | 85 | 76 | 65 | 51 | 47 | 46 | 43 | 41 | 40 | 39 | 39 | 43 | 55 | 61 | 73 | 71 | 69 | 75 | 64.9 | 96 | | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 84 | 87 | 88 | 89 | 87 | 78 | 83 | 77 | 73 | 70 | 64 | 63 | 79 | 84 | 79 | 74 | 67 | 72 | 80 | 83 | 90 | 95 | 95 | 97 | 80.6 | 97 | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 97 | 97 | 97 | 97 | 98 | 96 | 90 | 77 | 67 | 58 | 51 | 48 | 45 | 43 | 43 | 42 | 42 | 41 | 44 | 51 | 62 | 66 | 72 | 76 | 66.7 | 98 | | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 77 | 78 | 79 | 86 | 90 | 88 | 71 | 62 | 54 | 47 | 43 | 40 | 37 | 37 | 35 | 35 | 34 | 36 | 40 | 48 | 56 | 62 | 64 | 65 | 56.8 | 90 | | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 65 | 67 | 68 | 67 | 66 | 67 | 60 | 55 | 50 | 43 | 40 | 38 | 36 | 35 | 36 | 34 | 35 | 37 | 39 | 44 | 53 | 56 | 57 | 61 | 50.4 | 68 | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 65 | 67 | 67 | 69 | 76 | 85 | 84 | 78 | 73 | 70 | 73 | 82 | 88 | 91 | 92 | 92 | 86 | 83 | 85 | 89 | 92 | 95 | 96 | 96 | 82.3 | 96 | | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 96 | 97 | 97 | 97 | 98 | 98 | 96 | 94 | 85 | 84 | 79 | 71 | 67 | 75 | 78 | 89 | 88 | 89 | 89 | 89 | 90 | 92 | 91 | 88 | 88.2 | 98 | | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 91 | 91 | 94 | 94 | 93 | 92 | 88 | 83 | 75 | 66 | 53 | 43 | 42 | 41 | 42 | 38 | 41 | 40 | 45 | 57 | 65 | 70 | 73 | 75 | 66.3 | 94 | | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 75 | 77 | 79 | 81 | 83 | 84 | 77 | 71 | 65 | 59 | 53 | 49 | 46 | 43 | 44 | 40 | 39 | 38 | 41 | 54 | 58 | 61 | 64 | 67 | 60.4 | 84 | | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 68 | 73 | 73 | 77 | 82 | 83 | 84 | 78 | 73 | 65 | 59 | 51 | 51 | 54 | 55 | 56 | 59 | 61 | 61 | 70 | 64 | 60 | 59 | 60 | 65.7 | 84 | | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 65 | 72 | 75 | 78 | 79 | 78 | 69 | 62 | 56 | 51 | 49 | 50 | 51 | 48 | 47 | 45 | 48 | 45 | 45 | 46 | 50 | 52 | 59 | 61 | 57.6 | 79 | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 64 | 66 | 67 | 69 | 67 | 66 | 67 | 68 | 67 | 67 | 61 | 53 | 46 | 39 | 33 | 52 | 50 | 45 | 50 | 79 | 80 | 78 | 77 | 75 | 61.8 | 80 | | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 72 | 73 | 73 | 74 | 79 | 83 | 73 | 65 | 58 | 52 | 50 | 50 | 44 | 39 | 37 | 35 | 37 | 42 | 44 | 51 | 57 | 61 | 63 | 66 | 57.5 | 83 | | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 67 | 70 | 74 | 78 | 82 | 82 | 83 | 78 | 74 | 67 | 58 | 60 | 59 | 59 | 61 | 59 | 58 | 63 | 64 | 78 | 81 | 79 | 82 | 85 | 70.9 | 85 | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 90 | 93 | 94 | 96 | 96 | 95 | 84 | 74 | 66 | 64 | 65 | 63 | 57 | 54 | 50 | 47 | 46 | 50 | 56 | 63 | 66 | 67 | 67 | 68 | 69.6 | 96 | | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 65 | 66 | 73 | 83 | 90 | 90 | 84 | 78 | 77 | 80 | 72 | 70 | 58 | 54 | 55 | 60 | 64 | 63 | 65 | 70 | 75 | 78 | 74 | 79 | 71.8 | 90 | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 89 | 94 | 93 | 92 | 89 | 86 | 84 | 76 | 73 | 70 | 66 | 68 | 68 | 63 | 55 | 52 | 50 | 49 | 51 | 60 | 65 | 66 | 64 | 64 | 70.2 | 94 | | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 65 | 64 | 68 | 71 | 72 | 71 | 69 | 64 | 61 | 58 | 52 | 47 | 44 | 43 | 43 | 41 | 43 | 43 | 49 | 53 | 57 | 58 | 60 | 57 | 56.3 | 72 | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 59 | 65 | 68 | 68 | 70 | 69 | 64 | 60 | 55 | 49 | 43 | 40 | 40 | 41 | 42 | 43 | 46 | 48 | 49 | 54 | 56 | 59 | 60 | 62 | 54.5 | 70 | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 63 | 64 | 69 | 78 | 79 | 80 | 78 | 71 | 62 | 51 | 50 | 48 | 43 | 39 | 37 | 35 | 34 | 34 | 38 | 47 | 58 | 77 | 83 | 84 | 58.4 | 84 | | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 87 | 89 | 91 | 93 | 94 | 93 | 88 | 75 | 54 | 43 | 34 | 31 | 30 | 30 | 27 | 28 | 29 | 27 | 37 | 46 | 56 | 60 | 54 | 51 | 56.1 | 94 | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 51 | 58 | 62 | 60 | 56 | 63 | 62 | 51 | 49 | 46 | 43 | 42 | 42 | 43 | 45 | 47 | 51 | 56 | 62 | 63 | 68 | 76 | 83 | 88 | 56.9 | 88 | | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 92 | 91 | 93 | 95 | 96 | 95 | 95 | 88 | 80 | 71 | 61 | 55 | 44 | 40 | 38 | 39 | 45 | 44 | 49 | 57 | 61 | 58 | 60 | 61 | 66.9 | 96 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 78.7 | 81.2 | 82.9 | 84.8 | 85.6 | 85.5 | 81.3 | 74.5 | 67.7 | 62.0 | 56.8 | 53.7 | 51.5 | 50.4 | 50.1 | 51.4 | 52.1 | 52.5 | 56.1 | 63.4 | 69.5 | 72.6 | 73.8 | 75.6 | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | | | | | | | 97 | 98 | 98 | 98 | 98 | 98 | 97 | 94 | 91 | 86 | 79 | 82 | 88 | 91 | 92 | 94 | 95 | 93 | 95 | 95 | 95 | 96 | 97 | 97 | Diurnal Maximum | |



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Christina Lake - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Christina Lake - August 2017

| Concentration Ranges (%) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 0 | 0.00 | 0.00 |
| 20 - 40 | 59 | 7.93 | 7.93 |
| 40 - 60 | 206 | 27.69 | 35.62 |
| 60 - 80 | 260 | 34.95 | 70.56 |
| 80 - 100 | 219 | 29.44 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



| | | |
|--|---|---------------------------------|
| Maximum Speed: 25 km/h on Aug 13 13:00 | Maximum Daily Speed Average: 15.4 km/h on Aug 13 | Hours in Service: 744 |
| Minimum Speed Value: 0 km/h on Aug 2 08:00 | Minimum Daily Speed Average: 1.8 km/h on Aug 6 | Hours of Data: 744 |
| Maximum Diurnal Speed Average: 5.8 km/h at hour 15 | Minimum Diurnal Speed Average: 3.3 km/h at hour 5 | Hours of Missing Data: 0 |
| Monthly Average Velocity: 4.4 km/h 213.4 deg | Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 8 Q ₃ = 12 P ₉₀ = 16 P ₉₉ = 23 | Percent Operational Time: 100.0 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | N10 | NNW9 | NW5 | SW4 | NW6 | WNW6 | WNW4 | NNW5 | NNE4 | NNE4 | NNW8 | N8 | NW13 | NW20 | N12 | N8 | NNE7 | NW10 | NW12 | WSW9 | WSW8 | SW8 | SW8 | SSW1 | NW5.7 | NW20 |
| 2-Aug | SW5 | SW5 | SSW4 | SSW5 | SW4 | SSW5 | SSW4 | W0 | ENE3 | NNE5 | NNE4 | N5 | NNE4 | WSW6 | WSW5 | WNW5 | SSW5 | SSW5 | WSW7 | SW5 | SSW6 | S6 | SSW6 | SSW5 | SW2.8 | WSW7 |
| 3-Aug | S3 | SSE4 | SSE3 | ESE3 | SSE4 | SSE4 | SSE3 | S5 | S7 | SSW9 | S10 | S11 | SSE11 | SSW8 | SW6 | SSW5 | SSW6 | SSW4 | S3 | SE4 | SSE4 | SSE3 | S5 | SSE3 | S4.8 | SSE11 |
| 4-Aug | SSE3 | NNE2 | NNE2 | NNE13 | NNE10 | WSW3 | NNE8 | NE12 | NE11 | NE12 | NNE12 | N17 | N18 | SE4 | SW3 | ENE7 | ENE10 | E6 | ESE4 | E3 | NNE6 | S3 | S2 | ESE3 | NE5.1 | N18 |
| 5-Aug | SE3 | SE3 | SSE4 | S3 | E3 | SE3 | E5 | SE7 | SSE9 | S8 | S9 | S10 | S10 | S11 | SSE13 | S10 | SSE9 | SSE8 | SSE8 | SSE8 | SSE6 | S8 | S9 | S7 | SSE6.5 | SSE13 |
| 6-Aug | S5 | S6 | S5 | SSE4 | S5 | S5 | SSW6 | SSW9 | SW10 | SW10 | SW11 | SW9 | WSW9 | SSW6 | NNW6 | N16 | SSE5 | NW5 | WSW3 | NW12 | NNE9 | NNE11 | N12 | NNE14 | WSW1.8 | N16 |
| 7-Aug | N13 | NNE15 | NNE10 | N7 | N9 | NNE8 | N10 | N9 | NNE8 | NNE11 | NNE10 | NNE11 | NE11 | NE8 | N9 | N9 | NNW10 | NW12 | NW10 | NNW13 | WNW12 | NW10 | WNW5 | SW3 | N8.1 | NNE15 |
| 8-Aug | SW4 | SSW5 | SSW4 | SSW5 | SSW5 | SSW5 | SW3 | W0 | NNE3 | ESE2 | SSW1 | NNE4 | SW4 | SW5 | SSW6 | SW5 | SW7 | SSW8 | S2 | SE2 | S6 | S6 | SSW7 | SW9 | SSW3.6 | SW9 |
| 9-Aug | S2 | E5 | SSE5 | ESE2 | SSE7 | S5 | S4 | SSW5 | SSW5 | ESE1 | SSE5 | S3 | S4 | NE5 | ENE2 | W5 | SW5 | WSW4 | SE4 | SSE7 | S5 | SSW7 | S8 | S5 | S3.2 | S8 |
| 10-Aug | SSE4 | SSE4 | SSE4 | SE4 | SE4 | S5 | ENE6 | ESE3 | S4 | ESE6 | SSW8 | S6 | E1 | SW9 | SSW10 | SW12 | SW4 | WSW5 | SSE6 | S5 | SSE4 | S4 | SSW3 | S4 | S3.9 | SW12 |
| 11-Aug | S5 | SSE3 | S5 | S3 | SSE3 | SW2 | SSE4 | SE2 | NNE0 | S2 | S4 | ESE5 | ESE6 | ESE7 | ESE6 | SE8 | SE8 | SSE7 | SSE8 | S6 | S7 | S7 | S7 | S7 | SSE4.5 | SSE8 |
| 12-Aug | SSE6 | SSE6 | SSE5 | SE4 | E5 | E5 | S10 | S11 | S13 | SSE17 | SSE17 | SSE20 | S18 | SSE17 | S16 | SSE18 | SSE19 | S16 | S17 | S10 | SSE8 | SE10 | SSE12 | SSE13 | SSE11.7 | SSE20 |
| 13-Aug | SSE13 | SSE13 | SSE13 | SSE14 | SSE14 | SSE12 | SE13 | SE15 | SE15 | SE18 | SE20 | SE22 | SSE25 | SE24 | SE23 | SSE24 | SE23 | SSE21 | SE16 | SE10 | E7 | ESE10 | ESE9 | ESE7 | SE15.4 | SSE25 |
| 14-Aug | ESE7 | ESE6 | SE8 | ESE4 | ESE5 | ESE5 | SE6 | S5 | SW6 | SSE3 | SW6 | SSW6 | SSW4 | SSE4 | SW8 | WSW9 | WSW8 | SW7 | S5 | S6 | SSE4 | ESE4 | ESE3 | E4 | S3.5 | WSW9 |
| 15-Aug | E2 | SSE4 | S2 | S3 | SSW4 | SSW1 | WSW5 | SW3 | NW11 | NW15 | NNW11 | NW8 | NW10 | N12 | NNW5 | SE4 | NE11 | NW16 | NNW9 | WNW6 | WSW5 | SW3 | W7 | NNW11 | NW4.2 | NW16 |
| 16-Aug | WSW9 | WSW8 | SW10 | WSW8 | WSW7 | WSW10 | WSW10 | WSW9 | SW7 | WSW8 | WSW9 | SW12 | WSW12 | SW13 | WSW13 | WSW14 | WSW10 | W12 | WSW10 | SW7 | SW8 | SW7 | SW9 | SW10 | WSW9.4 | WSW14 |
| 17-Aug | SW8 | WSW7 | WSW7 | SW8 | SW8 | SW8 | SW8 | SW8 | SW8 | SW8 | SW8 | SW8 | SW8 | SW8 | SW8 | SW8 | SW8 | SW8 | SW8 | SW8 | SW8 | SW8 | SW8 | SW8 | WSW9.8 | WNW17 |
| 18-Aug | SSW8 | SSW7 | SSW8 | SSW8 | SSW6 | S6 | S6 | SSW7 | S7 | S7 | S10 | SSW11 | S12 | S9 | WSW13 | W15 | SW8 | SSW6 | S6 | S6 | SW10 | WSW10 | W19 | WSW10 | SW7.6 | W19 |
| 19-Aug | SW10 | SW13 | SW14 | SW13 | WSW12 | WSW12 | WSW13 | WSW13 | W17 | W20 | W20 | W23 | W20 | W23 | WSW19 | WSW20 | WSW14 | WSW14 | WSW12 | WSW13 | W10 | WSW9 | WSW9 | WSW11 | WSW14.3 | W23 |
| 20-Aug | WSW10 | WSW7 | WSW7 | WSW8 | WSW9 | WSW10 | WSW11 | WSW10 | WSW12 | SW9 | WSW11 | WSW13 | W17 | W19 | W21 | NNW23 | WSW14 | W15 | W18 | SW13 | SW10 | WSW10 | WSW11 | WSW10 | WSW11.9 | WNW23 |
| 21-Aug | WSW10 | WSW10 | WSW10 | WSW8 | SW4 | SW3 | WSW6 | WSW8 | WSW10 | WSW10 | WSW9 | SW10 | WSW11 | WSW12 | WSW13 | WSW11 | SW11 | SW8 | SW8 | SSW7 | SSW8 | SSW8 | SSW8 | SSW7 | SW8.4 | WSW13 |
| 22-Aug | SSW8 | SSW7 | S5 | SSE6 | SE4 | SE4 | SSE5 | S7 | SSW7 | SW6 | SW6 | WSW5 | SW6 | SSW5 | SE2 | ENE4 | E4 | E4 | E4 | SE5 | SE5 | SSE5 | ESE4 | SSE4 | S3.6 | SSW8 |
| 23-Aug | ESE3 | SE4 | SE4 | E4 | E6 | SSE4 | SSE4 | SSE11 | SSE14 | SSE12 | SSE11 | SE13 | SE11 | SE15 | SE17 | SSE16 | SE14 | SE10 | ESE7 | SE8 | SE11 | SSE11 | SSE9 | SE9.4 | SE17 | |
| 24-Aug | SE11 | SW6 | SW5 | SE5 | E6 | SE8 | ESE14 | ESE12 | SE14 | S3 | E12 | E10 | SE11 | SE19 | SE15 | S10 | S8 | SE10 | S11 | WSW9 | WSW6 | WSW10 | WSW14 | W15 | SSE6.4 | SE19 |
| 25-Aug | WSW9 | SW8 | SW8 | SW12 | SW13 | SSW11 | SSW11 | SSW15 | SW19 | SW20 | SW22 | SW20 | WSW23 | WSW18 | WSW22 | WSW20 | WSW21 | WSW19 | SW14 | SSW10 | SSW10 | SW10 | SW11 | SW12 | SW14.4 | WSW23 |
| 26-Aug | SW12 | WSW13 | SW12 | SW12 | SW12 | SW12 | SW12 | SW14 | WSW14 | SW12 | WSW14 | SW17 | WSW17 | WSW16 | SW17 | WSW18 | SW14 | WSW15 | SW9 | SSW9 | SSW9 | SSW11 | SW10 | SW12 | SW12.7 | WSW18 |
| 27-Aug | SW14 | WSW12 | SW11 | SW10 | SSW10 | SW10 | SW11 | WSW13 | WSW16 | WSW17 | WSW19 | WSW20 | WSW19 | W18 | WSW16 | WSW16 | WSW12 | WSW10 | WSW10 | WSW9 | SW9 | SW9 | SW8 | SW9 | WSW12.4 | WSW20 |
| 28-Aug | WSW11 | WSW10 | WSW10 | SW8 | SW9 | WSW9 | WSW10 | W10 | W9 | WSW10 | WSW10 | W13 | W14 | W15 | W17 | W15 | NNW17 | W12 | W7 | WNW5 | N2 | SSW4 | SSW4 | S4 | W8.9 | W17 |
| 29-Aug | SSW4 | ESE2 | S3 | S5 | SSW5 | S3 | S4 | SSE3 | NE2 | ENE4 | ENE4 | NNE4 | NE5 | E5 | ENE4 | ESE4 | E8 | ENE9 | ENE10 | E7 | ESE6 | SE7 | SE10 | ESE9 | ESE3.7 | SE10 |
| 30-Aug | SE10 | SE7 | ESE7 | ESE7 | ESE8 | ENE7 | ESE8 | SE18 | SE17 | SE18 | SE18 | SE17 | SE18 | SE20 | SE18 | SE19 | SSE17 | SSE12 | SSE10 | SSE9 | SE4 | ESE3 | SE2 | SE2 | SE11.1 | SE20 |
| 31-Aug | WNW2 | WNW3 | S5 | S4 | WSW3 | S2 | SSW3 | SSW3 | WSW4 | W4 | NNW14 | NNW17 | NNW19 | W20 | W17 | W15 | W15 | WSW9 | SW9 | SW9 | WSW10 | WSW11 | WSW9 | WSW10 | W7.8 | W20 |

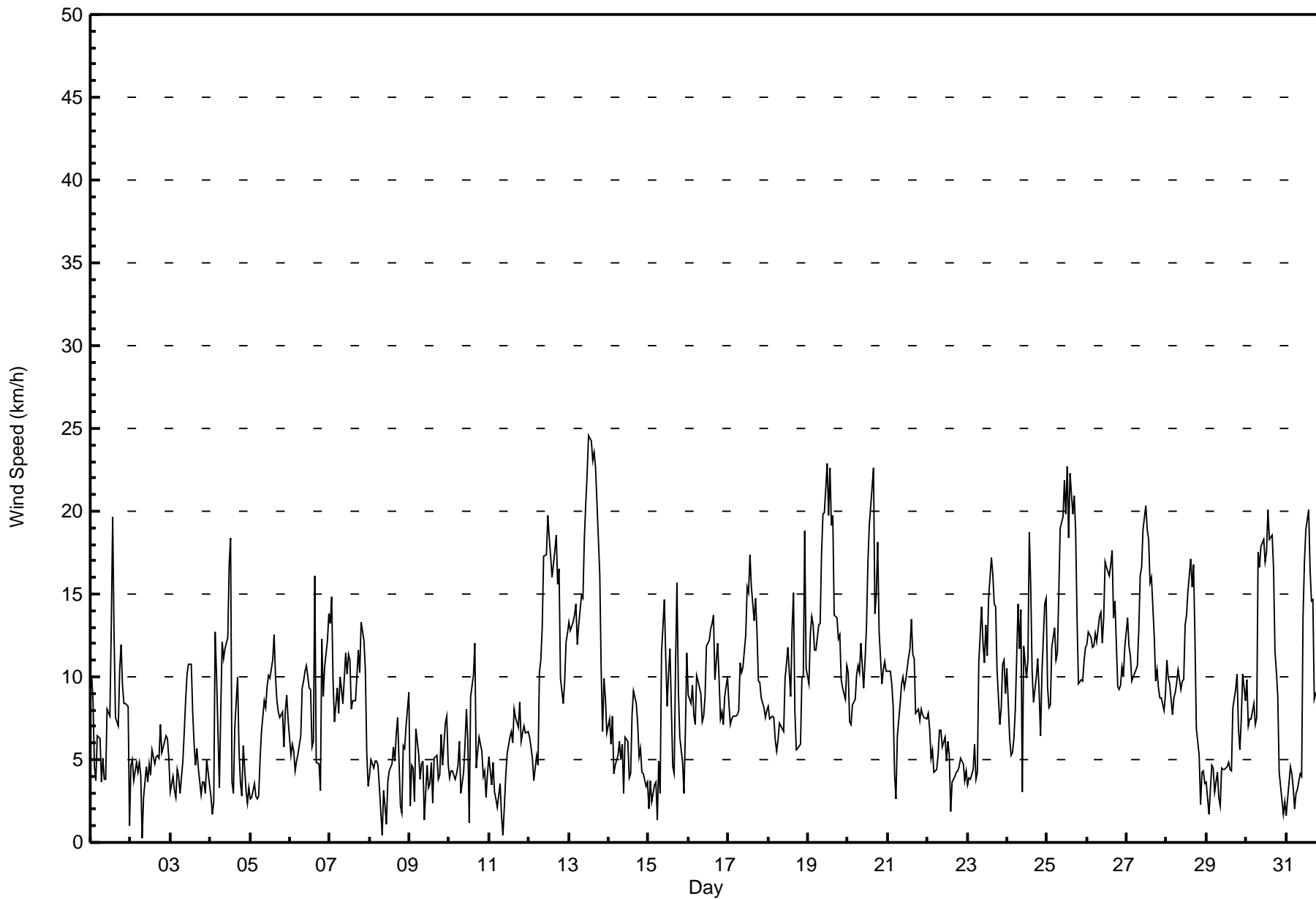
| | | |
|--|-----------------|-----------------|
| SSW4.0SSW3.6SSW4.3SSW3.7SSW3.3SSW3.8SSW3.6SSW4.4SSW4.7SSW4.3 SW5.1 SW5.1 SW5.1 SW5.4 SW5.8 SW5.4 SW4.7 SW5.1SSW4.7SSW4.4SSW3.8SSW4.7SSW5.0SSW4.5 SW14 NNE15 SW14 SSE14 SSE14 SW13 ESE14 SE18 SW19 W20 SW22 W23 SSE25 SE24 SE23 SSE24 SE23 SSE21 W18NNW13WNW12 SE11 W19 W15 | Diurnal Average | Diurnal Maximum |
|--|-----------------|-----------------|

All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Christina Lake - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Christina Lake - August 2017**

| Wind Speed Ranges (km/h) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 5 | 225 | 30.24 | 30.24 |
| 6 - 11 | 327 | 43.95 | 74.19 |
| 12 - 19 | 164 | 22.04 | 96.24 |
| 20 - 28 | 28 | 3.76 | 100.00 |
| 29 - 38 | 0 | 0.00 | 100.00 |
| > 38 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Christina Lake - August 2017**

| Wind Speed Ranges (km/h) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-----------------------------|----------------|-----|----|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 5 | 2 | 11 | 3 | 6 | 13 | 20 | 21 | 33 | 43 | 29 | 20 | 10 | 4 | 6 | 2 | 2 | 225 |
| 6 - 11 | 7 | 14 | 4 | 6 | 7 | 16 | 18 | 23 | 39 | 39 | 64 | 69 | 5 | 4 | 7 | 5 | 327 |
| 12 - 19 | 7 | 4 | 2 | 0 | 1 | 2 | 20 | 21 | 5 | 1 | 25 | 38 | 23 | 10 | 5 | 0 | 164 |
| 20 - 28 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 4 | 0 | 0 | 3 | 6 | 7 | 1 | 1 | 0 | 28 |
| 29 - 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 16 | 29 | 9 | 12 | 21 | 38 | 65 | 81 | 87 | 69 | 112 | 123 | 39 | 21 | 15 | 7 | 744 |

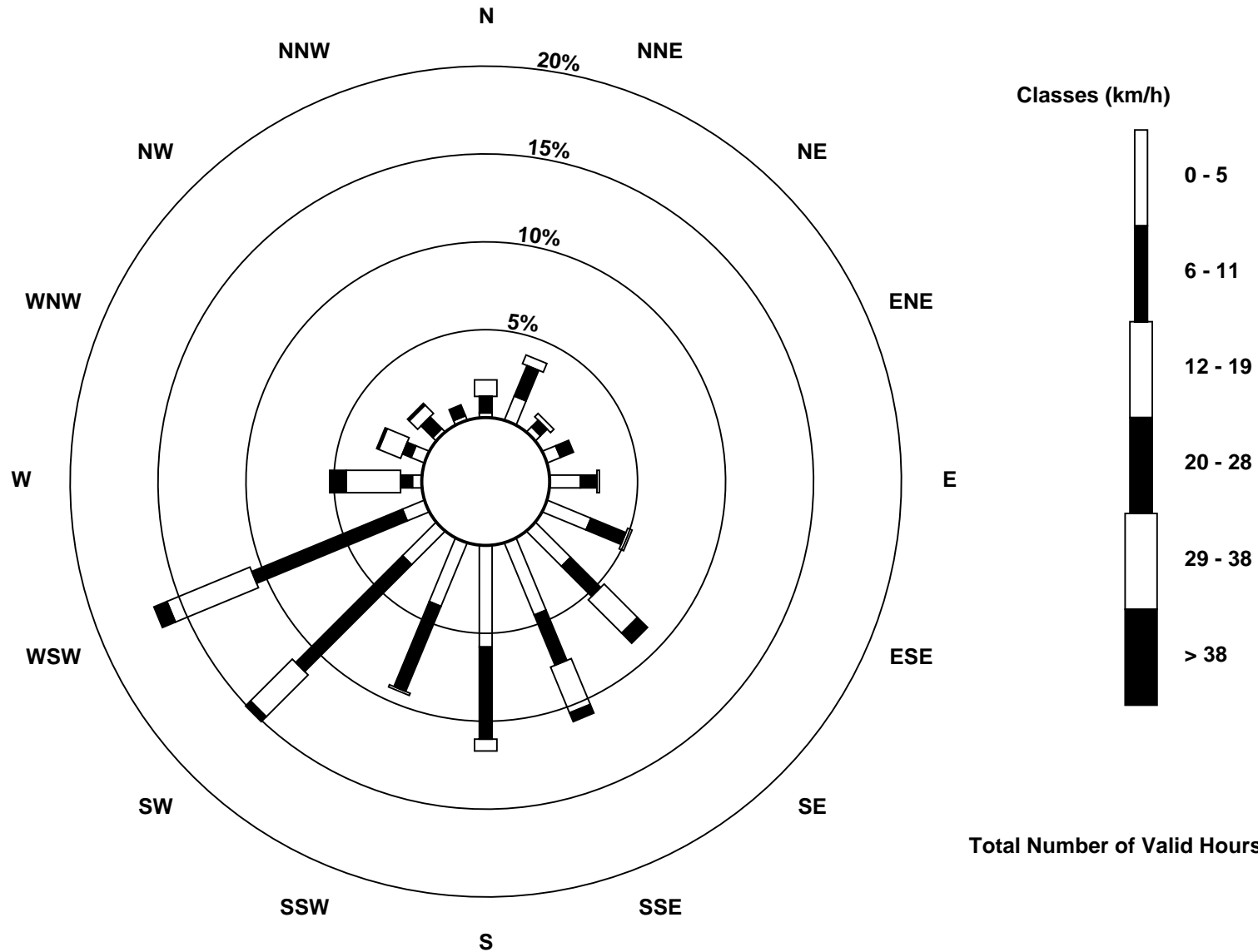
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Wind Speed (WS) - km/h
Christina Lake (AMS 500)



Total Number of Valid Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Christina Lake - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Aug 20 19:00 | | | | | | | | | | | | | | | | | Hours in Service: 744 | | | | | | | | |
|--|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|---------------------------------|----|----|----|----|----|----|----|---------------|
| Minimum Value: 0 km/h on Aug 10 03:00 | | | | | | | | | | | | | | | | | Hours of Data: 744 | | | | | | | | |
| Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 7 | | | | | | | | | | | | | | | | | Hours of Missing Data: 0 | | | | | | | | |
| | | | | | | | | | | | | | | | | | Hours of Calibration: 0 | | | | | | | | |
| | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 4 | 3 | 8 | 5 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 1 | 8 |
| 2-Aug | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 3 |
| 3-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 4 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 4 |
| 4-Aug | 1 | 2 | 2 | 6 | 3 | 2 | 4 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 6 |
| 5-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 4 | 3 | 3 | 3 | 4 | 2 | 2 | 2 | 1 | 1 | 2 | 2 | 4 |
| 6-Aug | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 2 | 10 | 5 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 10 |
| 7-Aug | 3 | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 1 | 4 |
| 8-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 2 | 1 | 2 | 3 |
| 9-Aug | 2 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 3 |
| 10-Aug | 1 | 1 | 0 | 1 | 1 | 2 | 3 | 1 | 1 | 2 | 3 | 4 | 3 | 4 | 3 | 3 | 4 | 3 | 2 | 2 | 1 | 2 | 2 | 2 | 4 |
| 11-Aug | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 3 |
| 12-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 3 | 3 | 4 | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 4 | 4 | 2 | 1 | 2 | 2 | 2 | 5 |
| 13-Aug | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 3 | 3 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 5 | 4 | 3 | 1 | 2 | 2 | 2 | 6 |
| 14-Aug | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 4 | 3 | 3 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 4 |
| 15-Aug | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 4 | 3 | 4 | 3 | 2 | 2 | 3 | 3 | 4 | 3 | 4 | 3 | 2 | 2 | 6 | 6 |
| 16-Aug | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 3 | 2 | 1 | 1 | 2 | 2 | 4 |
| 17-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 5 | 5 | 6 | 5 | 5 | 5 | 4 | 3 | 3 | 2 | 2 | 2 | 2 | 6 |
| 18-Aug | 2 | 1 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 7 | 5 | 2 | 1 | 1 | 1 | 3 | 4 | 6 | 5 | 7 |
| 19-Aug | 3 | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 6 | 5 | 6 | 6 | 6 | 7 | 7 | 7 | 5 | 4 | 4 | 4 | 3 | 3 | 2 | 4 | 7 |
| 20-Aug | 3 | 2 | 2 | 2 | 3 | 3 | 4 | 3 | 4 | 3 | 4 | 4 | 5 | 6 | 7 | 8 | 5 | 7 | 10 | 8 | 3 | 3 | 3 | 3 | 10 |
| 21-Aug | 3 | 2 | 2 | 2 | 3 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 5 | 4 | 4 | 3 | 2 | 1 | 1 | 1 | 2 | 1 | 5 |
| 22-Aug | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 3 |
| 23-Aug | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 3 | 2 | 1 | 2 | 2 | 3 | 2 | 4 |
| 24-Aug | 3 | 5 | 2 | 1 | 3 | 3 | 4 | 4 | 6 | 3 | 3 | 3 | 4 | 7 | 4 | 4 | 3 | 3 | 4 | 3 | 3 | 4 | 5 | 5 | 7 |
| 25-Aug | 3 | 3 | 3 | 4 | 4 | 3 | 3 | 5 | 6 | 7 | 7 | 7 | 7 | 6 | 7 | 6 | 7 | 6 | 6 | 2 | 2 | 2 | 3 | 3 | 7 |
| 26-Aug | 3 | 4 | 3 | 3 | 3 | 4 | 4 | 4 | 5 | 4 | 5 | 6 | 6 | 5 | 6 | 6 | 5 | 5 | 3 | 2 | 2 | 3 | 2 | 3 | 6 |
| 27-Aug | 4 | 4 | 3 | 2 | 2 | 3 | 3 | 4 | 5 | 5 | 6 | 6 | 6 | 6 | 5 | 5 | 4 | 3 | 4 | 3 | 2 | 2 | 2 | 2 | 6 |
| 28-Aug | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 5 | 5 | 5 | 5 | 4 | 3 | 3 | 3 | 1 | 1 | 2 | 5 |
| 29-Aug | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 3 | 2 | 2 | 3 |
| 30-Aug | 2 | 1 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 5 | 3 | 2 | 1 | 2 | 1 | 5 |
| 31-Aug | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 5 | 5 | 6 | 5 | 5 | 5 | 3 | 2 | 2 | 2 | 3 | 2 | 2 | 6 |
| | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | | | | |



Wood Buffalo Environmental Association
Summary of Hour Averages

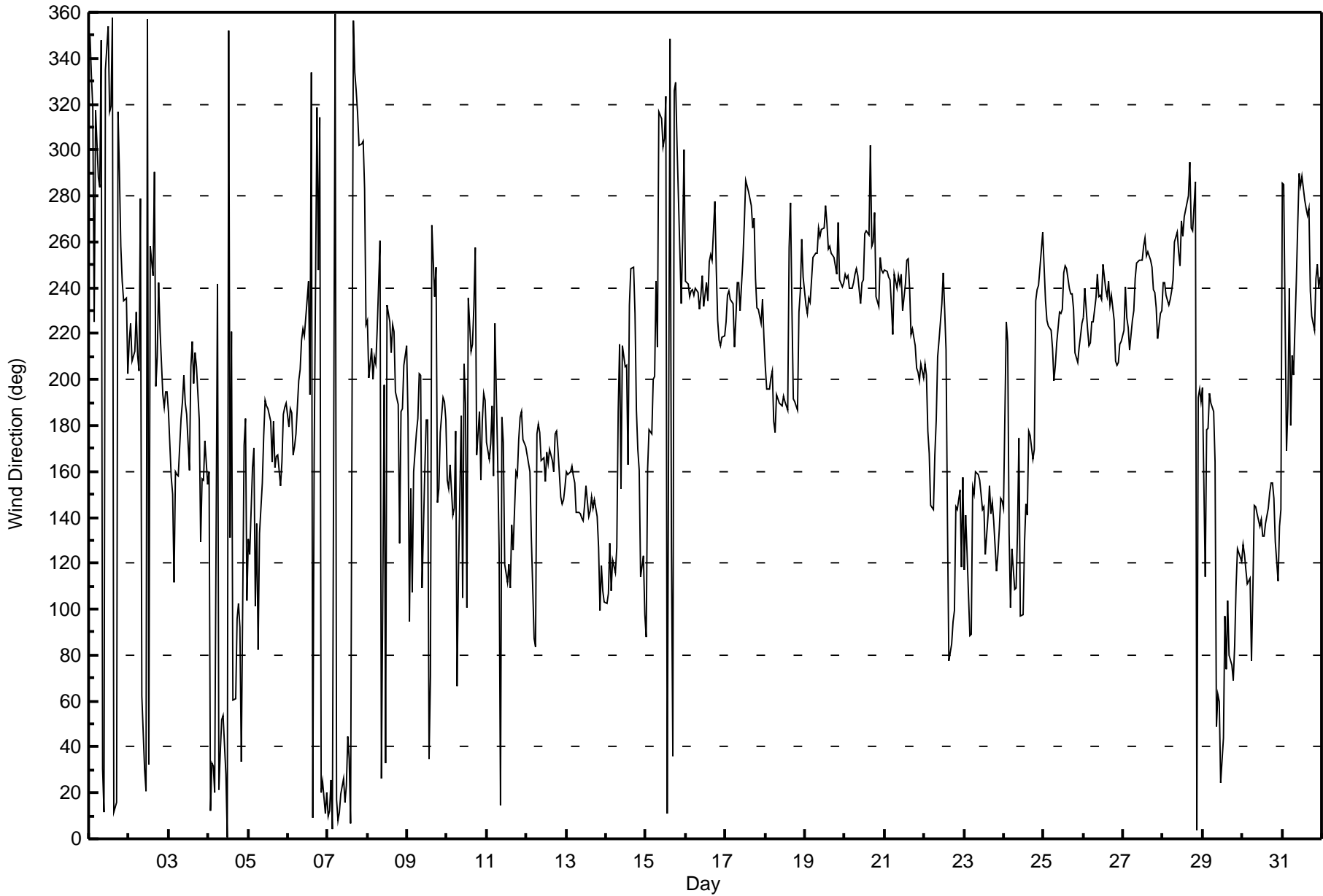
Wind Direction (WD) - deg
Christina Lake - August 2017

| Direction of Maximum Speed: 154 deg on Aug 13 13:00 Direction of Maximum Daily Speed Average: 143.9 deg on Aug 13 | | | | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 | | |
|---|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------------------------|------|---------------|
| Direction of Minimum Speed: 279 deg on Aug 2 08:00 | | | | | | | | | | | Direction of Minimum Daily Speed Average: 1.8 deg on Aug 6 | | | | | | | | | | | | Hours of Data: 744 | | |
| Monthly Average Direction: 219.0 deg | | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: 0 | | |
| | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 350 | 332 | 319 | 225 | 318 | 288 | 283 | 348 | 30 | 12 | 335 | 354 | 317 | 319 | 358 | 11 | 16 | 316 | 291 | 258 | 243 | 234 | 235 | 202 | 316.0 |
| 2-Aug | 216 | 225 | 208 | 212 | 229 | 210 | 204 | 279 | 63 | 30 | 21 | 357 | 33 | 258 | 246 | 290 | 197 | 210 | 242 | 222 | 194 | 188 | 194 | 195 | 221.4 |
| 3-Aug | 186 | 157 | 150 | 112 | 160 | 159 | 158 | 183 | 190 | 202 | 190 | 185 | 161 | 205 | 217 | 199 | 212 | 205 | 182 | 129 | 157 | 156 | 173 | 155 | 180.2 |
| 4-Aug | 160 | 12 | 33 | 32 | 20 | 241 | 22 | 38 | 52 | 54 | 28 | 1 | 352 | 131 | 221 | 60 | 96 | 103 | 92 | 33 | 172 | 183 | 104 | 38.1 | |
| 5-Aug | 130 | 124 | 162 | 170 | 101 | 137 | 82 | 133 | 155 | 176 | 191 | 189 | 188 | 182 | 164 | 182 | 162 | 166 | 167 | 154 | 164 | 185 | 188 | 190 | 168.7 |
| 6-Aug | 180 | 187 | 185 | 167 | 171 | 176 | 199 | 204 | 217 | 222 | 219 | 235 | 243 | 193 | 334 | 9 | 166 | 318 | 248 | 314 | 20 | 25 | 11 | 20 | 250.8 |
| 7-Aug | 9 | 12 | 26 | 4 | 359 | 17 | 8 | 11 | 20 | 26 | 16 | 23 | 45 | 35 | 7 | 357 | 334 | 326 | 316 | 302 | 303 | 304 | 283 | 224 | 356.3 |
| 8-Aug | 226 | 201 | 213 | 200 | 210 | 207 | 222 | 261 | 26 | 108 | 198 | 33 | 233 | 225 | 212 | 224 | 221 | 195 | 189 | 129 | 186 | 187 | 206 | 215 | 206.5 |
| 9-Aug | 183 | 95 | 152 | 107 | 160 | 177 | 183 | 203 | 202 | 109 | 161 | 183 | 183 | 35 | 71 | 267 | 236 | 249 | 146 | 153 | 177 | 192 | 190 | 183 | 176.5 |
| 10-Aug | 156 | 153 | 163 | 141 | 144 | 178 | 66 | 116 | 184 | 105 | 207 | 190 | 101 | 236 | 212 | 215 | 232 | 258 | 167 | 186 | 156 | 182 | 194 | 191 | 184.6 |
| 11-Aug | 173 | 165 | 172 | 189 | 158 | 225 | 165 | 127 | 15 | 183 | 173 | 120 | 112 | 120 | 109 | 137 | 126 | 160 | 158 | 174 | 184 | 186 | 174 | 171 | 155.7 |
| 12-Aug | 167 | 163 | 160 | 131 | 87 | 84 | 176 | 180 | 177 | 165 | 166 | 155 | 169 | 164 | 170 | 165 | 160 | 176 | 177 | 169 | 149 | 146 | 148 | 153 | 162.7 |
| 13-Aug | 160 | 159 | 160 | 162 | 158 | 155 | 142 | 142 | 142 | 139 | 138 | 145 | 154 | 141 | 143 | 149 | 144 | 148 | 141 | 127 | 100 | 119 | 108 | 103 | 143.9 |
| 14-Aug | 103 | 107 | 129 | 108 | 121 | 116 | 127 | 186 | 215 | 153 | 215 | 206 | 206 | 163 | 232 | 248 | 249 | 229 | 187 | 169 | 161 | 114 | 123 | 98 | 172.2 |
| 15-Aug | 88 | 161 | 178 | 176 | 200 | 201 | 243 | 214 | 317 | 314 | 301 | 305 | 323 | 11 | 348 | 126 | 36 | 326 | 330 | 302 | 256 | 233 | 261 | 300 | 311.1 |
| 16-Aug | 243 | 241 | 236 | 239 | 239 | 237 | 240 | 238 | 231 | 237 | 245 | 232 | 242 | 234 | 251 | 254 | 252 | 278 | 248 | 226 | 217 | 215 | 218 | 219 | 239.4 |
| 17-Aug | 225 | 237 | 239 | 235 | 233 | 214 | 227 | 242 | 243 | 230 | 252 | 268 | 287 | 284 | 282 | 276 | 266 | 270 | 244 | 231 | 230 | 225 | 235 | 219 | 251.2 |
| 18-Aug | 206 | 196 | 196 | 201 | 204 | 182 | 177 | 194 | 190 | 189 | 189 | 193 | 190 | 187 | 258 | 277 | 231 | 192 | 190 | 187 | 229 | 239 | 261 | 245 | 215.0 |
| 19-Aug | 232 | 229 | 236 | 234 | 244 | 253 | 255 | 255 | 266 | 262 | 266 | 266 | 276 | 268 | 257 | 258 | 255 | 253 | 250 | 246 | 268 | 244 | 240 | 242 | 254.8 |
| 20-Aug | 246 | 244 | 245 | 240 | 240 | 242 | 246 | 248 | 245 | 233 | 242 | 243 | 264 | 265 | 263 | 302 | 258 | 260 | 273 | 236 | 232 | 253 | 248 | 246 | 254.6 |
| 21-Aug | 247 | 247 | 245 | 243 | 233 | 220 | 246 | 240 | 245 | 242 | 246 | 230 | 242 | 252 | 252 | 240 | 219 | 222 | 215 | 205 | 203 | 200 | 207 | 201 | 233.3 |
| 22-Aug | 207 | 202 | 177 | 168 | 145 | 143 | 167 | 182 | 210 | 217 | 233 | 246 | 231 | 213 | 139 | 78 | 85 | 95 | 99 | 145 | 144 | 152 | 118 | 157 | 175.1 |
| 23-Aug | 117 | 141 | 125 | 88 | 89 | 153 | 150 | 160 | 159 | 156 | 150 | 144 | 144 | 124 | 141 | 154 | 142 | 146 | 139 | 117 | 124 | 135 | 149 | 147 | 141.3 |
| 24-Aug | 144 | 225 | 216 | 133 | 101 | 126 | 108 | 109 | 133 | 175 | 97 | 97 | 129 | 146 | 141 | 177 | 176 | 165 | 170 | 234 | 239 | 241 | 256 | 264 | 158.6 |
| 25-Aug | 249 | 234 | 226 | 223 | 221 | 213 | 200 | 206 | 216 | 229 | 229 | 231 | 246 | 249 | 248 | 240 | 237 | 237 | 231 | 212 | 207 | 214 | 219 | 224 | 229.2 |
| 26-Aug | 227 | 240 | 222 | 215 | 216 | 225 | 225 | 236 | 246 | 236 | 237 | 235 | 250 | 239 | 236 | 243 | 233 | 237 | 226 | 208 | 206 | 207 | 216 | 217 | 230.0 |
| 27-Aug | 222 | 240 | 227 | 223 | 213 | 226 | 230 | 244 | 250 | 252 | 252 | 252 | 258 | 262 | 254 | 256 | 252 | 249 | 239 | 238 | 231 | 218 | 229 | 230 | 242.6 |
| 28-Aug | 242 | 242 | 237 | 232 | 235 | 239 | 243 | 260 | 264 | 256 | 250 | 269 | 262 | 271 | 277 | 280 | 295 | 266 | 265 | 286 | 4 | 192 | 196 | 190 | 258.8 |
| 29-Aug | 197 | 114 | 178 | 179 | 194 | 190 | 186 | 164 | 49 | 63 | 60 | 24 | 44 | 97 | 74 | 104 | 80 | 76 | 69 | 84 | 110 | 126 | 124 | 121 | 104.2 |
| 30-Aug | 128 | 124 | 117 | 111 | 114 | 78 | 109 | 145 | 144 | 142 | 136 | 139 | 132 | 132 | 137 | 144 | 151 | 155 | 155 | 148 | 129 | 112 | 136 | 144 | 135.8 |
| 31-Aug | 286 | 285 | 169 | 189 | 240 | 180 | 210 | 202 | 243 | 267 | 290 | 284 | 288 | 278 | 275 | 271 | 274 | 238 | 228 | 222 | 244 | 250 | 240 | 244 | 260.1 |
| 206.0 211.8 201.4 196.5 196.4 201.1 197.0 200.0 209.5 209.3 218.8 224.6 235.4 226.0 229.7 234.6 216.2 225.4 211.2 209.7 206.2 202.1 210.9 209.3 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Diurnal Average | | | | | | | | | | | | | | | | | | | | | | | | | |
| All monthly, daily, and diurnal averages have been calculated using vector methods | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Christina Lake - August 2017





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Christina Lake - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 106 deg on Aug 11 09:00 Minimum Value: 6 deg on Aug 29 05:00 Percentiles: P ₁ = 8 P ₁₀ = 13 Q ₁ = 17 Median = 22 Q ₃ = 29 P ₉₀ = 51 P ₉₉ = 89 | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|---|----|----|----|----|----|----|-----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 14 | 20 | 49 | 28 | 23 | 24 | 39 | 40 | 51 | 61 | 45 | 39 | 64 | 17 | 20 | 49 | 36 | 16 | 19 | 20 | 17 | 14 | 16 | 102 | 102 |
| 2-Aug | 48 | 21 | 25 | 14 | 23 | 13 | 19 | 98 | 40 | 68 | 88 | 79 | 72 | 60 | 59 | 69 | 45 | 43 | 19 | 20 | 8 | 6 | 10 | 11 | 98 |
| 3-Aug | 32 | 21 | 26 | 23 | 9 | 18 | 29 | 18 | 26 | 28 | 23 | 27 | 34 | 30 | 33 | 21 | 17 | 15 | 19 | 31 | 46 | 29 | 19 | 40 | 46 |
| 4-Aug | 33 | 63 | 63 | 19 | 23 | 71 | 55 | 16 | 15 | 17 | 21 | 21 | 81 | 76 | 22 | 19 | 41 | 45 | 71 | 15 | 28 | 64 | 25 | 81 | 81 |
| 5-Aug | 20 | 27 | 18 | 18 | 42 | 36 | 14 | 19 | 16 | 22 | 27 | 31 | 32 | 28 | 19 | 17 | 17 | 20 | 18 | 9 | 8 | 12 | 14 | 14 | 42 |
| 6-Aug | 11 | 14 | 14 | 17 | 16 | 17 | 22 | 19 | 23 | 22 | 26 | 31 | 30 | 28 | 70 | 21 | 51 | 61 | 69 | 16 | 24 | 15 | 19 | 13 | 70 |
| 7-Aug | 18 | 18 | 16 | 19 | 17 | 16 | 20 | 23 | 22 | 23 | 24 | 23 | 20 | 34 | 24 | 26 | 24 | 14 | 15 | 8 | 10 | 11 | 52 | 31 | 52 |
| 8-Aug | 18 | 15 | 14 | 17 | 26 | 17 | 25 | 97 | 40 | 77 | 99 | 78 | 69 | 67 | 53 | 66 | 40 | 21 | 85 | 83 | 15 | 13 | 14 | 14 | 99 |
| 9-Aug | 71 | 26 | 29 | 32 | 8 | 11 | 20 | 24 | 34 | 102 | 61 | 75 | 78 | 57 | 88 | 74 | 47 | 77 | 37 | 8 | 13 | 10 | 7 | 11 | 102 |
| 10-Aug | 10 | 8 | 13 | 20 | 33 | 34 | 46 | 52 | 45 | 37 | 25 | 52 | 93 | 60 | 32 | 19 | 78 | 44 | 22 | 25 | 24 | 28 | 57 | 50 | 93 |
| 11-Aug | 13 | 32 | 16 | 28 | 26 | 33 | 17 | 55 | 106 | 86 | 65 | 61 | 50 | 39 | 41 | 31 | 35 | 25 | 26 | 11 | 11 | 9 | 8 | 8 | 106 |
| 12-Aug | 9 | 11 | 15 | 34 | 8 | 13 | 20 | 15 | 16 | 16 | 19 | 17 | 21 | 18 | 28 | 18 | 18 | 15 | 13 | 12 | 8 | 9 | 11 | 11 | 34 |
| 13-Aug | 11 | 10 | 9 | 11 | 10 | 11 | 13 | 14 | 16 | 16 | 17 | 16 | 17 | 18 | 19 | 19 | 15 | 15 | 13 | 13 | 20 | 12 | 14 | 17 | 20 |
| 14-Aug | 10 | 15 | 16 | 25 | 44 | 17 | 19 | 48 | 28 | 70 | 24 | 17 | 25 | 19 | 26 | 23 | 23 | 25 | 21 | 16 | 31 | 29 | 33 | 26 | 70 |
| 15-Aug | 38 | 22 | 53 | 25 | 24 | 70 | 39 | 86 | 19 | 16 | 22 | 55 | 32 | 15 | 74 | 56 | 28 | 22 | 27 | 49 | 47 | 67 | 32 | 26 | 86 |
| 16-Aug | 23 | 25 | 15 | 30 | 31 | 16 | 19 | 18 | 24 | 28 | 32 | 27 | 26 | 28 | 24 | 23 | 26 | 25 | 21 | 16 | 13 | 14 | 15 | 17 | 32 |
| 17-Aug | 19 | 22 | 20 | 18 | 18 | 17 | 21 | 22 | 25 | 24 | 25 | 26 | 22 | 23 | 26 | 28 | 22 | 26 | 21 | 20 | 19 | 16 | 20 | 16 | 28 |
| 18-Aug | 15 | 11 | 12 | 14 | 15 | 21 | 12 | 18 | 18 | 19 | 18 | 20 | 18 | 22 | 30 | 23 | 32 | 24 | 16 | 23 | 21 | 23 | 19 | 32 | 32 |
| 19-Aug | 24 | 23 | 23 | 22 | 23 | 20 | 20 | 23 | 21 | 22 | 22 | 19 | 21 | 19 | 22 | 20 | 21 | 21 | 20 | 20 | 31 | 23 | 16 | 20 | 31 |
| 20-Aug | 20 | 21 | 21 | 21 | 24 | 23 | 24 | 22 | 22 | 25 | 24 | 22 | 20 | 18 | 22 | 23 | 23 | 28 | 26 | 22 | 18 | 19 | 18 | 18 | 28 |
| 21-Aug | 20 | 19 | 18 | 17 | 52 | 46 | 24 | 22 | 24 | 25 | 20 | 25 | 30 | 27 | 25 | 27 | 22 | 18 | 18 | 12 | 13 | 13 | 13 | 13 | 52 |
| 22-Aug | 14 | 16 | 46 | 11 | 21 | 18 | 15 | 17 | 19 | 32 | 40 | 69 | 36 | 26 | 48 | 47 | 29 | 23 | 22 | 20 | 25 | 28 | 36 | 35 | 69 |
| 23-Aug | 27 | 29 | 37 | 33 | 9 | 27 | 28 | 16 | 15 | 15 | 15 | 20 | 23 | 19 | 17 | 19 | 20 | 17 | 13 | 11 | 10 | 14 | 16 | 15 | 37 |
| 24-Aug | 16 | 46 | 19 | 37 | 45 | 42 | 15 | 23 | 31 | 70 | 14 | 20 | 53 | 20 | 21 | 22 | 20 | 19 | 29 | 22 | 28 | 21 | 21 | 23 | 70 |
| 25-Aug | 26 | 24 | 22 | 20 | 20 | 20 | 20 | 19 | 21 | 23 | 22 | 23 | 23 | 21 | 22 | 22 | 22 | 23 | 21 | 16 | 16 | 15 | 17 | 20 | 26 |
| 26-Aug | 20 | 21 | 19 | 18 | 18 | 19 | 21 | 22 | 23 | 24 | 25 | 24 | 24 | 26 | 25 | 26 | 23 | 24 | 20 | 16 | 15 | 17 | 16 | 18 | 26 |
| 27-Aug | 20 | 22 | 20 | 19 | 16 | 20 | 20 | 22 | 21 | 23 | 23 | 21 | 23 | 23 | 24 | 24 | 21 | 22 | 20 | 19 | 18 | 15 | 20 | 19 | 24 |
| 28-Aug | 20 | 20 | 18 | 19 | 21 | 17 | 20 | 23 | 25 | 30 | 25 | 32 | 27 | 26 | 24 | 24 | 20 | 22 | 28 | 36 | 81 | 19 | 11 | 33 | 81 |
| 29-Aug | 45 | 76 | 42 | 19 | 6 | 34 | 16 | 33 | 40 | 26 | 55 | 70 | 65 | 73 | 74 | 71 | 31 | 16 | 8 | 11 | 13 | 10 | 12 | 11 | 76 |
| 30-Aug | 12 | 12 | 9 | 10 | 13 | 20 | 25 | 14 | 15 | 16 | 15 | 17 | 16 | 15 | 18 | 16 | 18 | 14 | 10 | 22 | 25 | 55 | 87 | 23 | 87 |
| 31-Aug | 77 | 65 | 32 | 29 | 57 | 56 | 49 | 61 | 41 | 53 | 21 | 20 | 18 | 19 | 22 | 23 | 26 | 23 | 19 | 16 | 18 | 17 | 17 | 18 | 77 |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association

SO₂ Calibration Summary

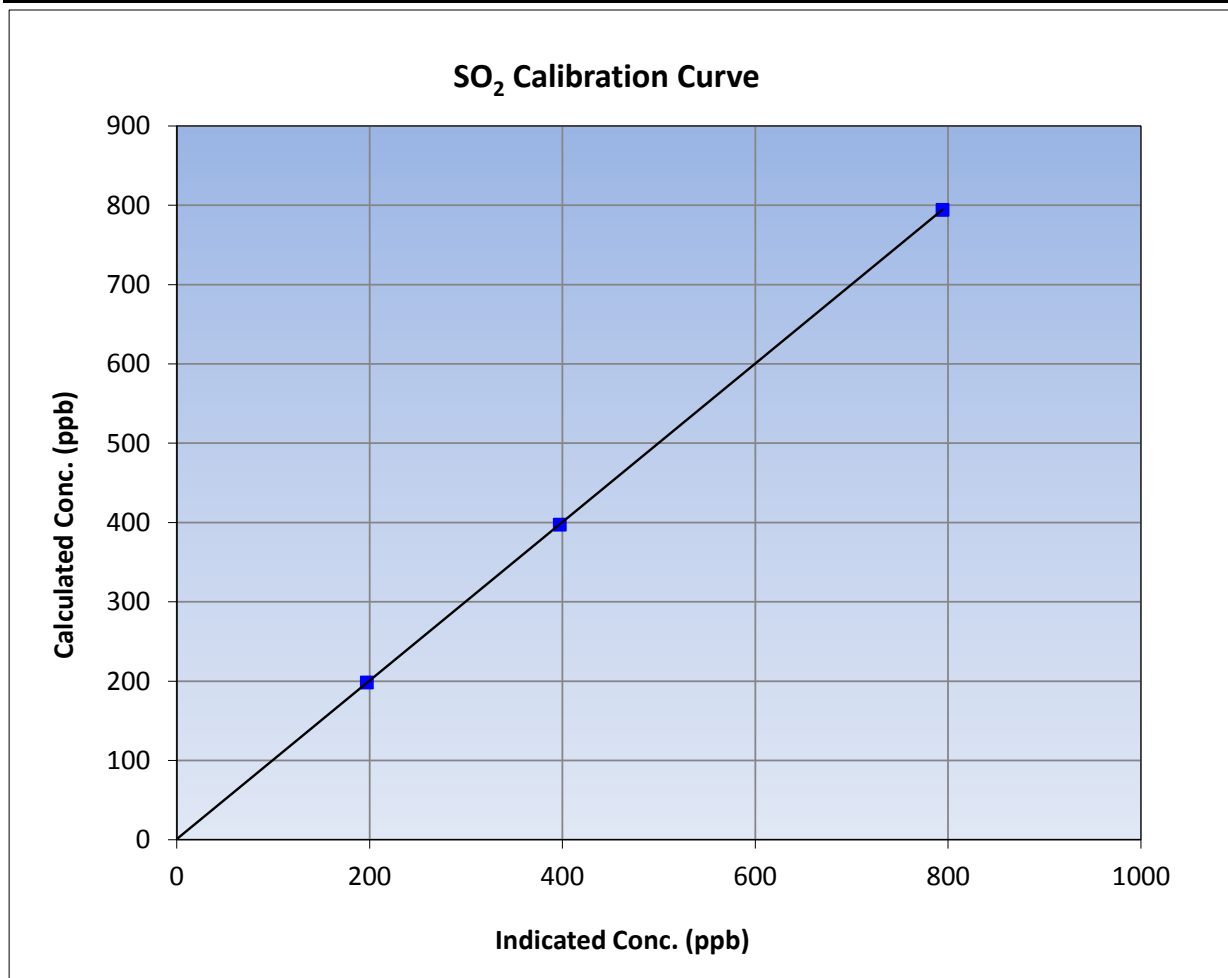
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 15, 2017 | Previous Calibration | July 20, 2017 |
| Station Name | Christina Lake | Station Number | AMS 500 |
| Start Time (MST) | 12:05 | End Time (MST) | 16:25 |
| Analyzer make | Thermo 43i | Analyzer serial # | 1118148497 |

Calibration Data

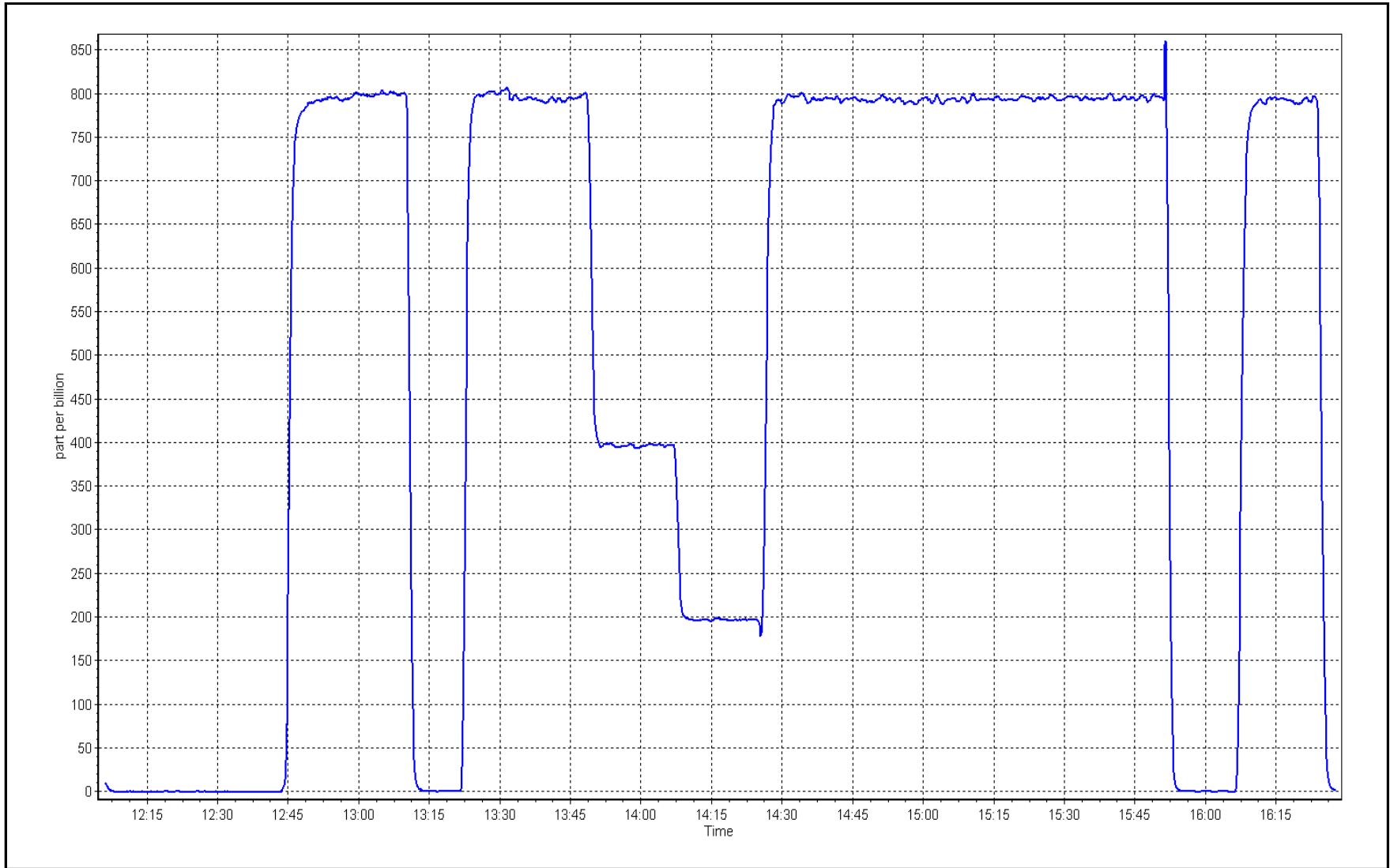
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|-------------|
| 0.0 | -0.6 | ---- | Correlation Coefficient | 0.999999 | ≥0.995 |
| 794.1 | 793.7 | 1.0005 | | | |
| 397.0 | 396.9 | 1.0003 | Slope | 0.999402 | 0.90 - 1.10 |
| 198.0 | 196.8 | 1.0061 | | | |
| | | | Intercept | 0.789062 | +/-30 |



SO2 Calibration Plot

Date: August 15, 2017

Location: Christina Lake





Wood Buffalo Environmental Association

H₂S Calibration Summary

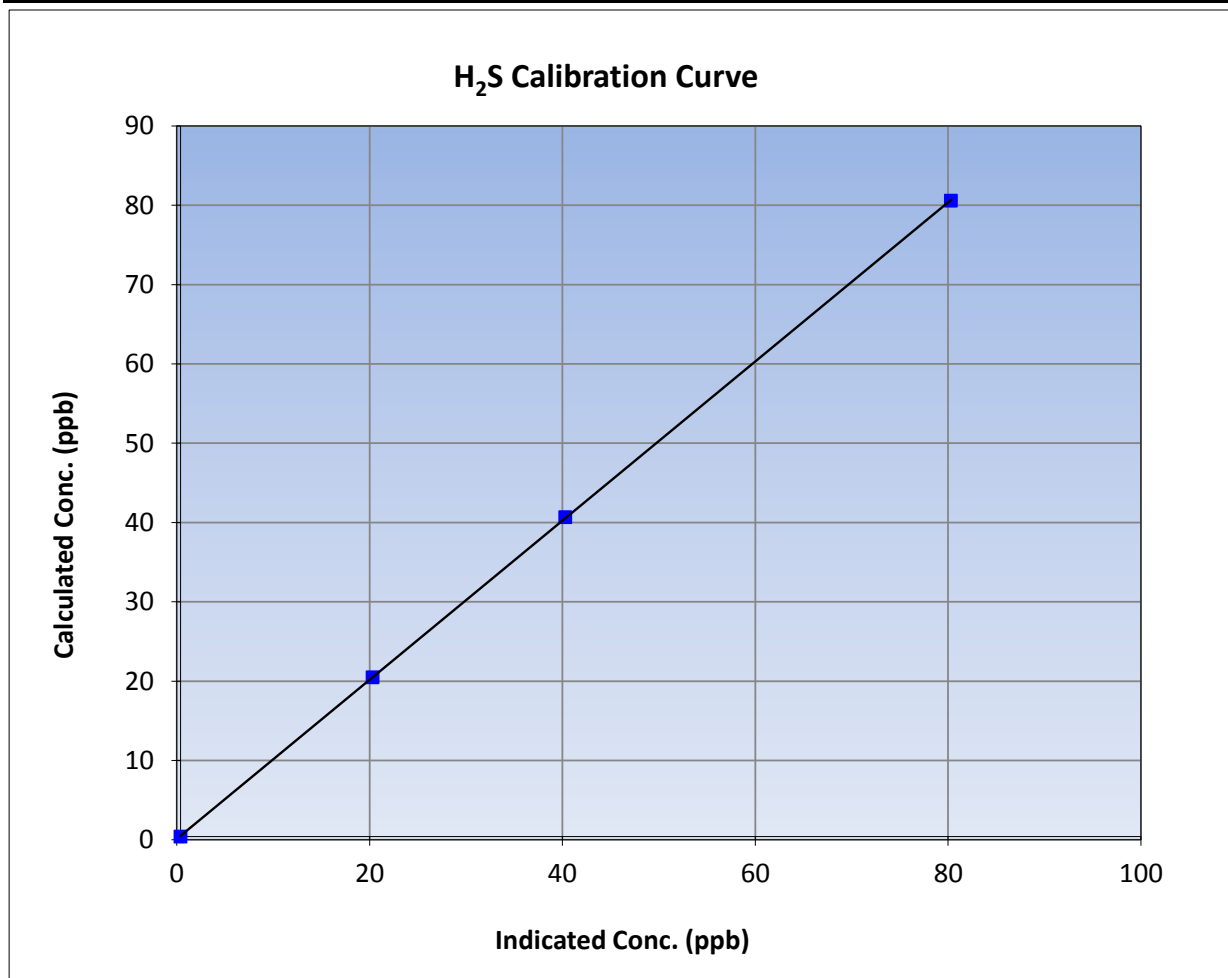
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 16, 2017 | Previous Calibration | July 21, 2017 |
| Station Name | Christina Lake | Station Number | AMS 500 |
| Start Time (MST) | 7:47 | End Time (MST) | 9:51 |
| Analyzer make | Thermo 43i- TLE | Analyzer serial # | 1008841400 |

Calibration Data

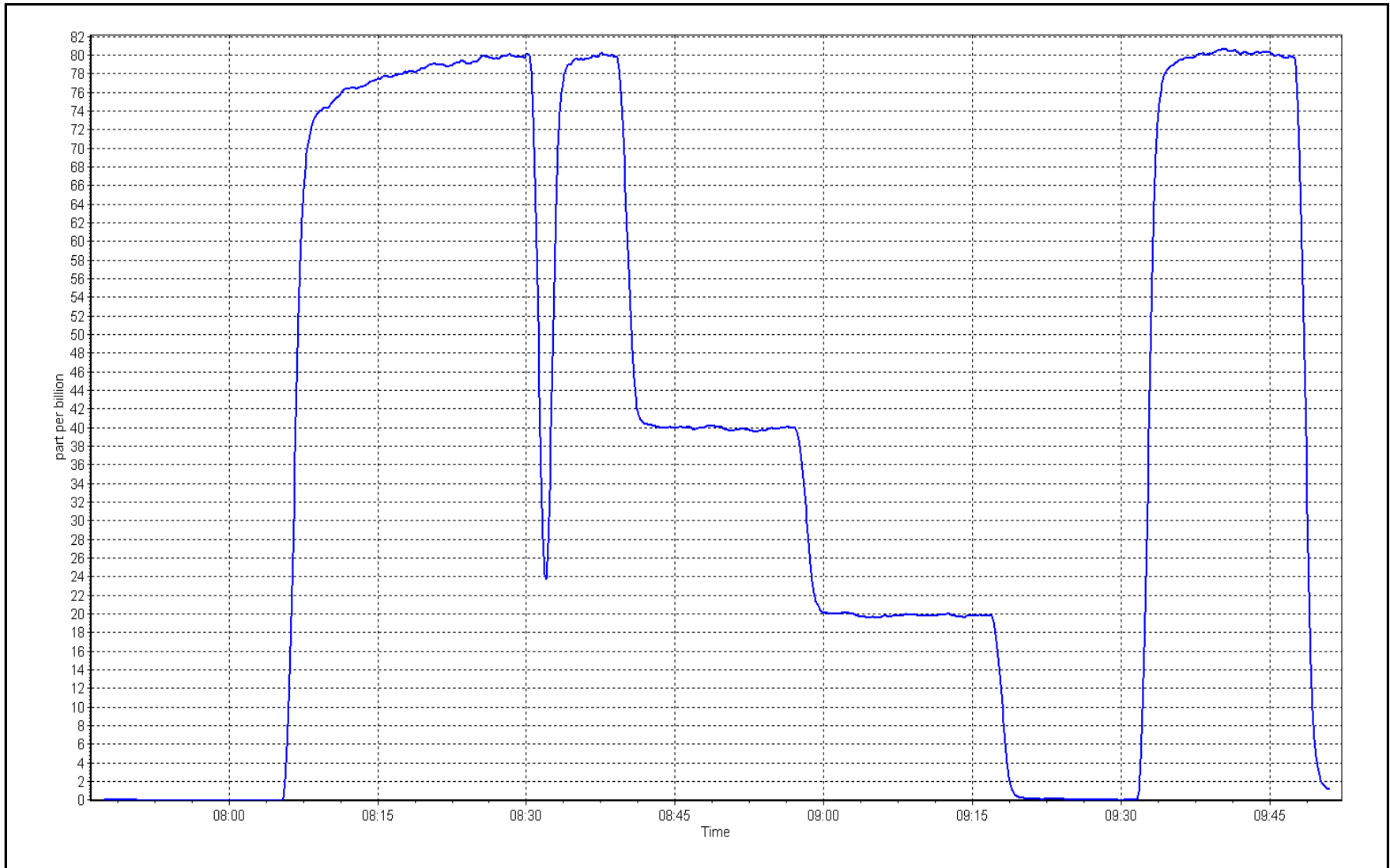
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | 0.999988 | ≥0.995 |
| 80.2 | 79.9 | 1.0037 | | | |
| 40.3 | 39.9 | 1.0099 | Slope | 1.003513 | 0.90 - 1.10 |
| 20.1 | 19.9 | 1.0098 | | | |
| | | | Intercept | 0.098236 | +/-3 |



H₂S Calibration Plot

Date: August 16, 2017

Location: Christina Lake





Wood Buffalo Environmental Association

NO_x - NO - NO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|---------------|
| Station Name: | Christina Lake | Station number: | AMS 500 |
| Calibration Date: | August 15, 2017 | Last Cal Date: | July 24, 2017 |
| Start time (MST): | 12:05 | End time (MST): | 16:25 |
| Reason: | Maintenance | | |

Calibration Standards

| | | | |
|-------------------|-------------------|---------------------|-------------------|
| NO Gas Cylinder # | LL107928 | Cal Gas Expiry Date | September 8, 2018 |
| NOX Cal Gas Conc. | <u>50.8</u> ppb | NO Cal Gas Conc. | <u>50.5</u> ppb |
| Calibrator Model | Teledyne API T700 | Serial Number | 1221 |
| ZAG make/model | Teledyne API 701 | Serial Number | 4604 |

Analyzer Information

| | | | | | |
|----------------------------------|--------------|---------------|------------------------|--------------|---------------|
| Analyzer make: Teledyne API T200 | | | Analyzer serial #: 723 | | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| NO coefficient | 1.252 | 1.272 | NOX Range (ppb) | 0 - 1000 ppb | |
| NOX coefficient | 1.260 | 1.277 | Moly Temperature | 315.9 | 314.9 |
| NO2 coefficient | 1.000 | 1.000 | Reaction cell Press | 4.3 | 4.2 |
| NO bkgrnd | -0.4 | -0.4 | Sample Flow | 0.485 | 0.490 |
| NOX bkgrnd | 0.9 | 0.9 | PMT Voltage | 826.0 | 827.0 |

Calibration Statistics

| | | |
|----------------------------|--------------|---------------|
| | <u>Start</u> | <u>Finish</u> |
| NO _x Cal Slope | 0.992356 | 0.997935 |
| NO _x Cal Offset | 1.420060 | 1.066259 |
| NO Cal Slope | 0.993315 | 0.996778 |
| NO Cal Offset | 0.784806 | 0.586306 |
| NO ₂ Cal Slope | 1.003361 | 1.004267 |
| NO ₂ Cal Offset | -1.537555 | 1.122650 |



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Version-03-2017

Dilution Calibration Data

| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|----------------------------------|---------------------------|-----------------------------|---|--|---|--|---------------------------------------|--|---|--|
| as found zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | ---- | ---- |
| as found span | 4920 | 79.4 | 806.8 | 802.0 | 4.8 | 795.1 | 791.2 | 3.9 | 1.0147 | 1.0137 |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | ---- | ---- |
| high point | 4920 | 79.4 | 806.8 | 802.0 | 4.8 | 807.9 | 804.1 | 3.8 | 0.9986 | 0.9974 |
| second point | 4960 | 39.7 | 403.4 | 401.0 | 2.4 | 402.7 | 402.1 | 0.6 | 1.0017 | 0.9972 |
| third point | 4980 | 19.8 | 201.2 | 200.0 | 1.2 | 199.4 | 199.0 | 0.3 | 1.0089 | 1.0050 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | -0.2 | 0.9 | -1.1 | ---- | ---- |
| as left span | 4920 | 79.4 | 806.8 | 419.6 | 387.2 | 807.2 | 417.7 | 389.5 | 0.9995 | 1.0045 |
| Average Correction Factor | | | | | | | | | 1.0031 | 0.9999 |

| | | | | | |
|--------------------|-----------------------------|----------------|--|-----------------|------------------------|
| Corrected As found | NO _x = 795.1 ppb | NO = 791.2 ppb | | *Percent Change | NO _x = 2.1% |
| Previous Response | NO _x = 811.6 ppb | NO = 806.6 ppb | | *Percent Change | NO = 2.0% |

* = > +/-5% change initiates investigation

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO drop conc (ppb) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | Converter Efficiency <i>Limit = 96-104%</i> |
|----------------------------------|------------------------------|---|--|---------------------------------------|--|---|--|---|--|
| 1st NO ref point | | 4.8 | 807.4 | 805.2 | 2.2 | 0.9993 | 0.9961 | ---- | ---- |
| 1st NO2 (400 ppb O3) | 419.6 | 390.4 | 807.8 | 419.6 | 388.2 | 0.9988 | ---- | 1.0056 | 99.4% |
| 2nd NO2 (200 ppb O3) | 612.9 | 197.1 | 807.3 | 612.9 | 194.4 | 0.9994 | ---- | 1.0137 | 98.6% |
| 3rd NO2 (100 ppb O3) | 709.7 | 100.3 | 807.4 | 709.7 | 97.7 | 0.9993 | ---- | 1.0262 | 97.4% |
| 2nd NO ref point | ---- | 4.8 | 809.5 | 805.7 | 3.8 | 0.9967 | 0.9955 | ---- | ---- |
| Average Correction Factor | | | | | | 0.9985 | 0.9958 | 1.0152 | 98.5% |

Notes: Sample inlet filter replaced after as founds. As founds zero was a bit slow to stabilize and come closer to 0.0 ppb. Will look into doing maintenance that could be completed to mitigate this issue next month. Slightly adjusted span.

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

NO_x Calibration Summary

Version-03-2017

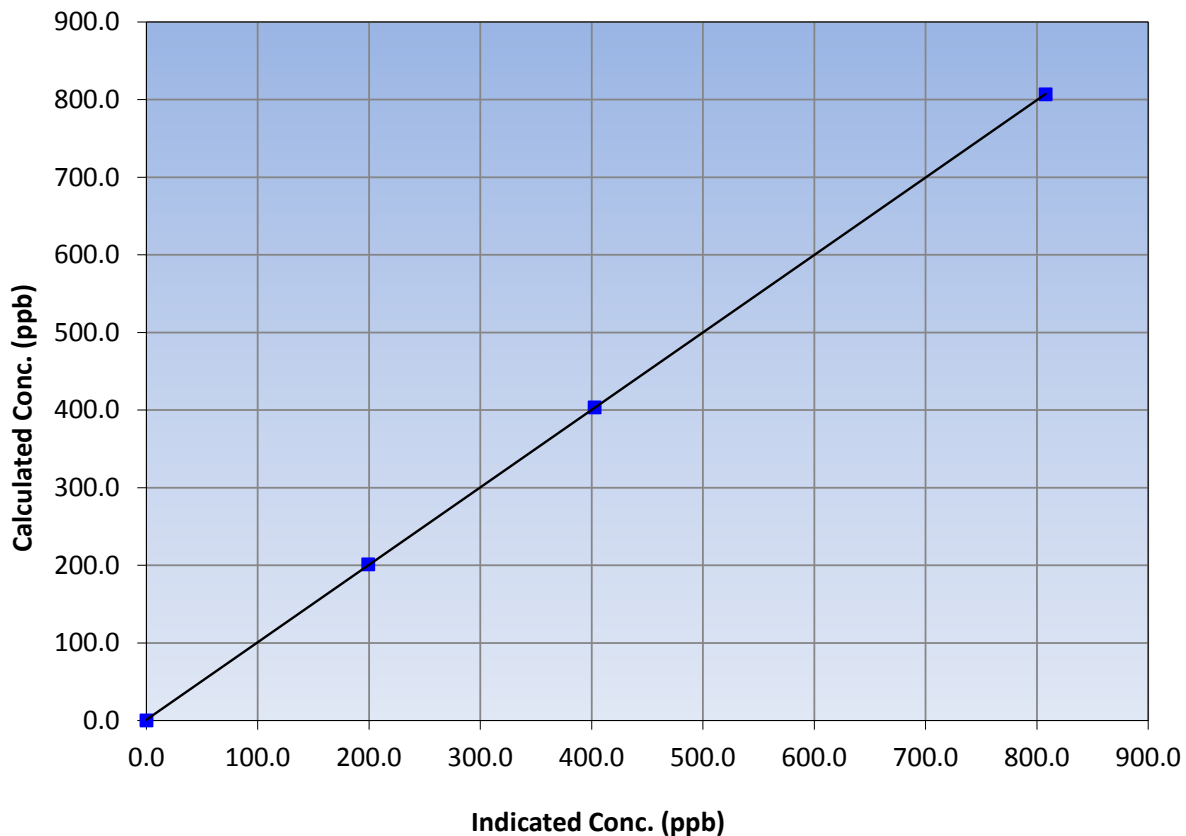
Station Information

| | | | |
|------------------|-------------------|----------------------|---------------|
| Calibration Date | August 15, 2017 | Previous Calibration | July 24, 2017 |
| Station Name | Christina Lake | Station Number | AMS 500 |
| Start Time (MST) | 12:05 | End Time (MST) | 16:25 |
| Analyzer make | Teledyne API T200 | Analyzer serial # | 723 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | ≥0.995 | |
| 806.8 | 807.9 | 0.9986 | | | |
| 403.4 | 402.7 | 1.0017 | | | |
| 201.2 | 199.4 | 1.0089 | | | |
| | | | Slope | 0.997935 | 0.90 - 1.10 |
| | | | Intercept | 1.066259 | +/-20 |

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

Version-03-2017

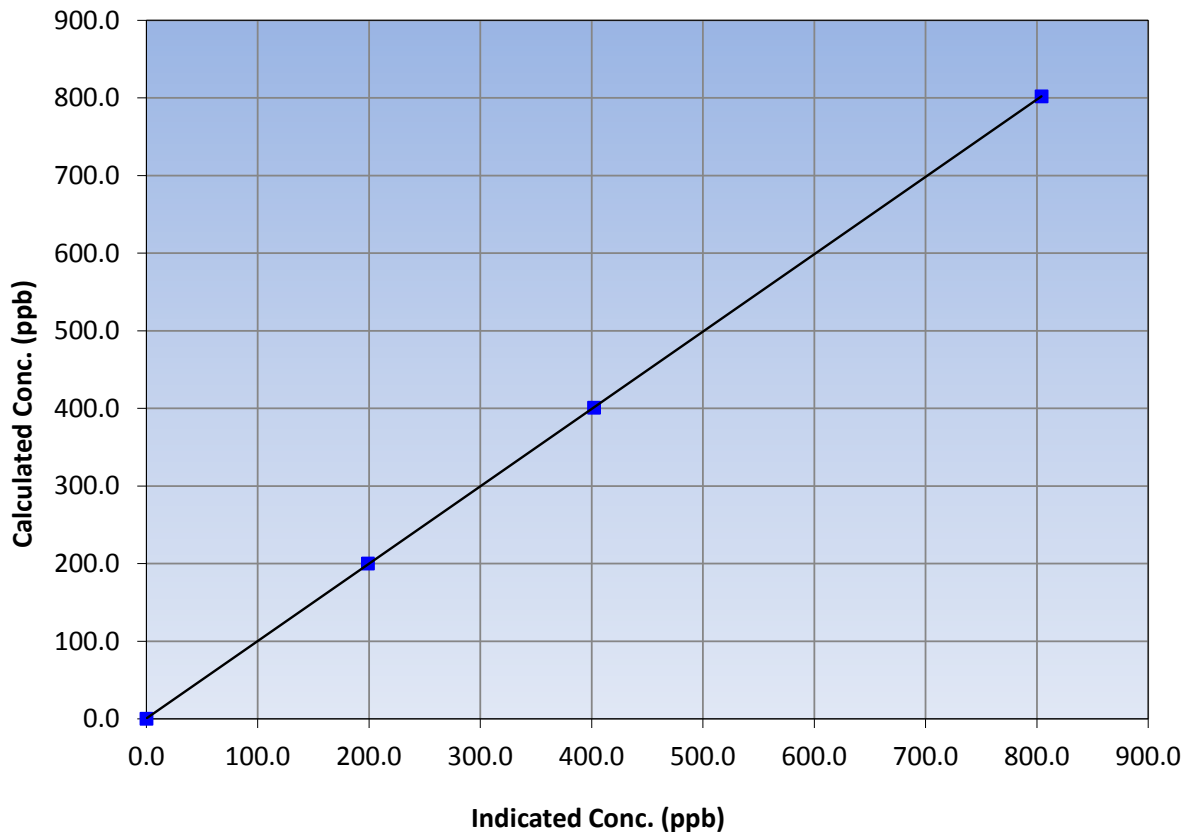
Station Information

| | | | |
|------------------|-------------------|----------------------|---------------|
| Calibration Date | August 15, 2017 | Previous Calibration | July 24, 2017 |
| Station Name | Christina Lake | Station Number | AMS 500 |
| Start Time (MST) | 12:05 | End Time (MST) | 16:25 |
| Analyzer make | Teledyne API T200 | Analyzer serial # | 723 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | ≥0.995 | |
| 802.0 | 804.1 | 0.9974 | | | |
| 401.0 | 402.1 | 0.9972 | | | |
| 200.0 | 199.0 | 1.0050 | | | |
| | | | Slope | 0.996778 | 0.90 - 1.10 |
| | | | Intercept | 0.586306 | +/-20 |

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

Version-03-2017

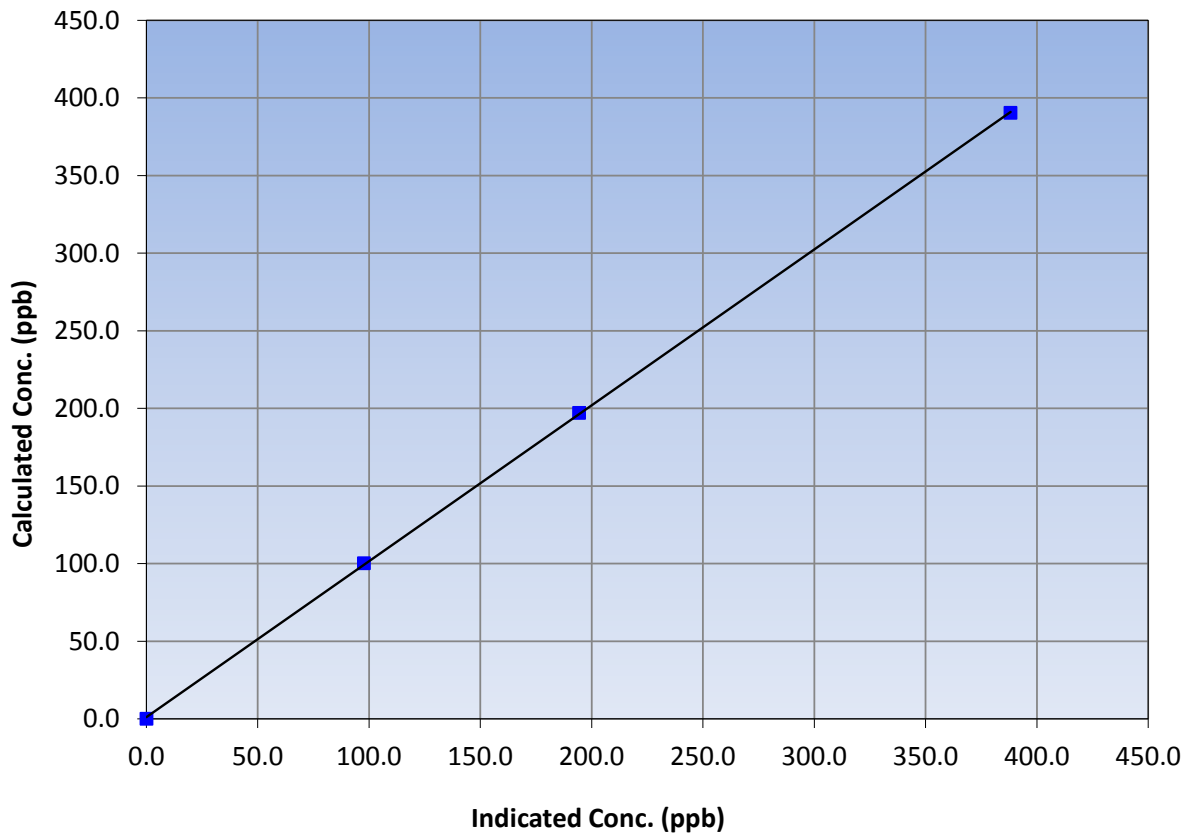
Station Information

| | | | |
|------------------|-------------------|----------------------|---------------|
| Calibration Date | August 15, 2017 | Previous Calibration | July 24, 2017 |
| Station Name | Christina Lake | Station Number | AMS 500 |
| Start Time (MST) | 12:05 | End Time (MST) | 16:25 |
| Analyzer make | Teledyne API T200 | Analyzer serial # | 723 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | ≥0.995 |
| 390.4 | 388.2 | 1.0056 | | |
| 197.1 | 194.4 | 1.0137 | | |
| 100.3 | 97.7 | 1.0262 | | |
| | | | Slope | 0.99 - 1.10 |
| | | | Intercept | +/-20 |

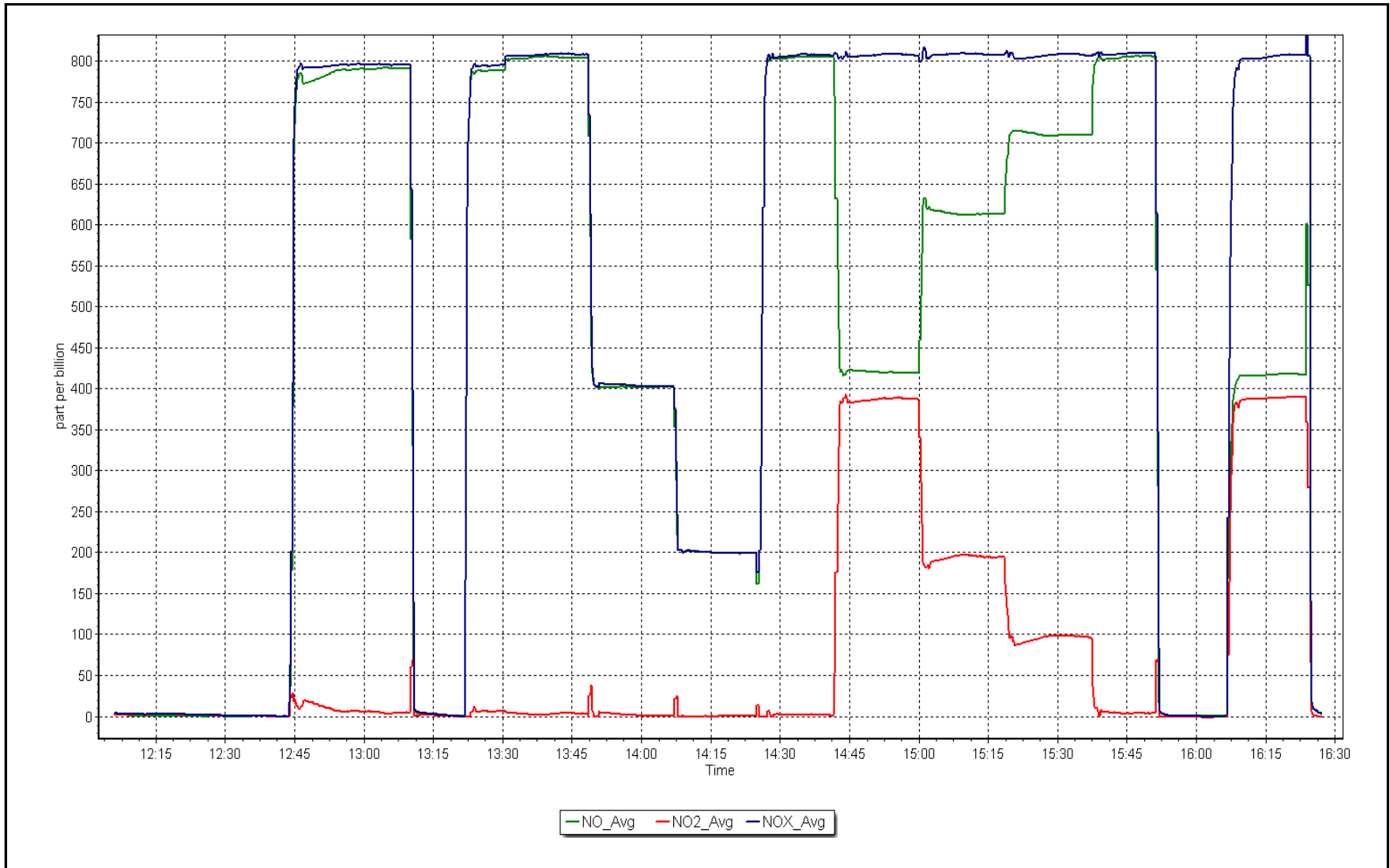
NO₂ Calibration Curve



NO_x Calibration Plot

Date: August 15, 2017

Location: Christina Lake





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 502
SURMONT
AUGUST 2017**

Operations, Data Collection,
QA/QC, Data Validation and Reporting by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

September 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SURMONT (AMS 502)
AUGUST 2017

MONTHLY SUMMARY for
AMD SECTION III.B.1(c)

| Parameter | Hours of Data | Hours of Calibration | Hours without Data | Operational Time | Maximum 1-Hour Value | 1-Hour Exceedances | Maximum 24-Hour Value | 24-Hour Exceedances |
|-----------------------------------|---------------|----------------------|--------------------|------------------|----------------------|--------------------|-----------------------|---------------------|
| SO2 (ppb) Average | 708 | 35 | 36 | 99.87 | 10 | 0 | 2 | 0 |
| H2S (ppb) Average | 695 | 34 | 49 | 97.98 | 4 | 0 | 1 | 0 |
| NO2 (ppb) Average | 708 | 35 | 36 | 99.87 | 27 | 0 | 9 | - |
| NO (ppb) Average | 708 | 35 | 36 | 99.87 | 50 | - | 10 | - |
| NOX (ppb) Average | 708 | 35 | 36 | 99.87 | 72 | - | 18 | - |
| Temperature 2 m (C) Average | 744 | 0 | 0 | 100 | 26.5 | - | 21.4 | - |
| Relative Humidity (%) Average | 744 | 0 | 0 | 100 | 100 | - | 88 | - |
| Wind Speed 10 m (km/h) Average | 744 | 0 | 0 | 100 | 36 | - | 22 | - |
| Wind Direction 10 m (deg) Average | 744 | 0 | 0 | 100 | - | - | - | - |

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SURMONT (AMS 502)
AUGUST 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

| Parameter | Number | Mean | StnDev | Total | Percentile | | | | | | |
|-----------------------------------|--------|-------|--------|-------|------------|------|------|--------|------|------|------|
| | | | | | Min | P10 | Q1 | Median | Q3 | P90 | Max |
| SO2 (ppb) Average | 708 | 0.6 | 1 | - | 0 | 0 | 0 | 0 | 1 | 1 | 10 |
| H2S (ppb) Average | 695 | 0.4 | 0 | - | 0 | 0 | 0 | 0 | 1 | 1 | 4 |
| NO2 (ppb) Average | 708 | 2.1 | 3 | - | 0 | 0 | 0 | 1 | 2 | 5 | 27 |
| NO (ppb) Average | 708 | 1.8 | 5 | - | 0 | 0 | 0 | 0 | 1 | 4 | 50 |
| NOX (ppb) Average | 708 | 3.9 | 8 | - | 0 | 0 | 1 | 2 | 4 | 9 | 72 |
| Temperature 2 m (C) Average | 744 | 16.59 | 3.7 | - | 8.5 | 11.8 | 13.8 | 16.4 | 19.3 | 21.4 | 26.5 |
| Relative Humidity (%) Average | 744 | 64.6 | 16 | - | 28 | 42 | 51 | 66 | 76 | 86 | 100 |
| Wind Speed 10 m (km/h) Average | 744 | 12.7 | 6 | - | 0 | 6 | 8 | 12 | 16 | 22 | 36 |
| Wind Direction 10 m (deg) Average | 744 | - | - | - | - | - | - | - | - | - | - |

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SURMONT (AMS 502)
AUGUST 2017

OPERATIONAL NOTES

| Parameter | Period Start | Period End | Duration (Hours) | Notes |
|-------------------|-------------------|-------------------|------------------|---|
| NO2, NO, NOX, SO2 | 23 Aug 2017 13:00 | 23 Aug 2017 13:00 | 1 | Maintenance - sample manifold cleaned |
| H2S | 02 Aug 2017 16:00 | 02 Aug 2017 16:00 | 1 | Unstable operation - excessive baseline drift |
| H2S | 04 Aug 2017 15:00 | 04 Aug 2017 15:00 | 1 | Unstable operation - excessive baseline drift |
| H2S | 08 Aug 2017 14:00 | 08 Aug 2017 16:00 | 3 | Unstable operation - excessive baseline drift |
| H2S | 09 Aug 2017 15:00 | 09 Aug 2017 16:00 | 2 | Unstable operation - excessive baseline drift |
| H2S | 11 Aug 2017 16:00 | 11 Aug 2017 16:00 | 1 | Unstable operation - excessive baseline drift |
| H2S | 13 Aug 2017 15:00 | 13 Aug 2017 16:00 | 2 | Unstable operation - excessive baseline drift |
| H2S | 22 Aug 2017 11:00 | 22 Aug 2017 13:00 | 3 | Unstable operation - excessive baseline drift |
| H2S | 26 Aug 2017 15:00 | 26 Aug 2017 16:00 | 2 | Unstable operation - excessive baseline drift |



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Surmont - August 2017

| | | | | |
|---|--|----------|---------------------------|------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 10 ppb on Aug 29 06:00 | Maximum Daily Average: 1.9 ppb on Aug 1 | | Hours of Data: | 708 |
| Minimum Value: 0 ppb on Aug 15 03:00 | Minimum Daily Average: 0.1 ppb on Aug 26 | | Hours of Missing Data: | 36 |
| Maximum Diurnal Average: 1.0 ppb at hour 17 | Minimum Diurnal Average: 0.4 ppb at hour 3 | | Hours of Calibration: | 35 |
| Monthly Average: 0.6 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 4 | | Percent Operational Time: | 99.9 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|---|---|---|---|----|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 1 | 1 | Z | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 5 | 6 | 4 | 1 | 1 | 1 | 1 | 1 | 1.9 | 6 |
| 2-Aug | 1 | 1 | 1 | Z | 1 | 1 | 0 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0.9 | 2 |
| 3-Aug | 0 | 0 | 0 | 0 | Z | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.4 | 1 |
| 4-Aug | 0 | 1 | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0.6 | 1 |
| 5-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 6-Aug | 0 | Z | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0.7 | 2 |
| 7-Aug | 1 | 1 | Z | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 3 | 1 | 3 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 1.4 | 3 |
| 8-Aug | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 1 |
| 9-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 10-Aug | 0 | 0 | 0 | 0 | 1 | Z | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 11-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 |
| 12-Aug | 0 | Z | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0.9 | 2 |
| 13-Aug | 1 | 0 | Z | 1 | 2 | 3 | 1 | 2 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.9 | 3 |
| 14-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 15-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 2 | 1 | 2 | 0.7 | 2 |
| 16-Aug | 1 | 1 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 2 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 2 |
| 17-Aug | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 2 | 3 | 1 | 1 | 2 | 1 | 1 | 0 | 1 | 1 | 1 | 0.8 | 3 |
| 18-Aug | 2 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 2 |
| 19-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 5 |
| 20-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 4 |
| 21-Aug | 0 | 0 | 0 | 0 | Z | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 22-Aug | 0 | 1 | 1 | 0 | 0 | Z | 1 | 0 | 0 | 1 | C | C | C | C | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 1 |
| 23-Aug | Z | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 0 | C | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 2 |
| 24-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 |
| 25-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 26-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 27-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.2 | 1 |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 6 | 7 | 4 | 5 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 1.5 | 7 |
| 29-Aug | Z | 0 | 1 | 2 | 5 | 10 | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1.1 | 10 |
| 30-Aug | 0 | Z | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0.5 | 2 |
| 31-Aug | 0 | 1 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |

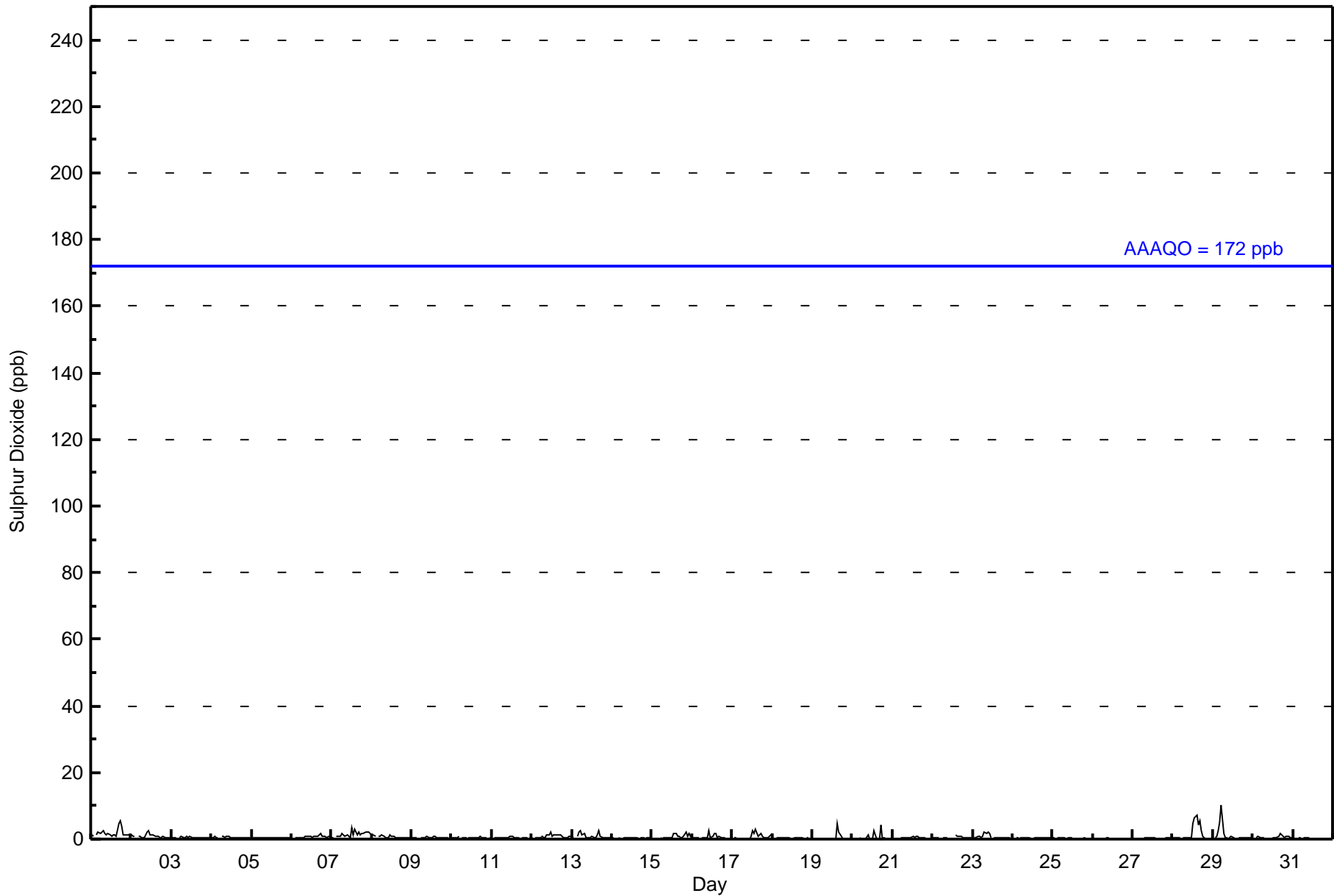
| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|
| 0.5 | 0.4 | 0.4 | 0.5 | 0.7 | 0.9 | 0.6 | 0.6 | 0.5 | 0.6 | 0.6 | 0.6 | 0.6 | 0.8 | 0.9 | 0.9 | 0.8 | 1.0 | 0.9 | 0.6 | 0.4 | 0.5 | 0.4 | 0.5 | 0.4 | Diurnal Average |
| 2 | 1 | 1 | 2 | 5 | 10 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 5 | 6 | 7 | 5 | 5 | 6 | 4 | 1 | 2 | 2 | 2 | 2 | Diurnal Maximum |

Z - zerospan C - Calibration M - Maintenance
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Surmont - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Surmont - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 10 | 708 | 100.00 | 100.00 |
| 11 - 20 | 0 | 0.00 | 100.00 |
| 21 - 60 | 0 | 0.00 | 100.00 |
| 61 - 110 | 0 | 0.00 | 100.00 |
| 111 - 172 | 0 | 0.00 | 100.00 |
| > 172 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Surmont - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 10 | 26 | 7 | 8 | 2 | 7 | 14 | 50 | 60 | 61 | 43 | 49 | 153 | 125 | 64 | 20 | 19 | 708 |
| 11 - 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21 - 60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 61 - 110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 111 - 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 26 | 7 | 8 | 2 | 7 | 14 | 50 | 60 | 61 | 43 | 49 | 153 | 125 | 64 | 20 | 19 | 708 |

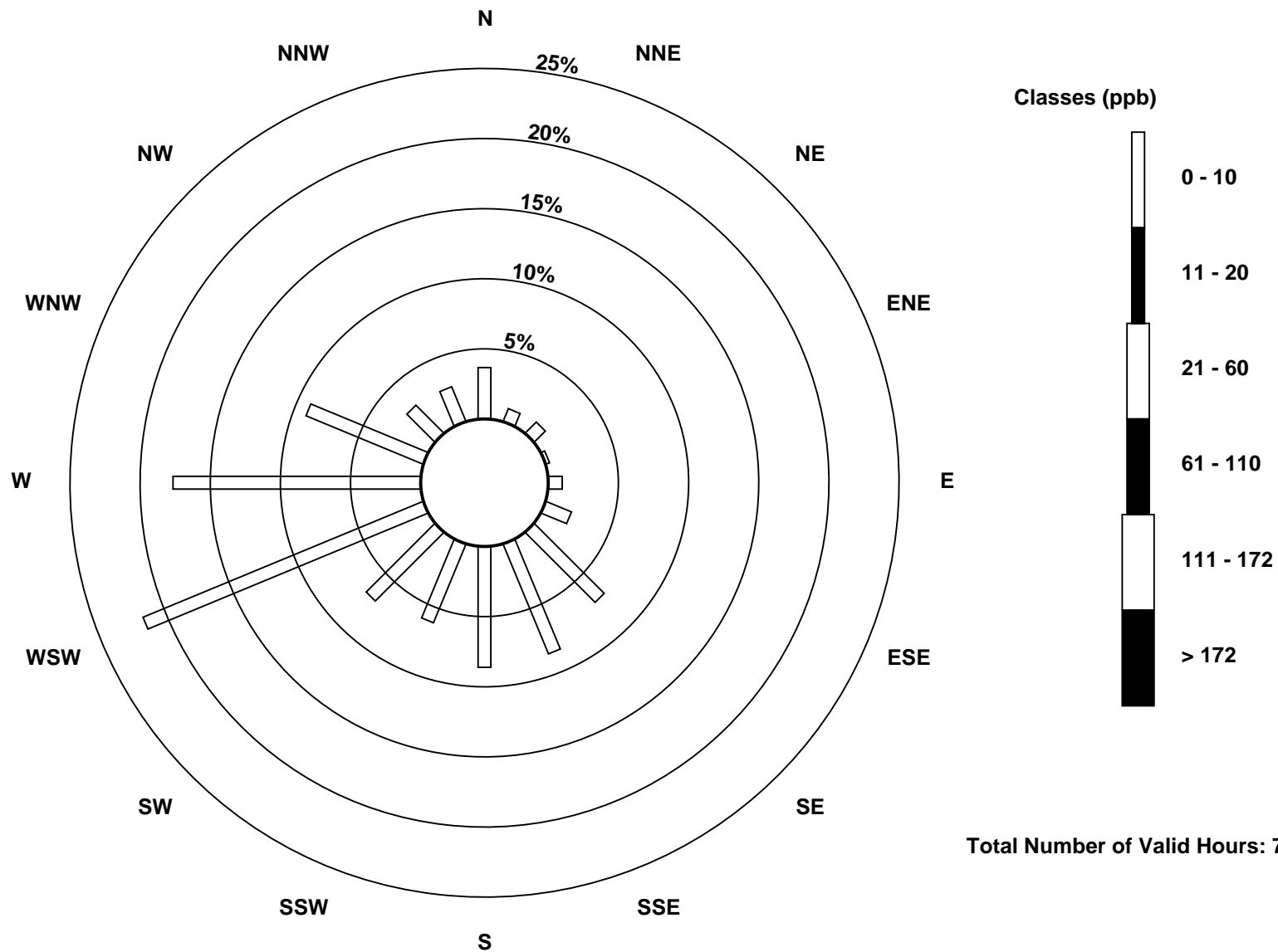
Total Number of Valid Hours: 708

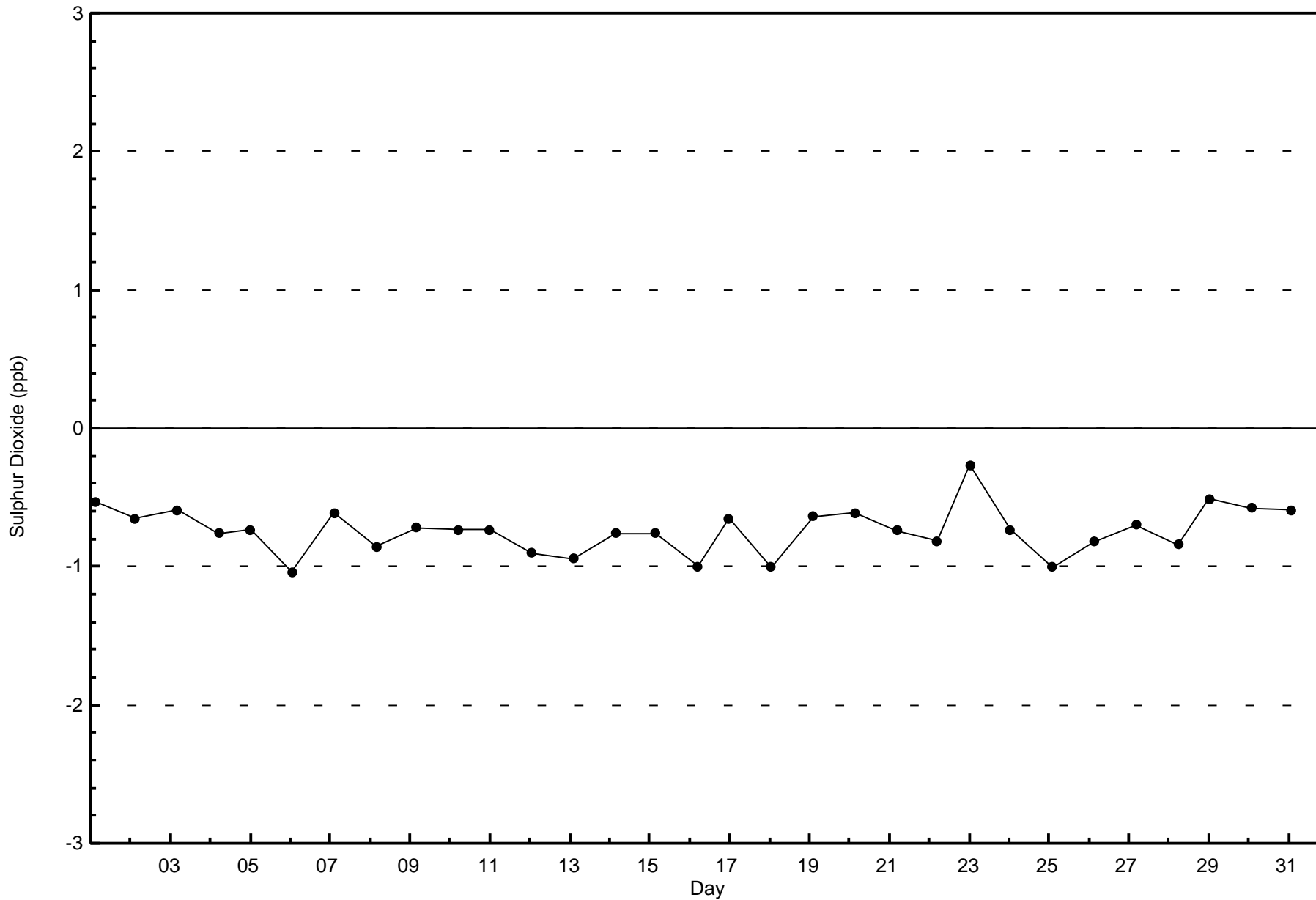
Total Number of Hours: 744

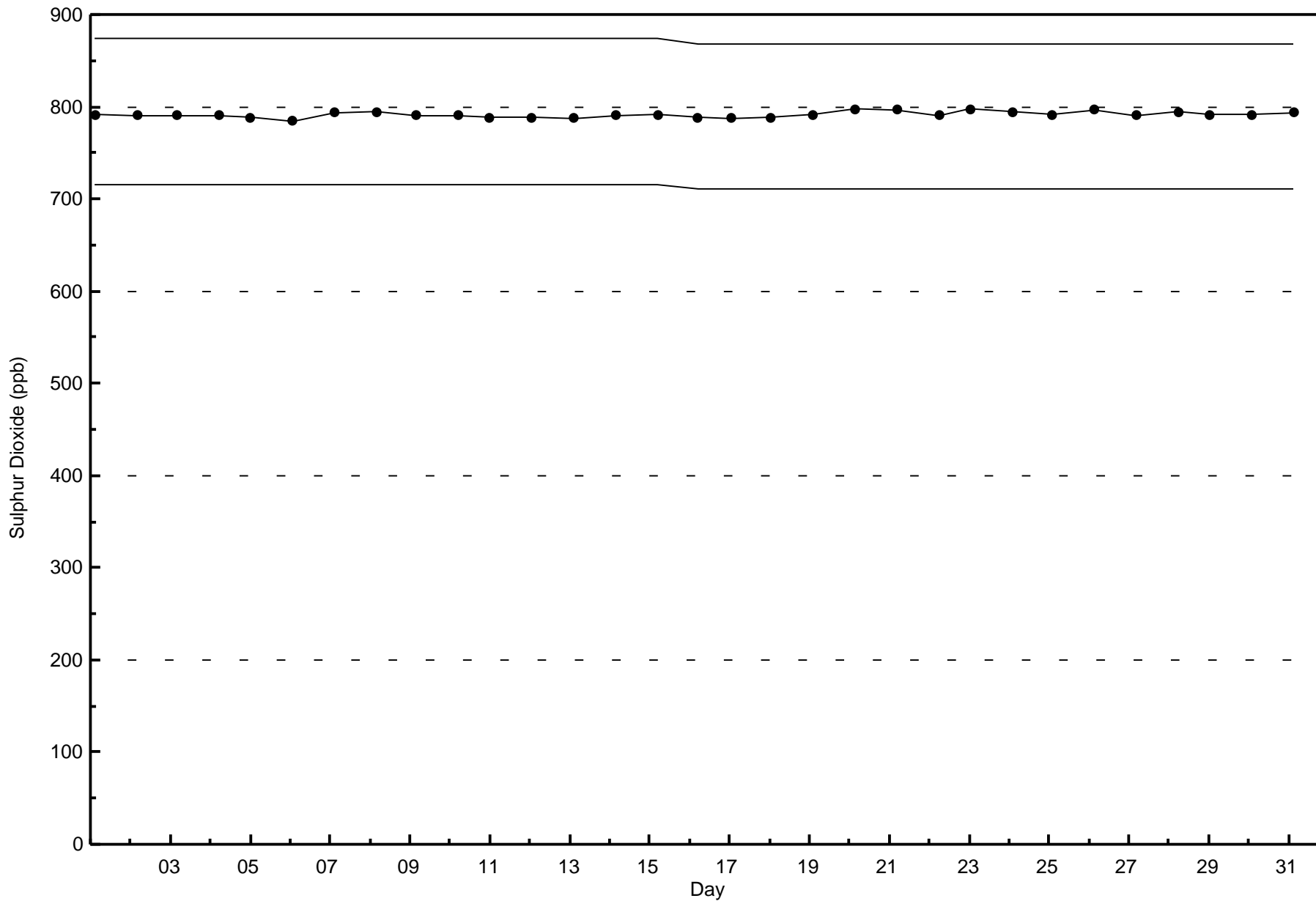


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Sulphur Dioxide (SO₂) - ppb
Surmont (AMS 502)









Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H₂S) - ppb

Surmont - August 2017

| | | | | |
|---|--|----------|---------------------------|------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 4 ppb on Aug 15 21:00 | Maximum Daily Average: 1.2 ppb on Aug 15 | | Hours of Data: | 695 |
| Minimum Value: 0 ppb on Aug 12 01:00 | Minimum Daily Average: 0.1 ppb on Aug 26 | | Hours of Missing Data: | 49 |
| Maximum Diurnal Average: 0.6 ppb at hour 21 | Minimum Diurnal Average: 0.3 ppb at hour 12 | | Hours of Calibration: | 34 |
| Monthly Average: 0.4 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 2 | | Percent Operational Time: | 98.0 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 1 | 1 | 1 | Z | 2 | 1 | 2 | 2 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1.0 | 2 |
| 2-Aug | 1 | 0 | 0 | 1 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | UO | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0.4 | 1 |
| 3-Aug | 1 | 1 | 1 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0.5 | 1 |
| 4-Aug | 2 | 1 | 0 | 1 | 2 | 2 | Z | 0 | 2 | 1 | 1 | 0 | 1 | 0 | UO | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0.8 | 2 |
| 5-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 6-Aug | 0 | 1 | Z | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 1 | 1 | 1 | 2 | 1.0 | 3 |
| 7-Aug | 3 | 3 | 2 | Z | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1.1 | 3 |
| 8-Aug | 1 | 0 | 0 | 1 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | UO | UO | UO | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 9-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | UO | UO | UO | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0.2 | 1 |
| 10-Aug | 0 | 0 | 0 | 0 | 2 | 0 | Z | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 2 |
| 11-Aug | 0 | Z | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | UO | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0.3 | 1 |
| 12-Aug | 0 | 0 | Z | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0.3 | 1 |
| 13-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | UO | UO | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 14-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0.4 | 1 |
| 15-Aug | 0 | 0 | 0 | 0 | 0 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 3 | 4 | 3 | 2 | 1 | 1.2 | 4 |
| 16-Aug | 1 | 1 | 1 | 1 | 1 | 1 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 1 |
| 17-Aug | 0 | Z | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0.5 | 1 |
| 18-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0.4 | 1 |
| 19-Aug | 0 | 0 | 0 | Z | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 1 |
| 20-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 0 |
| 21-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 22-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | UO | UO | UO | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 23-Aug | 0 | Z | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 24-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.3 | 1 |
| 25-Aug | 1 | 1 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 26-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | UO | UO | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 29-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0.2 | 1 |
| 30-Aug | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.5 | 1 |
| 31-Aug | 1 | 1 | 1 | Z | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0.5 | 1 |

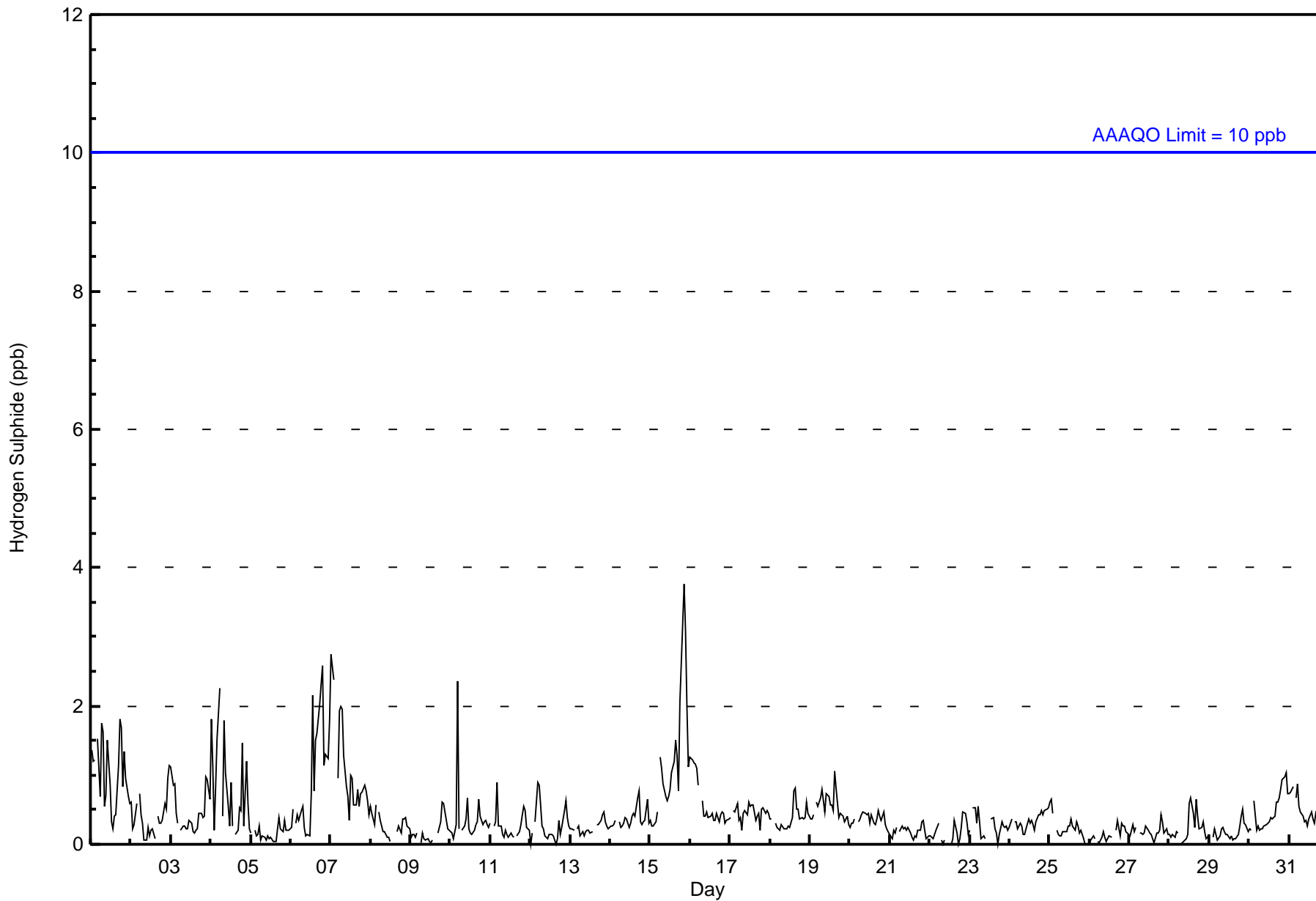
| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|
| 0.5 | 0.5 | 0.5 | 0.4 | 0.6 | 0.5 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 0.3 | 0.4 | 0.4 | 0.5 | 0.5 | 0.6 | 0.6 | 0.6 | 0.5 | 0.4 | Diurnal Average |
| 3 | 3 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 3 | 2 | 2 | Diurnal Maximum |

Z - zerospan C - Calibration UO - Unstable Operation
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb



Wood Buffalo Environmental Association
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Surmont - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Surmont - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2 | 689 | 99.14 | 99.14 |
| 3 - 4 | 6 | 0.86 | 100.00 |
| 5 - 7 | 0 | 0.00 | 100.00 |
| 8 - 11 | 0 | 0.00 | 100.00 |
| > 11 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 695

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Surmont - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2 | 25 | 6 | 8 | 2 | 8 | 11 | 50 | 54 | 61 | 41 | 47 | 154 | 124 | 63 | 18 | 17 | 689 |
| 3 - 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 6 |
| 5 - 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 - 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 25 | 6 | 8 | 2 | 8 | 11 | 50 | 54 | 61 | 41 | 47 | 154 | 124 | 63 | 21 | 20 | 695 |

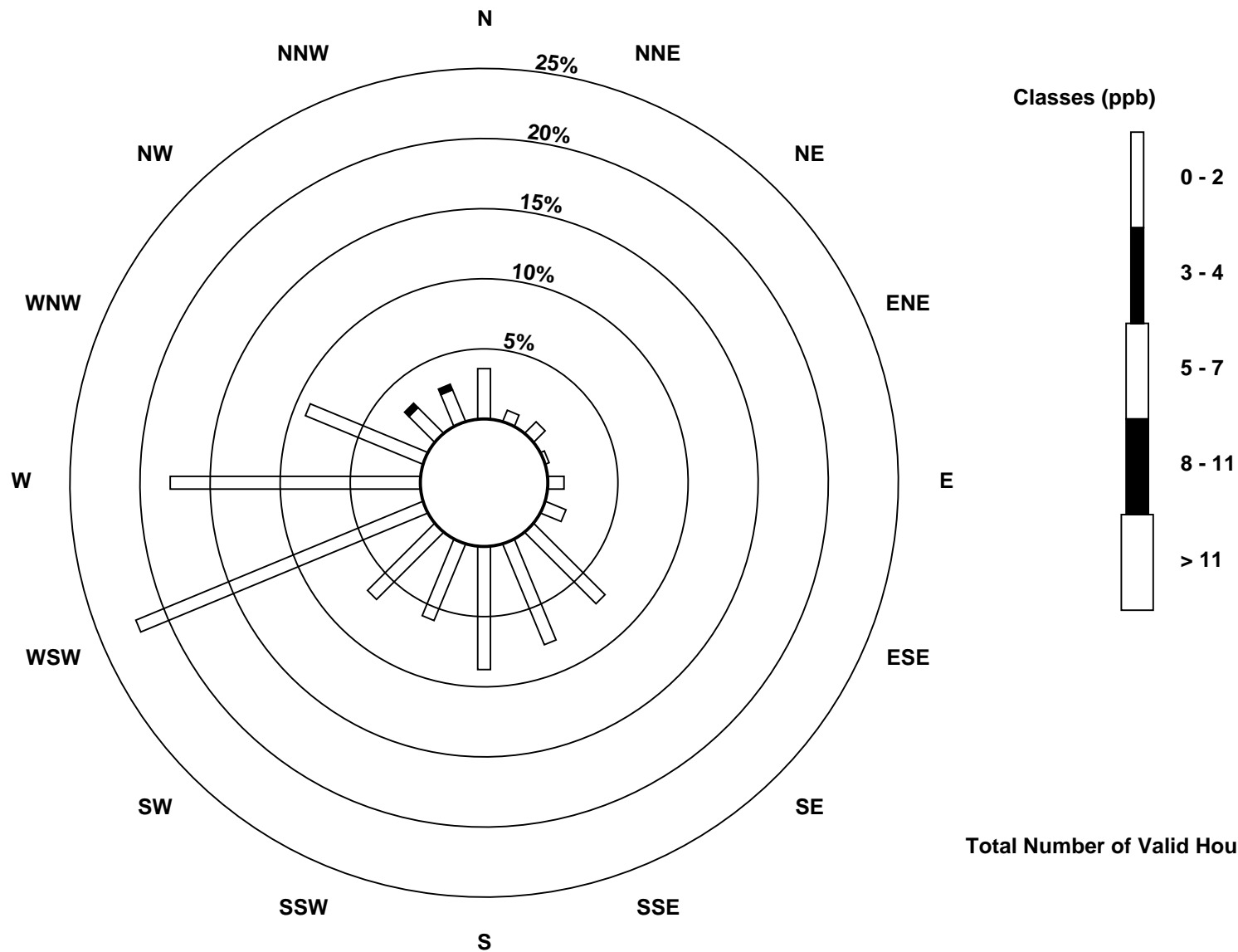
Total Number of Valid Hours: 695

Total Number of Hours: 744

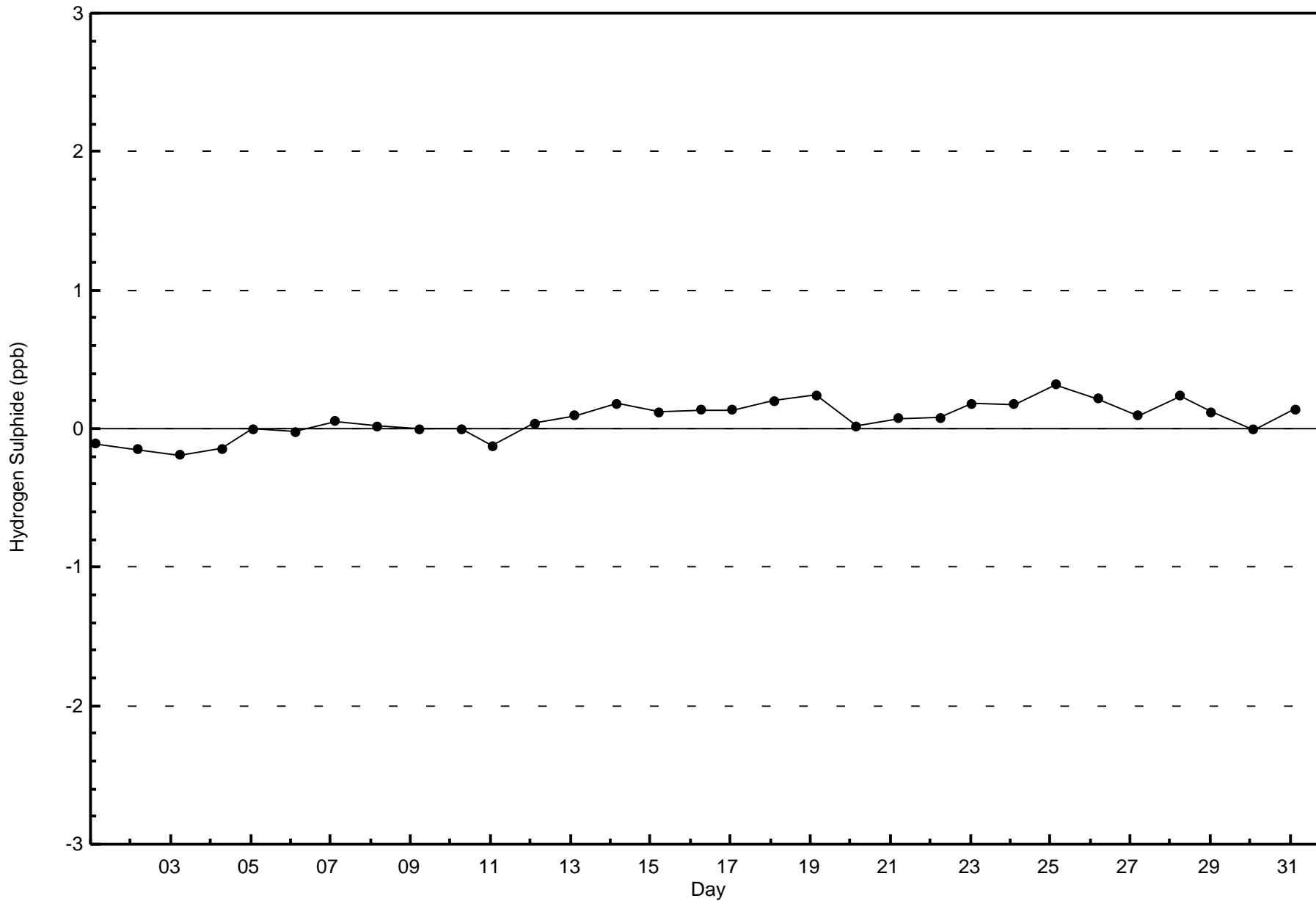


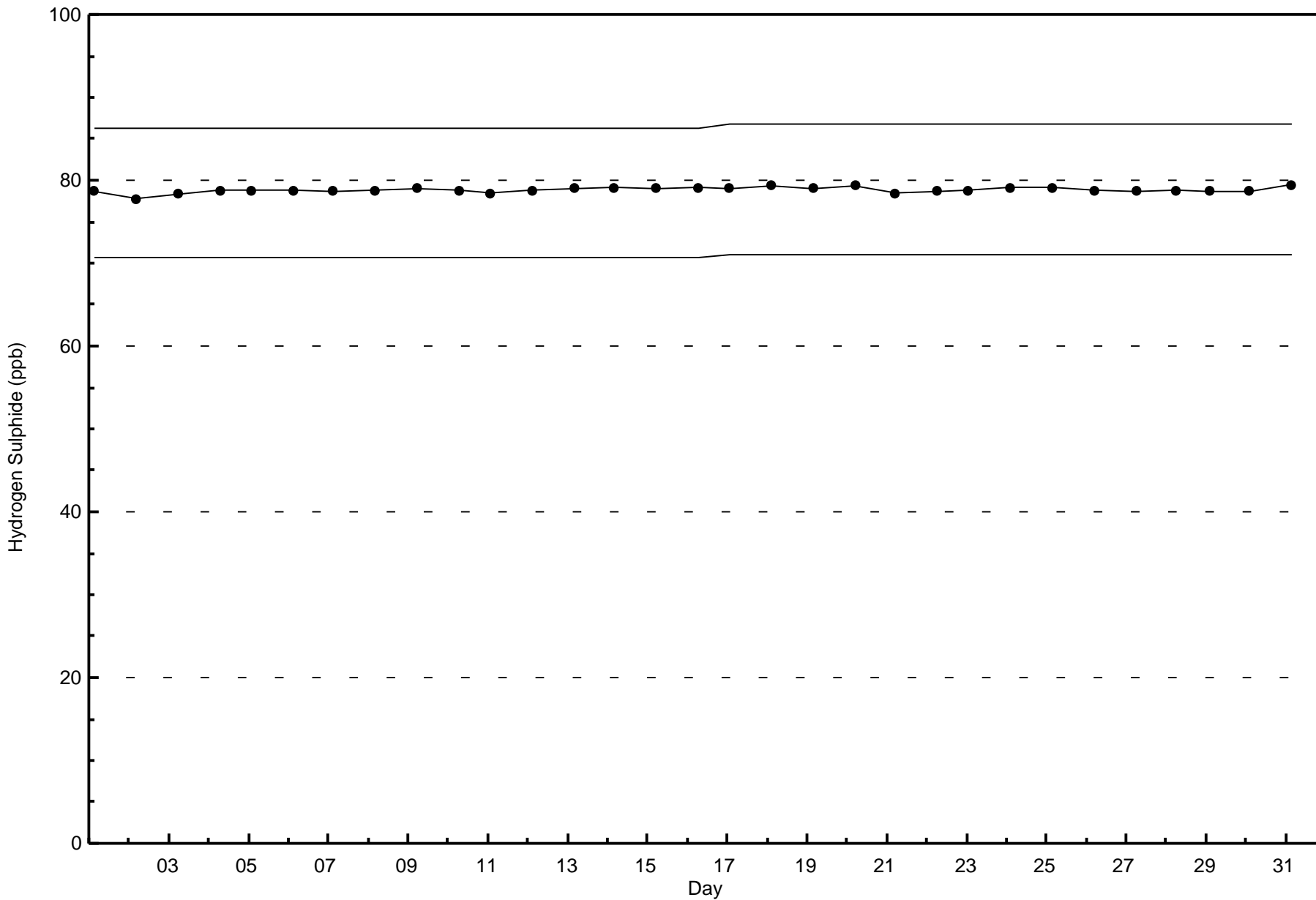
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Hydrogen Sulphide (H₂S) - ppb
Surmont (AMS 502)



Total Number of Valid Hours: 695







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxide (NO) - ppb

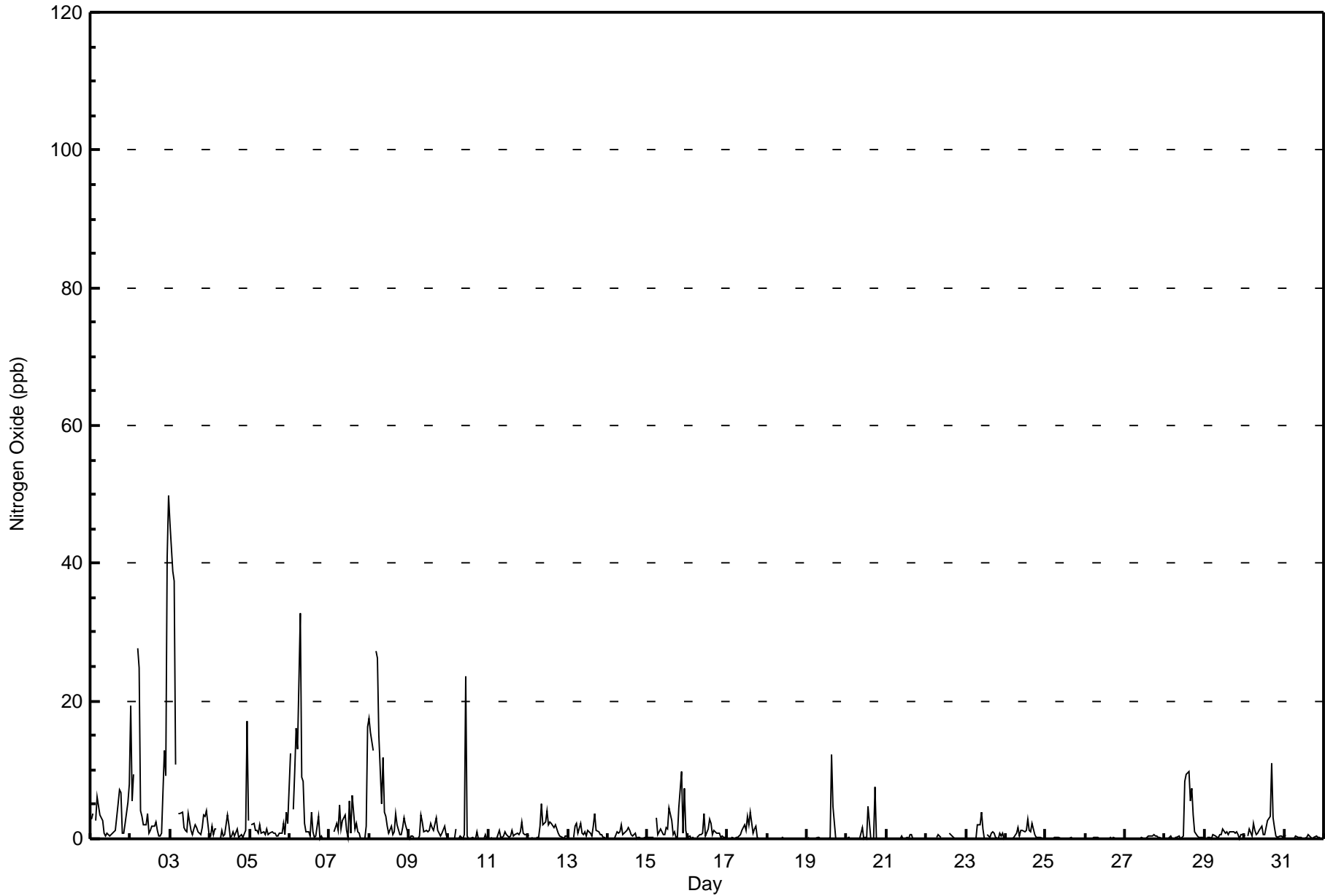
Surmont - August 2017

| Maximum Value: 50 ppb on Aug 3 00:00 | | Maximum Daily Average: 9.8 ppb on Aug 2 | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|---|----|--------------------------------|----|-----------------|----|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|---------------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|
| Minimum Value: 0 ppb on Aug 6 19:00 | | Minimum Daily Average: 0.0 ppb on Aug 18 | | Hours of Data: 708 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 3.9 ppb at hour 1 | | Minimum Diurnal Average: 0.5 ppb at hour 20 | | Hours of Missing Data: 36 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 1.8 ppb | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 4 P ₉₉ = 25 | | Hours of Calibration: 35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Percent Operational Time: 99.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 3 | 4 | Z | 3 | 6 | 4 | 3 | 3 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 5 | 7 | 7 | 1 | 1 | 2 | 5 | 8 | 2.9 | 8 | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 19 | 5 | 9 | Z | 28 | 25 | 4 | 3 | 2 | 2 | 4 | 1 | 1 | 2 | 2 | 2 | 1 | 0 | 0 | 1 | 13 | 9 | 41 | 50 | 9.8 | 50 | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 46 | 39 | 37 | 11 | Z | 4 | 4 | 4 | 2 | 1 | 1 | 4 | 1 | 1 | 2 | 2 | 1 | 1 | 2 | 4 | 3 | 4 | 0 | 7.5 | 46 | | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 0 | 2 | 1 | 1 | 1 | Z | 0 | 1 | 0 | 1 | 3 | 2 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 1 | 0 | 1 | 17 | 3 | 1.7 | 17 | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | Z | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 4 | 2 | 1.3 | 4 | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 12 | Z | 4 | 10 | 16 | 13 | 33 | 9 | 8 | 2 | 1 | 1 | 0 | 4 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 5.2 | 33 | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 0 | 0 | Z | 1 | 2 | 1 | 5 | 1 | 3 | 4 | 1 | 0 | 5 | 1 | 6 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 2 | 16 | 2.4 | 16 | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 17 | 15 | 13 | Z | 27 | 26 | 15 | 5 | 12 | 4 | 3 | 2 | 1 | 2 | 1 | 1 | 4 | 2 | 1 | 1 | 2 | 3 | 2 | 1 | 6.9 | 27 | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 3 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 3 | 1 | 1 | 0 | 1 | 2 | 1 | 0 | 1.1 | 3 | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 0 | 0 | 0 | 0 | 1 | Z | 0 | 0 | 0 | 1 | 24 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1.2 | 24 | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | Z | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 0.6 | 2 | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 2 | 5 | 2 | 2 | 4 | 2 | 3 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1.3 | 5 | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 0 | 0 | Z | 0 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 2 | 4 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1.0 | 4 | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 0 | 0 | 0 | Z | 0 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 2 | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 0 | 0 | 0 | 0 | Z | 3 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 5 | 3 | 1 | 1 | 0 | 0 | 4 | 10 | 1 | 7 | 1 | 1.9 | 10 | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 1 | 1 | 1 | 4 | 0 | 1 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0.8 | 4 | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 3 | 2 | 4 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0.9 | 4 | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.8 | 12 | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 8 | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 1 | 0 | 0 | C | C | C | C | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 4 | 1 | 0 | M | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0.7 | 4 | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 0 | Z | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 3 | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 9 | 10 | 6 | 7 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 2.1 | 10 | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | Z | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0.6 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 0 | Z | 0 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 3 | 3 | 11 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 1.6 | 11 | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 1 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 3.9 | 2.7 | 2.7 | 1.1 | 3.3 | 3.2 | 2.4 | 1.5 | 1.5 | 1.0 | 1.9 | 0.9 | 1.2 | 1.6 | 1.5 | 1.4 | 1.9 | 1.3 | 0.6 | 0.5 | 1.2 | 0.8 | 2.8 | 2.7 | Diurnal Average |
| | | | | | | | | | | | | | | | | | | | | | | | | 46 | 39 | 37 | 11 | 28 | 26 | 33 | 9 | 12 | 4 | 24 | 4 | 8 | 9 | 10 | 12 | 11 | 8 | 7 | 4 | 13 | 9 | 41 | 50 | Diurnal Maximum |
| Z - zerospan | | C - Calibration | | | | M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxide (NO) - ppb
Surmont - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Surmont - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 697 | 98.45 | 98.45 |
| 21 - 40 | 8 | 1.13 | 99.58 |
| 41 - 80 | 3 | 0.42 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Surmont - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 26 | 7 | 8 | 2 | 7 | 14 | 50 | 60 | 61 | 43 | 48 | 144 | 124 | 64 | 20 | 19 | 697 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 1 | 0 | 0 | 0 | 8 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 3 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 26 | 7 | 8 | 2 | 7 | 14 | 50 | 60 | 61 | 43 | 49 | 153 | 125 | 64 | 20 | 19 | 708 |

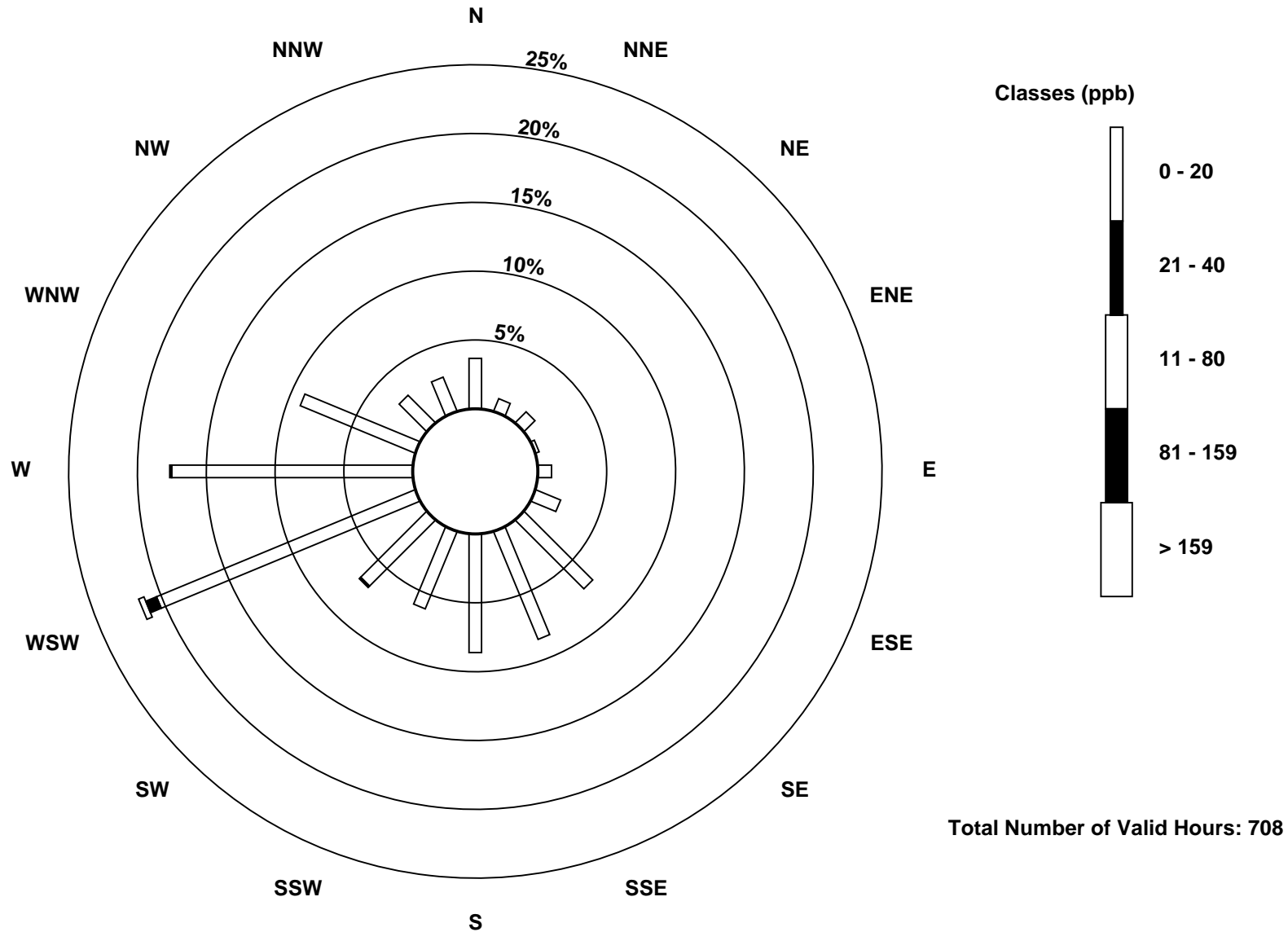
Total Number of Valid Hours: 708

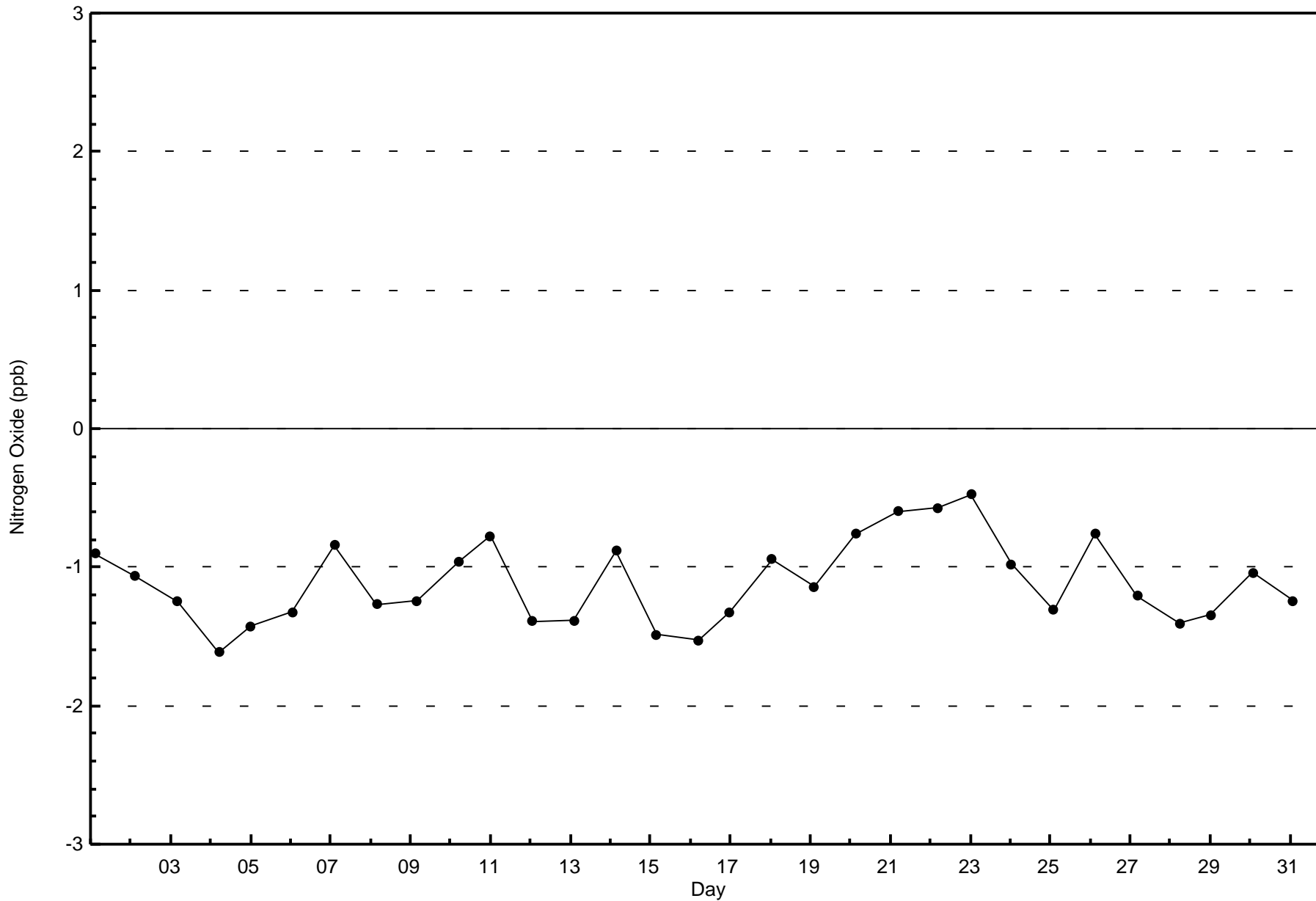
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Oxide (NO) - ppb
Surmont (AMS 502)

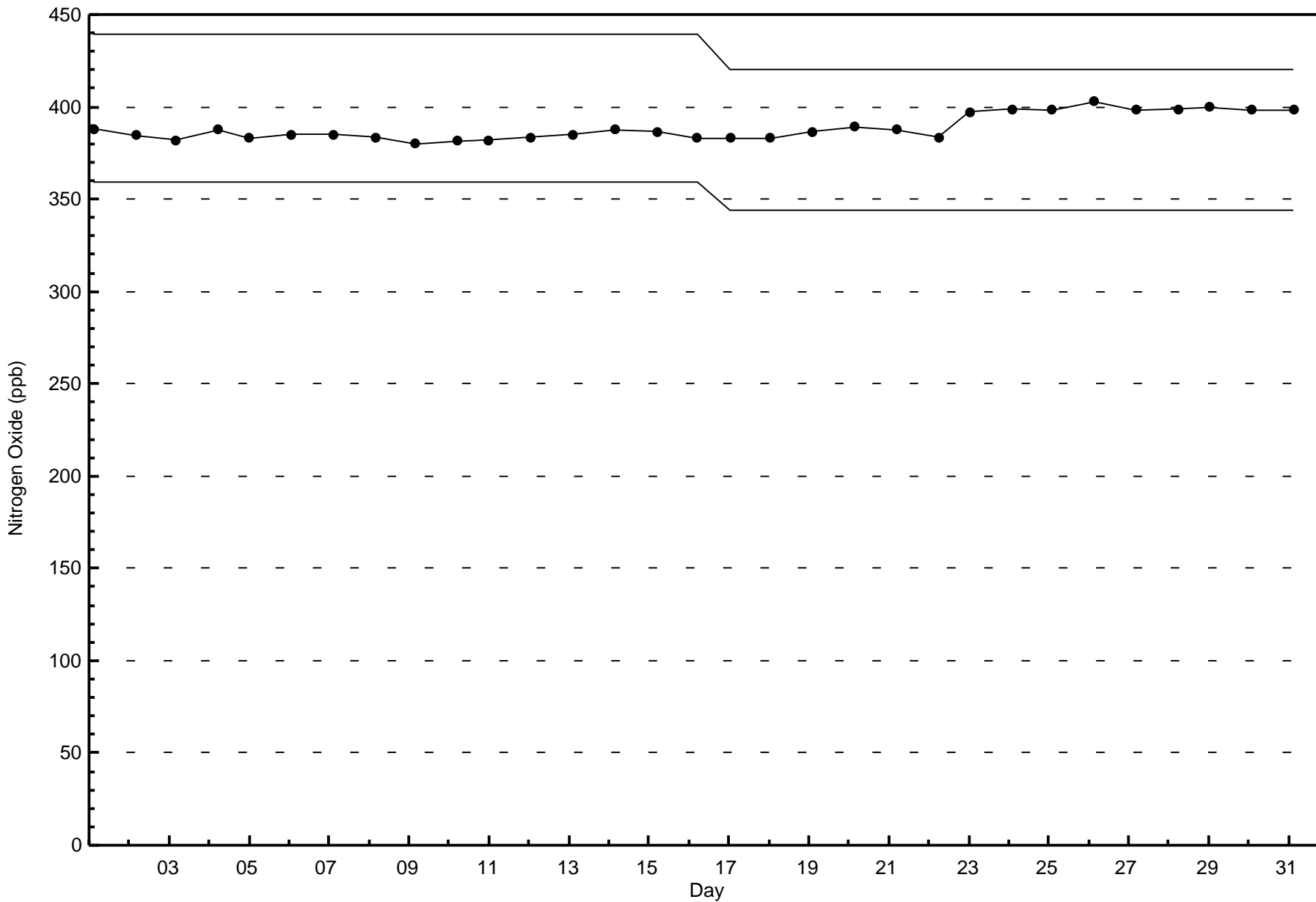






Wood Buffalo Environmental Association
Span Responses

Nitrogen Oxide (NO) - ppb
Surmont - August 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Surmont - August 2017

| | | | | |
|---|---|----------|---------------------------|------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 27 ppb on Aug 2 06:00 | Maximum Daily Average: 8.7 ppb on Aug 2 | | Hours of Data: | 708 |
| Minimum Value: 0 ppb on Aug 17 21:00 | Minimum Daily Average: 0.2 ppb on Aug 25 | | Hours of Missing Data: | 36 |
| Maximum Diurnal Average: 3.6 ppb at hour 23 | Minimum Diurnal Average: 1.0 ppb at hour 20 | | Hours of Calibration: | 35 |
| Monthly Average: 2.1 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 O ₃ = 2 P ₉₀ = 5 P ₉₉ = 18 | | Percent Operational Time: | 99.9 |

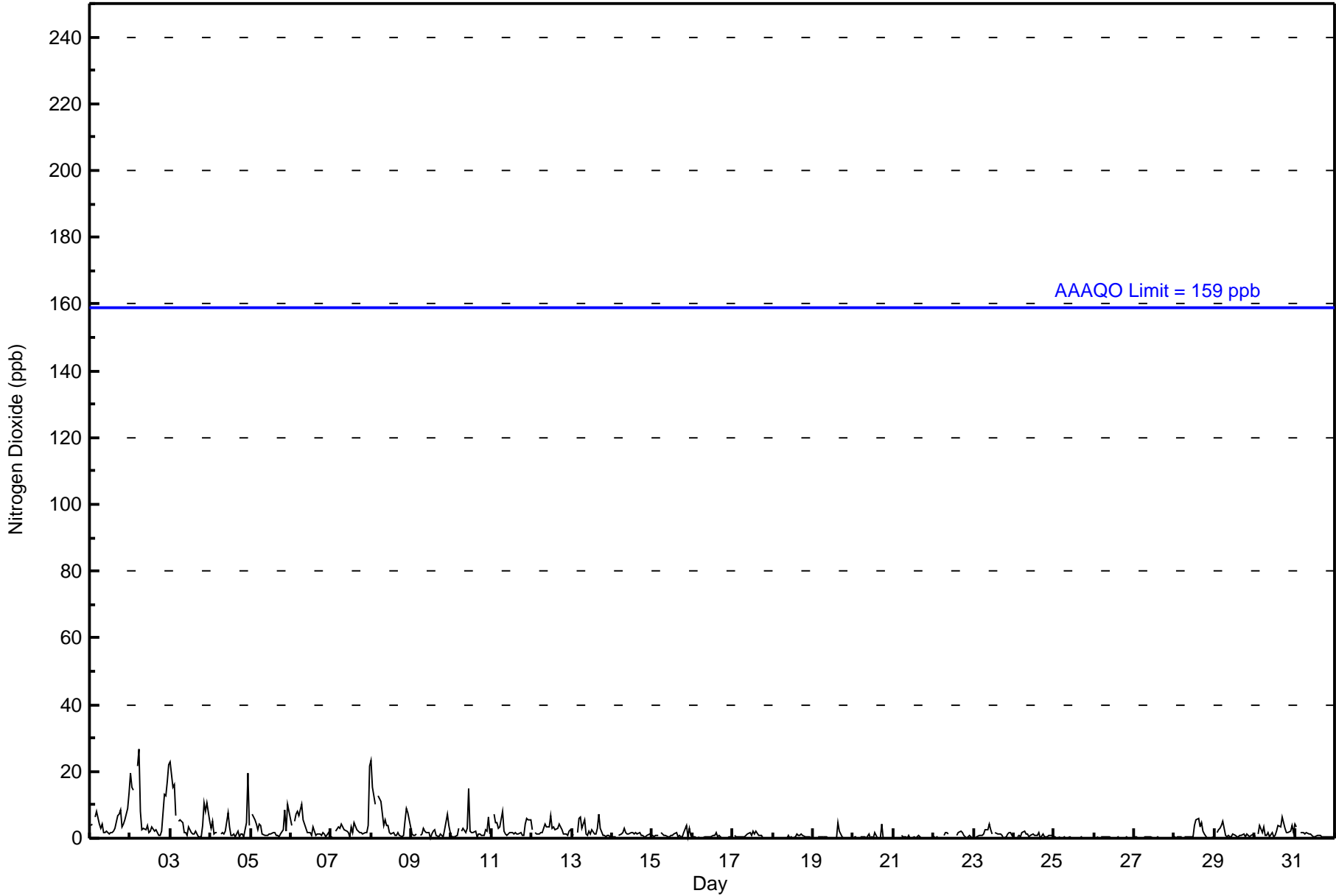
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|---|-------------------------------|----|----|---|----|----|----|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----------------|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 4 | 4 | Z | 7 | 8 | 4 | 3 | 4 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 3 | 7 | 7 | 8 | 3 | 4 | 5 | 9 | 13 | 4.7 | 13 |
| 2-Aug | 20 | 15 | 15 | Z | 22 | 27 | 8 | 2 | 3 | 3 | 4 | 2 | 2 | 3 | 2 | 3 | 2 | 1 | 1 | 2 | 13 | 13 | 17 | 22 | 8.7 | 27 |
| 3-Aug | 23 | 15 | 16 | 7 | Z | 5 | 6 | 5 | 2 | 2 | 1 | 4 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 4 | 10 | 8 | 11 | 5 | 5.7 | 23 |
| 4-Aug | 3 | 5 | 1 | 2 | 2 | Z | 1 | 2 | 1 | 2 | 8 | 3 | 1 | 1 | 1 | 1 | 2 | 0 | 1 | 1 | 1 | 5 | 20 | 4 | 2.9 | 20 |
| 5-Aug | Z | 7 | 5 | 4 | 3 | 4 | 4 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 0 | 1 | 3 | 8 | 2 | 10 | 8 | 3.1 | 10 |
| 6-Aug | 4 | Z | 5 | 7 | 8 | 7 | 10 | 6 | 4 | 3 | 2 | 2 | 1 | 4 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 3.2 | 10 |
| 7-Aug | 0 | 0 | Z | 2 | 4 | 3 | 4 | 3 | 2 | 2 | 2 | 1 | 4 | 2 | 5 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 4 | 21 | 3.1 | 21 |
| 8-Aug | 23 | 15 | 10 | Z | 13 | 12 | 11 | 4 | 6 | 4 | 4 | 2 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 5 | 9 | 8 | 4 | 5.9 | 23 |
| 9-Aug | 1 | 1 | 1 | 1 | Z | 1 | 1 | 3 | 2 | 2 | 2 | 0 | 1 | 2 | 3 | 1 | 0 | 1 | 1 | 0 | 3 | 7 | 4 | 2 | 1.7 | 7 |
| 10-Aug | 1 | 0 | 1 | 1 | 3 | Z | 2 | 3 | 2 | 3 | 15 | 2 | 2 | 2 | 2 | 0 | 1 | 1 | 1 | 1 | 3 | 2 | 6 | 1 | 2.4 | 15 |
| 11-Aug | Z | 7 | 5 | 5 | 3 | 4 | 8 | 2 | 1 | 1 | 1 | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 4 | 6 | 6 | 6 | 3.0 | 8 |
| 12-Aug | 3 | Z | 2 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 4 | 7 | 3 | 3 | 3 | 3 | 4 | 4 | 3 | 1 | 1 | 1 | 2 | 3 | 2.6 | 7 |
| 13-Aug | 2 | 1 | Z | 2 | 6 | 6 | 3 | 5 | 1 | 1 | 2 | 1 | 3 | 1 | 1 | 3 | 7 | 3 | 1 | 1 | 1 | 1 | 0 | 0 | 2.3 | 7 |
| 14-Aug | 1 | 0 | 0 | Z | 1 | 1 | 2 | 3 | 2 | 1 | 1 | 2 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.1 | 3 |
| 15-Aug | 1 | 1 | 1 | 1 | Z | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 2 | 4 | 1 | 3 | 1 | 1.1 | 4 |
| 16-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 2 |
| 17-Aug | Z | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 2 |
| 18-Aug | 1 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.4 | 1 |
| 19-Aug | 0 | 0 | Z | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 5 |
| 20-Aug | 0 | 0 | 1 | Z | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 4 |
| 21-Aug | 0 | 0 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 22-Aug | 0 | 0 | 0 | 0 | 0 | Z | 1 | 2 | 2 | 1 | C | C | C | C | 1 | 2 | 2 | 2 | 1 | 1 | 0 | 1 | 0 | 0 | 0.8 | 2 |
| 23-Aug | Z | 0 | 0 | 1 | 1 | 1 | 1 | 3 | 3 | 4 | 3 | 1 | Z | M | 2 | 1 | 1 | 1 | 0 | 0 | 1 | 2 | 2 | 1 | 1.4 | 4 |
| 24-Aug | 1 | Z | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.9 | 2 |
| 25-Aug | 1 | 1 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 26-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 27-Aug | 1 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 28-Aug | 0 | 0 | 0 | 1 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 4 | 6 | 6 | 4 | 5 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1.4 | 6 |
| 29-Aug | Z | 2 | 3 | 3 | 4 | 5 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1.3 | 5 |
| 30-Aug | 0 | Z | 1 | 4 | 2 | 3 | 1 | 1 | 2 | 1 | 2 | 1 | 1 | 2 | 4 | 3 | 7 | 5 | 3 | 2 | 2 | 2 | 4 | 2 | 2.2 | 7 |
| 31-Aug | 4 | 3 | Z | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.1 | 4 |
| 3.5 3.1 2.8 2.0 3.2 3.6 2.5 1.9 1.5 1.4 1.9 1.3 1.3 1.4 1.6 1.4 1.8 1.4 1.0 1.0 2.1 2.2 3.6 3.1 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| 23 15 16 7 22 27 11 6 6 4 15 7 4 6 6 5 7 7 8 4 13 13 20 22 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |

Z - zerospan C - Calibration M - Maintenance
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Surmont - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Surmont - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 702 | 99.15 | 99.15 |
| 21 - 40 | 6 | 0.85 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Surmont - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 26 | 7 | 8 | 2 | 7 | 14 | 50 | 60 | 61 | 43 | 48 | 149 | 124 | 64 | 20 | 19 | 702 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 1 | 0 | 0 | 0 | 6 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 26 | 7 | 8 | 2 | 7 | 14 | 50 | 60 | 61 | 43 | 49 | 153 | 125 | 64 | 20 | 19 | 708 |

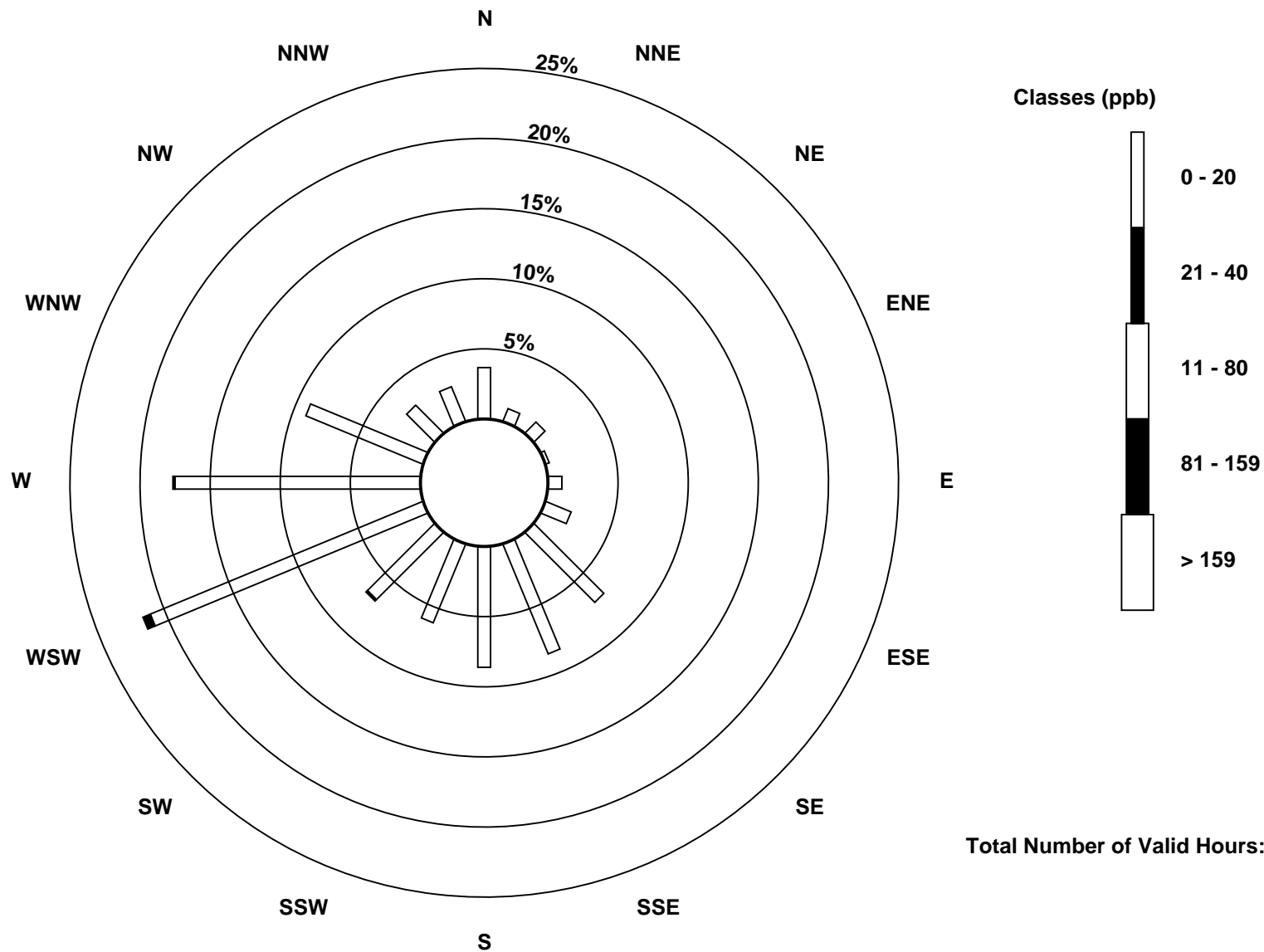
Total Number of Valid Hours: 708

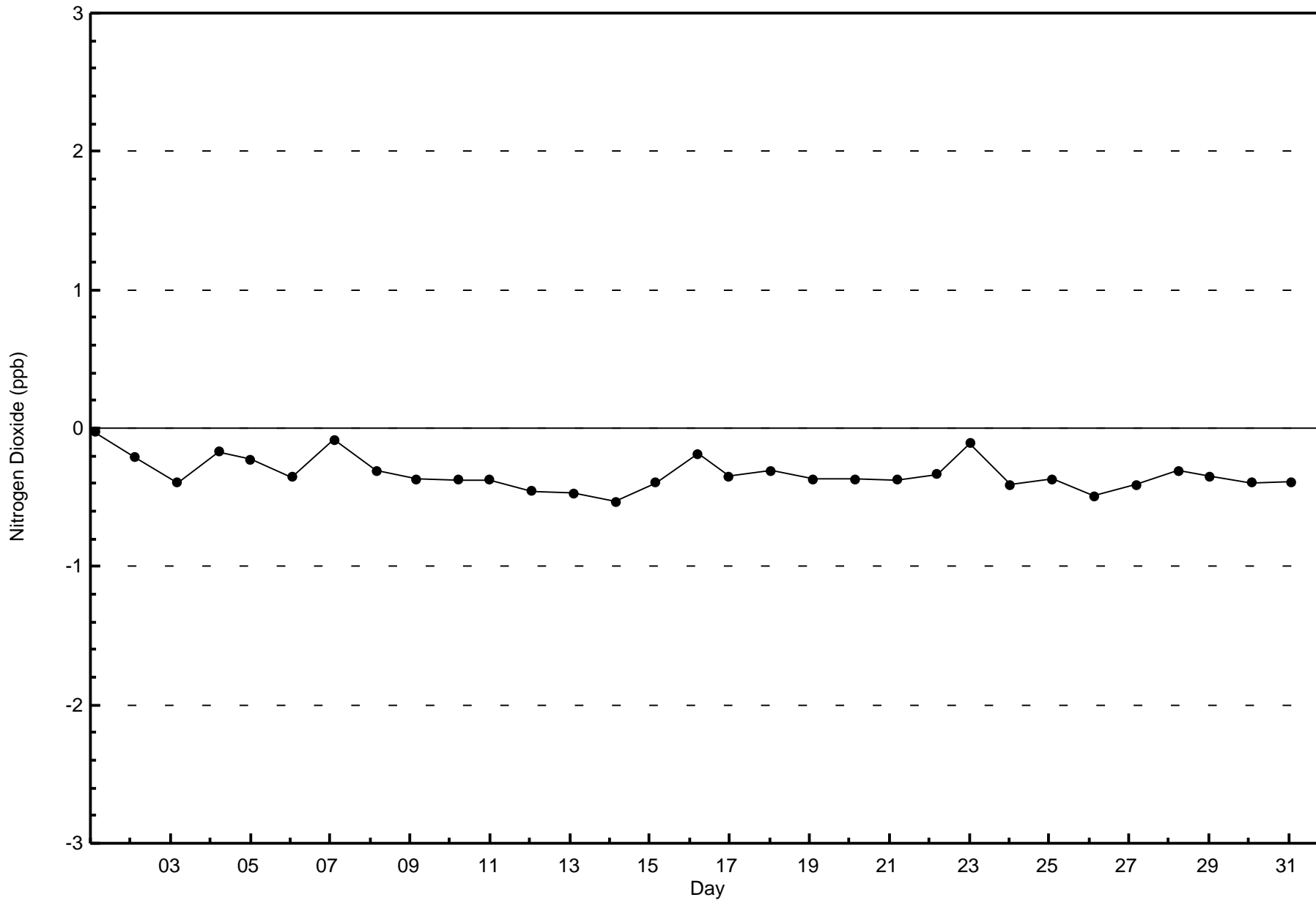
Total Number of Hours: 744

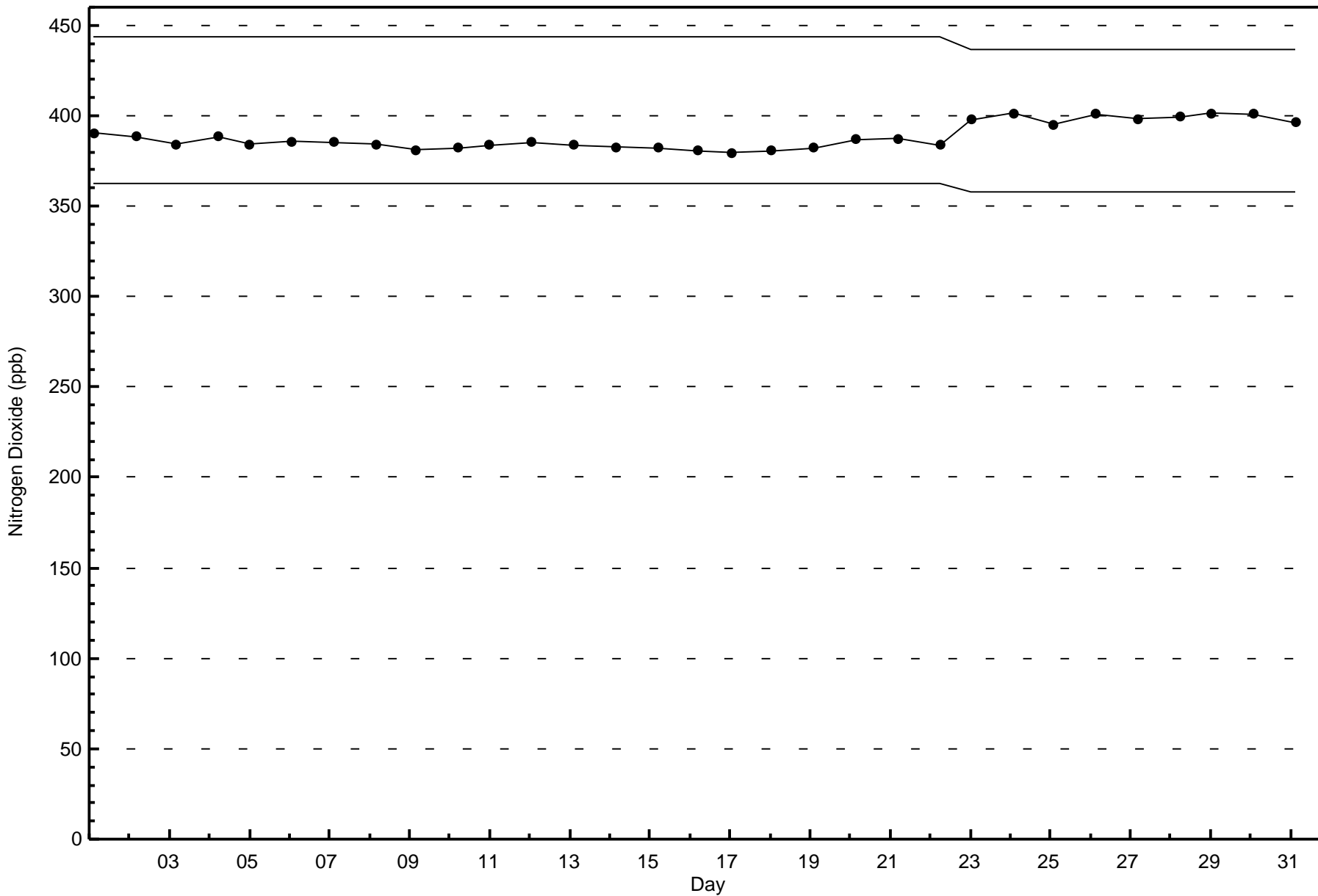


Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Dioxide (NO₂) - ppb
Surmont (AMS 502)









Wood Buffalo Environmental Association
Summary of Hour Averages

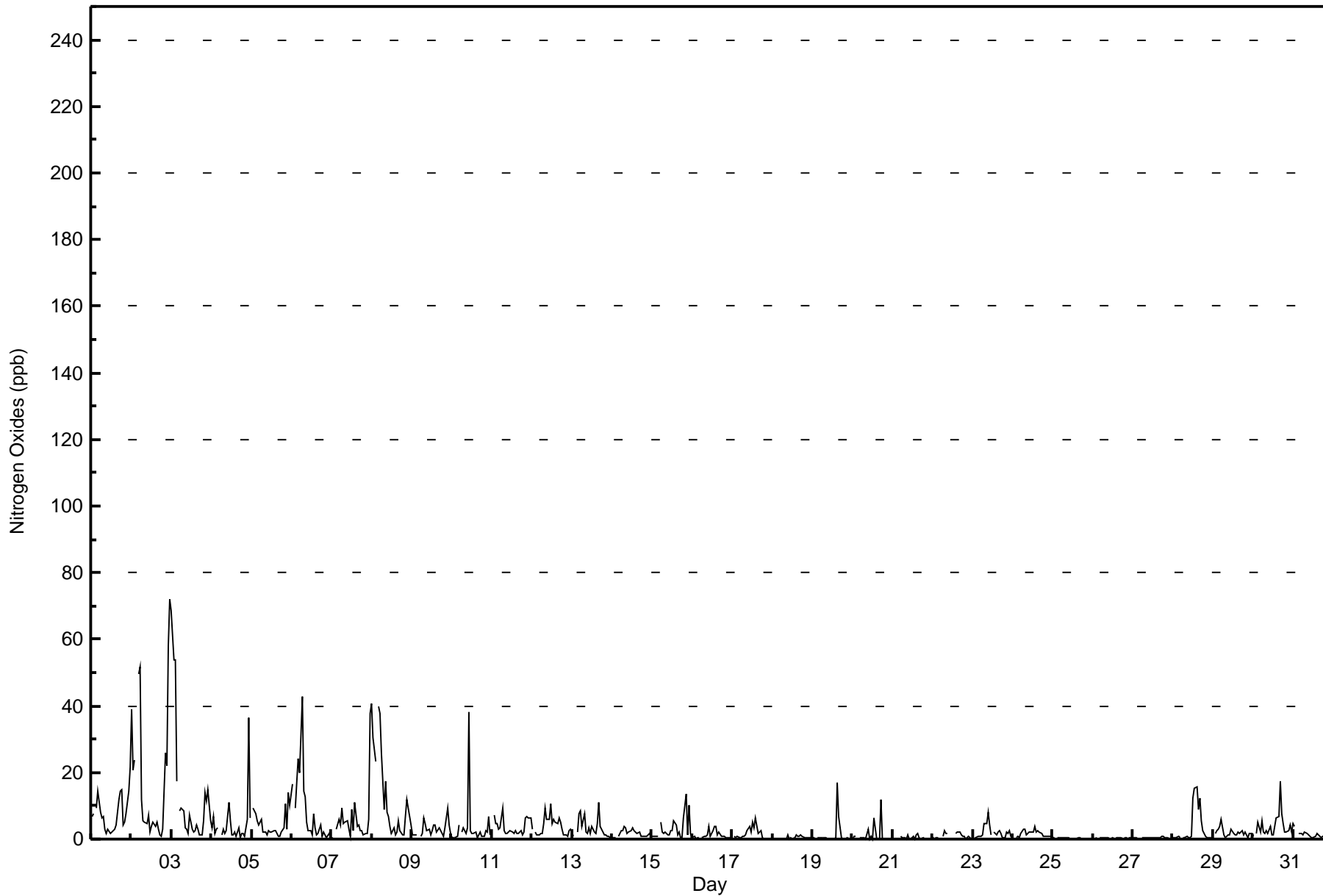
Nitrogen Oxides (NO_x) - ppb
Surmont - August 2017

| Maximum Value: 72 ppb on Aug 3 00:00 | | | | | | | | | | | | | | | | | | Maximum Daily Average: 18.5 ppb on Aug 2 | | | | | | Hours in Service: 744 | | |
|--|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|---------------------------|---------------|---------------|
| Minimum Value: 0 ppb on Aug 17 21:00 | | | | | | | | | | | | | | | | | | Minimum Daily Average: 0.2 ppb on Aug 25 | | | | | | Hours of Data: 708 | | |
| Maximum Diurnal Average: 7.4 ppb at hour 1 | | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 1.5 ppb at hour 20 | | | | | | Hours of Missing Data: 36 | | |
| Monthly Average: 3.9 ppb | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 O ₃ = 4 P ₉₀ = 9 P ₉₉ = 48 | | | | | | Hours of Calibration: 35 | | |
| | | | | | | | | | | | | | | | | | | Percent Operational Time: 99.9 | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 7 | 8 | Z | 9 | 14 | 8 | 6 | 7 | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 4 | 12 | 15 | 15 | 4 | 5 | 8 | 14 | 21 | 7.6 | 21 |
| 2-Aug | 39 | 21 | Z | Z | 50 | 52 | 12 | 6 | 5 | 5 | 7 | 2 | 4 | 5 | 4 | 5 | 3 | 1 | 1 | 3 | 26 | 22 | 58 | 72 | 18.5 | 72 |
| 3-Aug | 69 | 54 | 54 | 17 | Z | 9 | 9 | 9 | 3 | 3 | 2 | 7 | 3 | 2 | 2 | 4 | 3 | 1 | 1 | 6 | 14 | 11 | 15 | 5 | 13.2 | 69 |
| 4-Aug | 3 | 7 | 2 | 3 | 3 | Z | 1 | 3 | 2 | 3 | 11 | 5 | 1 | 1 | 2 | 1 | 4 | 0 | 2 | 2 | 1 | 6 | 37 | 7 | 4.6 | 37 |
| 5-Aug | Z | 9 | 8 | 5 | 4 | 5 | 6 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 2 | 1 | 1 | 2 | 3 | 11 | 3 | 14 | 10 | 4.4 | 14 |
| 6-Aug | 16 | Z | 9 | 17 | 24 | 20 | 43 | 15 | 13 | 5 | 2 | 3 | 1 | 8 | 3 | 1 | 2 | 4 | 1 | 2 | 1 | 1 | 2 | 1 | 8.4 | 43 |
| 7-Aug | 0 | 0 | Z | 3 | 6 | 4 | 9 | 4 | 5 | 6 | 3 | 1 | 9 | 2 | 11 | 4 | 4 | 3 | 2 | 1 | 2 | 1 | 6 | 38 | 5.4 | 38 |
| 8-Aug | 41 | 31 | 23 | Z | 40 | 38 | 26 | 9 | 17 | 8 | 7 | 4 | 2 | 3 | 1 | 2 | 5 | 3 | 1 | 1 | 7 | 12 | 10 | 4 | 12.8 | 41 |
| 9-Aug | 1 | 1 | 1 | 1 | Z | 1 | 1 | 6 | 5 | 3 | 3 | 1 | 3 | 4 | 4 | 2 | 3 | 2 | 2 | 1 | 3 | 9 | 4 | 2 | 2.8 | 9 |
| 10-Aug | 0 | 0 | 0 | 1 | 4 | Z | 2 | 3 | 2 | 4 | 38 | 3 | 2 | 2 | 2 | 0 | 1 | 2 | 1 | 1 | 3 | 2 | 7 | 1 | 3.6 | 38 |
| 11-Aug | Z | 7 | 5 | 5 | 3 | 3 | 9 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 3 | 1 | 2 | 6 | 7 | 6 | 6 | 3.6 | 9 |
| 12-Aug | 3 | Z | 2 | 1 | 1 | 2 | 2 | 5 | 9 | 6 | 6 | 11 | 5 | 6 | 5 | 5 | 6 | 5 | 3 | 1 | 1 | 1 | 3 | 3 | 4.0 | 11 |
| 13-Aug | 2 | 1 | Z | 2 | 8 | 9 | 4 | 8 | 2 | 2 | 3 | 2 | 4 | 2 | 2 | 5 | 11 | 4 | 2 | 1 | 1 | 1 | 1 | 0 | 3.3 | 11 |
| 14-Aug | 0 | 0 | 0 | Z | 1 | 2 | 3 | 4 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1.7 | 4 |
| 15-Aug | 1 | 1 | 1 | 1 | Z | 5 | 2 | 2 | 2 | 1 | 1 | 3 | 2 | 6 | 4 | 1 | 2 | 1 | 1 | 6 | 14 | 1 | 10 | 2 | 3.1 | 14 |
| 16-Aug | 0 | 1 | 0 | 0 | 0 | Z | 0 | 1 | 1 | 1 | 4 | 1 | 2 | 4 | 4 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1.3 | 4 |
| 17-Aug | Z | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 2 | 4 | 2 | 5 | 3 | 6 | 2 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 1.6 | 6 |
| 18-Aug | 1 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.4 | 1 |
| 19-Aug | 0 | 0 | Z | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.2 | 17 |
| 20-Aug | 0 | 1 | 1 | Z | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 6 | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 1.1 | 12 |
| 21-Aug | 0 | 0 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 2 |
| 22-Aug | 0 | 0 | 0 | 0 | 0 | Z | 1 | 3 | 2 | 2 | C | C | C | C | 2 | 2 | 2 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1.0 | 3 |
| 23-Aug | Z | 0 | 0 | 1 | 1 | 1 | 1 | 4 | 5 | 8 | 4 | 1 | M | 2 | 1 | 2 | 2 | 2 | 0 | 0 | 2 | 2 | 3 | 1 | 2.0 | 8 |
| 24-Aug | 1 | Z | 1 | 1 | 1 | 2 | 3 | 3 | 1 | 2 | 2 | 2 | 2 | 4 | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1.6 | 4 |
| 25-Aug | 0 | 1 | Z | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 26-Aug | 0 | 0 | 0 | Z | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 |
| 27-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0.4 | 1 |
| 28-Aug | 0 | 0 | 0 | 1 | 0 | Z | 1 | 1 | 1 | 0 | 1 | 1 | 12 | 15 | 16 | 9 | 12 | 6 | 2 | 1 | 0 | 0 | 0 | 0 | 3.5 | 16 |
| 29-Aug | Z | 2 | 3 | 3 | 4 | 6 | 1 | 1 | 1 | 1 | 1 | 3 | 2 | 1 | 1 | 2 | 2 | 2 | 1 | 2 | 1 | 0 | 2 | 2 | 1.9 | 6 |
| 30-Aug | 1 | Z | 2 | 5 | 2 | 5 | 2 | 2 | 3 | 2 | 4 | 1 | 1 | 4 | 6 | 7 | 17 | 8 | 4 | 2 | 2 | 3 | 4 | 2 | 3.9 | 17 |
| 31-Aug | 5 | 4 | Z | 2 | 2 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1.3 | 5 |
| | | | | | | | | | | | | | | | | | | Diurnal Average | | | | | | | | |
| | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | | | | |
| Z - zerospan | | | | | | | | | | | | | | | | | | C - Calibration | | | | | | M - Maintenance | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Surmont - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Surmont - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 684 | 96.61 | 96.61 |
| 21 - 40 | 15 | 2.12 | 98.73 |
| 41 - 80 | 9 | 1.27 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Surmont - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 26 | 7 | 8 | 2 | 7 | 14 | 50 | 59 | 61 | 42 | 48 | 134 | 124 | 63 | 20 | 19 | 684 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 12 | 0 | 1 | 0 | 0 | 15 |
| 41 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 7 | 1 | 0 | 0 | 0 | 9 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 26 | 7 | 8 | 2 | 7 | 14 | 50 | 60 | 61 | 43 | 49 | 153 | 125 | 64 | 20 | 19 | 708 |

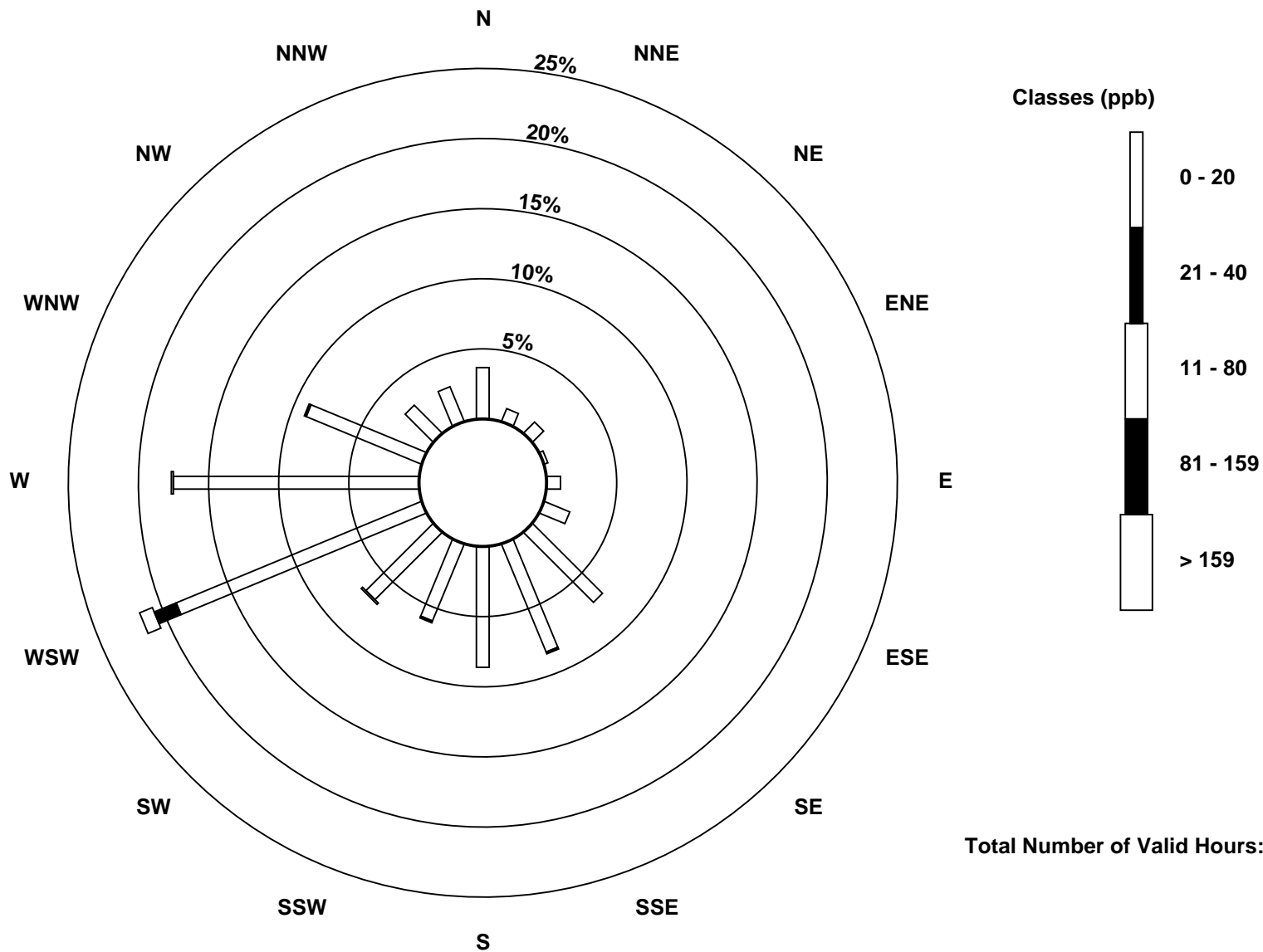
Total Number of Valid Hours: 708

Total Number of Hours: 744

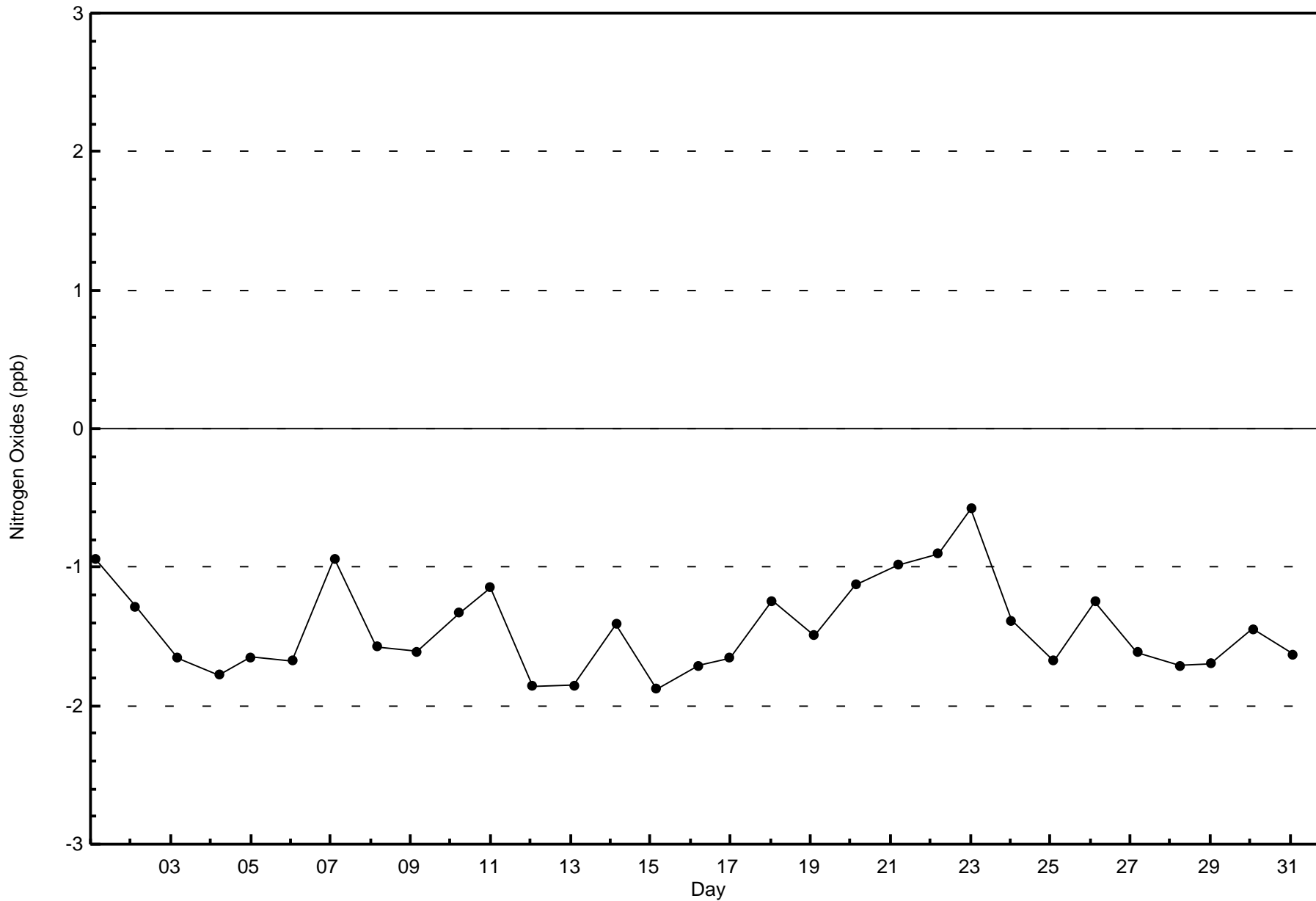


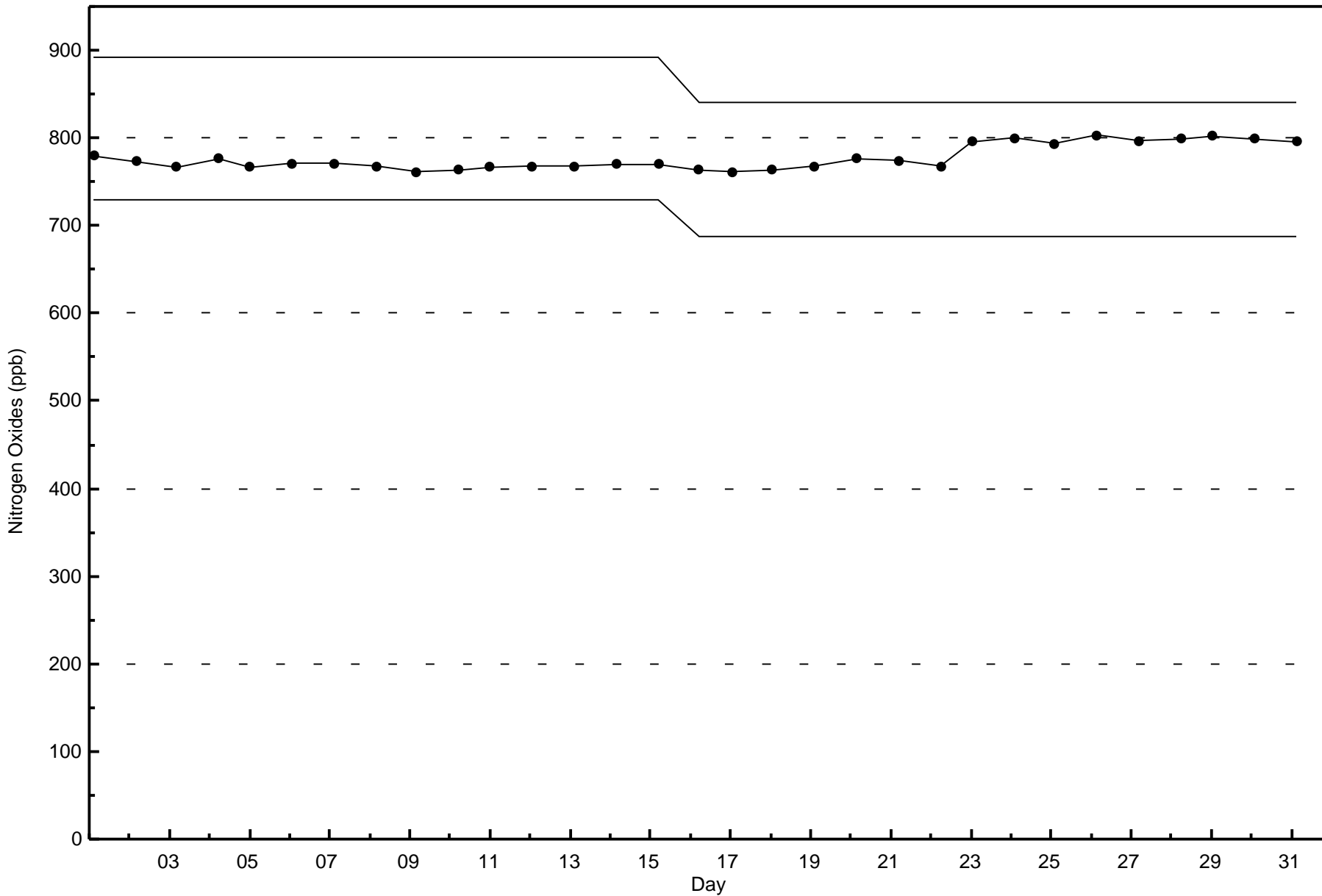
Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Oxides (NO_x) - ppb
Surmont (AMS 502)



Total Number of Valid Hours: 708







Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

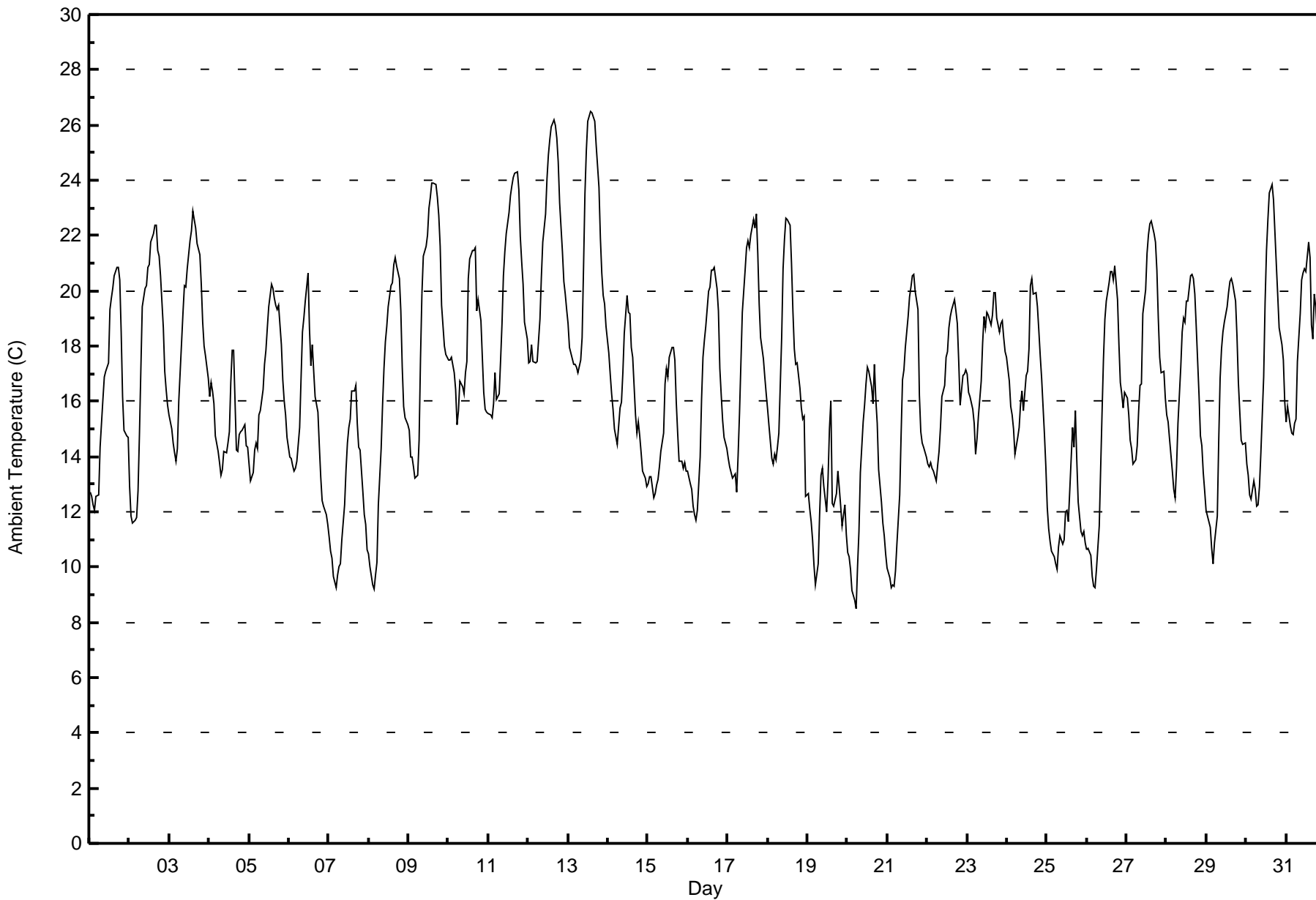
Surmont - August 2017

| Maximum Value: 26.5 C on Aug 13 14:00 Maximum Daily Average: 21.4 C on Aug 12 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: | 744 | | | |
|--|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------------------|-------|------|---------------|---------------|
| Minimum Value: 8.5 C on Aug 20 06:00 Minimum Daily Average: 11.8 C on Aug 25 | | | | | | | | | | | | | | | | | | | | | | Hours of Data: | 744 | | | |
| Maximum Diurnal Average: 20.4 C at hour 15 Minimum Diurnal Average: 12.9 C at hour 6 | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: | 0 | | | |
| Monthly Average: 16.59 C Percentiles: P ₁ = 9.3 P ₁₀ = 11.8 Q ₁ = 13.8 Median = 16.4 Q ₃ = 19.3 P ₉₀ = 21.4 P ₉₉ = 25.9 | | | | | | | | | | | | | | | | | | | | | | Hours of Calibration: | 0 | | | |
| | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: | 100.0 | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 12.7 | 12.6 | 12.3 | 12.1 | 12.5 | 12.6 | 14.4 | 15.2 | 16.0 | 16.9 | 17.1 | 17.4 | 19.3 | 19.7 | 20.1 | 20.5 | 20.8 | 20.8 | 20.4 | 18.5 | 16.2 | 14.9 | 14.8 | 14.7 | 16.4 | 20.8 |
| 2-Aug | 12.9 | 11.9 | 11.6 | 11.7 | 11.8 | 12.8 | 14.8 | 17.2 | 19.4 | 20.1 | 20.2 | 20.8 | 20.9 | 21.8 | 22.1 | 22.4 | 22.4 | 21.5 | 21.2 | 20.5 | 18.7 | 17.1 | 16.4 | 15.9 | 17.7 | 22.4 |
| 3-Aug | 15.5 | 15.0 | 14.5 | 14.1 | 13.8 | 14.3 | 16.0 | 18.2 | 19.2 | 20.2 | 20.1 | 20.8 | 21.8 | 22.2 | 22.9 | 22.6 | 22.3 | 21.7 | 21.3 | 20.3 | 18.8 | 18.0 | 17.6 | 16.8 | 18.7 | 22.9 |
| 4-Aug | 16.2 | 16.7 | 16.4 | 15.9 | 14.7 | 14.2 | 13.8 | 13.3 | 13.5 | 14.2 | 14.1 | 14.5 | 14.9 | 16.7 | 17.9 | 17.8 | 14.2 | 14.2 | 14.8 | 14.9 | 15.0 | 15.1 | 14.4 | 14.3 | 15.1 | 17.9 |
| 5-Aug | 13.7 | 13.1 | 13.4 | 14.2 | 14.5 | 14.3 | 15.5 | 15.7 | 16.4 | 17.3 | 17.9 | 18.7 | 19.4 | 20.2 | 20.1 | 19.7 | 19.5 | 19.3 | 19.5 | 18.1 | 16.8 | 16.0 | 15.5 | 14.7 | 16.8 | 20.2 |
| 6-Aug | 14.0 | 13.9 | 13.7 | 13.5 | 13.6 | 13.8 | 15.0 | 16.9 | 18.5 | 19.0 | 19.6 | 20.6 | 18.6 | 17.3 | 18.0 | 17.1 | 16.2 | 15.6 | 14.4 | 13.3 | 12.4 | 12.2 | 11.9 | 11.6 | 15.4 | 20.6 |
| 7-Aug | 11.1 | 10.6 | 10.3 | 9.6 | 9.2 | 9.7 | 10.0 | 10.1 | 11.0 | 12.2 | 13.5 | 14.5 | 15.1 | 15.3 | 16.4 | 16.4 | 16.6 | 15.2 | 14.3 | 14.3 | 12.7 | 11.9 | 11.5 | 10.6 | 12.6 | 16.6 |
| 8-Aug | 10.5 | 10.0 | 9.3 | 9.2 | 9.7 | 10.2 | 12.3 | 14.3 | 15.9 | 17.2 | 18.1 | 18.7 | 19.4 | 20.2 | 20.3 | 20.9 | 21.2 | 20.9 | 20.5 | 19.3 | 17.3 | 15.8 | 15.4 | 15.1 | 15.9 | 21.2 |
| 9-Aug | 14.9 | 14.0 | 14.0 | 13.6 | 13.2 | 13.3 | 14.6 | 17.5 | 19.9 | 21.2 | 21.6 | 22.0 | 23.0 | 23.4 | 23.9 | 23.9 | 23.9 | 23.4 | 22.7 | 21.6 | 19.5 | 18.0 | 17.7 | 17.6 | 19.1 | 23.9 |
| 10-Aug | 17.5 | 17.5 | 17.6 | 17.0 | 16.4 | 15.2 | 15.7 | 16.8 | 16.5 | 16.3 | 17.1 | 17.4 | 20.4 | 21.2 | 21.4 | 21.4 | 21.6 | 19.2 | 19.7 | 18.9 | 17.6 | 16.3 | 15.7 | 15.6 | 17.9 | 21.6 |
| 11-Aug | 15.6 | 15.5 | 15.4 | 15.9 | 17.0 | 16.0 | 16.3 | 17.5 | 18.8 | 20.6 | 21.4 | 22.1 | 22.8 | 23.4 | 23.8 | 24.1 | 24.2 | 24.3 | 23.6 | 22.0 | 21.1 | 20.2 | 18.9 | 18.3 | 19.9 | 24.3 |
| 12-Aug | 17.4 | 17.4 | 18.0 | 17.5 | 17.4 | 17.4 | 18.2 | 18.9 | 20.5 | 21.8 | 22.8 | 24.1 | 24.9 | 25.5 | 25.9 | 26.2 | 26.0 | 25.5 | 24.7 | 23.2 | 21.4 | 20.3 | 19.9 | 19.3 | 21.4 | 26.2 |
| 13-Aug | 18.8 | 17.9 | 17.5 | 17.3 | 17.3 | 17.2 | 17.0 | 17.5 | 18.3 | 20.8 | 23.5 | 25.1 | 26.2 | 26.5 | 26.4 | 26.3 | 26.1 | 25.3 | 23.7 | 21.9 | 20.7 | 19.9 | 19.5 | 18.7 | 21.2 | 26.5 |
| 14-Aug | 17.7 | 17.0 | 16.3 | 15.7 | 15.0 | 14.4 | 15.1 | 15.8 | 15.9 | 17.0 | 18.5 | 19.8 | 19.2 | 19.2 | 17.9 | 17.6 | 15.5 | 14.8 | 15.3 | 14.8 | 14.1 | 13.5 | 13.2 | 12.9 | 16.1 | 19.8 |
| 15-Aug | 13.0 | 13.3 | 13.3 | 12.5 | 12.7 | 13.0 | 13.2 | 13.6 | 14.2 | 14.8 | 16.6 | 17.2 | 16.9 | 17.6 | 18.0 | 17.9 | 17.5 | 16.0 | 14.9 | 13.8 | 13.8 | 13.6 | 13.8 | 13.5 | 14.8 | 18.0 |
| 16-Aug | 13.5 | 13.0 | 12.8 | 12.2 | 11.9 | 11.7 | 12.0 | 14.0 | 16.1 | 17.6 | 18.2 | 18.7 | 20.0 | 20.1 | 20.8 | 20.8 | 20.9 | 20.1 | 19.3 | 17.2 | 16.2 | 15.3 | 14.7 | 14.3 | 16.3 | 20.9 |
| 17-Aug | 13.9 | 13.7 | 13.4 | 13.2 | 13.4 | 12.7 | 14.0 | 15.6 | 17.4 | 19.2 | 20.8 | 21.6 | 21.8 | 21.6 | 22.0 | 22.6 | 22.3 | 22.8 | 21.4 | 19.5 | 18.3 | 17.6 | 16.9 | 16.3 | 18.0 | 22.8 |
| 18-Aug | 15.7 | 15.1 | 13.9 | 13.7 | 14.1 | 13.9 | 14.3 | 14.9 | 18.3 | 20.8 | 21.9 | 22.6 | 22.6 | 22.4 | 21.0 | 19.3 | 17.9 | 17.3 | 17.4 | 16.5 | 15.8 | 15.4 | 15.5 | 12.6 | 17.2 | 22.6 |
| 19-Aug | 12.7 | 12.1 | 11.6 | 11.0 | 10.1 | 9.3 | 10.1 | 11.9 | 13.3 | 13.6 | 12.9 | 12.0 | 13.2 | 15.0 | 16.0 | 12.3 | 12.2 | 12.7 | 13.5 | 12.9 | 12.2 | 11.5 | 12.3 | 11.2 | 12.3 | 16.0 |
| 20-Aug | 10.5 | 10.4 | 9.9 | 9.1 | 8.8 | 8.5 | 10.0 | 11.3 | 13.4 | 15.2 | 15.9 | 16.7 | 17.3 | 17.1 | 16.5 | 15.9 | 17.3 | 16.1 | 15.2 | 13.5 | 12.4 | 11.6 | 11.1 | 10.5 | 13.1 | 17.3 |
| 21-Aug | 10.0 | 9.6 | 9.3 | 9.4 | 9.3 | 9.9 | 10.8 | 12.6 | 14.8 | 16.8 | 17.2 | 17.9 | 19.1 | 19.8 | 20.1 | 20.6 | 20.6 | 20.0 | 19.3 | 16.2 | 14.9 | 14.5 | 14.4 | 14.0 | 15.0 | 20.6 |
| 22-Aug | 13.7 | 13.6 | 13.8 | 13.6 | 13.5 | 13.1 | 13.7 | 14.2 | 15.0 | 16.2 | 16.6 | 17.6 | 17.8 | 18.7 | 19.1 | 19.3 | 19.7 | 19.3 | 18.8 | 17.4 | 15.8 | 16.9 | 17.0 | 17.1 | 16.3 | 19.7 |
| 23-Aug | 17.0 | 16.3 | 16.2 | 15.7 | 15.2 | 14.1 | 14.6 | 15.5 | 16.7 | 18.1 | 19.0 | 18.7 | 19.2 | 19.1 | 18.8 | 19.1 | 19.9 | 19.9 | 19.0 | 18.5 | 18.8 | 18.9 | 18.3 | 17.8 | 17.7 | 19.9 |
| 24-Aug | 17.6 | 16.7 | 15.8 | 15.5 | 15.0 | 14.1 | 14.7 | 15.0 | 15.9 | 16.4 | 15.6 | 16.9 | 17.1 | 17.9 | 20.2 | 20.4 | 19.9 | 19.9 | 19.4 | 18.5 | 17.7 | 16.9 | 14.8 | 13.6 | 16.9 | 20.4 |
| 25-Aug | 12.2 | 11.4 | 10.9 | 10.6 | 10.4 | 10.1 | 9.9 | 10.7 | 11.1 | 10.8 | 11.0 | 12.0 | 12.1 | 11.7 | 12.7 | 15.0 | 14.4 | 15.6 | 13.9 | 12.4 | 11.3 | 11.1 | 11.3 | 10.9 | 11.8 | 15.6 |
| 26-Aug | 10.6 | 10.7 | 10.4 | 9.7 | 9.3 | 9.2 | 9.9 | 11.5 | 13.6 | 15.6 | 17.6 | 19.0 | 19.6 | 20.3 | 20.7 | 20.7 | 20.4 | 20.9 | 19.7 | 18.0 | 16.7 | 16.3 | 15.8 | 16.3 | 15.5 | 20.9 |
| 27-Aug | 16.1 | 15.5 | 14.6 | 14.3 | 13.7 | 13.9 | 14.4 | 15.6 | 16.6 | 16.6 | 19.2 | 20.0 | 21.3 | 22.0 | 22.4 | 22.5 | 22.1 | 21.7 | 20.7 | 19.0 | 17.6 | 17.0 | 17.1 | 16.1 | 17.9 | 22.5 |
| 28-Aug | 15.5 | 15.3 | 14.6 | 13.5 | 12.8 | 12.5 | 13.6 | 15.2 | 17.2 | 18.5 | 19.0 | 18.9 | 19.6 | 19.6 | 20.5 | 20.6 | 20.4 | 19.9 | 18.7 | 16.2 | 14.7 | 14.4 | 13.4 | 12.8 | 16.6 | 20.6 |
| 29-Aug | 12.0 | 11.7 | 11.5 | 10.7 | 10.1 | 10.9 | 11.9 | 14.5 | 16.8 | 17.9 | 18.5 | 18.9 | 19.4 | 19.9 | 20.3 | 20.4 | 20.2 | 19.6 | 18.4 | 16.7 | 15.6 | 14.6 | 14.4 | 14.5 | 15.8 | 20.4 |
| 30-Aug | 13.7 | 13.3 | 12.6 | 12.4 | 13.1 | 12.8 | 12.2 | 12.3 | 12.9 | 14.1 | 16.9 | 19.6 | 21.5 | 22.6 | 23.5 | 23.9 | 23.3 | 22.1 | 21.0 | 19.9 | 18.7 | 18.1 | 17.5 | 16.0 | 17.2 | 23.9 |
| 31-Aug | 15.3 | 15.8 | 15.1 | 14.9 | 14.8 | 15.2 | 15.4 | 17.4 | 19.2 | 20.4 | 20.7 | 20.8 | 20.7 | 21.7 | 21.2 | 18.8 | 18.3 | 19.9 | 19.4 | 17.6 | 16.0 | 15.2 | 14.8 | 14.0 | 17.6 | 21.7 |
| | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | |
| | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Surmont - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Surmont - August 2017**

| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 22 | 2.96 | 2.96 |
| 10 - 20 | 574 | 77.15 | 80.11 |
| > 20 | 148 | 19.89 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

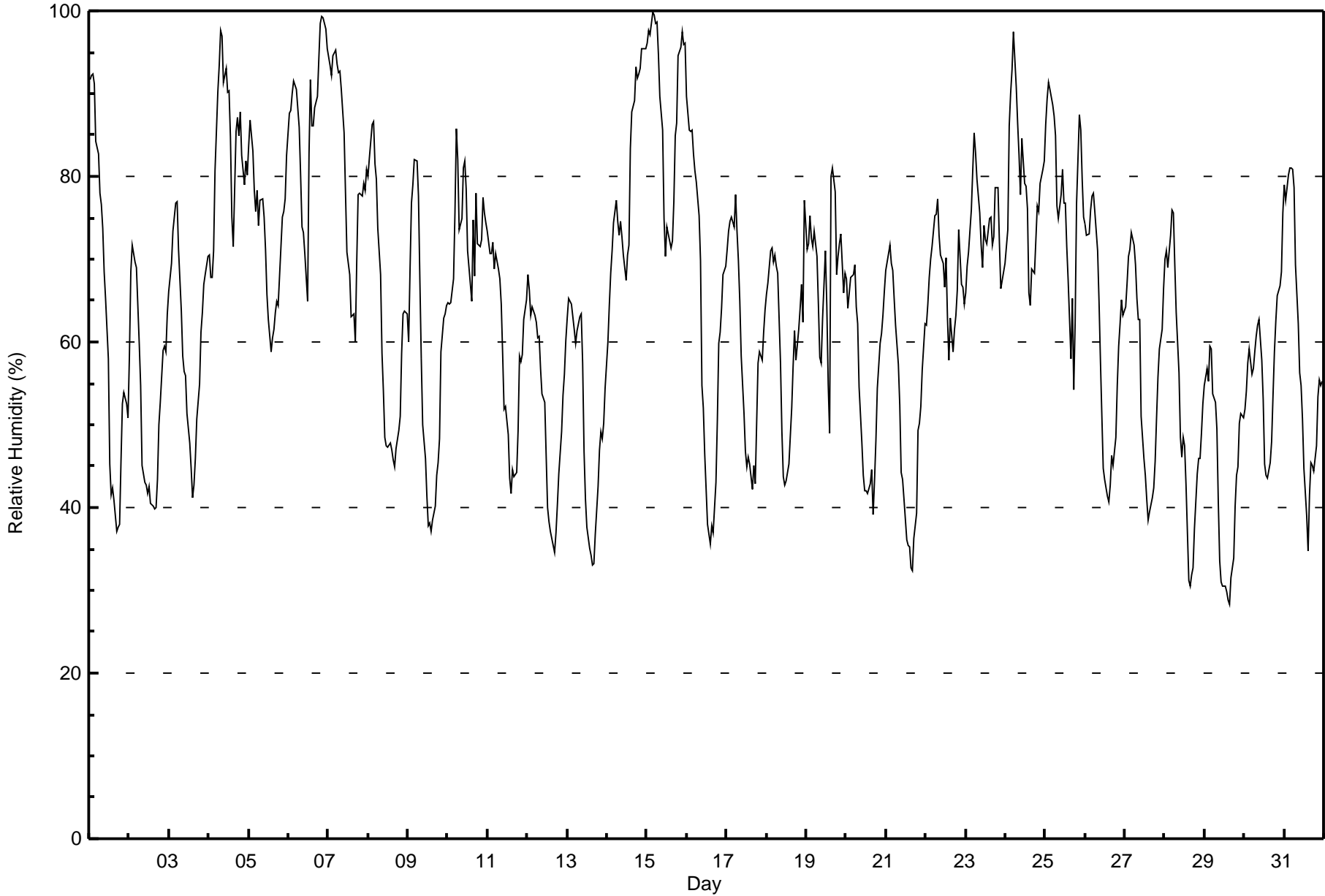
Surmont - August 2017

| Maximum Value: 100 % on Aug 15 04:00 Maximum Daily Average: 88.4 % on Aug 15 | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | |
|---|-------------------------------|----|----|-----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|---------------|---------------|
| Minimum Value: 28 % on Aug 29 16:00 Minimum Daily Average: 43.4 % on Aug 29 Maximum Diurnal Average: 77.1 % at hour 6 Minimum Diurnal Average: 50.5 % at hour 15 Monthly Average: 64.6 % Percentiles: P ₁ = 31 P ₁₀ = 42 Q ₁ = 51 Median = 66 Q ₃ = 76 P ₉₀ = 86 P ₉₉ = 98 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 92 | 92 | 92 | 91 | 84 | 83 | 78 | 77 | 74 | 69 | 65 | 58 | 45 | 41 | 42 | 41 | 37 | 38 | 38 | 46 | 53 | 54 | 52 | 51 | 62.2 | 92 |
| 2-Aug | 58 | 68 | 72 | 70 | 69 | 64 | 60 | 55 | 45 | 43 | 43 | 42 | 43 | 41 | 40 | 40 | 40 | 43 | 50 | 53 | 59 | 59 | 59 | 63 | 53.3 | 72 |
| 3-Aug | 66 | 69 | 73 | 75 | 77 | 77 | 71 | 64 | 58 | 56 | 56 | 51 | 48 | 45 | 41 | 43 | 46 | 51 | 55 | 61 | 64 | 67 | 68 | 70 | 60.5 | 77 |
| 4-Aug | 70 | 68 | 68 | 71 | 81 | 90 | 93 | 98 | 97 | 91 | 93 | 90 | 85 | 75 | 71 | 85 | 87 | 85 | 88 | 83 | 79 | 82 | 80 | 80 | 83.4 | 98 |
| 5-Aug | 84 | 87 | 83 | 78 | 76 | 78 | 74 | 77 | 77 | 75 | 71 | 66 | 63 | 59 | 61 | 61 | 64 | 65 | 64 | 71 | 75 | 76 | 77 | 82 | 72.7 | 87 |
| 6-Aug | 88 | 88 | 90 | 92 | 91 | 90 | 86 | 80 | 74 | 73 | 71 | 65 | 83 | 92 | 86 | 86 | 88 | 90 | 94 | 99 | 99 | 99 | 98 | 95 | 87.4 | 99 |
| 7-Aug | 94 | 93 | 92 | 94 | 95 | 93 | 93 | 93 | 91 | 85 | 78 | 71 | 69 | 68 | 63 | 63 | 60 | 70 | 78 | 78 | 78 | 79 | 78 | 81 | 80.8 | 95 |
| 8-Aug | 80 | 82 | 86 | 87 | 82 | 80 | 74 | 68 | 59 | 54 | 48 | 48 | 47 | 48 | 47 | 46 | 45 | 47 | 49 | 51 | 59 | 63 | 64 | 63 | 61.5 | 87 |
| 9-Aug | 60 | 69 | 77 | 79 | 82 | 82 | 78 | 67 | 58 | 50 | 46 | 41 | 38 | 38 | 37 | 38 | 40 | 44 | 45 | 48 | 59 | 63 | 63 | 64 | 57.0 | 82 |
| 10-Aug | 65 | 65 | 65 | 68 | 76 | 86 | 82 | 74 | 75 | 81 | 82 | 78 | 71 | 69 | 65 | 75 | 68 | 78 | 72 | 72 | 72 | 78 | 76 | 74 | 73.5 | 86 |
| 11-Aug | 73 | 71 | 71 | 72 | 69 | 71 | 69 | 68 | 65 | 59 | 52 | 52 | 49 | 44 | 42 | 45 | 44 | 44 | 49 | 58 | 58 | 58 | 63 | 65 | 58.7 | 73 |
| 12-Aug | 68 | 66 | 63 | 64 | 63 | 62 | 60 | 61 | 57 | 54 | 53 | 46 | 40 | 38 | 37 | 35 | 35 | 37 | 40 | 44 | 49 | 54 | 56 | 60 | 51.8 | 68 |
| 13-Aug | 63 | 65 | 65 | 63 | 61 | 60 | 61 | 63 | 63 | 57 | 47 | 41 | 38 | 35 | 34 | 33 | 33 | 37 | 43 | 47 | 49 | 48 | 50 | 54 | 50.5 | 65 |
| 14-Aug | 60 | 64 | 68 | 71 | 74 | 77 | 75 | 73 | 75 | 73 | 71 | 67 | 71 | 72 | 83 | 88 | 89 | 93 | 92 | 92 | 93 | 95 | 95 | 95 | 79.5 | 95 |
| 15-Aug | 96 | 98 | 97 | 100 | 100 | 98 | 99 | 95 | 90 | 86 | 75 | 70 | 74 | 73 | 71 | 72 | 77 | 85 | 86 | 95 | 96 | 97 | 96 | 96 | 88.4 | 100 |
| 16-Aug | 90 | 86 | 85 | 86 | 83 | 81 | 79 | 75 | 70 | 55 | 52 | 46 | 38 | 37 | 36 | 38 | 37 | 43 | 50 | 60 | 61 | 64 | 68 | 69 | 62.0 | 90 |
| 17-Aug | 71 | 73 | 75 | 75 | 74 | 78 | 73 | 70 | 65 | 58 | 51 | 47 | 45 | 46 | 45 | 42 | 45 | 43 | 50 | 58 | 59 | 58 | 61 | 64 | 59.4 | 78 |
| 18-Aug | 66 | 67 | 71 | 71 | 70 | 71 | 69 | 68 | 58 | 49 | 44 | 43 | 43 | 45 | 49 | 52 | 57 | 61 | 58 | 62 | 64 | 67 | 62 | 77 | 60.1 | 77 |
| 19-Aug | 71 | 72 | 75 | 73 | 72 | 73 | 70 | 65 | 58 | 58 | 63 | 71 | 64 | 55 | 49 | 80 | 81 | 78 | 68 | 70 | 72 | 73 | 66 | 68 | 68.6 | 81 |
| 20-Aug | 68 | 64 | 66 | 68 | 68 | 69 | 64 | 62 | 55 | 48 | 44 | 42 | 42 | 42 | 43 | 45 | 39 | 43 | 48 | 54 | 60 | 61 | 63 | 66 | 55.2 | 69 |
| 21-Aug | 69 | 71 | 72 | 69 | 69 | 65 | 62 | 57 | 52 | 44 | 43 | 41 | 36 | 35 | 35 | 33 | 32 | 36 | 39 | 49 | 50 | 52 | 57 | 62 | 51.4 | 72 |
| 22-Aug | 62 | 65 | 68 | 70 | 72 | 75 | 75 | 77 | 73 | 70 | 69 | 67 | 70 | 63 | 58 | 63 | 59 | 62 | 63 | 66 | 74 | 67 | 67 | 65 | 67.4 | 77 |
| 23-Aug | 66 | 69 | 71 | 76 | 81 | 85 | 83 | 80 | 76 | 72 | 69 | 74 | 72 | 72 | 75 | 75 | 72 | 73 | 79 | 79 | 72 | 66 | 67 | 68 | 73.8 | 85 |
| 24-Aug | 70 | 74 | 86 | 90 | 93 | 97 | 91 | 86 | 83 | 78 | 85 | 79 | 79 | 76 | 66 | 64 | 69 | 68 | 72 | 76 | 76 | 79 | 81 | 82 | 79.2 | 97 |
| 25-Aug | 86 | 89 | 91 | 91 | 89 | 87 | 85 | 77 | 75 | 78 | 81 | 77 | 77 | 72 | 67 | 58 | 65 | 54 | 63 | 77 | 87 | 86 | 80 | 75 | 77.7 | 91 |
| 26-Aug | 74 | 73 | 73 | 76 | 78 | 78 | 76 | 71 | 65 | 58 | 51 | 45 | 43 | 41 | 41 | 43 | 46 | 45 | 49 | 55 | 59 | 62 | 65 | 63 | 59.6 | 78 |
| 27-Aug | 64 | 67 | 70 | 71 | 73 | 72 | 69 | 65 | 63 | 63 | 51 | 46 | 44 | 41 | 38 | 39 | 41 | 42 | 46 | 51 | 56 | 59 | 61 | 66 | 56.7 | 73 |
| 28-Aug | 70 | 71 | 69 | 73 | 76 | 76 | 69 | 64 | 56 | 49 | 46 | 49 | 47 | 43 | 31 | 31 | 32 | 33 | 37 | 44 | 46 | 46 | 49 | 52 | 52.4 | 76 |
| 29-Aug | 55 | 57 | 55 | 60 | 59 | 54 | 53 | 49 | 41 | 34 | 31 | 31 | 31 | 30 | 29 | 28 | 32 | 34 | 40 | 44 | 45 | 50 | 51 | 51 | 43.4 | 60 |
| 30-Aug | 52 | 54 | 57 | 59 | 56 | 57 | 59 | 61 | 62 | 63 | 58 | 53 | 45 | 44 | 44 | 45 | 48 | 54 | 59 | 62 | 66 | 67 | 69 | 76 | 57.0 | 76 |
| 31-Aug | 79 | 77 | 80 | 81 | 81 | 81 | 79 | 69 | 62 | 56 | 55 | 51 | 45 | 39 | 35 | 42 | 45 | 45 | 44 | 47 | 53 | 55 | 55 | 55 | 58.8 | 81 |
| | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | | | | |
| | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Surmont - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Surmont - August 2017

| Concentration Ranges (%) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 0 | 0.00 | 0.00 |
| 20 - 40 | 51 | 6.85 | 6.85 |
| 40 - 60 | 231 | 31.05 | 37.90 |
| 60 - 80 | 333 | 44.76 | 82.66 |
| 80 - 100 | 129 | 17.34 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Speed (WS) - km/h
Surmont - August 2017

| | | |
|---|--|---------------------------------|
| Maximum Speed: 36 km/h on Aug 25 13:00 | Maximum Daily Speed Average: 21.9 km/h on Aug 20 | Hours in Service: 744 |
| Minimum Speed Value: 0 km/h on Aug 2 14:00 | Minimum Daily Speed Average: 2.5 km/h on Aug 22 | Hours of Data: 744 |
| Maximum Diurnal Speed Average: 9.5 km/h at hour 4 | Minimum Diurnal Speed Average: 4.7 km/h at hour 16 | Hours of Missing Data: 0 |
| Monthly Average Velocity: 7.4 km/h 244.3 deg | Percentiles: P ₁ = 2 P ₁₀ = 6 Q ₁ = 8 Median = 12 Q ₃ = 16 P ₉₀ = 22 P ₉₉ = 28 | Percent Operational Time: 100.0 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | NW9 | NW9 | NNW10 | WNW8 | WNW9 | WNW9 | NW11 | NNW10 | N8 | N12 | NNW15 | N15 | NNE11 | N9 | N12 | N11 | NW16 | NW15 | NW13 | WNW10 | WNW8 | WNW9 | WNW9 | WNW6 | NW9.3 | NW16 |
| 2-Aug | WSW4 | SSE1 | SSW2 | WSW2 | SW3 | W3 | WNW4 | W6 | WSW2 | ESE2 | NNE3 | ESE4 | NE5 | SW0 | SE6 | S6 | S6 | S6 | SE3 | SSW6 | WSW7 | WSW8 | WSW10 | WSW11 | SW2.6 | WSW11 |
| 3-Aug | WSW12 | WSW12 | WSW11 | WSW10 | WSW9 | WSW9 | SW8 | SW8 | SSW8 | SSE14 | SSE13 | SSW9 | S11 | S10 | S10 | SE12 | S10 | SSW7 | SSW6 | SW6 | SW7 | W5 | NNW2 | NNE6 | SSW6.5 | SSE14 |
| 4-Aug | N5 | NNW3 | E4 | NE3 | NNW10 | NW13 | N8 | NE9 | N8 | NNW4 | SSW1 | NE4 | N9 | NNE12 | NNE11 | NE9 | S16 | SSW10 | NNW3 | N6 | NE4 | WNW3 | WSW4 | ESE5 | N3.2 | S16 |
| 5-Aug | SE5 | SW4 | SW4 | SW6 | SSE7 | SW6 | SW5 | SSW6 | S8 | SSW9 | S11 | S12 | S12 | S11 | SSE14 | S11 | SSW8 | SSW8 | SSW8 | SSW6 | SW6 | SW7 | SW7 | SW7 | SW7.0 | SSE14 |
| 6-Aug | WSW9 | WSW12 | WSW10 | WSW12 | WSW13 | WSW13 | WSW12 | W9 | WSW4 | E4 | E4 | E6 | NNE9 | NW12 | N13 | NNW18 | N15 | NNW17 | NNW15 | NNW17 | N16 | N14 | N13 | N13 | NW6.9 | NNW18 |
| 7-Aug | NNW14 | NNW15 | NNW15 | NW11 | WNW12 | NNW13 | NNW12 | N13 | N12 | N10 | N11 | N10 | NNW10 | N11 | NW9 | N11 | NNW10 | WNW9 | WNW10 | WNW10 | WNW13 | WNW10 | W9 | WSW3 | NNW9.6 | NNW15 |
| 8-Aug | WSW8 | WSW9 | WSW8 | WSW7 | WSW9 | WSW9 | WSW7 | WSW6 | WSW7 | WSW7 | SSW3 | ENE2 | SE7 | SSE7 | SE8 | ESE9 | SE9 | SE11 | SSE8 | SSW8 | SW8 | SW9 | WSW9 | WSW10 | SSW4.9 | SE11 |
| 9-Aug | WSW11 | WSW13 | WSW13 | WSW13 | WSW12 | WSW13 | WSW10 | WSW8 | WSW7 | S3 | SSE8 | ESE7 | E6 | SSE7 | ESE6 | ESE7 | SSE8 | SSE10 | S9 | S10 | SSW8 | SW8 | SW9 | WSW11 | SW6.3 | WSW13 |
| 10-Aug | WSW13 | WSW15 | WSW15 | W15 | NW11 | SSW4 | SW7 | SSE9 | SSW9 | SW9 | WSW11 | SW11 | SSW6 | W5 | SSW3 | S6 | ENE2 | W7 | WSW9 | WSW8 | WSW8 | SSW4 | WSW9 | WSW6 | WSW7.1 | WSW15 |
| 11-Aug | WSW6 | WSW4 | SW5 | SSW7 | SSW6 | SSW6 | SW6 | SW8 | SSW8 | SSW8 | S10 | S9 | SSE9 | SSE12 | SSE12 | SSE10 | SE10 | SE8 | SSE6 | SE6 | S4 | SW7 | SW8 | SW8 | S6.3 | SSE12 |
| 12-Aug | SW8 | SW7 | SSW7 | SSW6 | SSW7 | SSW7 | S8 | S9 | S11 | S13 | SSE14 | SSE18 | SSE19 | SSE20 | SSE19 | S17 | S17 | SSE14 | S13 | S11 | S10 | S9 | S10 | S13 | S11.5 | SSE20 |
| 13-Aug | S15 | S14 | S14 | S16 | S17 | S18 | S14 | SSE13 | SE16 | SE15 | SE19 | SE22 | SSE24 | SSE25 | SSE27 | SSE26 | SSE23 | SSE20 | SE17 | SE15 | SE16 | SSE16 | SE15 | SE16 | SSE17.3 | SSE27 |
| 14-Aug | SE16 | SE15 | SE13 | SE11 | SE10 | SE10 | SE12 | SSE10 | SE11 | S10 | SE7 | SSE6 | SSE10 | S9 | SW7 | W12 | W8 | W7 | SW4 | SW6 | S4 | SW6 | SW4 | SW4 | S6.7 | SE16 |
| 15-Aug | SW6 | WSW8 | SSE4 | SSW5 | WSW3 | SE2 | WNW7 | WNW10 | WNW9 | WNW12 | WNW11 | WNW11 | WNW15 | WNW14 | NW12 | N10 | NW6 | W12 | WNW19 | NW14 | NW14 | NW9 | NW13 | WNW15 | WNW8.6 | WNW19 |
| 16-Aug | WNW16 | WNW15 | WNW16 | WNW15 | WNW15 | W15 | W14 | W15 | W14 | W13 | WNW10 | WNW11 | WNW14 | WNW14 | WNW13 | W13 | W12 | W10 | WSW11 | WSW10 | WSW11 | WSW13 | WSW15 | WSW16 | W12.9 | WSW16 |
| 17-Aug | WSW18 | WSW20 | WSW18 | W17 | W16 | WSW15 | WSW14 | WSW15 | W15 | W17 | W17 | WNW17 | WNW17 | WNW16 | WNW14 | WNW13 | WNW11 | WNW9 | W10 | WSW10 | WSW13 | WSW15 | WSW19 | WSW20 | W14.7 | WSW20 |
| 18-Aug | WSW17 | WSW16 | WSW17 | WSW15 | WSW16 | WSW19 | WSW17 | WSW11 | SW9 | SSW10 | SW14 | SW13 | WSW14 | WSW15 | W22 | W19 | WSW8 | SSW9 | SW12 | WSW11 | WSW18 | WSW16 | W26 | WSW15 | WSW14.4 | W26 |
| 19-Aug | WSW23 | WSW20 | WSW24 | W24 | W24 | W24 | W22 | W23 | W24 | W24 | W32 | W29 | W30 | W31 | W33 | NW18 | WNW15 | W13 | W16 | W12 | W12 | WSW16 | W16 | WSW15 | W21.1 | W33 |
| 20-Aug | WSW17 | WSW21 | WSW20 | WSW23 | W25 | WSW25 | WSW26 | WSW23 | W20 | WNW22 | WNW26 | W25 | W24 | WNW22 | WSW22 | W26 | W28 | WNW24 | W20 | W18 | W21 | W21 | W20 | W19 | W21.9 | W28 |
| 21-Aug | W19 | W17 | W16 | W18 | WSW21 | WSW22 | W22 | W18 | W16 | WNW18 | WNW15 | W17 | WNW19 | W22 | W19 | W19 | W16 | W13 | WSW11 | WSW10 | WSW12 | WSW13 | WSW14 | WSW15 | W16.3 | W22 |
| 22-Aug | WSW15 | WSW14 | WSW10 | WSW9 | WSW8 | W6 | W3 | E1 | NE3 | NE4 | NE7 | ENE6 | SE2 | E4 | E4 | SSE4 | SSW3 | S5 | S5 | SW6 | SSW3 | S5 | S6 | SSE9 | SSW2.5 | WSW15 |
| 23-Aug | SSE10 | SSW8 | SSW9 | S9 | S10 | S9 | S12 | S13 | S14 | SSE14 | SSE14 | SSE13 | S12 | SSE12 | SSE12 | SE12 | SE12 | SE11 | SE10 | SE16 | SSE16 | S15 | S13 | S14 | SSE11.3 | SSE16 |
| 24-Aug | S14 | S12 | SSW12 | SSW10 | SSW7 | SSE14 | SSE15 | SSE17 | SE15 | SE16 | ESE10 | ESE11 | ESE16 | SE10 | SE13 | SE13 | SE11 | SE15 | SSW7 | WSW9 | SW7 | W17 | W21 | W29 | S8.0 | W29 |
| 25-Aug | W24 | W21 | W18 | WSW12 | WSW15 | SW12 | SW13 | SW16 | SW18 | SW16 | SW20 | WSW28 | WSW36 | W34 | WSW27 | WSW29 | W25 | W29 | WSW24 | W15 | WSW14 | WSW12 | WSW16 | WSW19 | WSW19.9 | WSW36 |
| 26-Aug | WSW22 | WSW23 | WSW21 | WSW22 | WSW24 | WSW25 | WSW26 | W24 | W23 | WSW22 | WSW21 | W24 | W21 | W22 | WSW20 | WSW20 | WSW15 | WSW17 | W16 | WSW11 | WSW12 | WSW13 | WSW19 | WSW17 | WSW19.8 | WSW26 |
| 27-Aug | WSW19 | WSW19 | WSW20 | WSW20 | WSW20 | WSW22 | WSW24 | W25 | W22 | W16 | W25 | W26 | W25 | W25 | W24 | W24 | W22 | W20 | W17 | W14 | WSW12 | WSW15 | W17 | WSW15 | W20.1 | W26 |
| 28-Aug | WSW17 | W15 | W14 | W14 | W14 | W15 | W14 | W11 | W13 | W13 | W18 | WNW18 | WNW18 | NW19 | NW18 | WNW16 | NW15 | WNW15 | WNW9 | W10 | WSW12 | W12 | WSW11 | W8 | W13.4 | NW19 |
| 29-Aug | W7 | W5 | WSW9 | WSW2 | SW3 | WSW10 | WSW9 | W9 | WNW8 | N7 | N6 | NNE5 | E7 | ESE7 | ESE7 | ESE8 | SE10 | SE11 | SE9 | SE9 | SE12 | SE14 | SSE17 | SSE18 | SSE3.4 | SSE18 |
| 30-Aug | SE16 | SE16 | SSE14 | S11 | SSE16 | SSE15 | SSE20 | SSE20 | SE18 | SE18 | SE17 | SE19 | SSE24 | SSE23 | SE23 | SSE19 | SSE24 | SSE21 | S22 | S19 | S15 | SSW9 | SSW7 | WSW4 | SSE16.3 | SSE24 |
| 31-Aug | SW4 | NNW3 | NW6 | WNW9 | WNW7 | WNW7 | W9 | WNW10 | WNW10 | WNW11 | WNW16 | W19 | W19 | W20 | W24 | W19 | WSW14 | W14 | W19 | W19 | W18 | W22 | W22 | W21 | W13.8 | W24 |

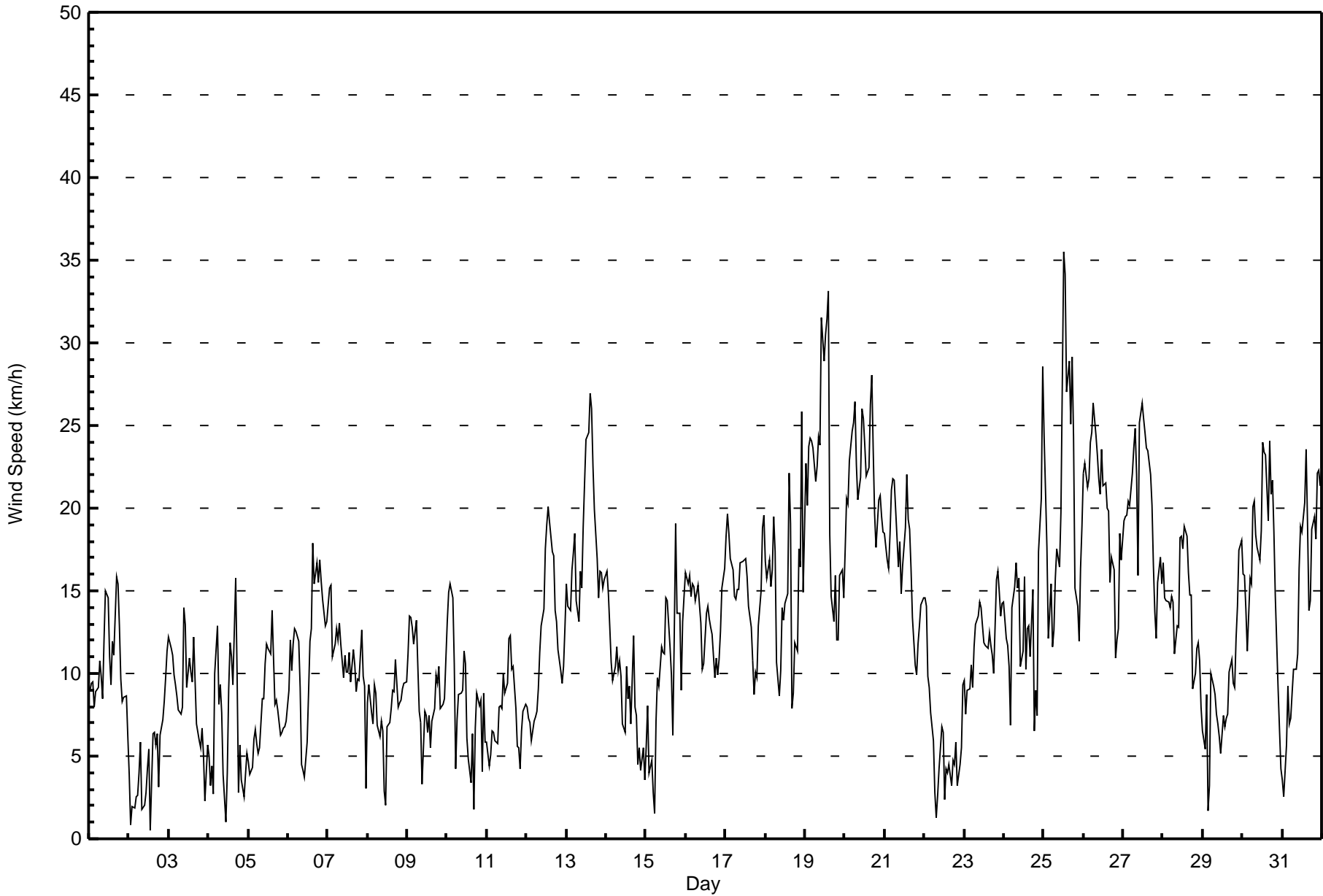
| | |
|--|-----------------|
| WSW9.3WSW9.4WSW9.2WSW9.5WSW9.2WSW9.2WSW8.8WSW7.6WSW6.9WSW5.5WSW5.9WSW5.7WSW5.9WSW6.4WSW5.5WSW4.7WSW5.4WSW6.1WSW6.9WSW6.6WSW7.5WSW8.3WSW9.3WSW8.7 | Diurnal Average |
| W24WSW23WSW24 W24 W25WSW25WSW26 W25 W24 W24 W32 W29WSW36 W34 W33WSW29 W28 W29WSW24 W19 W21 W22 W26 W29 | Diurnal Maximum |

All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Surmont - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Surmont - August 2017**

| Wind Speed Ranges (km/h) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 5 | 74 | 9.95 | 9.95 |
| 6 - 11 | 279 | 37.50 | 47.45 |
| 12 - 19 | 282 | 37.90 | 85.35 |
| 20 - 28 | 99 | 13.31 | 98.66 |
| 29 - 38 | 10 | 1.34 | 100.00 |
| > 38 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Surmont - August 2017**

| Wind Speed Ranges (km/h) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-----------------------------|----------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|-----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 5 | 1 | 2 | 6 | 2 | 5 | 4 | 4 | 3 | 6 | 9 | 10 | 10 | 5 | 2 | 0 | 5 | 74 |
| 6 - 11 | 15 | 4 | 3 | 1 | 3 | 9 | 20 | 17 | 31 | 34 | 31 | 53 | 15 | 30 | 9 | 4 | 279 |
| 12 - 19 | 10 | 1 | 0 | 0 | 0 | 1 | 28 | 28 | 26 | 1 | 8 | 68 | 58 | 29 | 13 | 11 | 282 |
| 20 - 28 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 13 | 1 | 0 | 1 | 34 | 44 | 4 | 0 | 0 | 99 |
| 29 - 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 8 | 0 | 0 | 0 | 10 |
| > 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 26 | 7 | 9 | 3 | 8 | 14 | 54 | 61 | 64 | 44 | 50 | 167 | 130 | 65 | 22 | 20 | 744 |

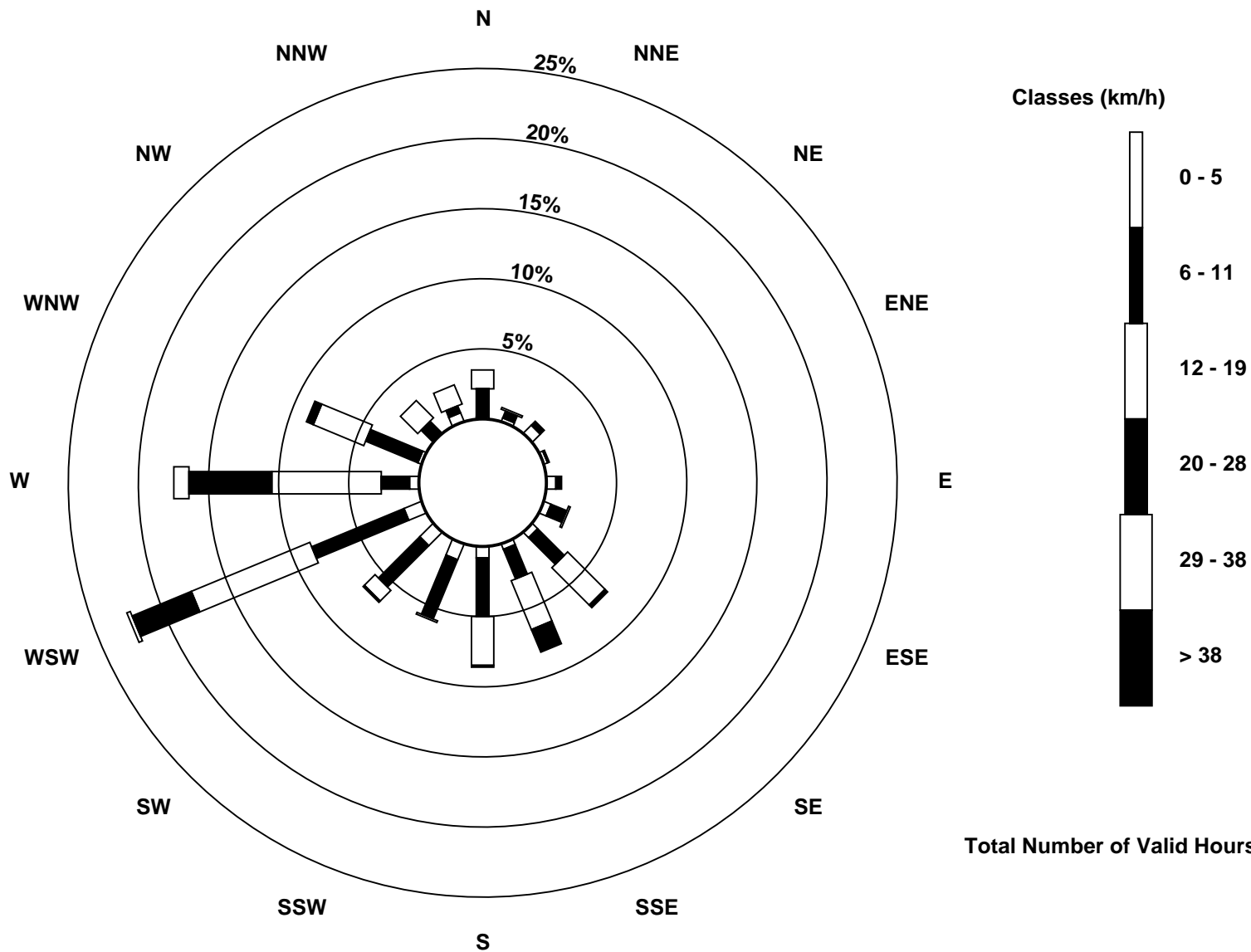
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Wind Speed (WS) - km/h
Surmont (AMS 502)



Total Number of Valid Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Surmont - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Aug 25 14:00 Minimum Value: 1 km/h on Aug 29 07:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 7 | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | |
|--|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 3 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 4 | 3 | 3 | 1 | 1 | 1 | 1 | 2 | 4 |
| 2-Aug | 3 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 3 |
| 3-Aug | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 4 |
| 4-Aug | 2 | 1 | 2 | 2 | 3 | 4 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 7 | 3 | 2 | 3 | 2 | 2 | 1 | 2 | 7 |
| 5-Aug | 1 | 1 | 1 | 2 | 2 | 1 | 2 | 2 | 3 | 2 | 3 | 4 | 4 | 4 | 3 | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 4 |
| 6-Aug | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 5 | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 5 |
| 7-Aug | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 2 | 2 | 1 | 1 | 3 | 3 |
| 8-Aug | 4 | 1 | 3 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 4 |
| 9-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 3 |
| 10-Aug | 2 | 2 | 2 | 2 | 4 | 3 | 4 | 4 | 3 | 3 | 5 | 2 | 2 | 1 | 2 | 2 | 6 | 4 | 2 | 1 | 1 | 1 | 1 | 2 | 6 |
| 11-Aug | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 3 |
| 12-Aug | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 5 |
| 13-Aug | 3 | 4 | 3 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 5 | 4 | 6 | 5 | 6 | 6 | 5 | 4 | 3 | 2 | 3 | 2 | 2 | 2 | 6 |
| 14-Aug | 3 | 2 | 2 | 2 | 1 | 1 | 2 | 2 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 4 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 4 |
| 15-Aug | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 1 | 2 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 4 | 3 | 2 | 2 | 3 | 3 | 4 |
| 16-Aug | 3 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 5 | 3 | 3 | 3 | 3 | 2 | 3 | 1 | 1 | 1 | 2 | 2 | 5 |
| 17-Aug | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 4 | 4 | 3 | 3 | 4 | 3 | 2 | 1 | 1 | 2 | 2 | 3 | 3 | 4 |
| 18-Aug | 2 | 2 | 3 | 3 | 2 | 3 | 3 | 4 | 3 | 3 | 4 | 4 | 4 | 6 | 5 | 5 | 5 | 3 | 4 | 3 | 3 | 4 | 7 | 6 | 7 |
| 19-Aug | 6 | 5 | 5 | 4 | 4 | 4 | 4 | 4 | 6 | 5 | 8 | 6 | 7 | 7 | 8 | 5 | 4 | 4 | 4 | 2 | 2 | 3 | 4 | 2 | 8 |
| 20-Aug | 2 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 3 | 5 | 6 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 4 | 3 | 3 | 3 | 3 | 3 | 6 |
| 21-Aug | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 4 | 5 | 6 | 4 | 5 | 4 | 6 | 3 | 1 | 1 | 1 | 2 | 2 | 6 |
| 22-Aug | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 3 | 3 |
| 23-Aug | 3 | 2 | 2 | 2 | 3 | 2 | 3 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 4 | 4 | 3 | 3 | 4 |
| 24-Aug | 3 | 4 | 4 | 3 | 2 | 6 | 4 | 4 | 4 | 3 | 2 | 3 | 3 | 2 | 4 | 3 | 2 | 4 | 2 | 3 | 3 | 4 | 4 | 7 | 7 |
| 25-Aug | 6 | 5 | 4 | 4 | 5 | 4 | 4 | 5 | 6 | 5 | 6 | 9 | 9 | 10 | 6 | 8 | 9 | 8 | 6 | 4 | 3 | 3 | 4 | 4 | 10 |
| 26-Aug | 4 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 6 | 5 | 7 | 5 | 2 | 3 | 3 | 3 | 3 | 7 |
| 27-Aug | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 5 | 5 | 4 | 7 | 6 | 6 | 5 | 5 | 5 | 6 | 5 | 4 | 2 | 2 | 3 | 3 | 2 | 7 |
| 28-Aug | 2 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 3 | 4 | 4 | 4 | 5 | 4 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 2 | 5 |
| 29-Aug | 1 | 1 | 2 | 1 | 3 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 2 | 2 | 3 | 3 | 3 |
| 30-Aug | 3 | 3 | 4 | 3 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 4 | 5 | 5 | 5 | 5 | 6 | 6 | 5 | 4 | 4 | 4 | 2 | 1 | 6 |
| 31-Aug | 2 | 2 | 4 | 1 | 2 | 2 | 4 | 1 | 2 | 3 | 3 | 4 | 4 | 5 | 6 | 5 | 4 | 6 | 4 | 3 | 3 | 3 | 3 | 3 | 6 |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Surmont - August 2017

| | | |
|---|---|---------------------------------|
| Direction of Maximum Speed: 256 deg on Aug 25 13:00 | | Hours in Service: 744 |
| Direction of Maximum Daily Speed Average: 266.8 deg on Aug 20 | | Hours of Data: 744 |
| Direction of Minimum Speed: 233 deg on Aug 2 14:00 | Direction of Minimum Daily Speed Average: 2.5 deg on Aug 22 | Hours of Missing Data: 0 |
| Monthly Average Direction: 251.9 deg | | Percent Operational Time: 100.0 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average |
|--------|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 315 | 305 | 298 | 289 | 297 | 295 | 325 | 336 | 8 | 360 | 347 | 358 | 20 | 3 | 350 | 354 | 318 | 313 | 317 | 283 | 285 | 288 | 300 | 294 | 325.1 |
| 2-Aug | 250 | 160 | 196 | 258 | 231 | 260 | 287 | 276 | 255 | 118 | 26 | 105 | 46 | 233 | 130 | 190 | 179 | 186 | 130 | 210 | 239 | 240 | 244 | 248 | 220.9 |
| 3-Aug | 251 | 248 | 248 | 244 | 242 | 240 | 235 | 226 | 201 | 152 | 156 | 194 | 182 | 176 | 188 | 146 | 171 | 195 | 209 | 219 | 233 | 264 | 338 | 18 | 207.5 |
| 4-Aug | 1 | 332 | 101 | 46 | 340 | 314 | 352 | 37 | 352 | 343 | 203 | 48 | 1 | 24 | 30 | 49 | 173 | 200 | 348 | 351 | 55 | 288 | 255 | 110 | 10.0 |
| 5-Aug | 143 | 219 | 215 | 216 | 156 | 220 | 219 | 194 | 182 | 194 | 184 | 178 | 170 | 171 | 147 | 170 | 205 | 195 | 198 | 213 | 225 | 217 | 226 | 235 | 190.8 |
| 6-Aug | 243 | 245 | 240 | 244 | 247 | 246 | 247 | 277 | 243 | 98 | 90 | 95 | 14 | 315 | 360 | 348 | 349 | 340 | 348 | 347 | 354 | 356 | 354 | 351 | 321.1 |
| 7-Aug | 347 | 348 | 345 | 321 | 301 | 336 | 338 | 352 | 357 | 356 | 358 | 10 | 342 | 352 | 307 | 349 | 328 | 296 | 289 | 286 | 284 | 282 | 275 | 250 | 328.9 |
| 8-Aug | 258 | 256 | 252 | 253 | 258 | 256 | 241 | 241 | 240 | 240 | 206 | 72 | 142 | 160 | 126 | 121 | 131 | 138 | 156 | 196 | 221 | 234 | 240 | 242 | 213.3 |
| 9-Aug | 245 | 248 | 248 | 244 | 242 | 245 | 244 | 257 | 258 | 185 | 157 | 117 | 96 | 151 | 107 | 123 | 159 | 162 | 183 | 187 | 212 | 231 | 227 | 244 | 214.2 |
| 10-Aug | 247 | 248 | 248 | 259 | 315 | 208 | 220 | 163 | 200 | 226 | 247 | 232 | 193 | 260 | 202 | 174 | 58 | 263 | 244 | 249 | 243 | 209 | 241 | 258 | 237.9 |
| 11-Aug | 255 | 252 | 218 | 202 | 202 | 210 | 222 | 217 | 213 | 193 | 182 | 174 | 167 | 151 | 148 | 152 | 142 | 142 | 149 | 135 | 177 | 218 | 226 | 228 | 185.0 |
| 12-Aug | 223 | 217 | 202 | 205 | 197 | 197 | 188 | 176 | 178 | 175 | 159 | 155 | 160 | 154 | 152 | 172 | 177 | 167 | 178 | 186 | 187 | 190 | 175 | 172 | 175.0 |
| 13-Aug | 186 | 185 | 185 | 184 | 177 | 180 | 182 | 156 | 141 | 138 | 144 | 144 | 147 | 147 | 147 | 148 | 153 | 147 | 143 | 142 | 146 | 147 | 146 | 139 | 154.9 |
| 14-Aug | 143 | 142 | 143 | 141 | 132 | 133 | 139 | 161 | 167 | 171 | 134 | 147 | 166 | 188 | 182 | 225 | 270 | 270 | 260 | 228 | 224 | 188 | 215 | 215 | 170.2 |
| 15-Aug | 233 | 241 | 152 | 199 | 243 | 132 | 295 | 292 | 295 | 288 | 286 | 288 | 290 | 298 | 319 | 349 | 325 | 274 | 286 | 305 | 316 | 324 | 318 | 295 | 294.5 |
| 16-Aug | 292 | 294 | 294 | 288 | 283 | 274 | 271 | 264 | 265 | 272 | 290 | 283 | 292 | 286 | 284 | 276 | 281 | 259 | 255 | 251 | 247 | 248 | 252 | 252 | 273.7 |
| 17-Aug | 253 | 255 | 258 | 259 | 262 | 254 | 258 | 253 | 265 | 265 | 272 | 282 | 289 | 294 | 295 | 286 | 284 | 294 | 260 | 247 | 254 | 253 | 257 | 258 | 266.1 |
| 18-Aug | 258 | 252 | 245 | 245 | 246 | 247 | 246 | 240 | 222 | 209 | 231 | 231 | 237 | 254 | 277 | 274 | 252 | 202 | 233 | 245 | 249 | 245 | 261 | 252 | 247.3 |
| 19-Aug | 250 | 248 | 254 | 259 | 262 | 265 | 274 | 274 | 277 | 267 | 275 | 268 | 264 | 269 | 268 | 316 | 300 | 279 | 274 | 262 | 265 | 255 | 275 | 258 | 268.4 |
| 20-Aug | 252 | 255 | 256 | 254 | 259 | 257 | 258 | 258 | 265 | 282 | 282 | 277 | 273 | 284 | 257 | 270 | 277 | 296 | 270 | 261 | 260 | 262 | 263 | 263 | 266.8 |
| 21-Aug | 261 | 263 | 263 | 261 | 255 | 257 | 259 | 263 | 277 | 290 | 282 | 277 | 285 | 278 | 275 | 276 | 267 | 264 | 256 | 246 | 245 | 249 | 247 | 248 | 265.4 |
| 22-Aug | 252 | 252 | 253 | 245 | 255 | 265 | 264 | 85 | 47 | 47 | 52 | 64 | 128 | 83 | 89 | 155 | 200 | 186 | 172 | 219 | 207 | 184 | 171 | 151 | 213.7 |
| 23-Aug | 162 | 196 | 194 | 190 | 186 | 190 | 183 | 184 | 179 | 168 | 163 | 149 | 185 | 163 | 160 | 136 | 129 | 135 | 139 | 144 | 165 | 186 | 179 | 183 | 168.0 |
| 24-Aug | 183 | 188 | 209 | 194 | 198 | 148 | 155 | 149 | 144 | 143 | 116 | 115 | 118 | 127 | 125 | 125 | 133 | 145 | 211 | 249 | 234 | 264 | 274 | 266 | 173.0 |
| 25-Aug | 265 | 268 | 267 | 250 | 247 | 233 | 225 | 229 | 229 | 223 | 232 | 247 | 256 | 268 | 257 | 252 | 268 | 259 | 256 | 271 | 245 | 241 | 245 | 245 | 251.7 |
| 26-Aug | 251 | 257 | 251 | 250 | 250 | 252 | 255 | 259 | 259 | 257 | 248 | 264 | 270 | 262 | 258 | 253 | 243 | 256 | 262 | 247 | 246 | 248 | 248 | 245 | 254.5 |
| 27-Aug | 248 | 251 | 250 | 250 | 251 | 251 | 253 | 260 | 262 | 262 | 260 | 268 | 271 | 267 | 272 | 270 | 273 | 272 | 271 | 262 | 257 | 253 | 260 | 258 | 260.9 |
| 28-Aug | 257 | 264 | 268 | 264 | 279 | 278 | 280 | 266 | 273 | 279 | 280 | 282 | 296 | 304 | 305 | 302 | 321 | 302 | 288 | 271 | 255 | 262 | 251 | 267 | 280.5 |
| 29-Aug | 279 | 276 | 258 | 249 | 233 | 251 | 256 | 264 | 289 | 9 | 5 | 18 | 91 | 118 | 104 | 118 | 129 | 134 | 135 | 131 | 133 | 144 | 149 | 150 | 154.2 |
| 30-Aug | 144 | 141 | 148 | 176 | 153 | 155 | 150 | 149 | 146 | 141 | 142 | 143 | 148 | 147 | 146 | 151 | 152 | 154 | 180 | 182 | 189 | 194 | 197 | 251 | 155.5 |
| 31-Aug | 226 | 336 | 320 | 295 | 291 | 303 | 272 | 285 | 282 | 290 | 291 | 280 | 277 | 272 | 272 | 267 | 247 | 262 | 274 | 274 | 263 | 266 | 268 | 263 | 274.1 |

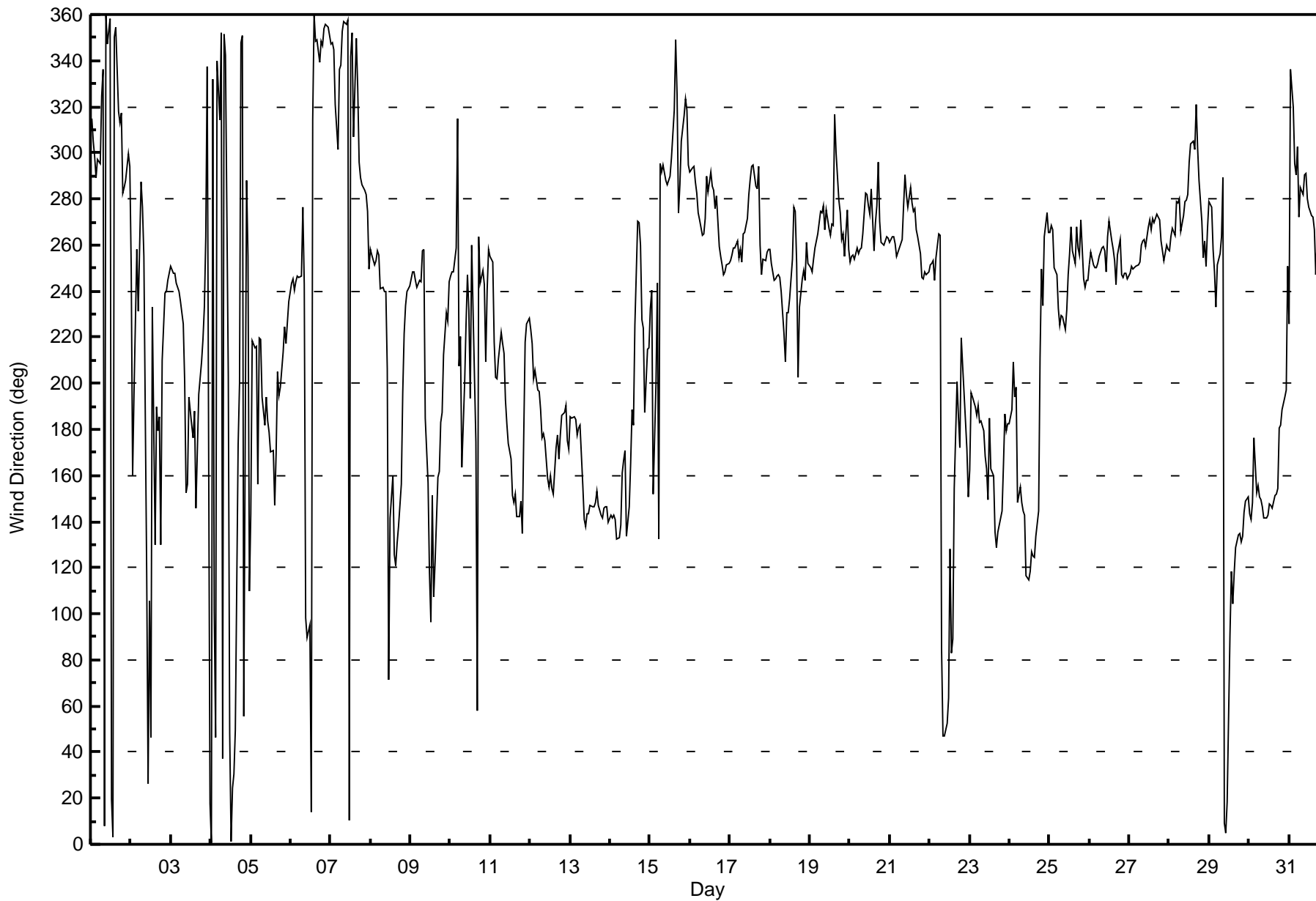
245.6 249.0 246.8 245.3 248.2 245.7 245.8 243.1 241.9 237.6 244.4 243.8 244.4 250.3 243.8 243.1 237.9 236.6 243.5 240.7 239.8 243.1 248.2 244.9
 Diurnal Average

All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Surmont - August 2017





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Surmont - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 105 deg on Aug 2 02:00 Minimum Value: 6 deg on Aug 28 20:00 Percentiles: P ₁ = 7 P ₁₀ = 9 Q ₁ = 11 Median = 16 Q ₃ = 24 P ₉₀ = 41 P ₉₉ = 87 | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | |
|---|-------------------------------|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 20 | 15 | 14 | 11 | 11 | 12 | 19 | 21 | 17 | 18 | 19 | 16 | 29 | 32 | 29 | 34 | 26 | 19 | 19 | 8 | 6 | 7 | 11 | 35 | 35 |
| 2-Aug | 54 | 105 | 57 | 69 | 57 | 66 | 42 | 15 | 98 | 80 | 97 | 73 | 48 | 98 | 45 | 47 | 51 | 23 | 44 | 20 | 13 | 12 | 11 | 9 | 105 |
| 3-Aug | 9 | 9 | 9 | 11 | 13 | 15 | 18 | 25 | 36 | 19 | 26 | 36 | 33 | 26 | 30 | 18 | 21 | 23 | 20 | 15 | 12 | 55 | 54 | 23 | 55 |
| 4-Aug | 28 | 44 | 27 | 42 | 30 | 23 | 16 | 21 | 21 | 46 | 81 | 35 | 20 | 16 | 16 | 27 | 29 | 25 | 77 | 44 | 73 | 65 | 24 | 32 | 81 |
| 5-Aug | 40 | 30 | 19 | 30 | 26 | 19 | 31 | 32 | 27 | 30 | 27 | 28 | 29 | 32 | 15 | 21 | 25 | 25 | 29 | 22 | 14 | 19 | 14 | 14 | 40 |
| 6-Aug | 12 | 12 | 17 | 13 | 11 | 11 | 11 | 15 | 51 | 62 | 83 | 32 | 36 | 29 | 16 | 14 | 13 | 15 | 12 | 14 | 15 | 15 | 16 | 14 | 83 |
| 7-Aug | 11 | 11 | 11 | 24 | 12 | 18 | 21 | 13 | 17 | 25 | 21 | 27 | 30 | 21 | 38 | 25 | 28 | 18 | 10 | 7 | 8 | 8 | 10 | 73 | 73 |
| 8-Aug | 60 | 8 | 25 | 23 | 6 | 7 | 13 | 14 | 21 | 35 | 85 | 89 | 48 | 52 | 33 | 26 | 18 | 12 | 34 | 25 | 16 | 11 | 10 | 10 | 89 |
| 9-Aug | 9 | 9 | 9 | 11 | 13 | 10 | 12 | 20 | 19 | 71 | 36 | 48 | 41 | 35 | 52 | 44 | 28 | 20 | 25 | 20 | 22 | 14 | 14 | 12 | 71 |
| 10-Aug | 10 | 9 | 10 | 30 | 37 | 79 | 58 | 46 | 39 | 27 | 21 | 18 | 38 | 28 | 35 | 31 | 79 | 55 | 17 | 13 | 12 | 56 | 12 | 56 | 79 |
| 11-Aug | 21 | 13 | 23 | 16 | 21 | 18 | 25 | 20 | 24 | 30 | 22 | 27 | 27 | 21 | 22 | 26 | 18 | 18 | 22 | 17 | 42 | 23 | 14 | 16 | 42 |
| 12-Aug | 17 | 20 | 25 | 21 | 22 | 24 | 21 | 16 | 19 | 20 | 22 | 19 | 23 | 18 | 18 | 22 | 19 | 20 | 21 | 22 | 19 | 19 | 24 | 20 | 25 |
| 13-Aug | 19 | 18 | 17 | 17 | 17 | 17 | 21 | 17 | 12 | 14 | 14 | 14 | 13 | 15 | 13 | 13 | 17 | 11 | 10 | 9 | 10 | 8 | 9 | 10 | 21 |
| 14-Aug | 10 | 9 | 10 | 10 | 10 | 10 | 13 | 16 | 19 | 22 | 33 | 45 | 26 | 28 | 26 | 29 | 14 | 13 | 13 | 20 | 18 | 48 | 26 | 46 | 48 |
| 15-Aug | 33 | 14 | 53 | 37 | 64 | 86 | 21 | 10 | 16 | 11 | 16 | 31 | 13 | 16 | 28 | 22 | 37 | 9 | 12 | 20 | 16 | 32 | 17 | 11 | 86 |
| 16-Aug | 9 | 10 | 10 | 11 | 11 | 10 | 8 | 10 | 12 | 14 | 23 | 16 | 20 | 14 | 20 | 15 | 17 | 13 | 10 | 6 | 7 | 7 | 8 | 8 | 23 |
| 17-Aug | 8 | 8 | 8 | 8 | 8 | 8 | 9 | 10 | 13 | 12 | 15 | 18 | 23 | 13 | 20 | 18 | 13 | 34 | 9 | 9 | 7 | 8 | 8 | 8 | 34 |
| 18-Aug | 7 | 10 | 11 | 11 | 10 | 9 | 10 | 16 | 22 | 28 | 22 | 22 | 20 | 21 | 13 | 12 | 36 | 25 | 21 | 13 | 11 | 15 | 10 | 15 | 36 |
| 19-Aug | 10 | 13 | 10 | 8 | 8 | 9 | 10 | 11 | 13 | 13 | 13 | 13 | 13 | 14 | 13 | 19 | 14 | 17 | 13 | 14 | 13 | 8 | 14 | 8 | 19 |
| 20-Aug | 7 | 9 | 8 | 8 | 8 | 8 | 8 | 9 | 10 | 19 | 16 | 15 | 18 | 21 | 13 | 12 | 12 | 16 | 10 | 9 | 8 | 8 | 9 | 9 | 21 |
| 21-Aug | 8 | 10 | 9 | 8 | 7 | 7 | 8 | 10 | 12 | 12 | 12 | 16 | 16 | 15 | 20 | 20 | 14 | 19 | 9 | 10 | 9 | 7 | 8 | 8 | 20 |
| 22-Aug | 7 | 7 | 13 | 13 | 50 | 38 | 48 | 84 | 60 | 26 | 17 | 25 | 69 | 50 | 49 | 53 | 52 | 37 | 42 | 27 | 48 | 30 | 37 | 26 | 84 |
| 23-Aug | 22 | 28 | 23 | 21 | 20 | 21 | 19 | 19 | 16 | 22 | 20 | 25 | 25 | 24 | 22 | 14 | 14 | 12 | 10 | 9 | 28 | 21 | 22 | 18 | 28 |
| 24-Aug | 17 | 22 | 28 | 25 | 31 | 39 | 14 | 11 | 14 | 13 | 13 | 17 | 13 | 20 | 19 | 13 | 12 | 17 | 28 | 13 | 20 | 15 | 12 | 12 | 39 |
| 25-Aug | 12 | 13 | 13 | 19 | 15 | 21 | 23 | 24 | 23 | 24 | 21 | 16 | 14 | 14 | 15 | 15 | 19 | 13 | 12 | 14 | 15 | 14 | 13 | 13 | 24 |
| 26-Aug | 10 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 10 | 11 | 15 | 15 | 17 | 16 | 19 | 15 | 18 | 19 | 12 | 12 | 12 | 12 | 10 | 12 | 19 |
| 27-Aug | 10 | 10 | 9 | 9 | 9 | 10 | 10 | 11 | 12 | 10 | 13 | 13 | 16 | 16 | 15 | 14 | 14 | 12 | 11 | 8 | 7 | 9 | 9 | 7 | 16 |
| 28-Aug | 8 | 9 | 9 | 17 | 11 | 10 | 9 | 11 | 14 | 15 | 15 | 13 | 24 | 17 | 24 | 22 | 23 | 20 | 10 | 6 | 8 | 6 | 8 | 19 | 24 |
| 29-Aug | 8 | 10 | 15 | 93 | 90 | 9 | 8 | 10 | 35 | 28 | 61 | 64 | 59 | 47 | 38 | 36 | 15 | 11 | 9 | 9 | 10 | 10 | 9 | 10 | 93 |
| 30-Aug | 10 | 11 | 18 | 17 | 13 | 14 | 9 | 9 | 10 | 10 | 12 | 13 | 11 | 12 | 13 | 18 | 13 | 15 | 16 | 16 | 21 | 29 | 30 | 32 | 32 |
| 31-Aug | 41 | 72 | 59 | 8 | 12 | 43 | 22 | 15 | 10 | 11 | 12 | 13 | 11 | 14 | 12 | 12 | 15 | 19 | 12 | 9 | 8 | 9 | 9 | 8 | 72 |
| 60 105 59 93 90 86 58 84 98 80 97 89 69 98 52 53 79 55 77 44 73 65 54 73 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association

SO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|---------------|
| Station Name: | Surmont | Station number: | AMS 502 |
| Calibration Date: | August 22, 2017 | Last Cal Date: | July 27, 2017 |
| Start time (MST): | 9:53 | End time (MST): | 14:08 |
| Reason: | Routine | | |

Calibration Standards

| | | | | |
|-----------------------|-----------------|-----|------------------|-------------------|
| Cal Gas Concentration | <u>48.3</u> | ppm | Cal Gas Exp Date | February 12, 2018 |
| Cal Gas Cylinder # | <u>LL104215</u> | | | |
| Calibrator Make/Model | API T700 | | Serial Number | 622 |
| ZAG Make/Model | API 701 | | Serial Number | 196 |

Analyzer Information

| | | | |
|----------------------|--------------|--------------------|---------------|
| Analyzer make: | Thermo 43i | Analyzer serial #: | 1160290011 |
| | <u>Start</u> | <u>Finish</u> | |
| Analyzer Range | 0 - 1000 ppb | PMT voltage | -619 |
| Calculated slope | 0.998628 | Lamp voltage | 764 |
| Calculated intercept | 2.527594 | Pressure | 691.2 |
| Analyzer Background | 15.7 | Flow | 0.412 |
| Analyzer Coefficient | 0.998 | Intensity | 89 |
| | | | <u>Finish</u> |
| | | | -619 |
| | | | 764 |
| | | | 687.8 |
| | | | 0.409 |
| | | | 90 |

SO₂ Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5007 | 0.0 | 0.0 | -0.7 | ---- |
| as found span | 4930 | 83.2 | 801.6 | 802.3 | 0.999 |
| calibrator zero | 5007 | 0.0 | 0.0 | -0.7 | ---- |
| high point | 4930 | 83.2 | 801.6 | 802.3 | 0.999 |
| second point | 4973 | 41.6 | 400.7 | 401.0 | 0.999 |
| third point | 4991 | 20.9 | 201.4 | 199.7 | 1.009 |
| as left zero | 5009 | 0.0 | 0.0 | -0.3 | ---- |
| as left span | 4818 | 83.2 | 819.9 | 807.7 | 1.015 |
| Average Correction Factor | | | | | 1.002 |
| Corrected As found | 803.00 | Previous response | 800.17 | *% change | -0.4% |

Notes:

No adjustments made.

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association

SO₂ Calibration Summary

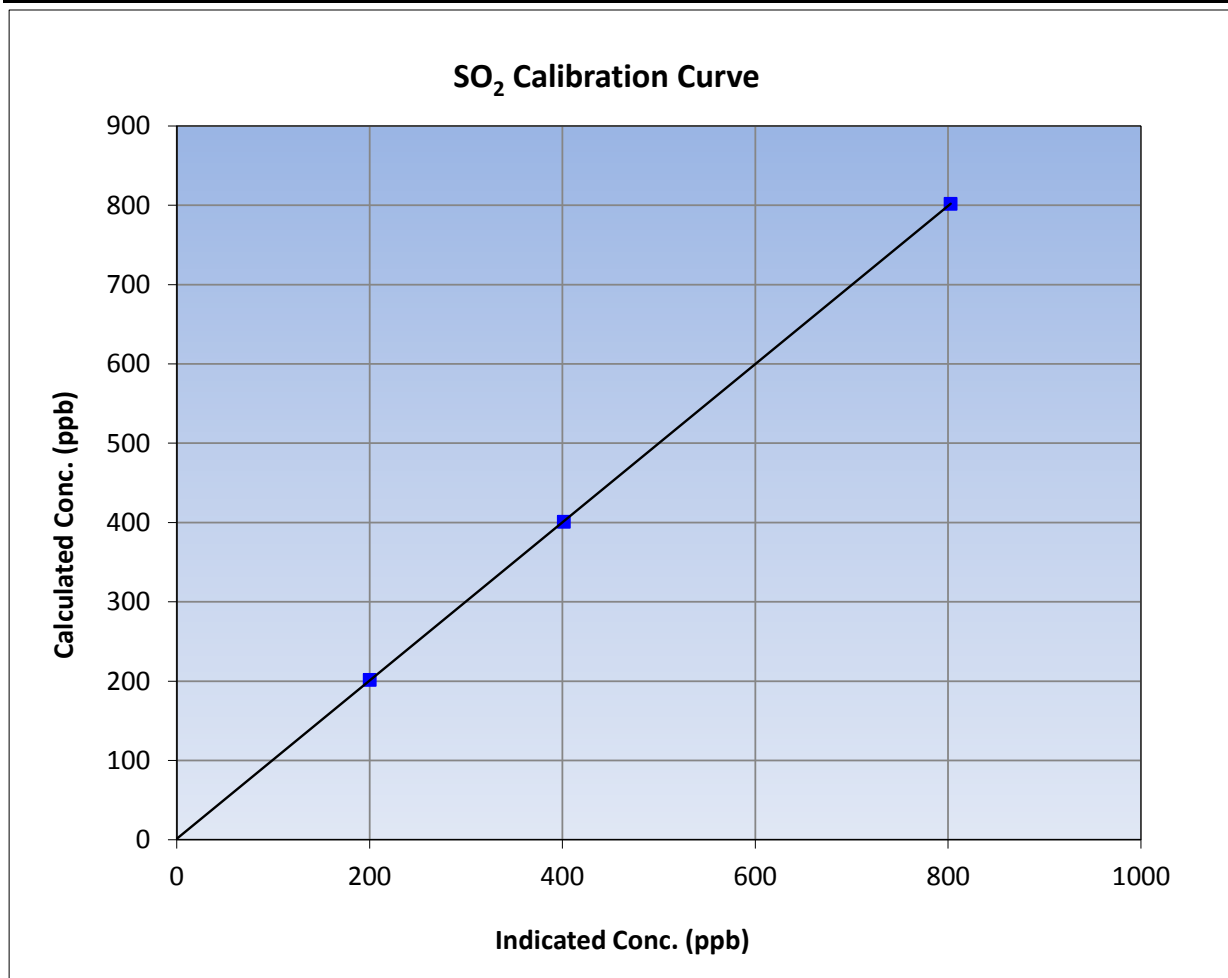
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 22, 2017 | Previous Calibration | July 27, 2017 |
| Station Name | Surmont | Station Number | AMS 502 |
| Start Time (MST) | 9:53 | End Time (MST) | 14:08 |
| Analyzer make | Thermo 43i | Analyzer serial # | 1160290011 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|-------------|
| 0.0 | -0.7 | ---- | Correlation Coefficient | 0.999996 | ≥0.995 |
| 801.6 | 802.3 | 0.9991 | | | |
| 400.7 | 401.0 | 0.9992 | Slope | 0.997623 | 0.90 - 1.10 |
| 201.4 | 199.7 | 1.0086 | | | |
| | | | Intercept | 1.182453 | +/-30 |



SO2 Calibration Plot

Date: August 22, 2017

Location: Surmont





Wood Buffalo Environmental Association

H₂S Calibration Report

Version-06-2017

Station Information

Station Name: Surmont
Calibration Date: August 23, 2017
Start time (MST): 10:18
Reason: Routine
Station number: AMS 502
Last Cal Date: July 28, 2017
End time (MST): 12:59

Calibration Standards

Cal Gas Concentration 5.08 ppm
Cal Gas Cylinder # DR0000407
Calibrator Make/Model API T700
ZAG Make/Model API 701
Cal Gas Exp Date July 12, 2019
Serial Number 622
Serial Number 196

Analyzer Information

Analyzer make: API T101

Analyzer serial #: 197

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|----------------------|--------------|---------------|--------------|--------------|---------------|
| Analyzer Range | 0 - 100 ppb | | PMT voltage | 497 | 497 |
| Calculated slope | 1.006633 | 1.004948 | Lamp voltage | 2106 | 2103 |
| Calculated intercept | 0.307925 | 0.290604 | Pressure | 23.1 | 23.1 |
| Analyzer Background | 23.5 | 23.5 | Flow | 0.613 | 0.607 |
| Analyzer Coefficient | 0.928 | 0.928 | Intensity | 47 | 47 |

H₂S Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|-----------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5007 | 0.0 | 0.0 | 0.1 | ---- |
| as found span | 4935 | 78.8 | 79.8 | 79.4 | 1.006 |
| calibrator zero | 5007 | 0.0 | 0.0 | 0.1 | ---- |
| high point | 4935 | 78.8 | 79.8 | 79.4 | 1.006 |
| second point | 4972 | 39.5 | 40.0 | 39.2 | 1.021 |
| third point | 4993 | 19.8 | 20.1 | 19.4 | 1.034 |
| as left zero | 5008 | 0.0 | 0.0 | 0.0 | ---- |
| as left span | 4936 | 78.8 | 79.8 | 78.5 | 1.017 |

SO₂ Scrubber Check

| | | | | Average Correction Factor | 1.020 |
|--------------------|-------|-------------------|-------|---------------------------|-------|
| Corrected As found | 79.30 | Previous response | 79.01 | *% change | -0.4% |

* = > +/-5% change initiates investigation

Notes:

No adjustments made.

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association

H₂S Calibration Summary

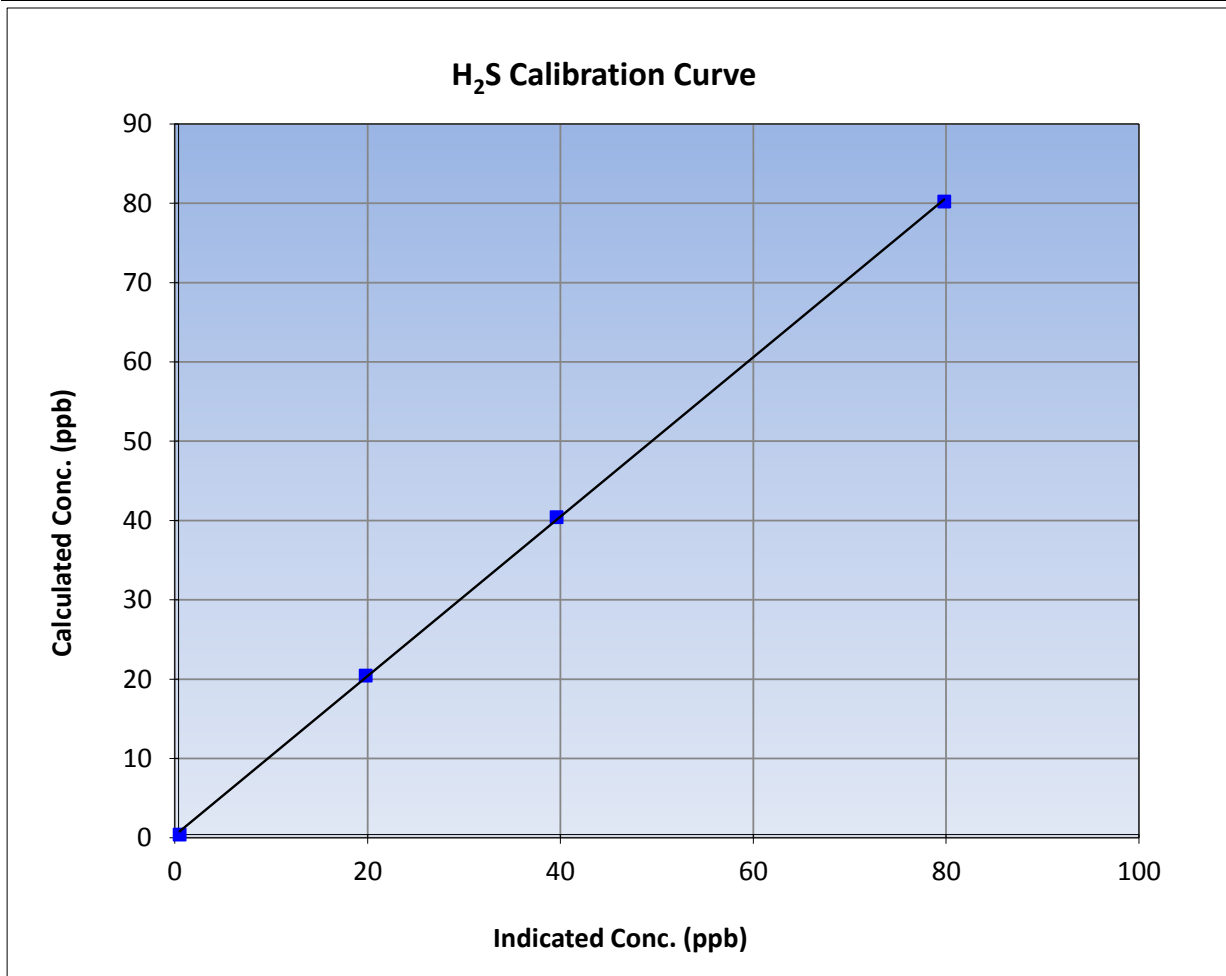
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 23, 2017 | Previous Calibration | July 28, 2017 |
| Station Name | Surmont | Station Number | AMS 502 |
| Start Time (MST) | 10:18 | End Time (MST) | 12:59 |
| Analyzer make | API T101 | Analyzer serial # | 197 |

Calibration Data

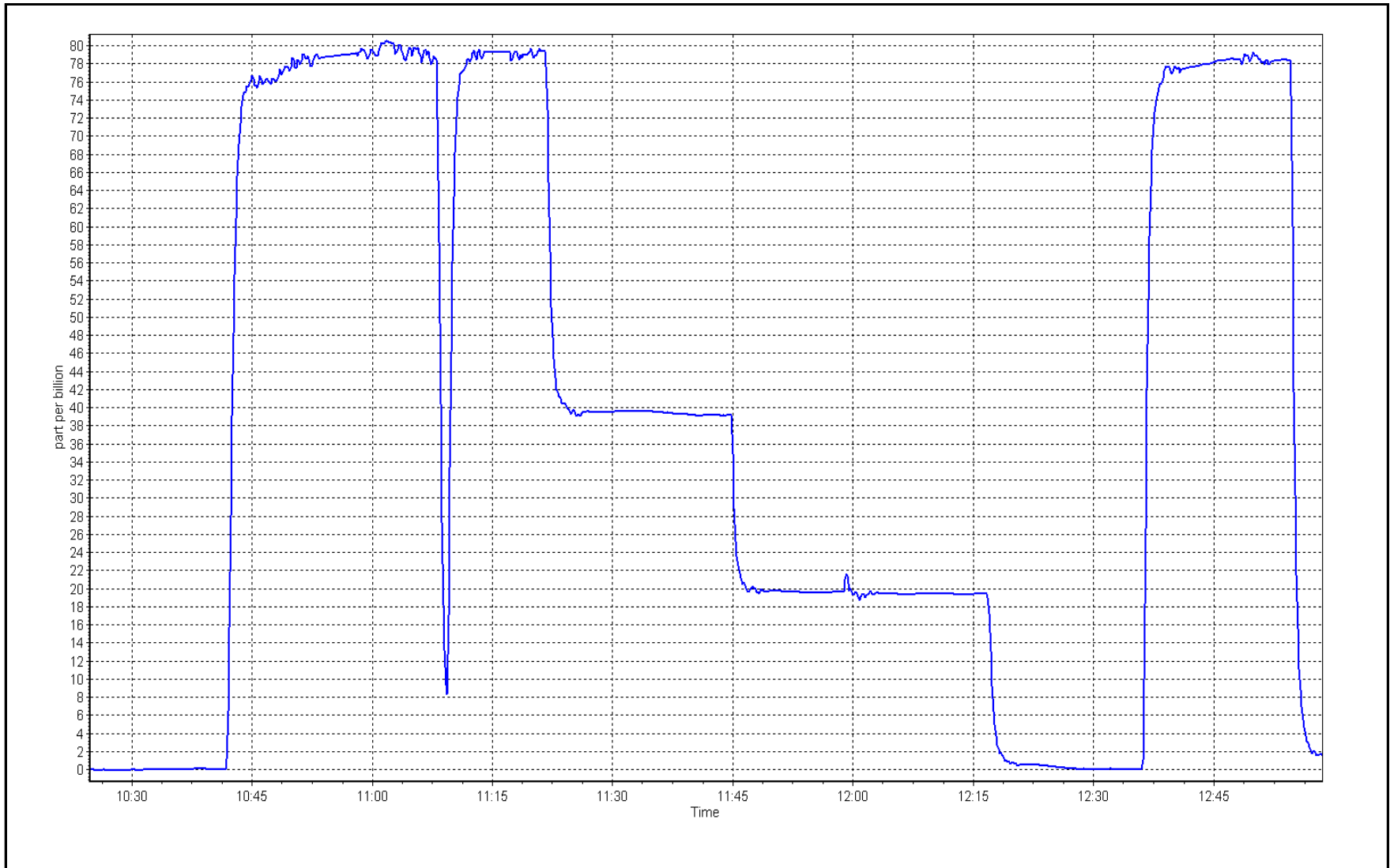
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|-------------|
| 0.0 | 0.1 | ---- | Correlation Coefficient | 0.999881 | ≥0.995 |
| 79.8 | 79.4 | 1.0055 | | | |
| 40.0 | 39.2 | 1.0214 | Slope | 1.004948 | 0.90 - 1.10 |
| 20.1 | 19.4 | 1.0343 | | | |
| | | | Intercept | 0.290604 | +/-3 |



H₂S Calibration Plot

Date: August 23, 2017

Location: Surmont





Wood Buffalo Environmental Association

NO_x - NO - NO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|---------------|
| Station Name: | Surmont | Station number: | AMS 502 |
| Calibration Date: | August 22, 2017 | Last Cal Date: | July 27, 2017 |
| Start time (MST): | 9:53 | End time (MST): | 14:08 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|-------------------|-------------------|---------------------|-------------------|
| NO Gas Cylinder # | LL104215 | Cal Gas Expiry Date | February 12, 2018 |
| NOX Cal Gas Conc. | <u>48.1</u> ppb | NO Cal Gas Conc. | <u>48.1</u> ppb |
| Calibrator Model | API T700 | Serial Number | 622 |
| ZAG make/model | Teledyne API T701 | Serial Number | 196 |

Analyzer Information

| | | | | | |
|-----------------------------|--------------|--------------------|---------------------|---------------|--------|
| Analyzer make: | Thermo 42i | Analyzer serial #: | 1218153356 | | |
| | <u>Start</u> | <u>Finish</u> | <u>Start</u> | <u>Finish</u> | |
| NO coefficient | 1.014 | 1.045 | NOX Range (ppb) | 0 - 1000 ppb | |
| NOX coefficient | 1.000 | 1.001 | PMT Temperature | -2.8 | -2.7 |
| NO ₂ coefficient | 1.000 | 1.000 | Reaction cell Press | 162.1 | 160.3 |
| NO bkgrnd | 5.7 | 5.8 | Sample Flow | 0.676 | 0.667 |
| NOX bkgrnd | 6.2 | 6.3 | PMT Voltage | -866.9 | -866.7 |

Calibration Statistics

| | | |
|----------------------------|--------------|---------------|
| | <u>Start</u> | <u>Finish</u> |
| NO _x Cal Slope | 0.996120 | 0.994643 |
| NO _x Cal Offset | 2.821198 | 2.116792 |
| NO Cal Slope | 0.995314 | 0.994189 |
| NO Cal Offset | 2.778091 | 2.175914 |
| NO ₂ Cal Slope | 1.003970 | 0.994477 |
| NO ₂ Cal Offset | 0.342634 | -1.000749 |



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Version-03-2017

Dilution Calibration Data

| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|----------------------------------|---------------------------|-----------------------------|---|--|---|--|---------------------------------------|--|---|--|
| as found zero | 5007 | 0.0 | 0.0 | 0.0 | 0.0 | -0.7 | -0.7 | 0.1 | ---- | ---- |
| as found span | 4930 | 83.2 | 798.3 | 798.3 | 0.0 | 771.2 | 771.5 | -0.4 | 1.0351 | 1.0347 |
| calibrator zero | 5008 | 0.0 | 0.0 | 0.0 | 0.0 | -0.7 | -0.7 | 0.1 | ---- | ---- |
| high point | 4930 | 83.2 | 798.3 | 798.3 | 0.0 | 801.2 | 801.5 | -0.4 | 0.9964 | 0.9960 |
| second point | 4973 | 41.6 | 399.0 | 399.0 | 0.0 | 398.2 | 398.4 | -0.1 | 1.0021 | 1.0016 |
| third point | 4991 | 20.9 | 200.6 | 200.6 | 0.0 | 198.2 | 198.1 | 0.1 | 1.0120 | 1.0125 |
| as left zero | 5009 | 0.0 | 0.0 | 0.0 | 0.0 | -0.5 | -0.2 | -0.3 | ---- | ---- |
| as left span | 4816 | 83.2 | 816.9 | 404.5 | 412.4 | 807.4 | 404.7 | 402.7 | 1.0117 | 0.9995 |
| Average Correction Factor | | | | | | | | | 1.0035 | 1.0034 |

| | | | | | |
|--------------------|-----------------------------|----------------|--|-----------------|------------------------|
| Corrected As found | NO _x = 771.9 ppb | NO = 772.2 ppb | | *Percent Change | NO _x = 3.5% |
| Previous Response | NO _x = 798.6 ppb | NO = 799.3 ppb | | *Percent Change | NO = 3.5% |

* = > +/-5% change initiates investigation

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO drop conc (ppb) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | Converter Efficiency <i>Limit = 96-104%</i> |
|----------------------------------|------------------------------|---|--|---------------------------------------|--|---|--|---|--|
| 1st NO ref point | | 0.0 | 804.7 | 802.8 | 1.9 | 0.9920 | 0.9944 | ---- | ---- |
| 1st NO2 (400 ppb O3) | 404.5 | 398.3 | 804.9 | 404.5 | 400.5 | 0.9918 | ---- | 0.9945 | 100.6% |
| 2nd NO2 (200 ppb O3) | 596.0 | 206.8 | 806.9 | 596.0 | 210.9 | 0.9893 | ---- | 0.9806 | 102.0% |
| 3rd NO2 (100 ppb O3) | 692.2 | 110.6 | 804.5 | 692.2 | 112.2 | 0.9923 | ---- | 0.9857 | 101.4% |
| 2nd NO ref point | ---- | 0.0 | 804.6 | 803.6 | 1.0 | 0.9921 | 0.9934 | ---- | ---- |
| Average Correction Factor | | | | | | 0.9914 | 0.9939 | 0.9869 | 101.3% |

Notes:

Span adjusted.

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association

NO_x Calibration Summary

Version-03-2017

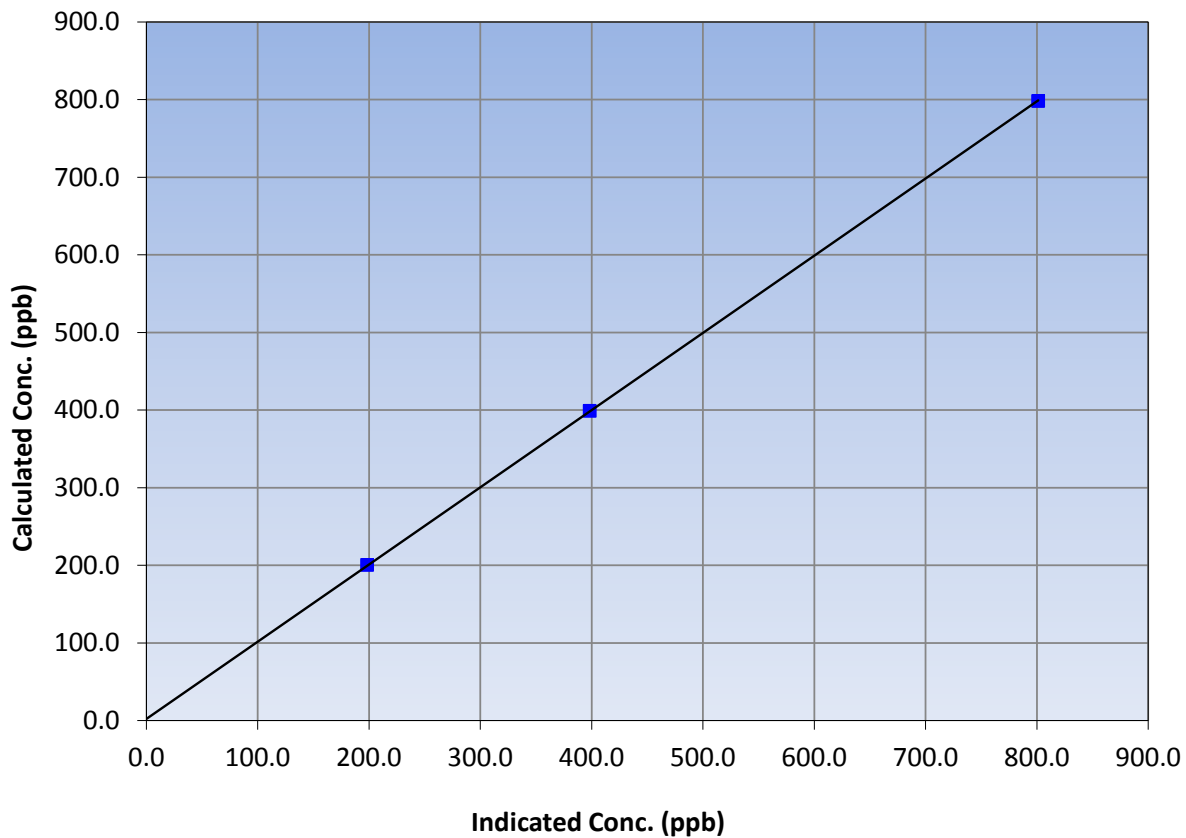
Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 22, 2017 | Previous Calibration | July 27, 2017 |
| Station Name | Surmont | Station Number | AMS 502 |
| Start Time (MST) | 9:53 | End Time (MST) | 14:08 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1218153356 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | -0.7 | ---- | Correlation Coefficient | ≥0.995 | |
| 798.3 | 801.2 | 0.9964 | | | |
| 399.0 | 398.2 | 1.0021 | | | |
| 200.6 | 198.2 | 1.0120 | | | |
| | | | Slope | 0.994643 | 0.90 - 1.10 |
| | | | Intercept | 2.116792 | +/-20 |

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

Version-03-2017

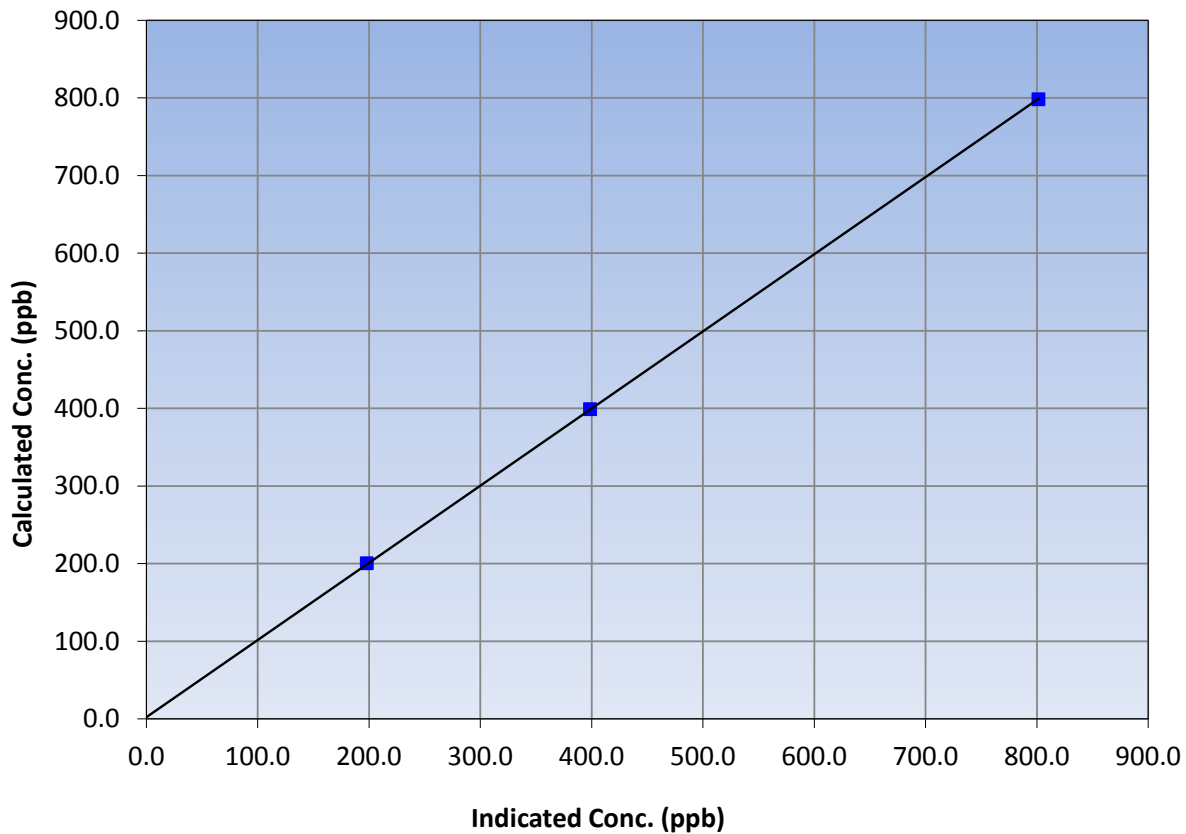
Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 22, 2017 | Previous Calibration | July 27, 2017 |
| Station Name | Surmont | Station Number | AMS 502 |
| Start Time (MST) | 9:53 | End Time (MST) | 14:08 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1218153356 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | -0.7 | ---- | Correlation Coefficient | 0.999984 | ≥0.995 |
| 798.3 | 801.5 | 0.9960 | | | |
| 399.0 | 398.4 | 1.0016 | Slope | 0.994189 | 0.90 - 1.10 |
| 200.6 | 198.1 | 1.0125 | | | |
| | | | Intercept | 2.175914 | +/-20 |

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

Version-03-2017

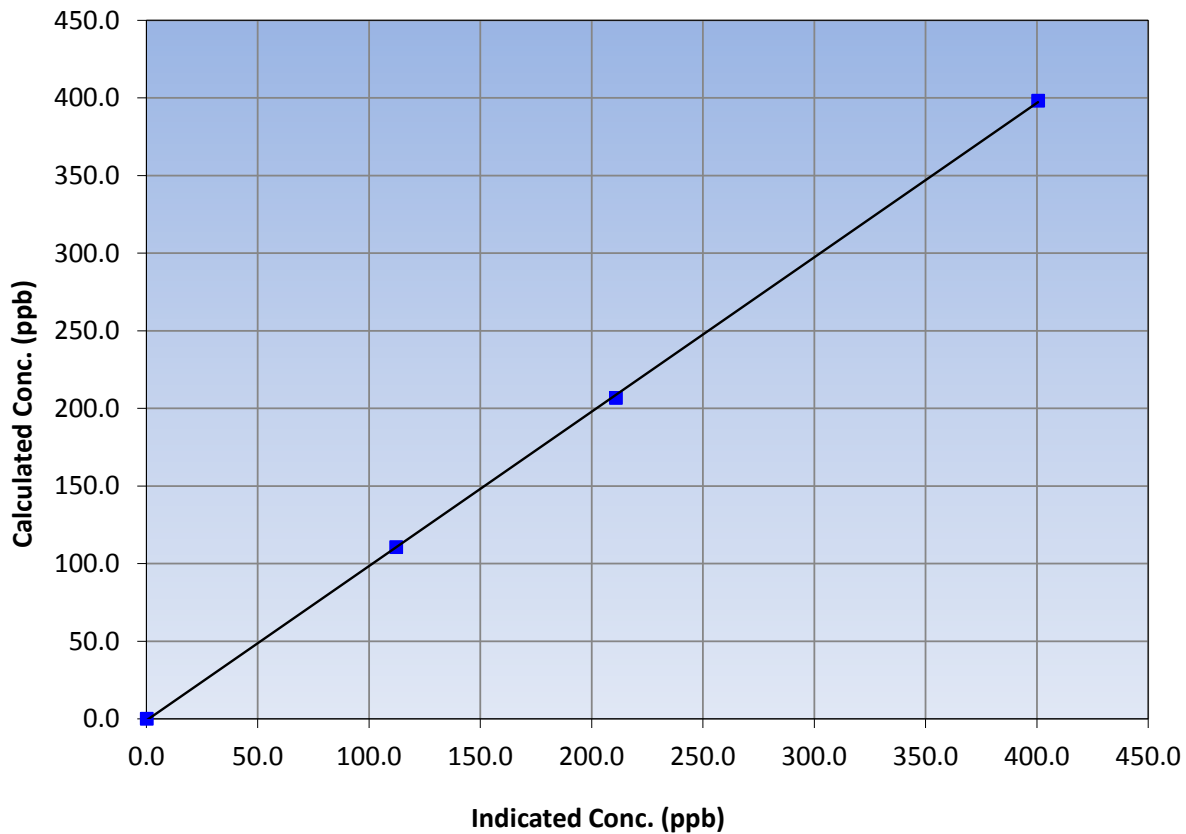
Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 22, 2017 | Previous Calibration | July 27, 2017 |
| Station Name | Surmont | Station Number | AMS 502 |
| Start Time (MST) | 9:53 | End Time (MST) | 14:08 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1218153356 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.1 | ---- | Correlation Coefficient | ≥0.995 | |
| 398.3 | 400.5 | 0.9945 | | | |
| 206.8 | 210.9 | 0.9806 | | | |
| 110.6 | 112.2 | 0.9857 | | | |
| | | | Slope | 0.994477 | 0.90 - 1.10 |
| | | | Intercept | -1.000749 | +/-20 |

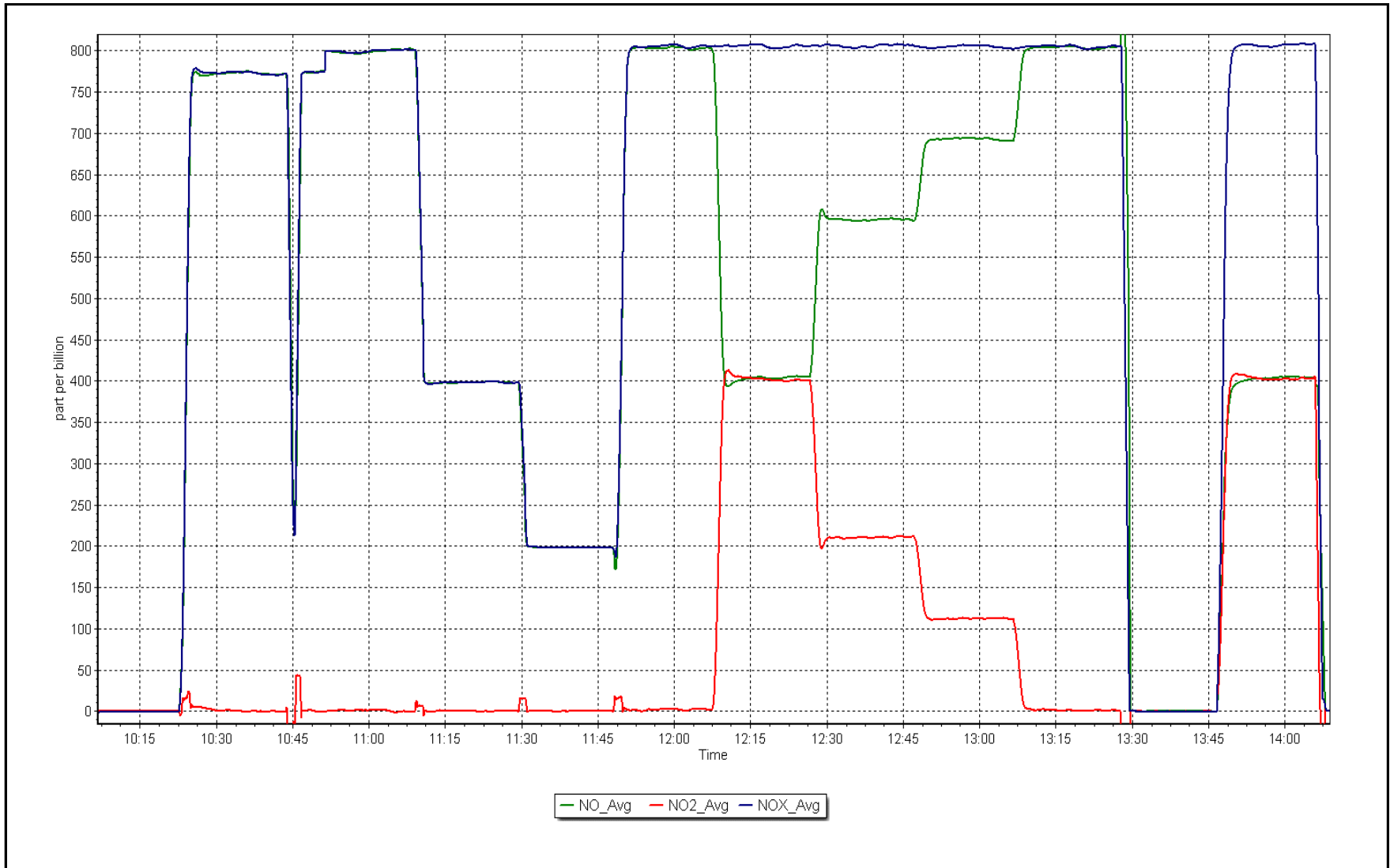
NO₂ Calibration Curve



NO_x Calibration Plot

Date: August 22, 2017

Location: Surmont





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 505
SAWBONES BAY
AUGUST 2017**

Operations, Data Collection,
QA/QC, Data Validation and Reporting by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

September 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SAWBONES BAY (AMS 505)
AUGUST 2017

MONTHLY SUMMARY for
AMD SECTION III.B.1(c)

| Parameter | Hours of Data | Hours of Calibration | Hours without Data | Operational Time | Maximum 1-Hour Value | 1-Hour Exceedances | Maximum 24-Hour Value | 24-Hour Exceedances |
|-----------------------------------|---------------|----------------------|--------------------|------------------|----------------------|--------------------|-----------------------|---------------------|
| SO2 (ppb) Average | 708 | 36 | 36 | 100 | 22 | 0 | 7 | 0 |
| H2S (ppb) Average | 709 | 34 | 35 | 99.87 | 1 | 0 | 1 | 0 |
| THC(ppm) Average | 708 | 36 | 36 | 100 | 20.6 | - | 3.9 | - |
| NO2 (ppb) Average | 708 | 36 | 36 | 100 | 15 | 0 | 6 | - |
| NO (ppb) Average | 708 | 36 | 36 | 100 | 13 | - | 4 | - |
| NOX (ppb) Average | 708 | 36 | 36 | 100 | 24 | - | 10 | - |
| PM2.5(ug/m3) Average | 744 | 0 | 0 | 100 | 82 | - | 27 | 0 |
| Temperature 2 m (C) Average | 744 | 0 | 0 | 100 | 27.1 | - | 21.6 | - |
| Relative Humidity (%) Average | 744 | 0 | 0 | 100 | 98 | - | 89 | - |
| Wind Speed 10 m (km/h) Average | 743 | 0 | 1 | 99.87 | 32 | - | 20 | - |
| Wind Direction 10 m (deg) Average | 743 | 0 | 1 | 99.87 | - | - | 0 | - |

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SAWBONES BAY (AMS 505)
AUGUST 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

| Parameter | Number | Mean | StnDev | Total | Percentile | | | | | | |
|-----------------------------------|--------|-------|--------|-------|------------|-----|------|--------|------|------|------|
| | | | | | Min | P10 | Q1 | Median | Q3 | P90 | Max |
| SO2 (ppb) Average | 708 | 1.6 | 3 | - | 0 | 0 | 0 | 0 | 1 | 5 | 22 |
| H2S (ppb) Average | 709 | 0.2 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| THC(ppm) Average | 708 | 2.33 | 0.9 | - | 1.9 | 2.1 | 2.1 | 2.2 | 2.3 | 2.7 | 20.6 |
| NO2 (ppb) Average | 708 | 2.4 | 3 | - | 0 | 0 | 1 | 2 | 3 | 6 | 15 |
| NO (ppb) Average | 708 | 1.2 | 2 | - | 0 | 0 | 0 | 0 | 1 | 3 | 13 |
| NOX (ppb) Average | 708 | 3.5 | 4 | - | 0 | 0 | 1 | 2 | 5 | 9 | 24 |
| PM2.5(ug/m3) Average | 744 | 9.4 | 10 | - | 0 | 0 | 3 | 7 | 12 | 21 | 82 |
| Temperature 2 m (C) Average | 744 | 16.55 | 4.5 | - | 4.4 | 11 | 13.1 | 16.3 | 20.2 | 22.8 | 27.1 |
| Relative Humidity (%) Average | 744 | 65.8 | 20 | - | 25 | 39 | 49 | 65 | 83 | 94 | 98 |
| Wind Speed 10 m (km/h) Average | 743 | 10.7 | 6 | - | 0 | 4 | 6 | 10 | 15 | 20 | 32 |
| Wind Direction 10 m (deg) Average | 743 | 0 | 0 | - | 0 | - | - | - | - | - | 0 |

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SAWBONES BAY (AMS 505)
AUGUST 2017

OPERATIONAL NOTES

| Parameter | Period Start | Period End | Duration (Hours) | Notes |
|----------------------------|-------------------|-------------------|------------------|-----------------------------------|
| H2S | 11 Aug 2017 10:00 | 11 Aug 2017 10:00 | 1 | Maintenance - manifold cleaning |
| Wind Speed, Wind Direction | 28 Aug 2017 21:00 | 28 Aug 2017 21:00 | 1 | Flat line in sensor output signal |



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Sawbones Bay - August 2017

| | | | | |
|--|---|----------|---------------------------|-------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 22 ppb on Aug 21 03:00 | Maximum Daily Average: 7.0 ppb on Aug 20 | | Hours of Data: | 708 |
| Minimum Value: 0 ppb on Aug 1 13:00 | Minimum Daily Average: 0.0 ppb on Aug 7 | | Hours of Missing Data: | 36 |
| Maximum Diurnal Average: 2.5 ppb at hour 8 | Minimum Diurnal Average: 0.9 ppb at hour 13 | | Hours of Calibration: | 36 |
| Monthly Average: 1.6 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 5 P ₉₉ = 17 | | Percent Operational Time: | 100.0 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 2-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 3 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 2 | 1 | 5 | 0 | 0 | 0 | 0 | 0.8 | 5 |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 4-Aug | Z | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 2 |
| 5-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 6-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 2 |
| 7-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 8-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 1 |
| 9-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0.6 | 2 |
| 10-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 6 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 6 |
| 11-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | C | C | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 |
| 12-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 |
| 13-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 14-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 2 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 3 |
| 15-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 1 | 0 | 0 | 0.3 | 4 |
| 16-Aug | Z | 2 | 0 | 0 | 0 | 0 | 11 | 16 | 6 | 4 | 2 | 1 | 0 | 1 | 1 | 1 | 3 | 1 | 0 | 10 | 1 | 0 | 0 | 0 | 2.7 | 16 |
| 17-Aug | 0 | Z | 2 | 1 | 15 | 9 | 10 | 14 | 9 | 2 | 4 | 2 | 2 | 1 | 1 | 0 | 4 | 4 | 0 | 3 | 0 | 3 | 9 | 4 | 4.3 | 15 |
| 18-Aug | 0 | 1 | Z | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 1 | 1 | 2 | 1 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 6 | 5 | 6 | 1.7 | 6 |
| 19-Aug | 6 | 2 | 1 | Z | 17 | 21 | 6 | 1 | 0 | 4 | 3 | 0 | 0 | 5 | 5 | 8 | 3 | 12 | 19 | 5 | 1 | 5 | 3 | 5 | 5.8 | 21 |
| 20-Aug | 12 | 13 | 3 | 7 | Z | 0 | 1 | 6 | 2 | 2 | 4 | 7 | 5 | 6 | 3 | 7 | 8 | 12 | 3 | 11 | 5 | 11 | 14 | 16 | 7.0 | 16 |
| 21-Aug | 18 | 21 | 22 | 8 | 3 | Z | 12 | 18 | 10 | 6 | 2 | 3 | 2 | 4 | 3 | 3 | 2 | 5 | 0 | 1 | 1 | 1 | 1 | 1 | 6.4 | 22 |
| 22-Aug | Z | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 3 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0.8 | 5 |
| 23-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 |
| 24-Aug | 0 | 2 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 2 | 4 | 0 | 0.6 | 4 |
| 25-Aug | 4 | 9 | 10 | Z | 0 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 6 | 11 | 10 | 6 | 5 | 8 | 2 | 0 | 1 | 1 | 0 | 0 | 3.5 | 11 |
| 26-Aug | 0 | 1 | 0 | 0 | Z | 0 | 0 | 1 | 5 | 1 | 0 | 2 | 2 | 3 | 7 | 4 | 5 | 3 | 1 | 1 | 2 | 1 | 1 | 2 | 1.8 | 7 |
| 27-Aug | 0 | 4 | 0 | 0 | 0 | Z | 1 | 8 | 13 | 5 | 2 | 5 | 1 | 6 | 1 | 0 | 1 | 5 | 12 | 4 | 2 | 0 | 3 | 3 | 3.4 | 13 |
| 28-Aug | Z | 5 | 2 | 11 | 5 | 18 | 13 | 0 | 2 | 3 | 3 | 3 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.9 | 18 |
| 29-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0.8 | 3 |
| 30-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 |
| 31-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 12 | 0 | 0 | 16 | 1 | 4 | 22 | 2.7 | 22 |

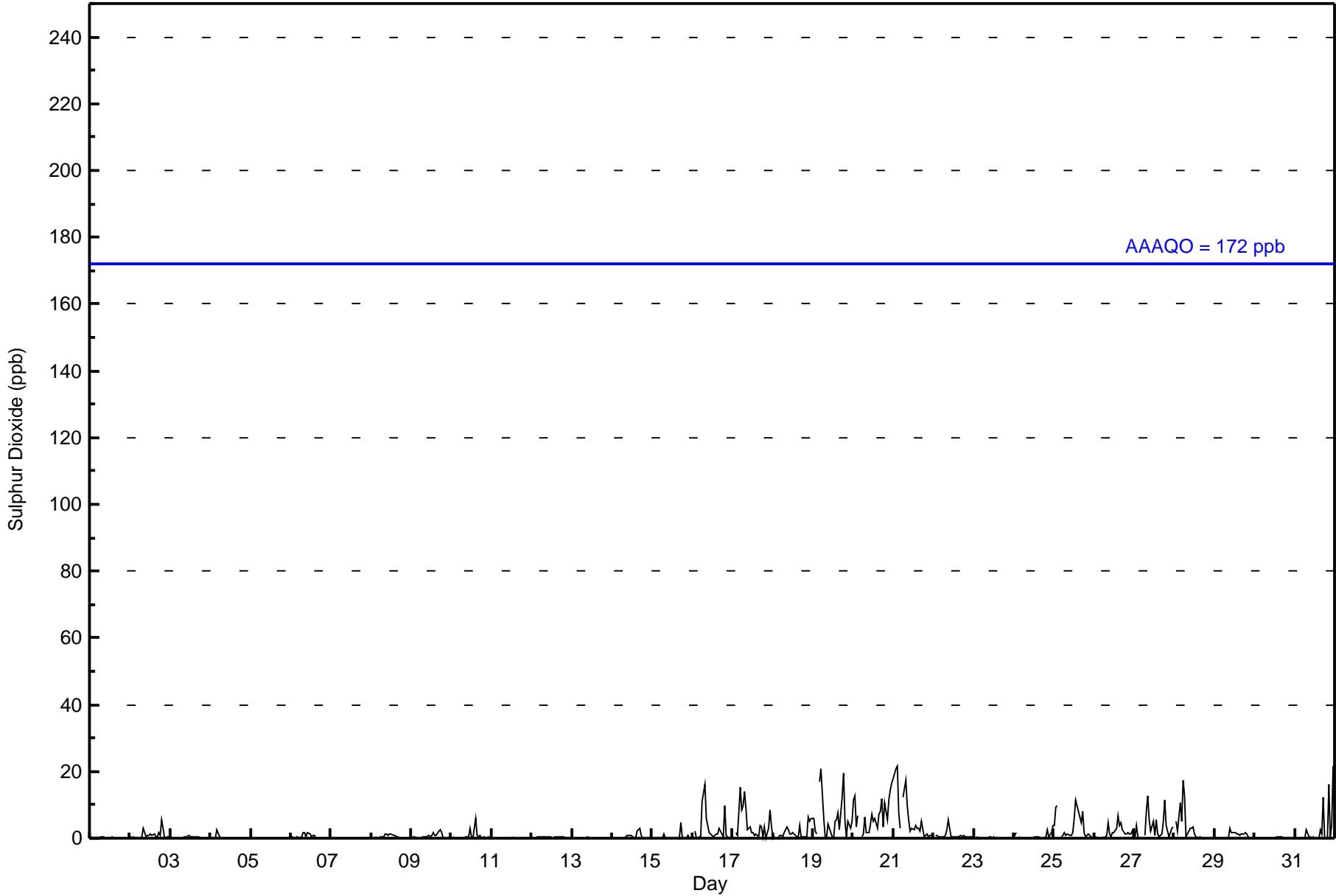
| | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|
| 1.6 | 2.4 | 1.7 | 1.2 | 1.8 | 2.0 | 1.9 | 2.5 | 2.1 | 1.5 | 1.1 | 1.3 | 0.9 | 1.5 | 1.5 | 1.3 | 1.5 | 2.5 | 1.5 | 1.4 | 1.1 | 1.0 | 1.4 | 2.1 | Diurnal Average |
| 18 | 21 | 22 | 11 | 17 | 21 | 13 | 18 | 13 | 6 | 4 | 7 | 6 | 11 | 10 | 8 | 8 | 12 | 19 | 11 | 16 | 11 | 14 | 22 | Diurnal Maximum |

Z - zerospan C - Calibration
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Sawbones Bay - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Sawbones Bay - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 10 | 679 | 95.90 | 95.90 |
| 11 - 20 | 25 | 3.53 | 99.44 |
| 21 - 60 | 4 | 0.56 | 100.00 |
| 61 - 110 | 0 | 0.00 | 100.00 |
| 111 - 172 | 0 | 0.00 | 100.00 |
| > 172 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Sawbones Bay - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 10 | 20 | 27 | 10 | 3 | 10 | 23 | 39 | 92 | 81 | 49 | 61 | 65 | 62 | 91 | 34 | 11 | 678 |
| 11 - 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 23 | 0 | 0 | 0 | 25 |
| 21 - 60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 4 |
| 61 - 110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 111 - 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 20 | 27 | 10 | 3 | 10 | 23 | 39 | 92 | 81 | 49 | 61 | 67 | 89 | 91 | 34 | 11 | 707 |

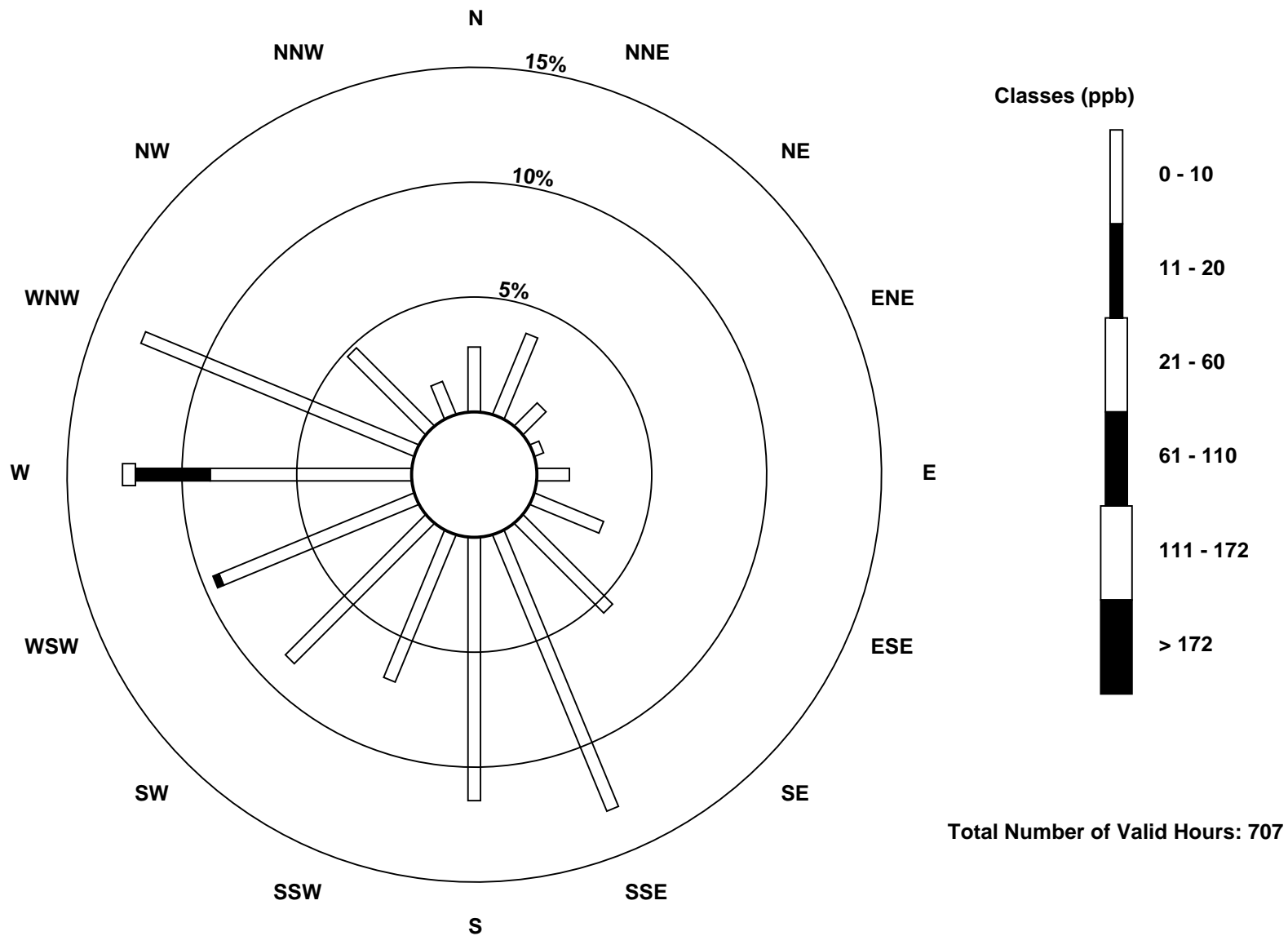
Total Number of Valid Hours: 707

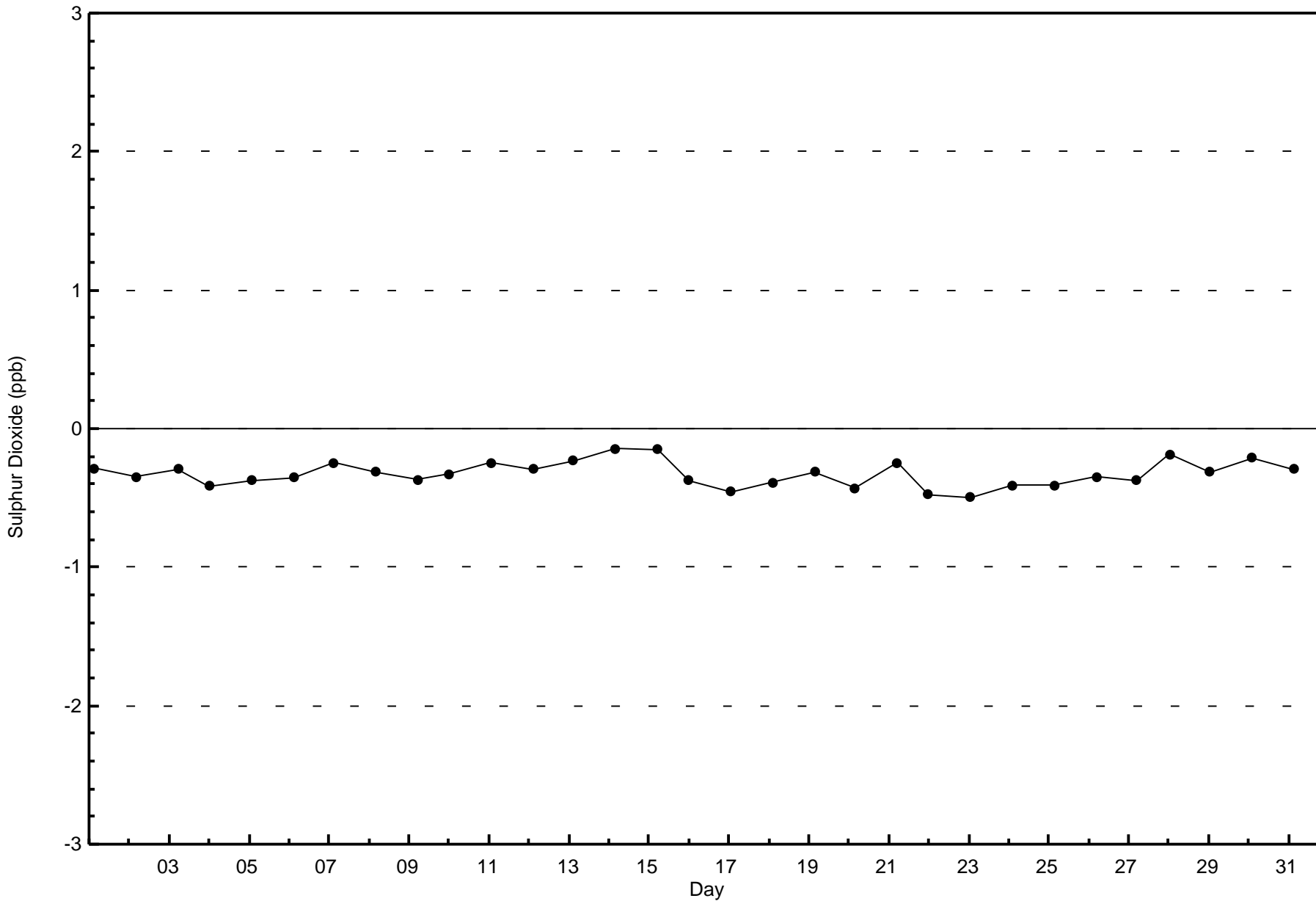
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Sulphur Dioxide (SO₂) - ppb
Sawbones Bay (AMS 505)

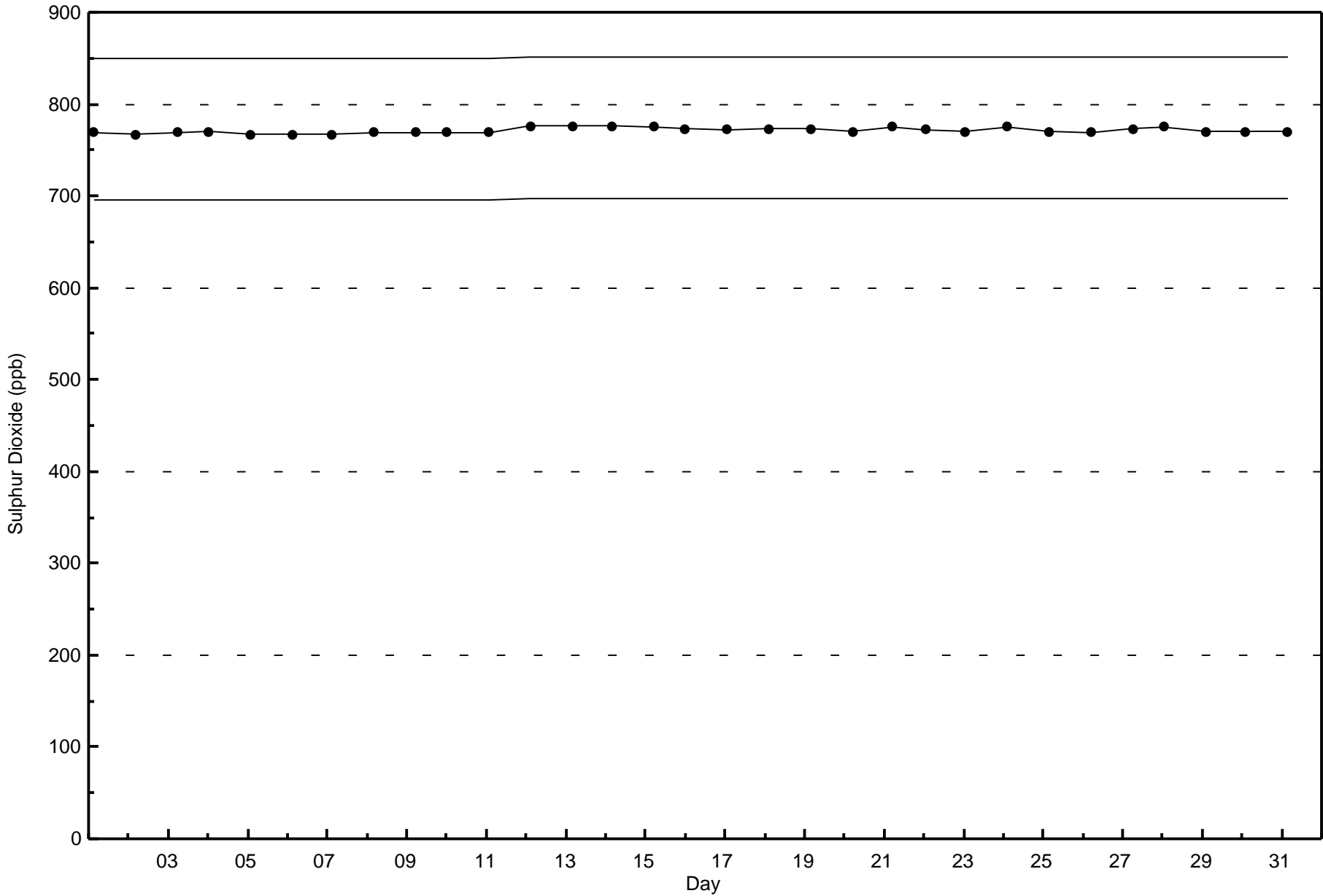






Wood Buffalo Environmental Association
Span Responses

Sulphur Dioxide (SO₂) - ppb
Sawbones Bay - August 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H2S) - ppb

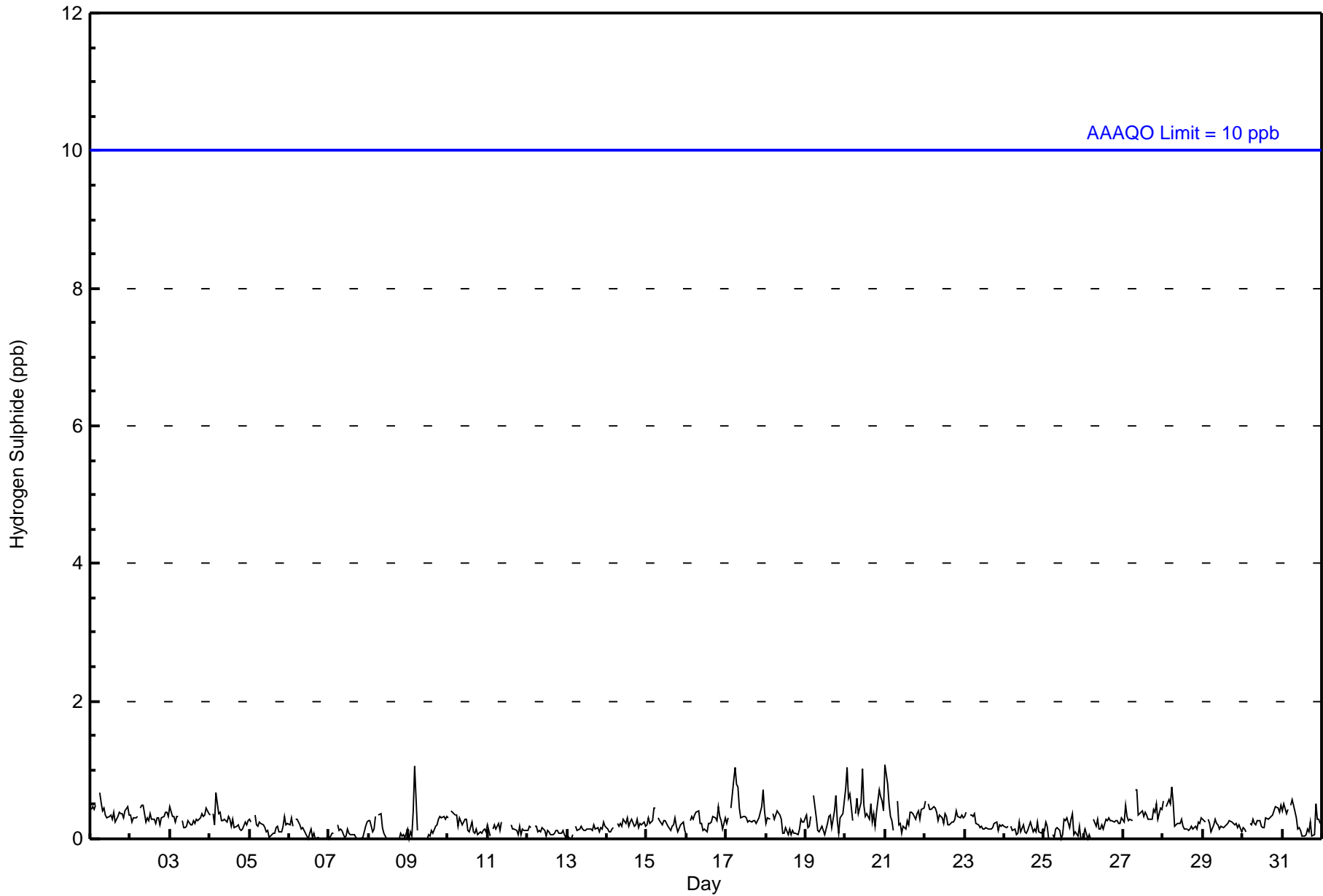
Sawbones Bay - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|---|---|---|---|---|---|---|---|--|----|----|----|----|----|----|----|----|----|--------------------------------|----|----|----|-----|---------------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|--|
| Maximum Value: 1 ppb on Aug 21 01:00 | | | | | | | | | | Maximum Daily Average: 0.5 ppb on Aug 20 | | | | | | | | | | Hours of Data: 709 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum Value: 0 ppb on Aug 6 17:00 | | | | | | | | | | Minimum Daily Average: 0.1 ppb on Aug 7 | | | | | | | | | | Hours of Missing Data: 35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 0.4 ppb at hour 5 | | | | | | | | | | Minimum Diurnal Average: 0.2 ppb at hour 14 | | | | | | | | | | Hours of Calibration: 34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 0.2 ppb | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1 | | | | | | | | | | Percent Operational Time: 99.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 0 | 0 | 0 | 0 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 0 | Z | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 0 | 0 | 0 | 0 | 1 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | M | 0 | C | C | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 0 | 0 | Z | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 0 | 0 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 1 | 1 | 1 | 1 | 0 | Z | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0.5 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 1 | 1 | 1 | 0 | 0 | 0 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 1 | Z | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 0 | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 0 | 0 | 0 | 0 | 0 | 0 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 1 | Z | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 0 | 1 | 0 | 0 | Z | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0.3 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | Diurnal Average | |
| | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | Diurnal Maximum | |
| Z - zerospan C - Calibration M - Maintenance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Sawbones Bay - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Sawbones Bay - August 2017

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2 | 709 | 100.00 | 100.00 |
| 3 - 4 | 0 | 0.00 | 100.00 |
| 5 - 7 | 0 | 0.00 | 100.00 |
| 8 - 11 | 0 | 0.00 | 100.00 |
| > 11 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Sawbones Bay - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-------------------------------|----------------|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2 | 19 | 28 | 9 | 3 | 10 | 23 | 40 | 89 | 81 | 54 | 61 | 68 | 87 | 92 | 32 | 12 | 708 |
| 3 - 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 - 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 - 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 19 | 28 | 9 | 3 | 10 | 23 | 40 | 89 | 81 | 54 | 61 | 68 | 87 | 92 | 32 | 12 | 708 |

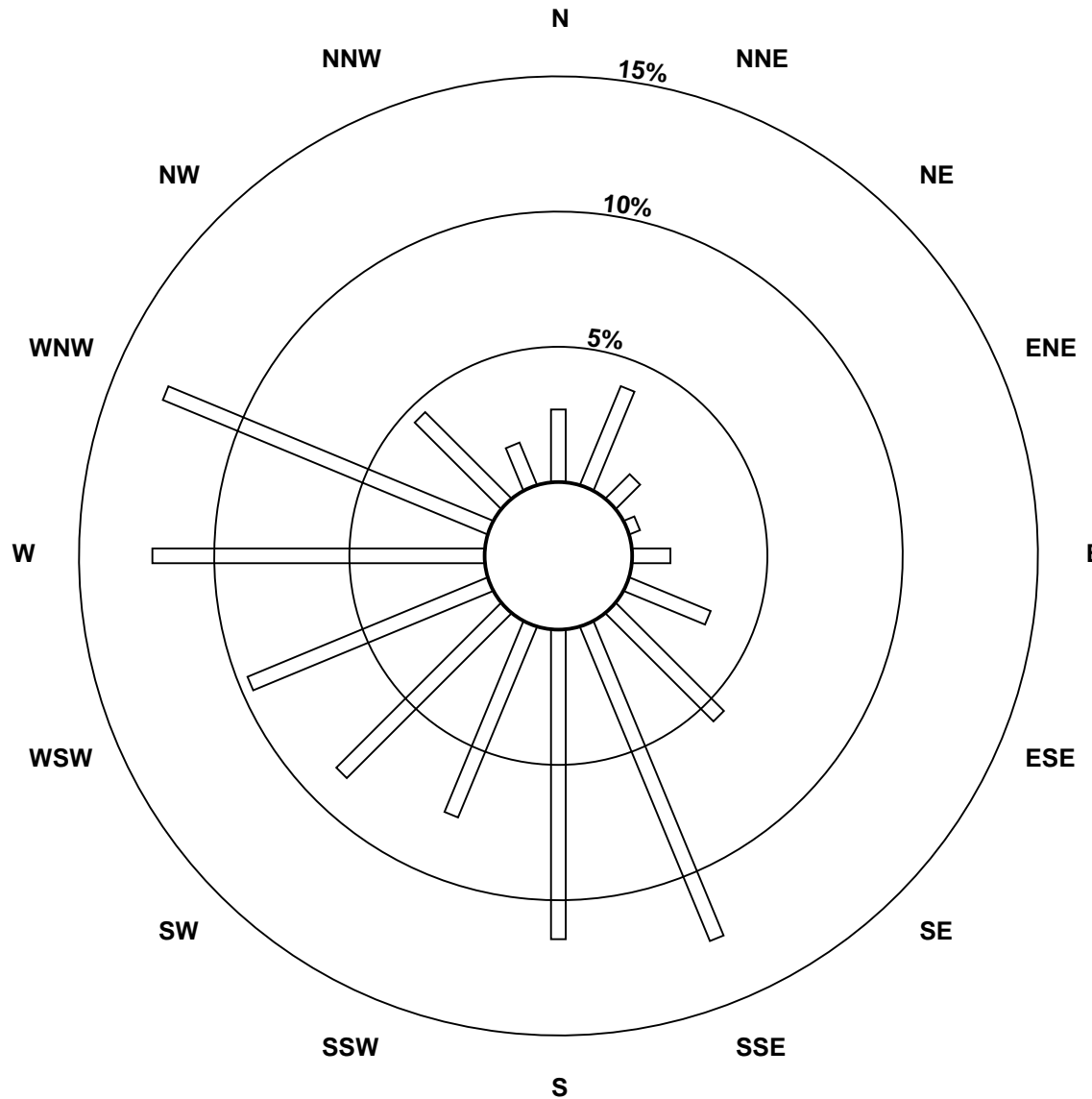
Total Number of Valid Hours: 708

Total Number of Hours: 744

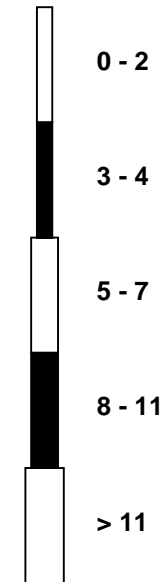


Wood Buffalo Environmental Association
Wind Rose Aug 2017

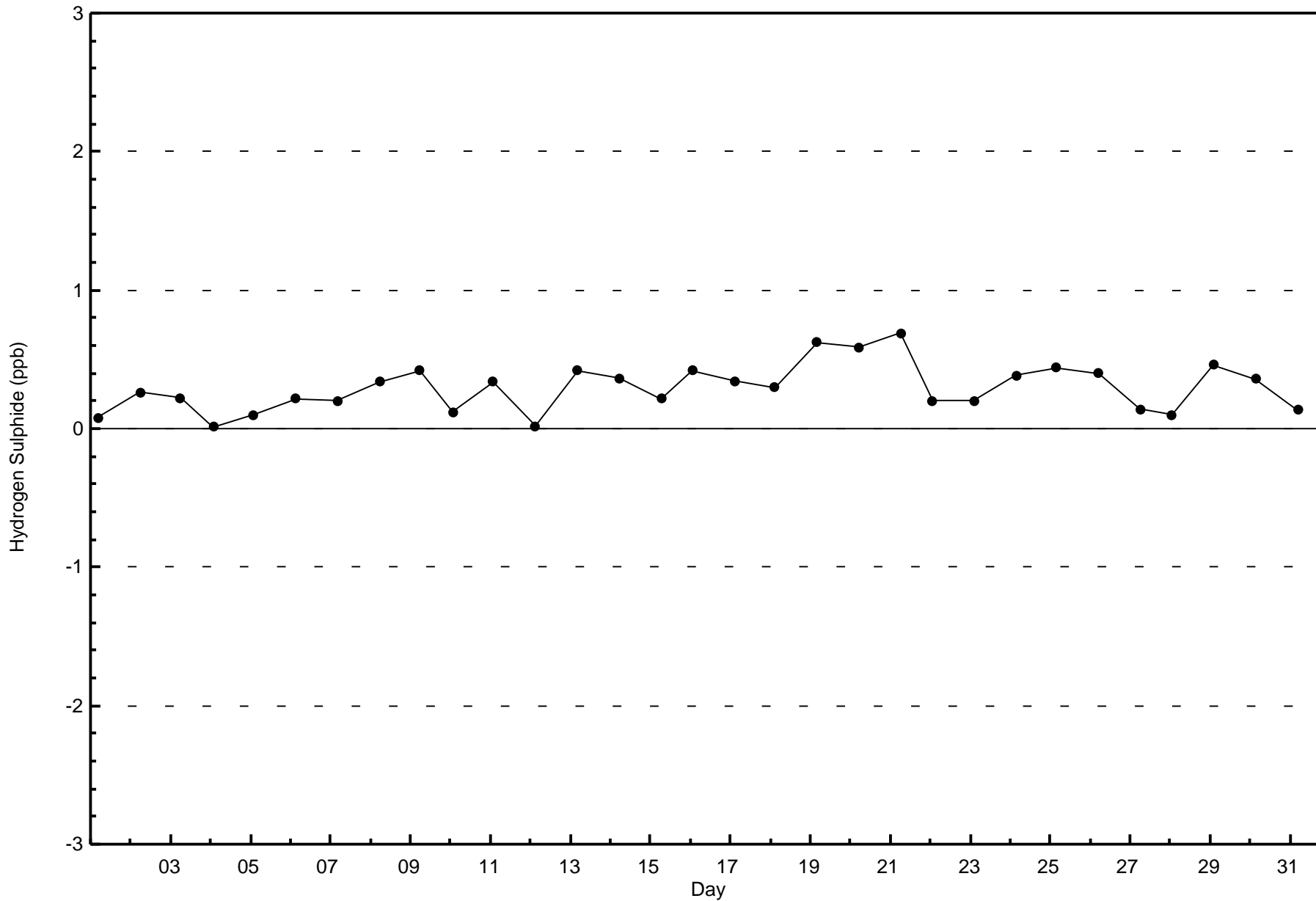
Hydrogen Sulphide (H₂S) - ppb
Sawbones Bay (AMS 505)

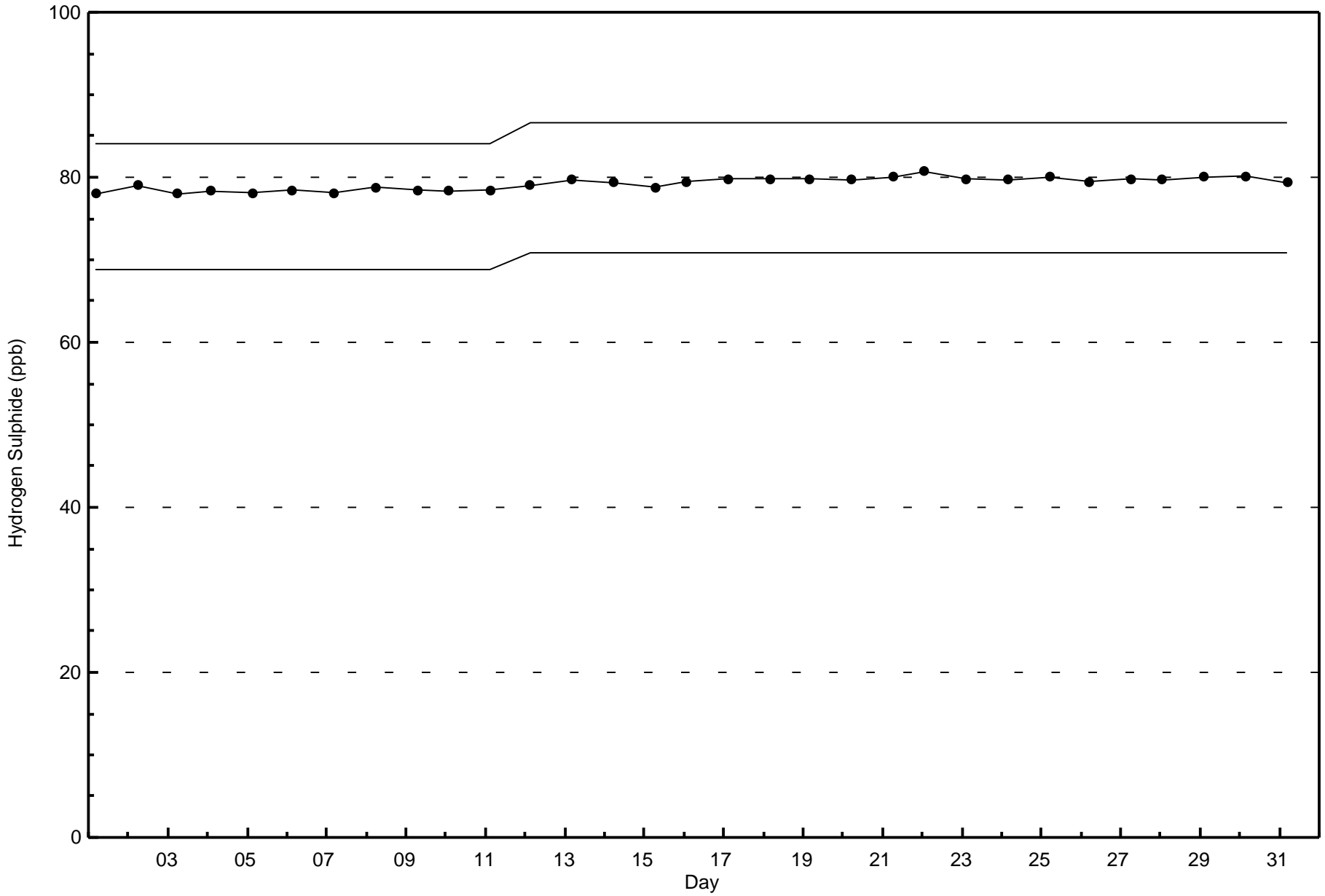


Classes (ppb)



Total Number of Valid Hours: 708







Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

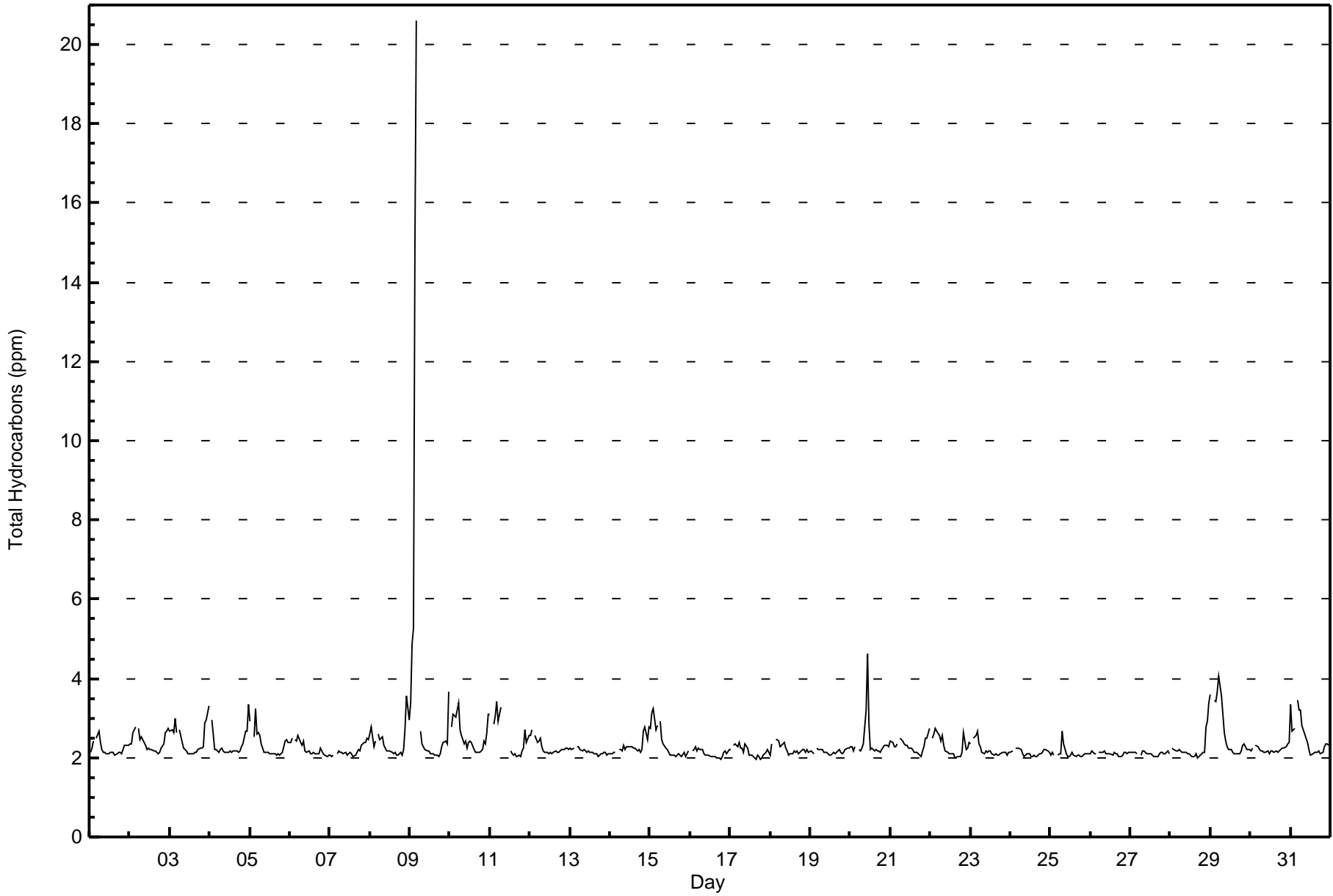
Sawbones Bay - August 2017

| Maximum Value: 20.6 ppm on Aug 9 05:00 | | | | | | | | | | | | | | | | | | | | Maximum Daily Average: 3.9 ppm on Aug 9 | | | | | Hours in Service: 744 | | | |
|--|-------------------------------|-----|-----|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|-----|-----|-----|-----------------|---------------------------|---------------|--|--|
| Minimum Value: 1.9 ppm on Aug 17 19:00 | | | | | | | | | | | | | | | | | | | | Minimum Daily Average: 2.1 ppm on Aug 27 | | | | | Hours of Data: 708 | | | |
| Maximum Diurnal Average: 3.2 ppm at hour 5 | | | | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 2.1 ppm at hour 17 | | | | | Hours of Missing Data: 36 | | | |
| Monthly Average: 2.33 ppm | | | | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 2.0 P ₁₀ = 2.1 Q ₁ = 2.1 Median = 2.2 Q ₃ = 2.3 P ₉₀ = 2.7 P ₉₉ = 3.4 | | | | | Hours of Calibration: 36 | | | |
| | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | |
| 1-Aug | 2.1 | 2.2 | 2.4 | Z | 2.5 | 2.7 | 2.4 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.3 | 2.3 | 2.3 | 2.2 | 2.7 | | |
| 2-Aug | 2.3 | 2.3 | 2.6 | 2.8 | Z | 2.7 | 2.5 | 2.5 | 2.5 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.3 | 2.4 | 2.6 | 2.7 | 2.8 | 2.4 | 2.8 | | |
| 3-Aug | 2.7 | 2.7 | 2.6 | 3.0 | 2.6 | Z | 2.7 | 2.4 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.3 | 2.9 | 3.0 | 3.3 | 2.4 | 3.3 | | |
| 4-Aug | Z | 3.0 | 2.6 | 2.2 | 2.2 | 2.1 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.2 | 2.2 | 2.1 | 2.2 | 2.1 | 2.2 | 2.3 | 2.7 | 2.7 | 3.3 | 2.3 | 3.3 | | |
| 5-Aug | 2.9 | Z | 2.5 | 3.3 | 2.6 | 2.6 | 2.6 | 2.3 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.3 | 2.4 | 2.5 | 2.4 | 2.3 | 3.3 | | |
| 6-Aug | 2.4 | 2.5 | Z | 2.5 | 2.4 | 2.6 | 2.4 | 2.3 | 2.4 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.1 | 2.1 | 2.0 | 2.1 | 2.2 | 2.6 | | |
| 7-Aug | 2.1 | 2.0 | 2.1 | Z | 2.1 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.0 | 2.1 | 2.1 | 2.2 | 2.2 | 2.3 | 2.4 | 2.4 | 2.5 | 2.5 | 2.2 | 2.5 | | |
| 8-Aug | 2.6 | 2.8 | 2.3 | 2.4 | Z | 2.6 | 2.5 | 2.5 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.7 | 3.5 | 2.9 | 2.4 | 3.5 | | |
| 9-Aug | 3.4 | 4.9 | 5.3 | 14.8 | 20.6 | Z | 2.7 | 2.4 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.1 | 2.3 | 2.4 | 2.4 | 2.4 | 3.7 | 3.9 | 20.6 | | |
| 10-Aug | Z | 2.8 | 3.1 | 3.0 | 3.2 | 3.4 | 2.7 | 2.6 | 2.4 | 2.4 | 2.2 | 2.4 | 2.4 | 2.4 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.4 | 2.4 | 2.6 | 3.1 | 2.5 | 3.4 | | |
| 11-Aug | 3.1 | Z | 2.9 | 3.1 | 3.4 | 2.9 | 3.3 | C | C | C | C | C | 2.2 | 2.1 | 2.0 | 2.1 | 2.0 | 2.0 | 2.0 | 2.2 | 2.2 | 2.7 | 2.4 | 2.6 | 2.5 | 3.4 | | |
| 12-Aug | 2.5 | 2.7 | Z | 2.6 | 2.4 | 2.4 | 2.5 | 2.3 | 2.2 | 2.1 | 2.2 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.2 | 2.2 | 2.3 | 2.7 | | |
| 13-Aug | 2.3 | 2.2 | 2.2 | Z | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.1 | 2.2 | 2.3 | | |
| 14-Aug | 2.1 | 2.1 | 2.1 | 2.1 | Z | 2.2 | 2.2 | 2.2 | 2.3 | 2.2 | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.3 | 2.2 | 2.2 | 2.1 | 2.2 | 2.7 | 2.8 | 2.4 | 2.8 | 2.3 | 2.8 | | |
| 15-Aug | 2.7 | 3.1 | 3.2 | 2.7 | 2.8 | Z | 2.9 | 2.4 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.1 | 2.1 | 2.1 | 2.0 | 2.1 | 2.0 | 2.1 | 2.2 | 2.3 | 3.2 | | |
| 16-Aug | Z | 2.2 | 2.2 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.2 | 2.1 | 2.2 | 2.1 | 2.3 | | |
| 17-Aug | 2.2 | Z | 2.3 | 2.3 | 2.3 | 2.4 | 2.2 | 2.2 | 2.1 | 2.4 | 2.2 | 2.1 | 2.0 | 2.1 | 2.0 | 2.0 | 2.1 | 2.0 | 1.9 | 2.0 | 2.1 | 2.1 | 2.2 | 2.1 | 2.2 | 2.4 | | |
| 18-Aug | 2.1 | 2.3 | Z | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.4 | 2.3 | 2.2 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.2 | 2.1 | 2.2 | 2.2 | 2.2 | 2.1 | 2.2 | 2.1 | 2.2 | 2.5 | | |
| 19-Aug | 2.2 | 2.1 | 2.1 | Z | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.1 | 2.2 | 2.1 | 2.1 | 2.1 | 2.2 | 2.3 | 2.2 | 2.2 | 2.3 | | |
| 20-Aug | 2.3 | 2.3 | 2.2 | 2.3 | Z | 2.2 | 2.2 | 2.2 | 2.3 | 3.2 | 4.6 | 2.8 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.2 | 2.3 | 2.3 | 2.3 | 2.3 | 2.4 | 4.6 | | |
| 21-Aug | 2.4 | 2.4 | 2.3 | 2.3 | 2.4 | Z | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.2 | 2.1 | 2.0 | 2.2 | 2.3 | 2.5 | 2.5 | 2.7 | 2.3 | 2.7 | | |
| 22-Aug | Z | 2.5 | 2.6 | 2.7 | 2.7 | 2.6 | 2.4 | 2.6 | 2.3 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.6 | 2.2 | 2.2 | 2.4 | 2.3 | 2.7 | | |
| 23-Aug | 2.3 | Z | 2.5 | 2.6 | 2.7 | 2.4 | 2.3 | 2.1 | 2.1 | 2.2 | 2.1 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.7 | | |
| 24-Aug | 2.1 | 2.2 | Z | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.0 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.1 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.2 | | |
| 25-Aug | 2.1 | 2.1 | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.7 | 2.3 | 2.1 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.0 | 2.1 | 2.1 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.7 | | |
| 26-Aug | 2.1 | 2.2 | 2.1 | 2.1 | Z | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | | |
| 27-Aug | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | Z | 2.1 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.2 | | |
| 28-Aug | Z | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.1 | 2.0 | 2.0 | 2.1 | 2.1 | 2.8 | 2.9 | 3.4 | 2.2 | 3.4 | | |
| 29-Aug | 3.6 | Z | 3.5 | 3.4 | 3.7 | 4.0 | 3.5 | 3.1 | 2.6 | 2.4 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.6 | 4.0 | | |
| 30-Aug | 2.2 | 2.2 | Z | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.2 | 2.1 | 2.2 | 2.2 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.4 | 2.2 | 2.4 | | |
| 31-Aug | 3.3 | 2.7 | 2.8 | Z | 3.5 | 3.2 | 3.2 | 2.8 | 2.6 | 2.5 | 2.4 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.1 | 2.3 | 2.3 | 2.3 | 2.3 | 2.5 | 3.5 | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | |
| Z - zerospan C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Sawbones Bay - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Sawbones Bay - August 2017

| Concentration Ranges (ppm) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 2.0 | 51 | 7.20 | 7.20 |
| 2.1 - 3.0 | 623 | 87.99 | 95.20 |
| 3.1 - 10.0 | 32 | 4.52 | 99.72 |
| > 10.0 | 2 | 0.28 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Sawbones Bay - August 2017**

| Concentration Ranges (ppm) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|----------|------------|-----------|------------|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 2.0 | 0 | 5 | 0 | 0 | 0 | 0 | 2 | 7 | 2 | 0 | 2 | 7 | 6 | 17 | 2 | 1 | 51 |
| 2.1 - 3.0 | 19 | 22 | 10 | 2 | 9 | 21 | 36 | 80 | 63 | 48 | 59 | 58 | 81 | 72 | 32 | 10 | 622 |
| 3.1 - 10.0 | 1 | 0 | 0 | 1 | 1 | 2 | 1 | 5 | 14 | 1 | 0 | 2 | 2 | 2 | 0 | 0 | 32 |
| > 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Totals | 20 | 27 | 10 | 3 | 10 | 23 | 39 | 92 | 81 | 49 | 61 | 67 | 89 | 91 | 34 | 11 | 707 |

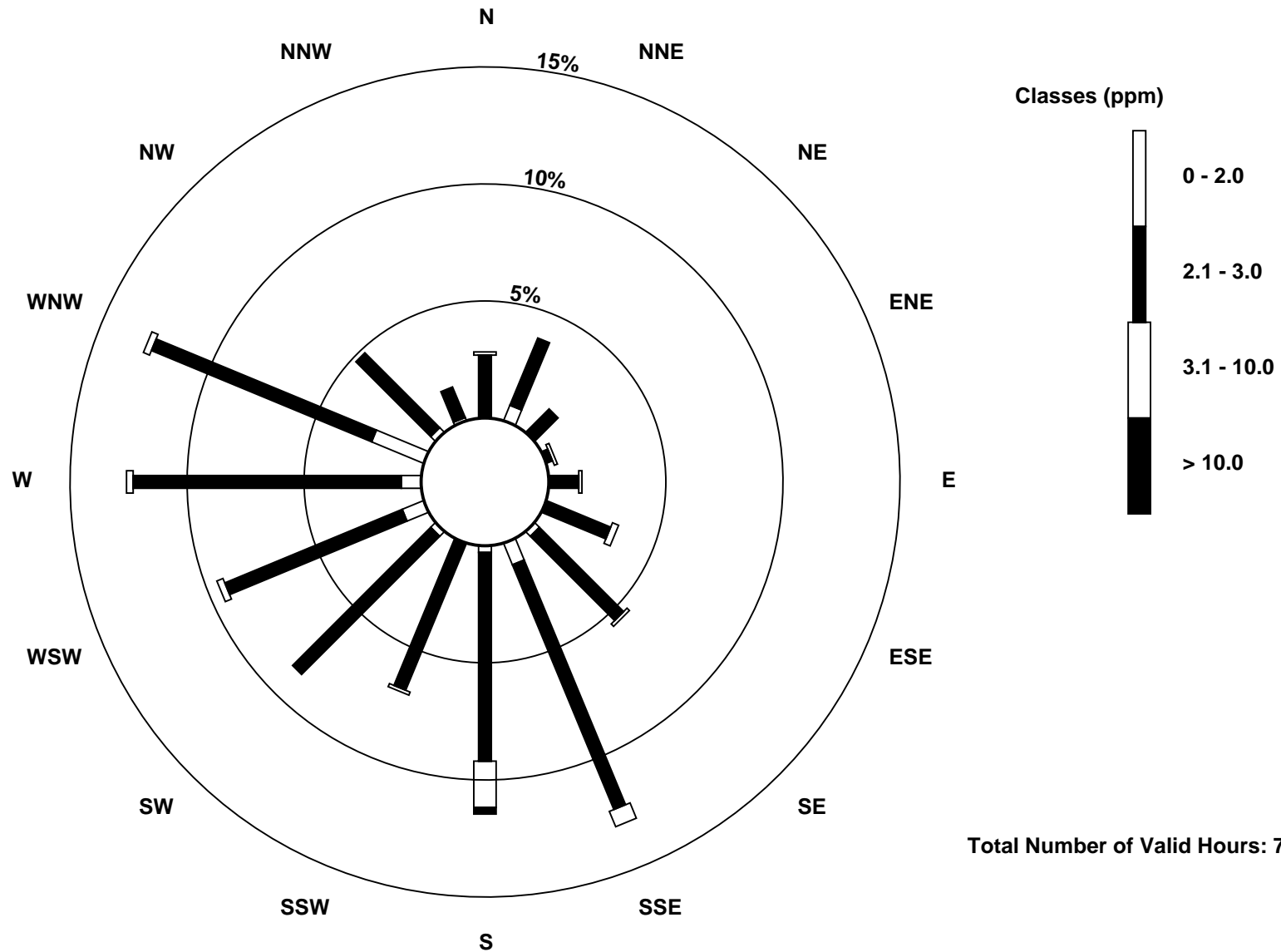
Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

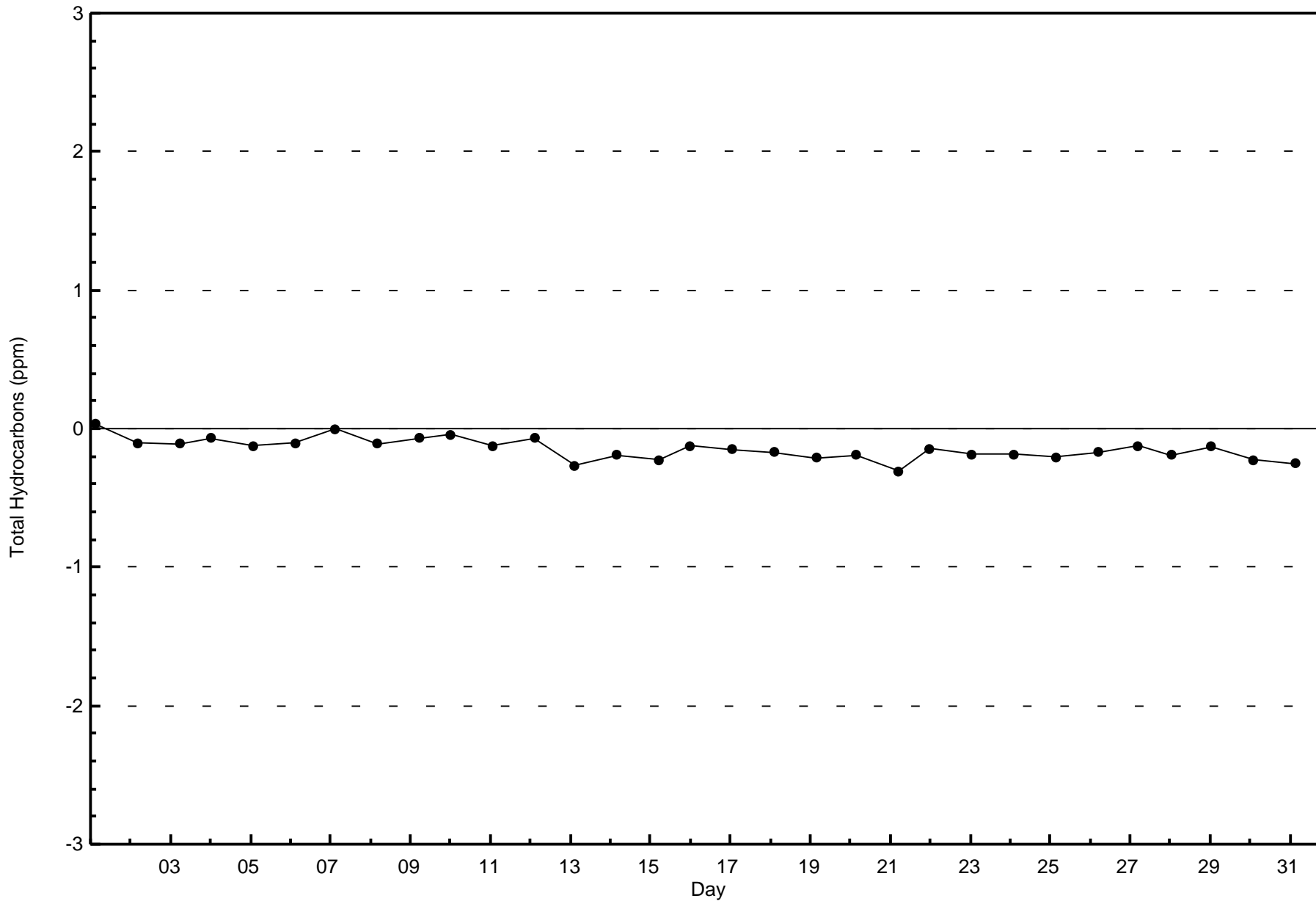
Total Hydrocarbons (THC) - ppm
Sawbones Bay (AMS 505)

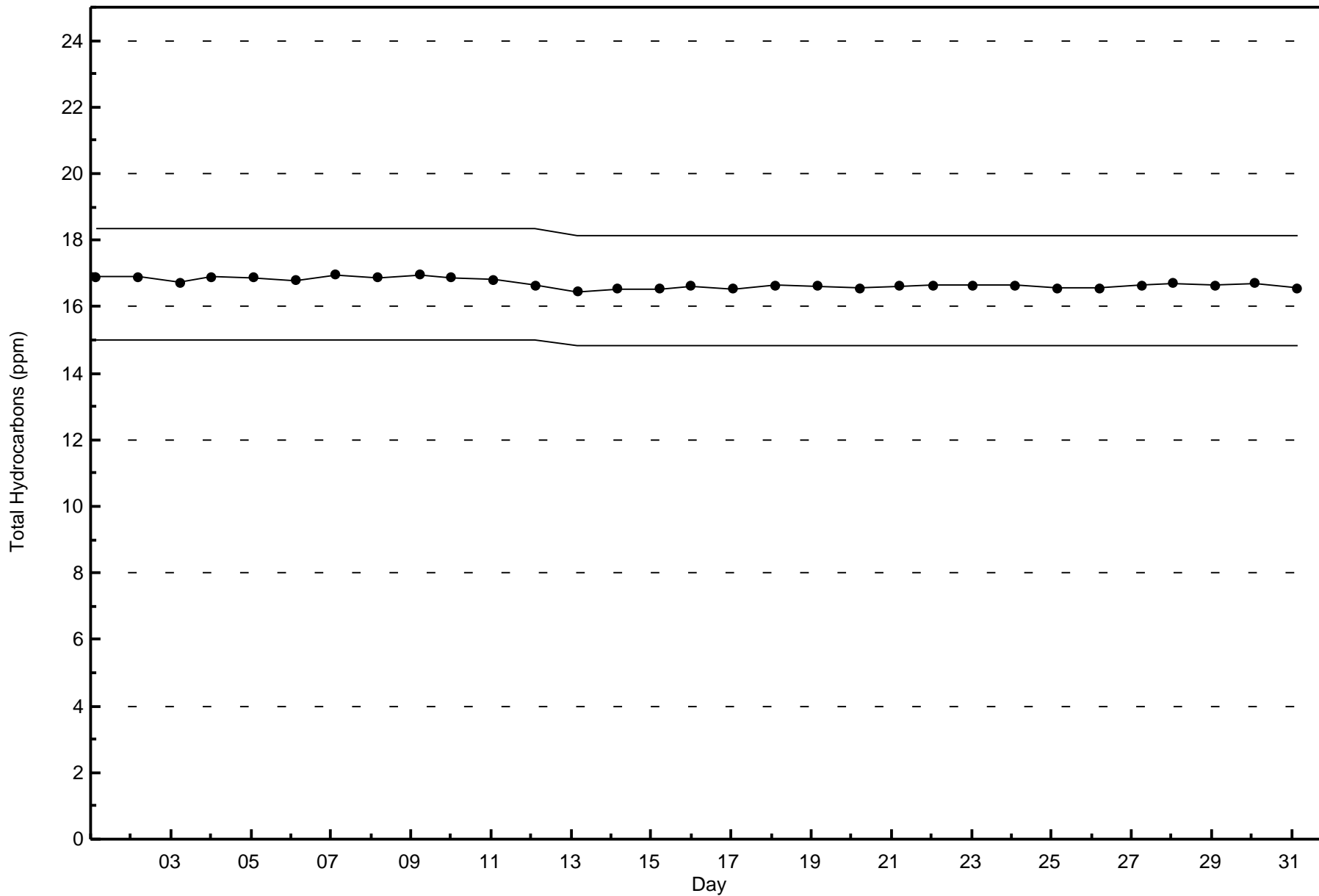




Wood Buffalo Environmental Association
Zero Responses

Total Hydrocarbons (THC) - ppm
Sawbones Bay - August 2017







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

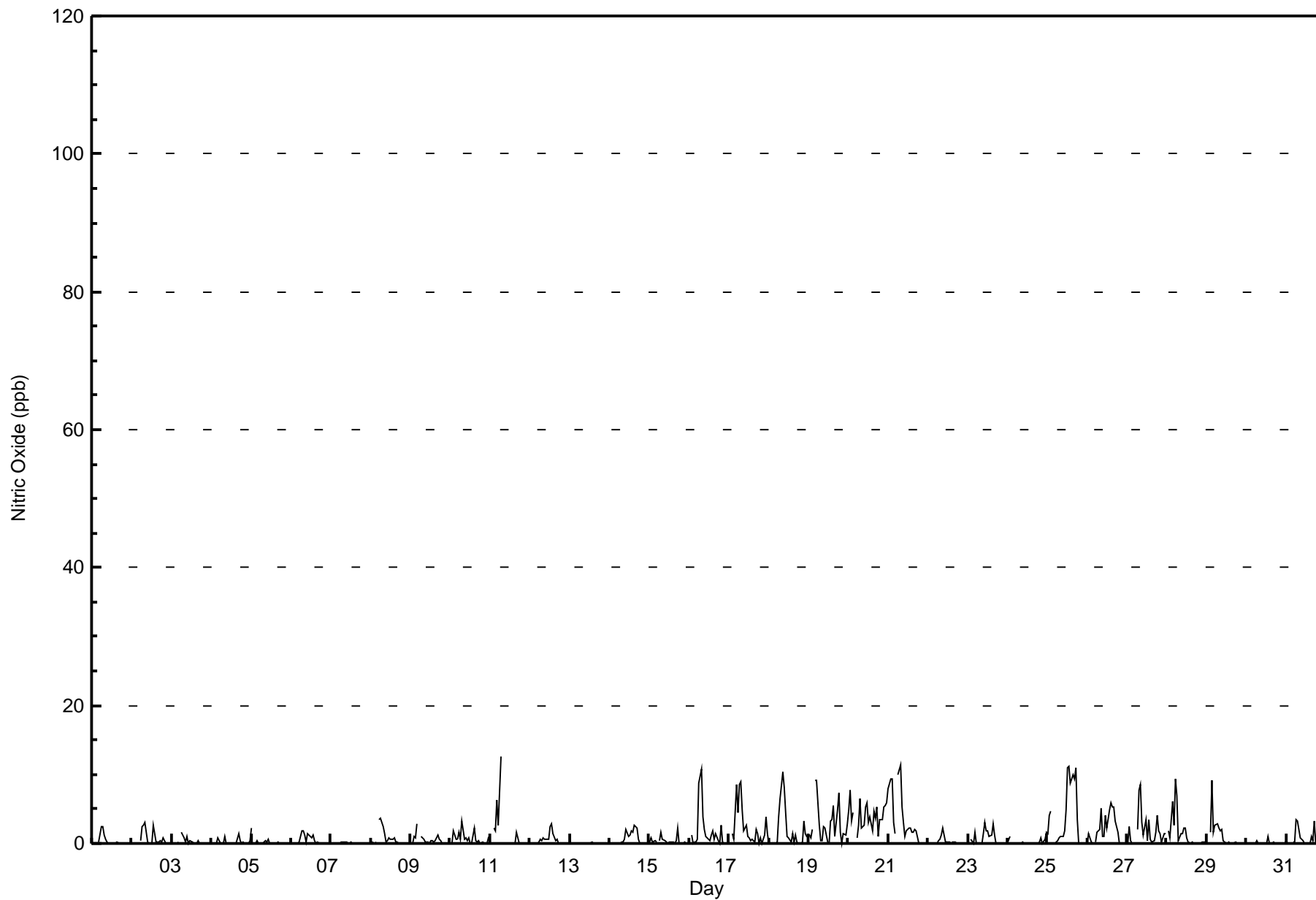
Sawbones Bay - August 2017

| Maximum Value: 13 ppb on Aug 11 07:00 | | | | | | | | | | | | | | | | | Maximum Daily Average: 4.1 ppb on Aug 20 | | | | | | | | | | | | | | | | | Hours in Service: 744 | |
|---|-------------------------------|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|-----------------|---------------|---------------|--|--|--|--|--|--|--|---------------------------------|--|
| Minimum Value: 0 ppb on Aug 1 01:00 | | | | | | | | | | | | | | | | | Minimum Daily Average: 0.0 ppb on Aug 13 | | | | | | | | | | | | | | | | | Hours of Data: 708 | |
| Maximum Diurnal Average: 2.7 ppb at hour 7 | | | | | | | | | | | | | | | | | Minimum Diurnal Average: 0.4 ppb at hour 21 | | | | | | | | | | | | | | | | | Hours of Missing Data: 36 | |
| Monthly Average: 1.2 ppb | | | | | | | | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 10 | | | | | | | | | | | | | | | | | Hours of Calibration: 36 | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Percent Operational Time: 100.0 | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | |
| 1-Aug | 0 | 0 | 0 | Z | 0 | 2 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 3 | | | | | | | | | |
| 2-Aug | 0 | 0 | 0 | 0 | Z | 0 | 2 | 3 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0.6 | 3 | | | | | | | | | |
| 3-Aug | 0 | 0 | 0 | 0 | 0 | Z | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 2 | | | | | | | | | |
| 4-Aug | Z | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 1 | | | | | | | | | |
| 5-Aug | 2 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 2 | | | | | | | | | |
| 6-Aug | 0 | 0 | Z | 0 | 0 | 0 | 2 | 2 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 2 | | | | | | | | | |
| 7-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | |
| 8-Aug | 0 | 0 | 0 | 0 | Z | 3 | 4 | 2 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 4 | | | | | | | | | |
| 9-Aug | 0 | 0 | 1 | 1 | 3 | Z | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 3 | | | | | | | | | |
| 10-Aug | Z | 0 | 2 | 1 | 1 | 2 | 1 | 3 | 1 | 1 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.7 | 3 | | | | | | | | | |
| 11-Aug | 1 | Z | 2 | 2 | 6 | 3 | 13 | C | C | C | C | C | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.5 | 13 | | | | | | | | | |
| 12-Aug | 0 | 0 | Z | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 2 | 3 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 3 | | | | | | | | | |
| 13-Aug | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | | | | | | | | | |
| 14-Aug | 0 | 0 | 0 | 0 | Z | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 2 | 2 | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 3 | | | | | | | | | |
| 15-Aug | 0 | 1 | 0 | 0 | 0 | Z | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 2 | | | | | | | | | |
| 16-Aug | Z | 1 | 0 | 0 | 0 | 1 | 9 | 11 | 4 | 2 | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 1.7 | 11 | | | | | | | | | |
| 17-Aug | 0 | Z | 1 | 1 | 9 | 5 | 9 | 9 | 5 | 2 | 3 | 1 | 1 | 0 | 1 | 0 | 2 | 1 | 0 | 1 | 0 | 1 | 4 | 1 | 2.4 | 9 | | | | | | | | | |
| 18-Aug | 0 | 0 | Z | 0 | 0 | 0 | 4 | 7 | 10 | 8 | 4 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 3 | 1 | 1 | 2.0 | 10 | | | | | | | | | |
| 19-Aug | 1 | 1 | 2 | Z | 9 | 9 | 3 | 0 | 0 | 2 | 2 | 0 | 0 | 3 | 3 | 5 | 1 | 5 | 7 | 2 | 0 | 1 | 1 | 3 | 2.8 | 9 | | | | | | | | | |
| 20-Aug | 5 | 8 | 3 | 4 | Z | 1 | 3 | 6 | 2 | 3 | 5 | 6 | 3 | 4 | 2 | 5 | 4 | 5 | 1 | 3 | 3 | 5 | 6 | 6 | 4.1 | 8 | | | | | | | | | |
| 21-Aug | 8 | 9 | 9 | 3 | 1 | Z | 10 | 11 | 5 | 3 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 3.3 | 11 | | | | | | | | | |
| 22-Aug | Z | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 2 | | | | | | | | | |
| 23-Aug | 0 | Z | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 3 | 2 | 2 | 1 | 1 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 3 | | | | | | | | | |
| 24-Aug | 0 | 1 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 0.2 | 2 | | | | | | | | | |
| 25-Aug | 1 | 4 | 5 | Z | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 5 | 11 | 11 | 9 | 10 | 9 | 11 | 4 | 0 | 0 | 0 | 0 | 0 | 3.7 | 11 | | | | | | | | | |
| 26-Aug | 0 | 1 | 0 | 0 | Z | 0 | 2 | 2 | 5 | 1 | 1 | 4 | 2 | 5 | 6 | 5 | 5 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 2.0 | 6 | | | | | | | | | |
| 27-Aug | 0 | 2 | 0 | 0 | 0 | Z | 2 | 8 | 8 | 3 | 1 | 3 | 0 | 4 | 1 | 0 | 0 | 2 | 4 | 2 | 1 | 0 | 1 | 1 | 2.0 | 8 | | | | | | | | | |
| 28-Aug | Z | 2 | 1 | 6 | 3 | 9 | 7 | 0 | 1 | 1 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.6 | 9 | | | | | | | | | |
| 29-Aug | 0 | Z | 2 | 9 | 2 | 3 | 3 | 2 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.1 | 9 | | | | | | | | | |
| 30-Aug | 0 | 0 | Z | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 1 | | | | | | | | | |
| 31-Aug | 1 | 0 | 0 | Z | 0 | 0 | 4 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 6 | 0 | 1 | 8 | 1.3 | 8 | | | | | | | | | |
| 0.7 1.2 1.2 1.1 1.4 1.5 2.7 2.6 1.9 1.3 1.1 1.1 1.0 1.4 1.1 1.2 1.2 1.3 0.6 0.4 0.4 0.4 0.5 0.8 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | | | | | | | | |
| 8 9 9 9 9 9 13 11 10 8 5 6 11 11 9 10 9 11 7 3 6 5 6 8 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | | | | | | | |
| Z - zerospan C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Sawbones Bay - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Sawbones Bay - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 708 | 100.00 | 100.00 |
| 21 - 40 | 0 | 0.00 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Sawbones Bay - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 20 | 27 | 10 | 3 | 10 | 23 | 39 | 92 | 81 | 49 | 61 | 67 | 89 | 91 | 34 | 11 | 707 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 20 | 27 | 10 | 3 | 10 | 23 | 39 | 92 | 81 | 49 | 61 | 67 | 89 | 91 | 34 | 11 | 707 |

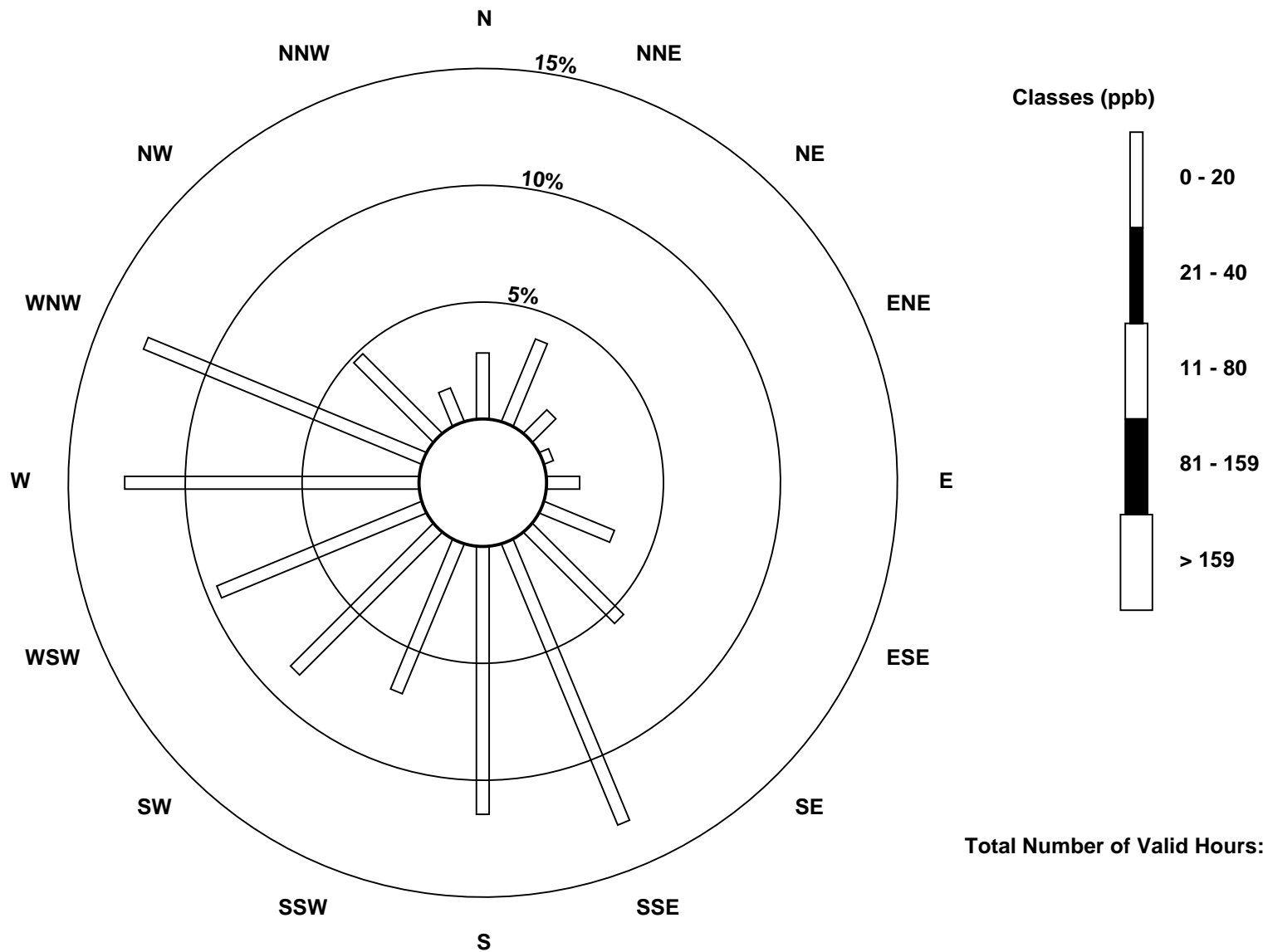
Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

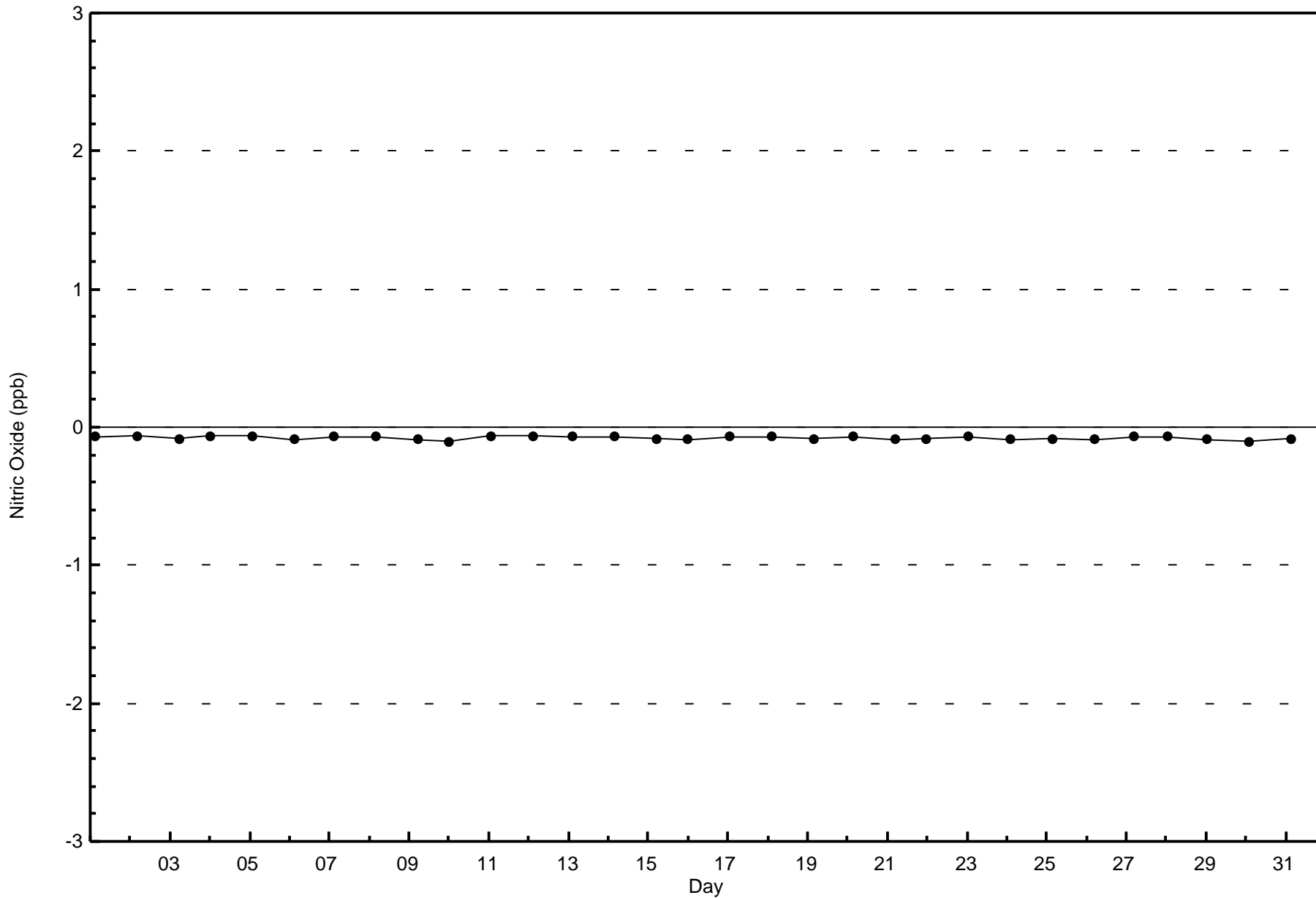
Nitric Oxide (NO) - ppb
Sawbones Bay (AMS 505)





Wood Buffalo Environmental Association
Zero Responses

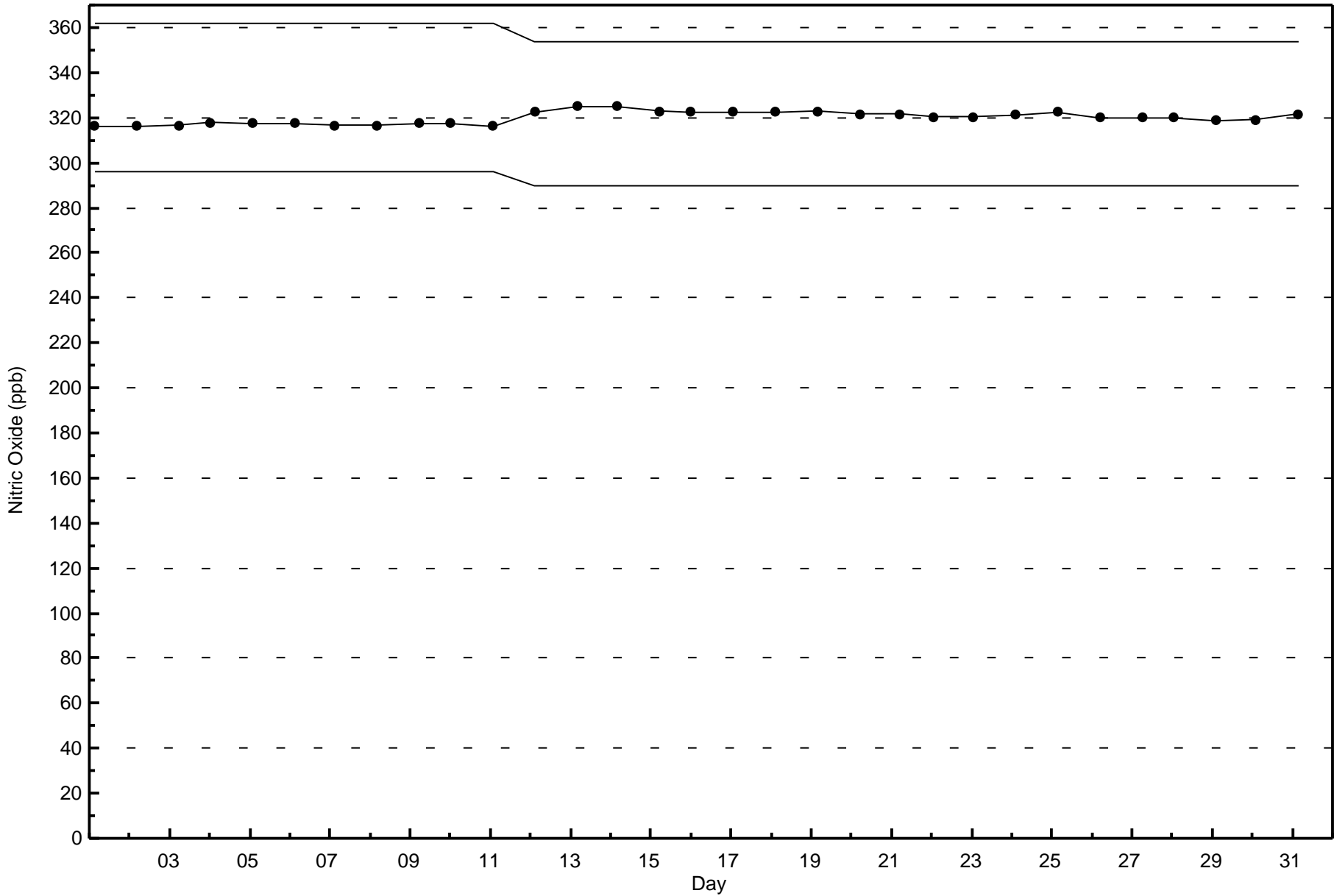
Nitric Oxide (NO) - ppb
Sawbones Bay - August 2017





Wood Buffalo Environmental Association
Span Responses

Nitric Oxide (NO) - ppb
Sawbones Bay - August 2017





Wood Buffalo Environmental Association
Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb
Sawbones Bay - August 2017

| | | | | |
|--|---|----------|---------------------------|-------|
| Number of Exceedences (AAAQO): | 1-hr: 0 | 24-hr: 0 | Hours in Service: | 744 |
| Maximum Value: 15 ppb on Sep 1 00:00 | Maximum Daily Average: 6.1 ppb on Aug 20 | | Hours of Data: | 708 |
| Minimum Value: 0 ppb on Aug 6 23:00 | Minimum Daily Average: 0.5 ppb on Aug 7 | | Hours of Missing Data: | 36 |
| Maximum Diurnal Average: 3.8 ppb at hour 5 | Minimum Diurnal Average: 1.5 ppb at hour 13 | | Hours of Calibration: | 36 |
| Monthly Average: 2.4 ppb | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 O ₃ = 3 P ₉₀ = 6 P ₉₉ = 12 | | Percent Operational Time: | 100.0 |

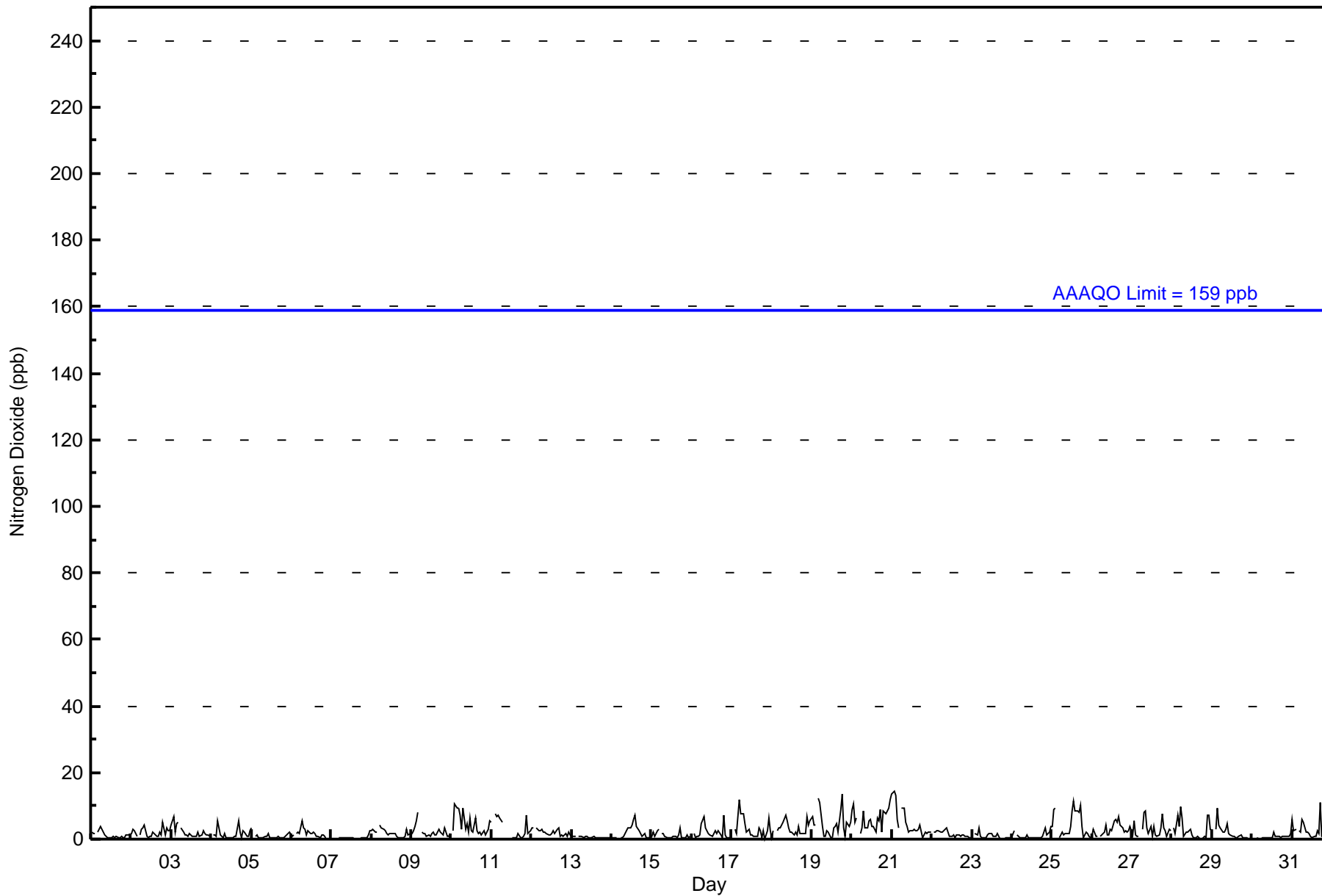
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
|--------|-------------------------------|----|----|---|----|----|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----------------|---------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 2 | 2 | 2 | Z | 2 | 4 | 3 | 2 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1.3 | 4 |
| 2-Aug | 2 | 3 | 3 | 1 | Z | 1 | 3 | 3 | 4 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 5 | 1 | 3 | 3 | 3 | 2.0 | 5 |
| 3-Aug | 4 | 7 | 2 | 5 | 5 | Z | 3 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 3 | 2 | 1 | 1 | 1 | 2.1 | 7 | |
| 4-Aug | Z | 1 | 1 | 1 | 6 | 1 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 6 | 2 | 0 | 2 | 2 | 1 | 1 | 3 | 1.5 | 6 |
| 5-Aug | 4 | Z | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 0.9 | 4 |
| 6-Aug | 1 | 1 | Z | 2 | 2 | 2 | 5 | 3 | 3 | 1 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1.6 | 5 | |
| 7-Aug | 0 | 0 | 0 | Z | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 3 | 0.5 | 3 |
| 8-Aug | 3 | 3 | 2 | 2 | Z | 4 | 3 | 3 | 3 | 2 | 1 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 0 | 0 | 1 | 3 | 1 | 2 | 1.8 | 4 |
| 9-Aug | 2 | 2 | 4 | 5 | 8 | Z | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 3 | 2 | 2 | 1 | 4 | 1 | 1 | 2 | 2.2 | 8 |
| 10-Aug | Z | 3 | 11 | 9 | 9 | 7 | 3 | 9 | 3 | 5 | 2 | 7 | 2 | 2 | 6 | 3 | 2 | 2 | 1 | 3 | 1 | 2 | 3 | 6 | 4.4 | 11 |
| 11-Aug | 5 | Z | 8 | 7 | 7 | 6 | 5 | C | C | C | C | C | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 1 | 2 | 7 | 2 | 3 | 3.1 | 8 |
| 12-Aug | 3 | 4 | Z | 4 | 3 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 2 | 3 | 2 | 3 | 4 | 1 | 1 | 1 | 2 | 1 | 2 | 1 | 2.1 | 4 |
| 13-Aug | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 1 |
| 14-Aug | 0 | 0 | 0 | 1 | Z | 1 | 1 | 1 | 2 | 3 | 4 | 4 | 4 | 6 | 7 | 4 | 3 | 2 | 1 | 1 | 2 | 1 | 1 | 0 | 2.0 | 7 |
| 15-Aug | 1 | 2 | 1 | 3 | 3 | Z | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 4 | 1 | 0 | 1 | 1 | 1 | 1 | 1.2 | 4 |
| 16-Aug | Z | 2 | 1 | 1 | 1 | 1 | 5 | 7 | 3 | 3 | 2 | 1 | 1 | 2 | 3 | 2 | 2 | 1 | 1 | 7 | 1 | 1 | 0 | 1 | 2.0 | 7 |
| 17-Aug | 1 | Z | 3 | 2 | 12 | 8 | 8 | 8 | 5 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 3 | 3 | 1 | 3 | 0 | 2 | 6 | 3 | 3.3 | 12 |
| 18-Aug | 1 | 3 | Z | 3 | 4 | 4 | 4 | 5 | 7 | 5 | 3 | 2 | 2 | 1 | 2 | 1 | 4 | 2 | 2 | 2 | 2 | 7 | 4 | 6 | 3.2 | 7 |
| 19-Aug | 7 | 4 | 4 | Z | 12 | 11 | 4 | 1 | 1 | 3 | 2 | 1 | 0 | 3 | 4 | 5 | 2 | 9 | 13 | 4 | 1 | 5 | 4 | 5 | 4.5 | 13 |
| 20-Aug | 9 | 11 | 5 | 6 | Z | 2 | 3 | 8 | 3 | 3 | 6 | 6 | 4 | 4 | 2 | 7 | 6 | 9 | 2 | 9 | 8 | 8 | 9 | 12 | 6.1 | 12 |
| 21-Aug | 13 | 14 | 13 | 6 | 4 | Z | 9 | 9 | 5 | 4 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 4 | 1 | 1 | 2 | 2 | 2 | 2 | 4.8 | 14 |
| 22-Aug | Z | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 4 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.6 | 4 |
| 23-Aug | 1 | Z | 2 | 1 | 3 | 1 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1.0 | 3 | |
| 24-Aug | 0 | 2 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 1 | 2 | 4 | 1.1 | 4 |
| 25-Aug | 4 | 9 | 9 | Z | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 4 | 9 | 12 | 9 | 8 | 8 | 10 | 4 | 1 | 2 | 2 | 1 | 1 | 4.4 | 12 |
| 26-Aug | 1 | 3 | 1 | 1 | Z | 1 | 1 | 2 | 4 | 1 | 1 | 3 | 3 | 6 | 6 | 5 | 7 | 4 | 3 | 2 | 3 | 2 | 2 | 4 | 2.9 | 7 |
| 27-Aug | 1 | 5 | 1 | 1 | 1 | Z | 3 | 8 | 8 | 3 | 2 | 4 | 1 | 4 | 1 | 1 | 1 | 4 | 8 | 3 | 3 | 1 | 3 | 3 | 3.0 | 8 |
| 28-Aug | Z | 4 | 2 | 7 | 4 | 10 | 7 | 1 | 2 | 2 | 3 | 3 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 7 | 7 | 3 | 2.9 | 10 |
| 29-Aug | 3 | Z | 3 | 9 | 4 | 4 | 2 | 2 | 3 | 5 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1.9 | 9 |
| 30-Aug | 0 | 0 | Z | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 0.7 | 2 |
| 31-Aug | 6 | 2 | 3 | Z | 3 | 2 | 6 | 5 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 3 | 2 | 11 | 1 | 1 | 13 | 1 | 4 | 15 | 3.7 | 15 |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |

Z - zerospan C - Calibration
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Sawbones Bay - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Sawbones Bay - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 708 | 100.00 | 100.00 |
| 21 - 40 | 0 | 0.00 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Sawbones Bay - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 20 | 27 | 10 | 3 | 10 | 23 | 39 | 92 | 81 | 49 | 61 | 67 | 89 | 91 | 34 | 11 | 707 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 20 | 27 | 10 | 3 | 10 | 23 | 39 | 92 | 81 | 49 | 61 | 67 | 89 | 91 | 34 | 11 | 707 |

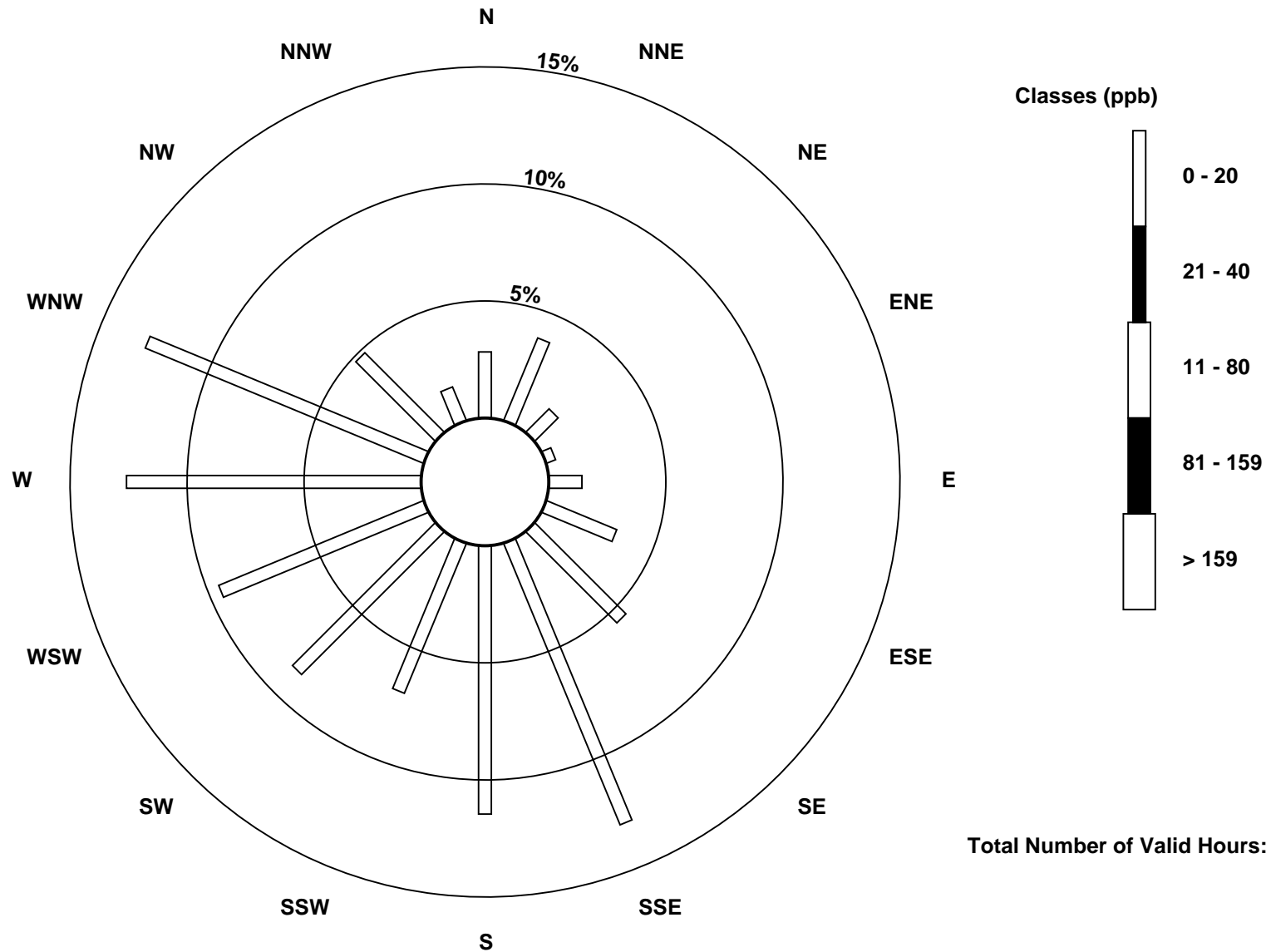
Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

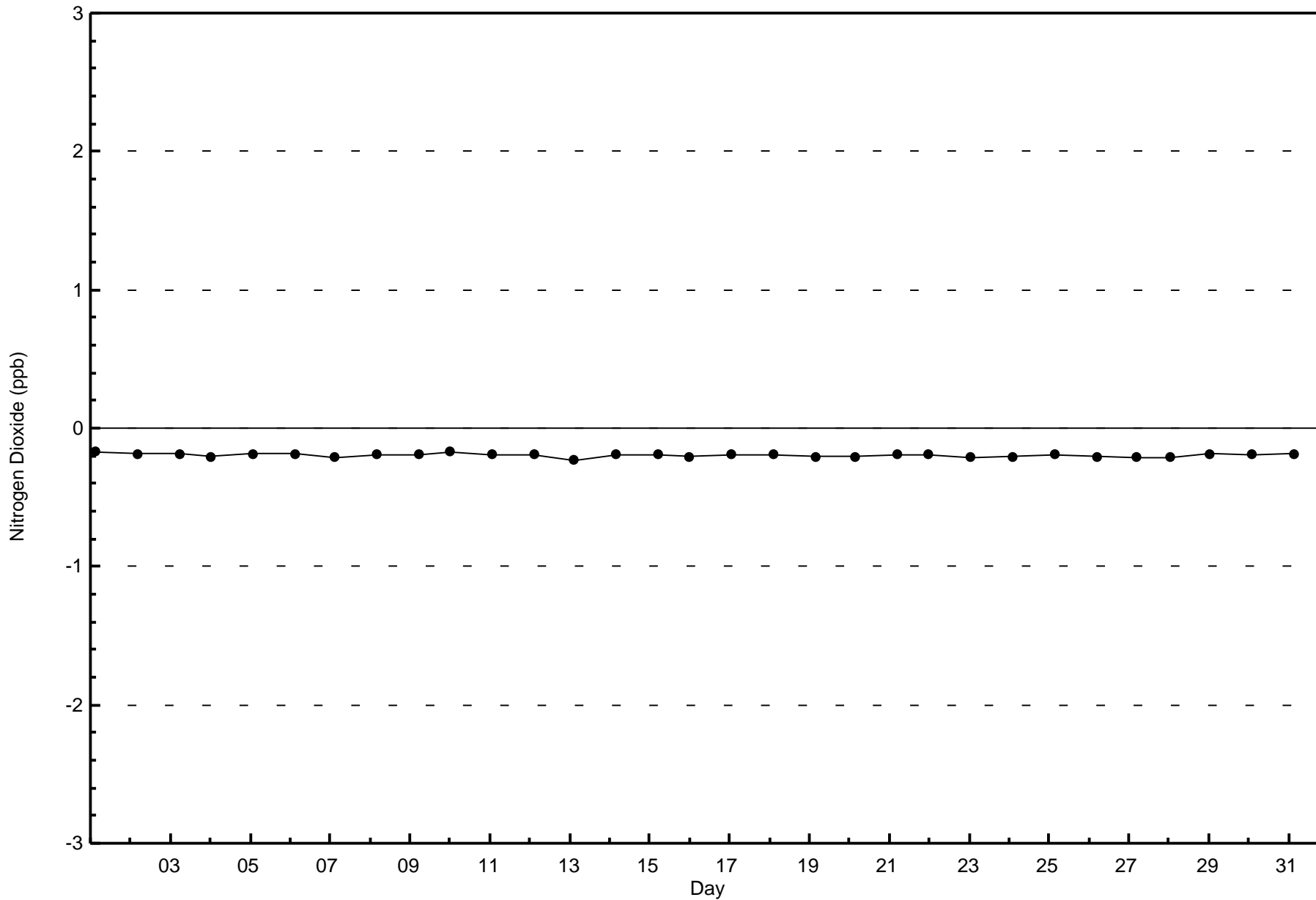
Nitrogen Dioxide (NO₂) - ppb
Sawbones Bay (AMS 505)





Wood Buffalo Environmental Association
Zero Responses

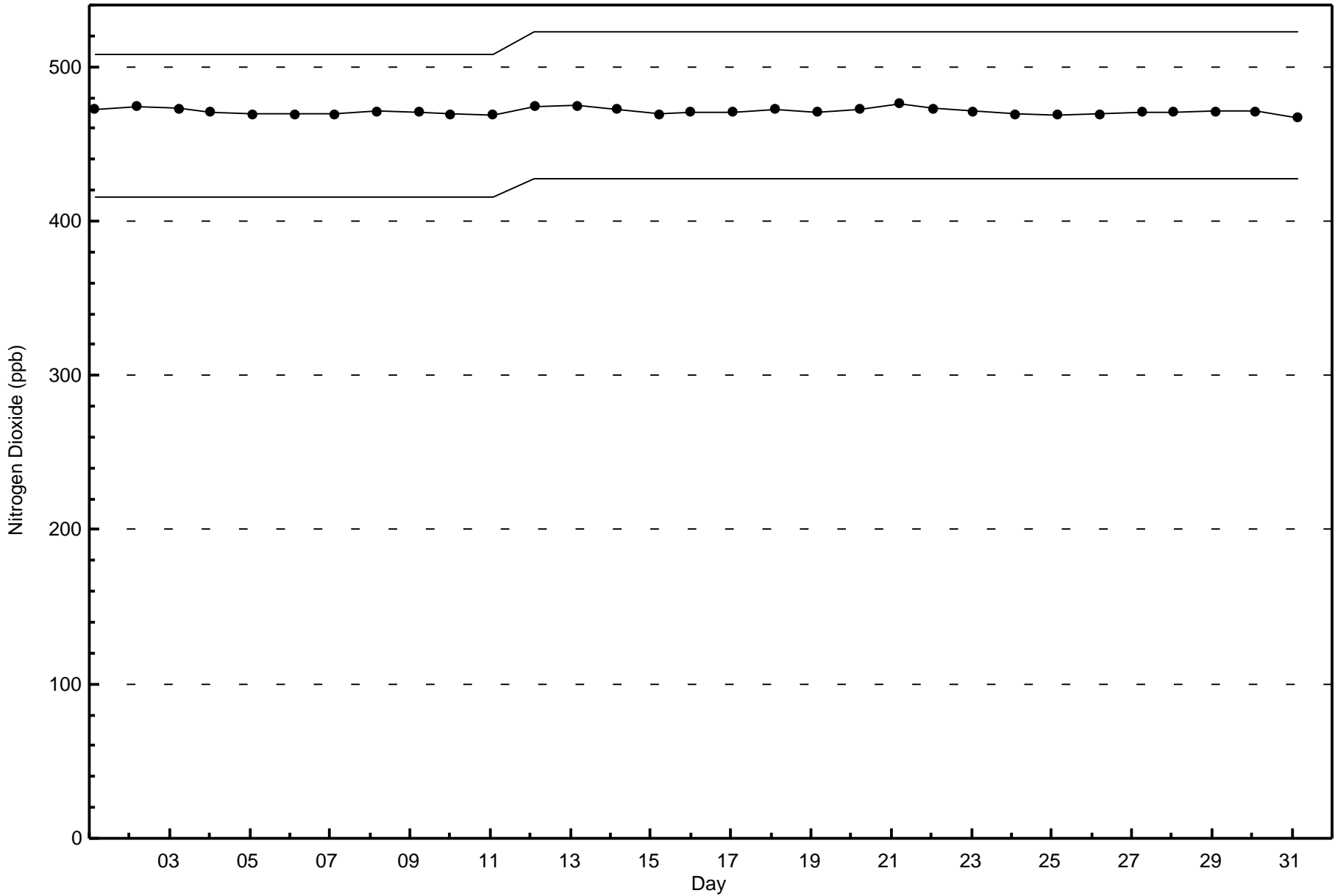
Nitrogen Dioxide (NO₂) - ppb
Sawbones Bay - August 2017





Wood Buffalo Environmental Association
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Sawbones Bay - August 2017





Wood Buffalo Environmental Association
Summary of Hour Averages

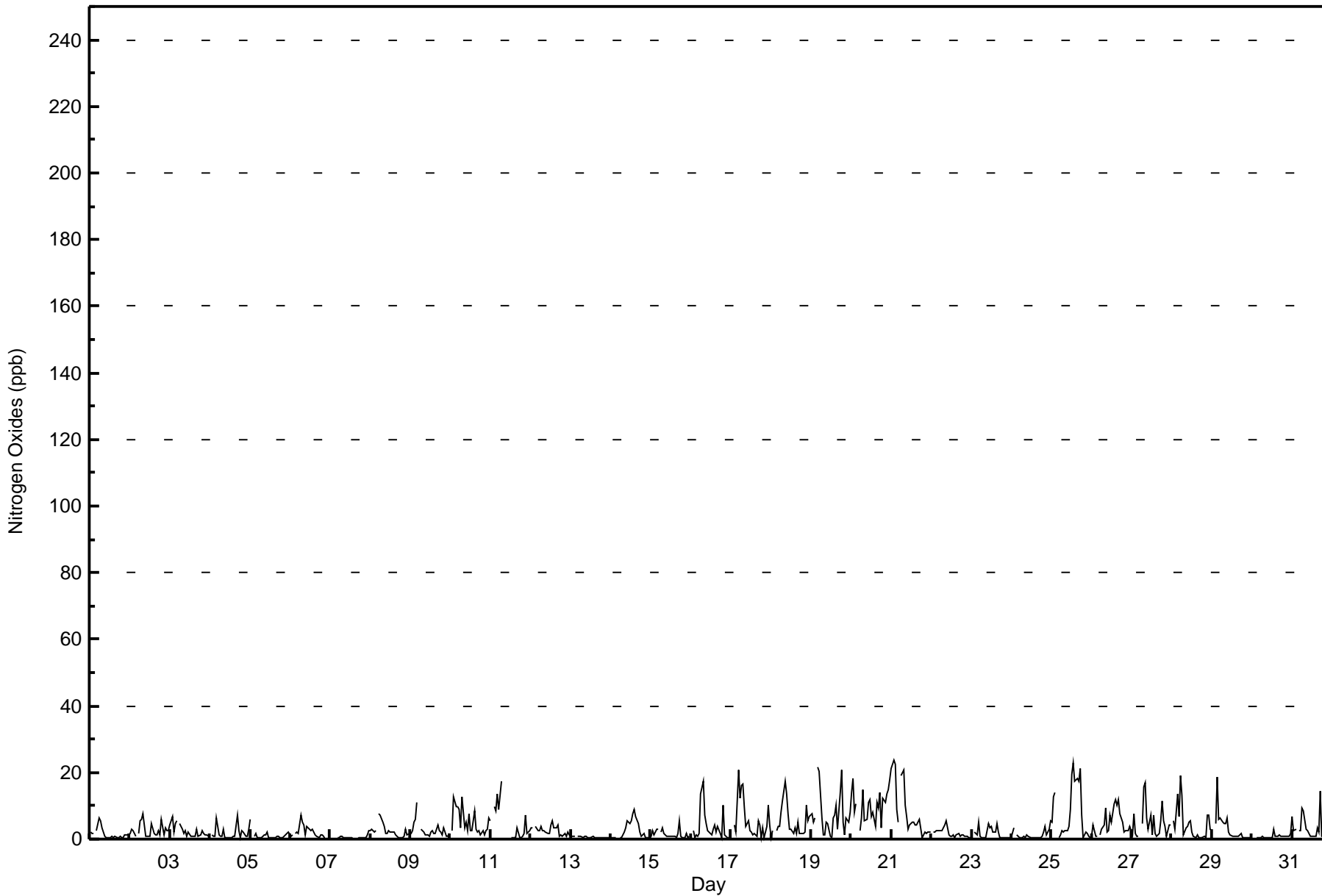
Nitrogen Oxides (NO_x) - ppb
Sawbones Bay - August 2017

| Maximum Value: 24 ppb on Aug 21 02:00 | | Maximum Daily Average: 10.2 ppb on Aug 20 | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------------|---|----|---------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----------------|---------------|---------------|
| Minimum Value: 0 ppb on Aug 7 02:00 | | Minimum Daily Average: 0.5 ppb on Aug 7 | | Hours of Data: 708 | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 5.7 ppb at hour 8 | | Minimum Diurnal Average: 2.2 ppb at hour 19 | | Hours of Missing Data: 36 | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 3.5 ppb | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 5 P ₉₀ = 9 P ₉₉ = 21 | | Hours of Calibration: 36 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 2 | 2 | 2 | Z | 2 | 6 | 5 | 4 | 2 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | | |
| 2-Aug | 2 | 3 | 3 | 1 | Z | 2 | 5 | 6 | 8 | 1 | 1 | 1 | 1 | 5 | 2 | 1 | 1 | 2 | 1 | 6 | 1 | 3 | 3 | 3 | | |
| 3-Aug | 4 | 7 | 2 | 5 | 5 | Z | 5 | 3 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 3 | 2 | 1 | 1 | 1 | | |
| 4-Aug | Z | 1 | 1 | 1 | 6 | 1 | 1 | 1 | 3 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 7 | 3 | 0 | 3 | 2 | 1 | 1 | 3 | | |
| 5-Aug | 6 | Z | 1 | 2 | 0 | 0 | 1 | 0 | 1 | 1 | 2 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | | |
| 6-Aug | 1 | 1 | Z | 2 | 2 | 2 | 7 | 5 | 4 | 1 | 4 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | | |
| 7-Aug | 0 | 0 | 0 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 3 | | |
| 8-Aug | 3 | 3 | 2 | 2 | Z | 8 | 7 | 5 | 4 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 0 | 0 | 1 | 3 | 1 | 2 | | |
| 9-Aug | 2 | 2 | 5 | 6 | 11 | Z | 3 | 2 | 2 | 1 | 1 | 1 | 2 | 3 | 2 | 2 | 4 | 3 | 2 | 1 | 4 | 1 | 1 | 2 | | |
| 10-Aug | Z | 3 | 13 | 10 | 10 | 9 | 4 | 13 | 3 | 5 | 3 | 7 | 3 | 2 | 9 | 3 | 2 | 2 | 1 | 3 | 1 | 2 | 3 | 6 | | |
| 11-Aug | 6 | Z | 10 | 8 | 13 | 9 | 17 | C | C | C | C | C | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 1 | 2 | 7 | 2 | 2 | | |
| 12-Aug | 3 | 4 | Z | 4 | 3 | 3 | 4 | 3 | 3 | 2 | 2 | 2 | 4 | 5 | 3 | 3 | 4 | 1 | 1 | 1 | 2 | 1 | 2 | 1 | | |
| 13-Aug | 1 | 1 | 1 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 14-Aug | 0 | 0 | 0 | 0 | Z | 1 | 1 | 1 | 2 | 3 | 6 | 5 | 5 | 8 | 9 | 7 | 5 | 2 | 1 | 1 | 2 | 1 | 0 | 0 | | |
| 15-Aug | 1 | 3 | 1 | 3 | 3 | Z | 2 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 2 | 6 | 1 | 0 | 1 | 2 | 1 | 1 | | |
| 16-Aug | Z | 3 | 1 | 1 | 1 | 2 | 14 | 17 | 7 | 4 | 2 | 2 | 1 | 3 | 4 | 2 | 4 | 2 | 1 | 10 | 1 | 1 | 0 | 1 | | |
| 17-Aug | 0 | Z | 4 | 2 | 21 | 12 | 16 | 16 | 10 | 4 | 6 | 2 | 2 | 1 | 2 | 1 | 5 | 4 | 1 | 3 | 0 | 4 | 10 | 4 | | |
| 18-Aug | 1 | 3 | Z | 3 | 4 | 4 | 8 | 12 | 17 | 13 | 8 | 3 | 3 | 2 | 4 | 2 | 5 | 2 | 2 | 2 | 2 | 10 | 6 | 7 | | |
| 19-Aug | 8 | 5 | 7 | Z | 22 | 20 | 6 | 1 | 1 | 5 | 5 | 1 | 0 | 6 | 7 | 10 | 3 | 14 | 21 | 5 | 1 | 6 | 5 | 8 | | |
| 20-Aug | 14 | 18 | 8 | 11 | Z | 3 | 6 | 15 | 6 | 6 | 11 | 12 | 7 | 8 | 4 | 11 | 9 | 14 | 3 | 12 | 11 | 14 | 15 | 18 | | |
| 21-Aug | 21 | 24 | 23 | 9 | 5 | Z | 19 | 21 | 10 | 7 | 3 | 4 | 5 | 5 | 4 | 4 | 5 | 6 | 1 | 1 | 2 | 2 | 2 | 2 | | |
| 22-Aug | Z | 2 | 2 | 3 | 2 | 2 | 3 | 3 | 4 | 6 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | | |
| 23-Aug | 0 | Z | 2 | 1 | 5 | 1 | 0 | 1 | 1 | 3 | 5 | 3 | 4 | 2 | 2 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | | |
| 24-Aug | 0 | 3 | Z | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 2 | 4 | 1 | 3 | 6 | | |
| 25-Aug | 5 | 13 | 14 | Z | 1 | 1 | 3 | 2 | 3 | 3 | 4 | 9 | 20 | 23 | 17 | 18 | 18 | 21 | 7 | 1 | 2 | 2 | 1 | 0 | | |
| 26-Aug | 1 | 4 | 1 | 1 | Z | 1 | 3 | 4 | 9 | 2 | 2 | 7 | 5 | 10 | 12 | 10 | 12 | 8 | 5 | 2 | 3 | 2 | 2 | 4 | | |
| 27-Aug | 1 | 8 | 2 | 1 | 1 | Z | 5 | 16 | 17 | 6 | 3 | 7 | 1 | 7 | 2 | 1 | 2 | 5 | 12 | 5 | 4 | 1 | 4 | 4 | | |
| 28-Aug | Z | 5 | 3 | 13 | 7 | 19 | 13 | 1 | 3 | 4 | 5 | 5 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 7 | 7 | 3 | | |
| 29-Aug | 3 | Z | 5 | 18 | 6 | 6 | 5 | 5 | 5 | 7 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | | |
| 30-Aug | 0 | 0 | Z | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | | |
| 31-Aug | 7 | 3 | 3 | Z | 3 | 2 | 10 | 8 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 3 | 2 | 14 | 1 | 1 | 18 | 1 | 5 | 22 | | |
| 3.5 4.6 4.4 4.3 5.2 4.5 5.7 5.7 4.4 3.2 2.7 2.9 2.5 3.5 3.0 3.1 3.4 3.8 2.2 2.3 2.3 2.5 2.7 3.5 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | |
| 21 24 23 18 22 20 19 21 17 13 11 12 20 23 17 18 18 21 21 12 18 14 15 22 | | | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | |
| Z - zerospan C - Calibration | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Sawbones Bay - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Sawbones Bay - August 2017**

| Concentration Ranges (ppb) | Number of Hours | % | Cumulative % |
|-----------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 698 | 98.59 | 98.59 |
| 21 - 40 | 10 | 1.41 | 100.00 |
| 41 - 80 | 0 | 0.00 | 100.00 |
| 81 - 159 | 0 | 0.00 | 100.00 |
| > 159 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Sawbones Bay - August 2017**

| Concentration Ranges (ppb) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|---------------------------------------|-----------------------|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|---------------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 20 | 20 | 27 | 10 | 3 | 10 | 23 | 39 | 92 | 81 | 49 | 61 | 66 | 80 | 91 | 34 | 11 | 697 |
| 21 - 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 9 | 0 | 0 | 0 | 10 |
| 11 - 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 - 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| > 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 20 | 27 | 10 | 3 | 10 | 23 | 39 | 92 | 81 | 49 | 61 | 67 | 89 | 91 | 34 | 11 | 707 |

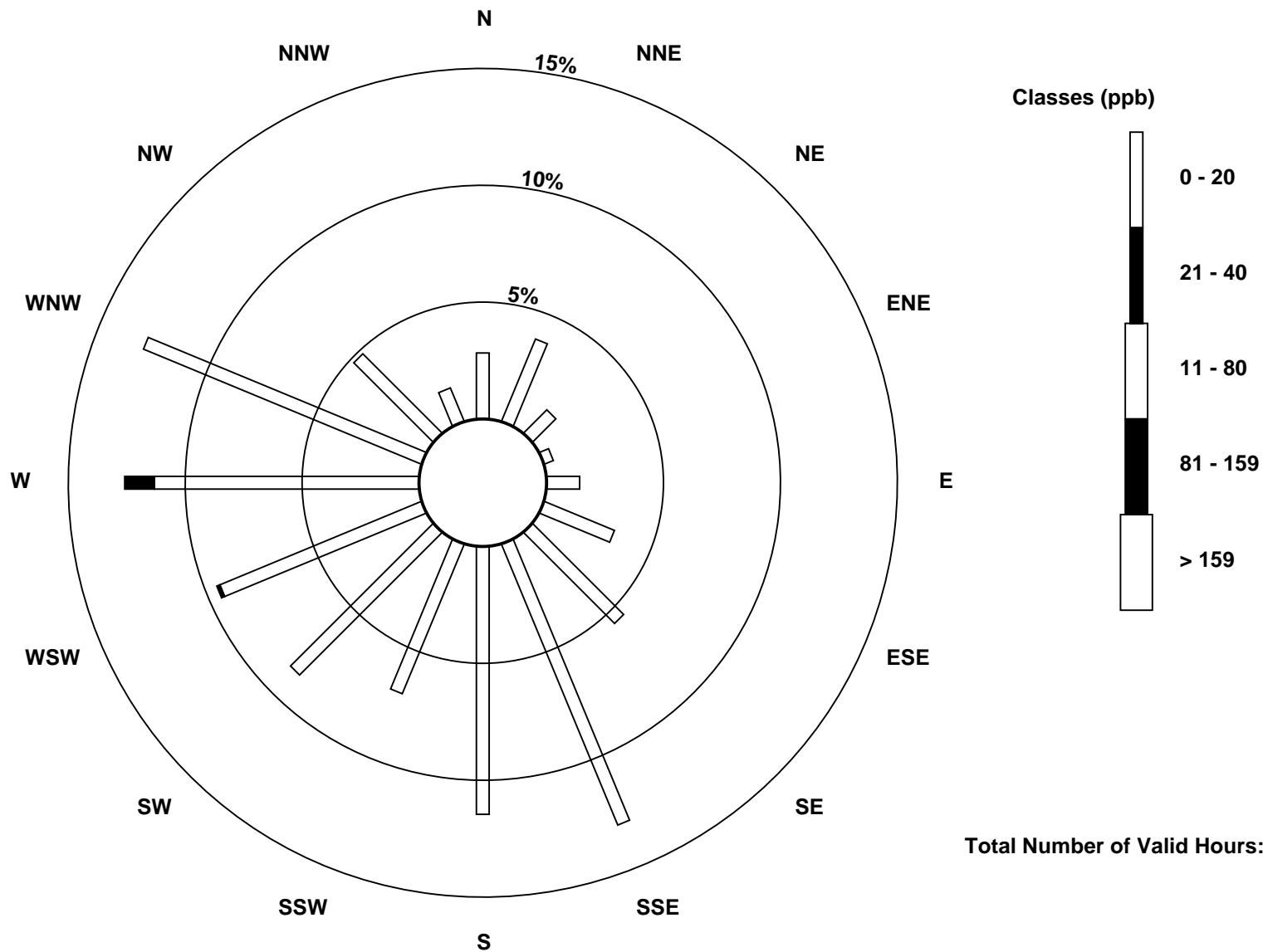
Total Number of Valid Hours: 707

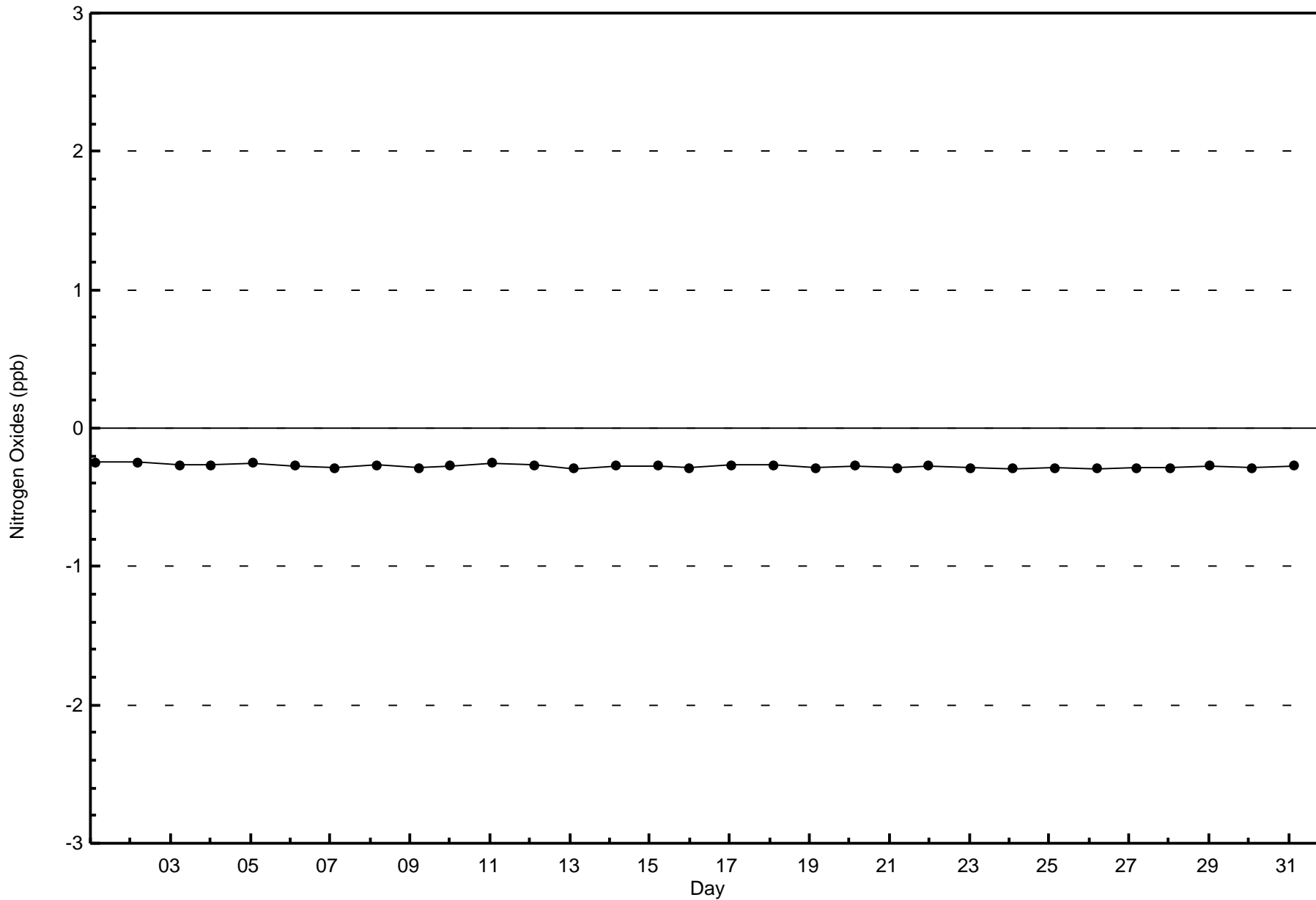
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Nitrogen Oxides (NO_x) - ppb
Sawbones Bay (AMS 505)

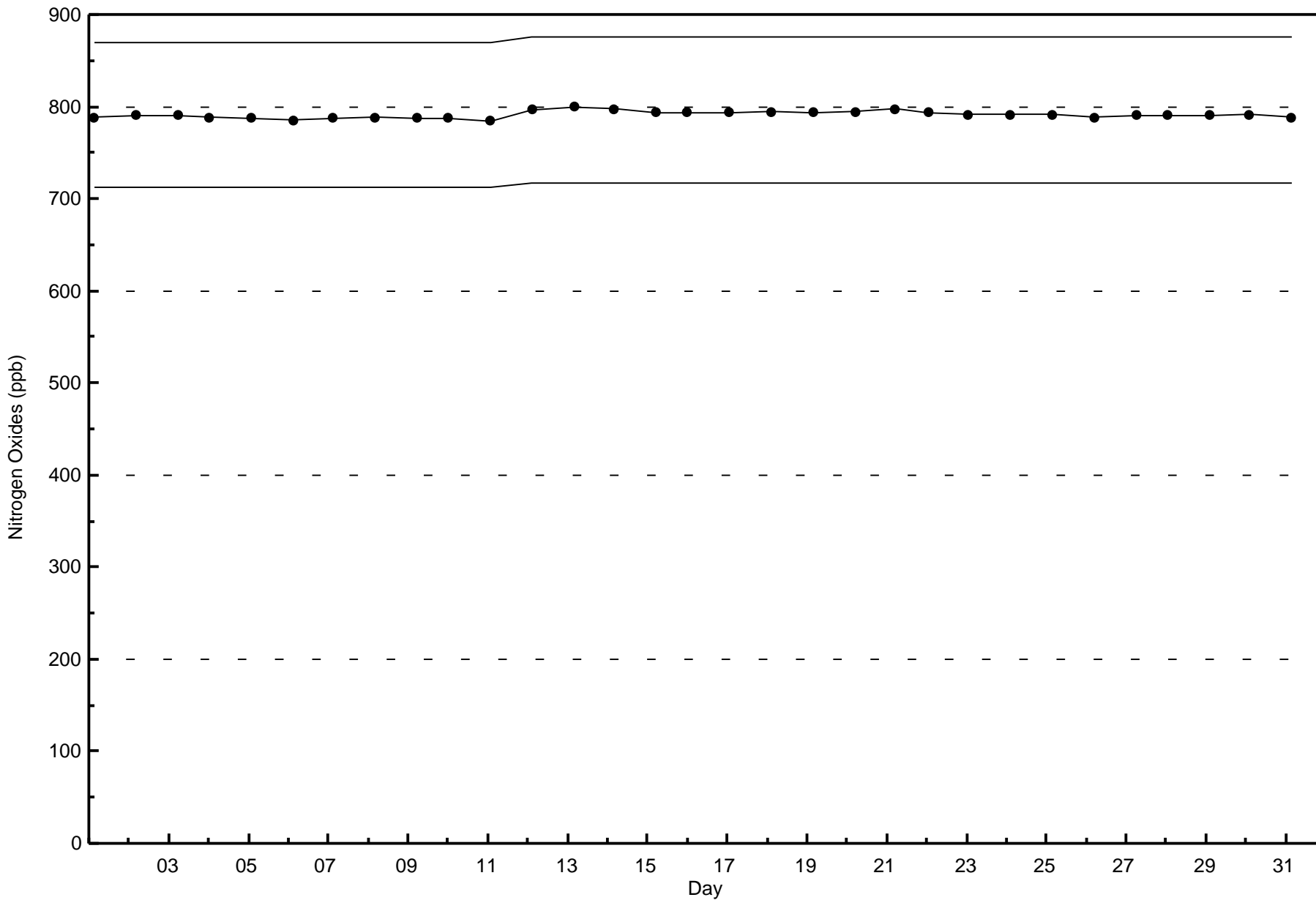






Wood Buffalo Environmental Association
Span Responses

Nitrogen Oxides (NO_x) - ppb
Sawbones Bay - August 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Particulate Matter 2.5 (PM_{2.5}) - µg/m³

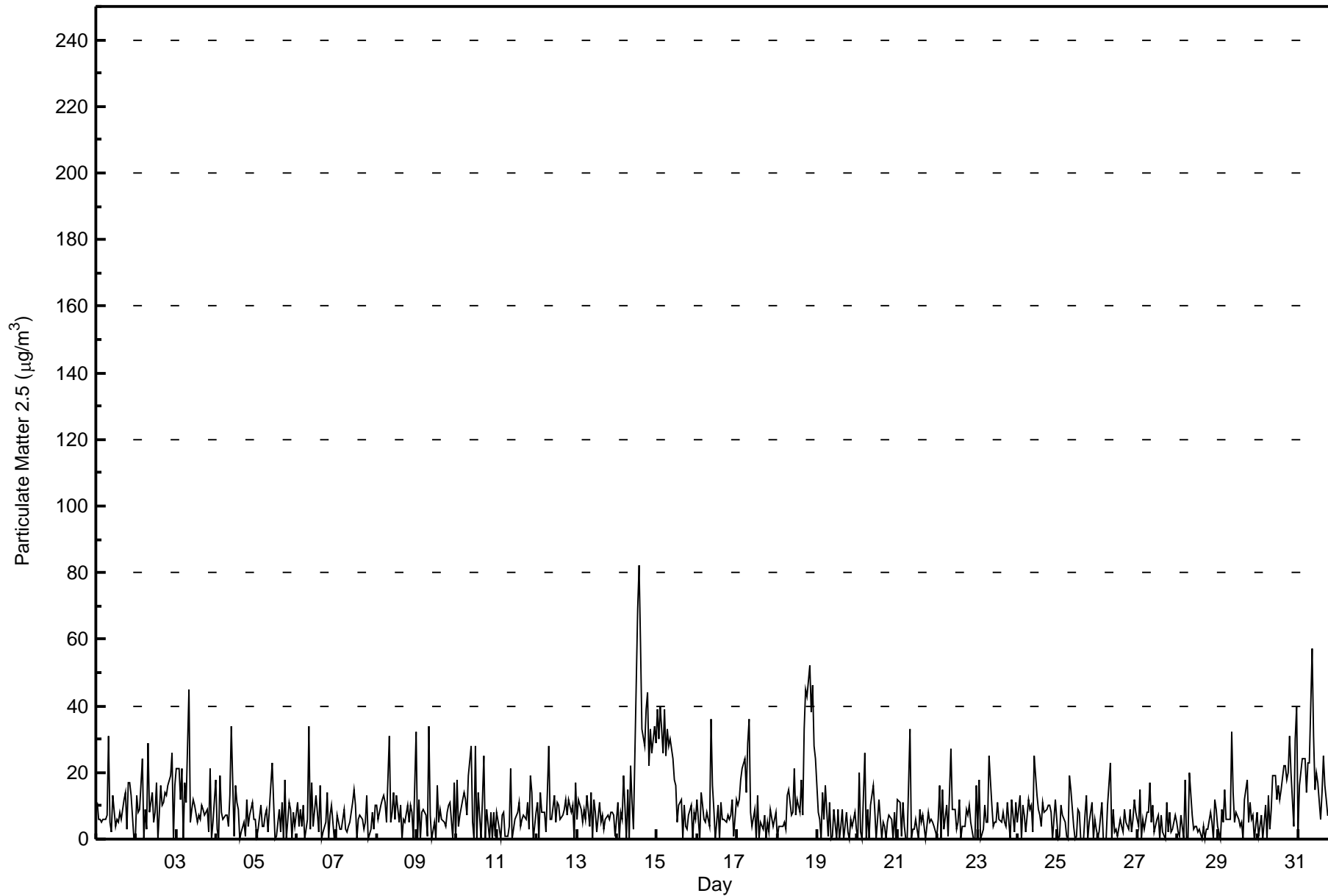
Sawbones Bay - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 | | | | | | | | | | Hours in Service: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|----|----|---------------------------------|----|----|----|-----|---------------|---------------|-----|------|-----|-----|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|------|-----------------|
| Maximum Value: 82 µg/m ³ on Aug 14 14:00 | | | | | | | | | | Maximum Daily Average: 26.7 µg/m ³ on Aug 14 | | | | | | | | | | Hours of Data: 744 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum Value: 0 µg/m ³ on Aug 1 23:00 | | | | | | | | | | Minimum Daily Average: 4.8 µg/m ³ on Aug 28 | | | | | | | | | | Hours of Missing Data: 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Diurnal Average: 17.9 µg/m ³ at hour 8 | | | | | | | | | | Minimum Diurnal Average: 6.4 µg/m ³ at hour 6 | | | | | | | | | | Hours of Calibration: 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monthly Average: 9.4 µg/m ³ | | | | | | | | | | Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 3 Median = 7 Q ₃ = 12 P ₉₀ = 21 P ₉₉ = 45 | | | | | | | | | | Percent Operational Time: 100.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Aug | 11 | 6 | 6 | 5 | 6 | 6 | 7 | 31 | 5 | 2 | 13 | 4 | 6 | 5 | 8 | 6 | 12 | 14 | 3 | 17 | 17 | 13 | 0 | 0 | 8.5 | 31 | | | | | | | | | | | | | | | | | | | | | | |
| 2-Aug | 13 | 8 | 9 | 24 | 0 | 9 | 3 | 29 | 8 | 14 | 5 | 8 | 17 | 0 | 16 | 10 | 11 | 14 | 13 | 16 | 19 | 26 | 0 | 16 | 12.0 | 29 | | | | | | | | | | | | | | | | | | | | | | |
| 3-Aug | 21 | 21 | 12 | 21 | 0 | 17 | 11 | 45 | 5 | 9 | 12 | 10 | 5 | 7 | 6 | 10 | 9 | 7 | 9 | 2 | 21 | 0 | 5 | 18 | 11.8 | 45 | | | | | | | | | | | | | | | | | | | | | | |
| 4-Aug | 3 | 0 | 19 | 8 | 6 | 7 | 7 | 4 | 13 | 34 | 1 | 16 | 11 | 9 | 0 | 2 | 5 | 1 | 12 | 4 | 7 | 11 | 6 | 6 | 8.0 | 34 | | | | | | | | | | | | | | | | | | | | | | |
| 5-Aug | 1 | 3 | 10 | 4 | 4 | 7 | 9 | 2 | 16 | 23 | 11 | 0 | 1 | 9 | 2 | 11 | 0 | 18 | 0 | 11 | 9 | 0 | 8 | 4 | 6.8 | 23 | | | | | | | | | | | | | | | | | | | | | | |
| 6-Aug | 11 | 4 | 9 | 4 | 10 | 0 | 6 | 34 | 3 | 17 | 4 | 13 | 8 | 2 | 16 | 0 | 2 | 5 | 14 | 0 | 7 | 10 | 0 | 0 | 7.5 | 34 | | | | | | | | | | | | | | | | | | | | | | |
| 7-Aug | 7 | 5 | 3 | 3 | 9 | 3 | 2 | 4 | 5 | 11 | 15 | 10 | 0 | 6 | 7 | 6 | 3 | 5 | 13 | 0 | 3 | 8 | 3 | 10 | 5.9 | 15 | | | | | | | | | | | | | | | | | | | | | | |
| 8-Aug | 10 | 6 | 10 | 12 | 13 | 11 | 5 | 31 | 5 | 8 | 14 | 6 | 13 | 5 | 10 | 0 | 6 | 5 | 10 | 5 | 10 | 8 | 0 | 32 | 9.8 | 32 | | | | | | | | | | | | | | | | | | | | | | |
| 9-Aug | 0 | 12 | 0 | 8 | 9 | 7 | 1 | 34 | 7 | 0 | 5 | 0 | 16 | 5 | 9 | 6 | 5 | 4 | 8 | 10 | 11 | 0 | 17 | 0 | 7.3 | 34 | | | | | | | | | | | | | | | | | | | | | | |
| 10-Aug | 18 | 4 | 7 | 12 | 14 | 12 | 7 | 19 | 28 | 5 | 0 | 28 | 0 | 14 | 0 | 12 | 25 | 0 | 9 | 0 | 8 | 0 | 8 | 1 | 9.6 | 28 | | | | | | | | | | | | | | | | | | | | | | |
| 11-Aug | 8 | 3 | 0 | 7 | 8 | 1 | 1 | 4 | 21 | 0 | 3 | 6 | 8 | 11 | 4 | 6 | 7 | 6 | 11 | 3 | 19 | 14 | 0 | 8 | 6.6 | 21 | | | | | | | | | | | | | | | | | | | | | | |
| 12-Aug | 11 | 0 | 14 | 8 | 8 | 2 | 14 | 28 | 6 | 6 | 13 | 5 | 11 | 10 | 6 | 7 | 9 | 12 | 7 | 12 | 8 | 10 | 0 | 17 | 9.3 | 28 | | | | | | | | | | | | | | | | | | | | | | |
| 13-Aug | 6 | 12 | 9 | 5 | 9 | 6 | 13 | 4 | 14 | 0 | 12 | 8 | 2 | 11 | 5 | 7 | 3 | 6 | 7 | 6 | 8 | 8 | 7 | 1 | 7.0 | 14 | | | | | | | | | | | | | | | | | | | | | | |
| 14-Aug | 11 | 0 | 8 | 6 | 19 | 0 | 15 | 0 | 22 | 11 | 3 | 47 | 69 | 82 | 59 | 33 | 28 | 39 | 44 | 22 | 33 | 26 | 34 | 29 | 26.7 | 82 | | | | | | | | | | | | | | | | | | | | | | |
| 15-Aug | 39 | 30 | 40 | 26 | 39 | 25 | 33 | 28 | 30 | 24 | 18 | 16 | 5 | 10 | 12 | 0 | 10 | 4 | 3 | 7 | 10 | 0 | 8 | 6 | 17.6 | 40 | | | | | | | | | | | | | | | | | | | | | | |
| 16-Aug | 12 | 0 | 14 | 10 | 6 | 5 | 8 | 4 | 36 | 16 | 9 | 0 | 10 | 0 | 11 | 6 | 6 | 5 | 7 | 6 | 7 | 12 | 1 | 12 | 8.5 | 36 | | | | | | | | | | | | | | | | | | | | | | |
| 17-Aug | 10 | 12 | 18 | 21 | 24 | 14 | 29 | 36 | 8 | 4 | 9 | 0 | 13 | 0 | 5 | 3 | 7 | 0 | 5 | 2 | 9 | 4 | 6 | 8 | 10.3 | 36 | | | | | | | | | | | | | | | | | | | | | | |
| 18-Aug | 0 | 4 | 4 | 4 | 5 | 3 | 13 | 15 | 7 | 8 | 21 | 7 | 12 | 8 | 18 | 7 | 33 | 45 | 43 | 52 | 38 | 46 | 28 | 24 | 18.5 | 52 | | | | | | | | | | | | | | | | | | | | | | |
| 19-Aug | 8 | 6 | 0 | 14 | 6 | 16 | 1 | 11 | 0 | 1 | 9 | 0 | 9 | 0 | 4 | 9 | 0 | 8 | 2 | 0 | 6 | 4 | 8 | 3 | 5.2 | 16 | | | | | | | | | | | | | | | | | | | | | | |
| 20-Aug | 0 | 20 | 2 | 0 | 26 | 0 | 9 | 0 | 10 | 16 | 9 | 0 | 6 | 12 | 0 | 5 | 4 | 0 | 5 | 7 | 6 | 0 | 8 | 0 | 6.0 | 26 | | | | | | | | | | | | | | | | | | | | | | |
| 21-Aug | 12 | 11 | 1 | 11 | 4 | 0 | 0 | 33 | 0 | 3 | 3 | 6 | 0 | 9 | 5 | 7 | 4 | 0 | 8 | 5 | 6 | 5 | 4 | 1 | 5.8 | 33 | | | | | | | | | | | | | | | | | | | | | | |
| 22-Aug | 6 | 16 | 0 | 15 | 3 | 10 | 1 | 14 | 27 | 9 | 9 | 3 | 5 | 12 | 0 | 4 | 4 | 9 | 7 | 10 | 5 | 0 | 0 | 16 | 7.7 | 27 | | | | | | | | | | | | | | | | | | | | | | |
| 23-Aug | 3 | 18 | 0 | 3 | 10 | 5 | 5 | 25 | 10 | 4 | 5 | 5 | 11 | 6 | 5 | 8 | 5 | 4 | 11 | 0 | 12 | 7 | 2 | 11 | 7.3 | 25 | | | | | | | | | | | | | | | | | | | | | | |
| 24-Aug | 5 | 13 | 0 | 10 | 7 | 2 | 12 | 9 | 10 | 2 | 25 | 13 | 9 | 7 | 4 | 11 | 8 | 9 | 10 | 10 | 8 | 0 | 12 | 6 | 8.4 | 25 | | | | | | | | | | | | | | | | | | | | | | |
| 25-Aug | 0 | 1 | 10 | 7 | 5 | 1 | 0 | 19 | 15 | 4 | 0 | 1 | 9 | 8 | 0 | 0 | 7 | 13 | 0 | 5 | 11 | 0 | 6 | 3 | 5.2 | 19 | | | | | | | | | | | | | | | | | | | | | | |
| 26-Aug | 1 | 2 | 11 | 0 | 0 | 0 | 10 | 23 | 0 | 9 | 2 | 3 | 1 | 6 | 4 | 2 | 9 | 5 | 3 | 9 | 2 | 6 | 12 | 8 | 5.3 | 23 | | | | | | | | | | | | | | | | | | | | | | |
| 27-Aug | 4 | 15 | 0 | 6 | 3 | 8 | 8 | 17 | 5 | 10 | 2 | 6 | 7 | 0 | 7 | 2 | 0 | 11 | 2 | 8 | 2 | 3 | 7 | 5 | 5.8 | 17 | | | | | | | | | | | | | | | | | | | | | | |
| 28-Aug | 2 | 1 | 7 | 0 | 18 | 0 | 0 | 20 | 7 | 3 | 4 | 4 | 2 | 3 | 0 | 4 | 0 | 3 | 3 | 8 | 5 | 0 | 12 | 9 | 4.8 | 20 | | | | | | | | | | | | | | | | | | | | | | |
| 29-Aug | 4 | 0 | 9 | 5 | 15 | 6 | 6 | 6 | 32 | 14 | 5 | 8 | 6 | 4 | 5 | 0 | 12 | 18 | 5 | 11 | 6 | 7 | 0 | 8 | 8.0 | 32 | | | | | | | | | | | | | | | | | | | | | | |
| 30-Aug | 1 | 4 | 7 | 0 | 10 | 0 | 13 | 3 | 9 | 19 | 19 | 12 | 16 | 12 | 15 | 22 | 22 | 18 | 20 | 31 | 20 | 4 | 30 | 40 | 14.5 | 40 | | | | | | | | | | | | | | | | | | | | | | |
| 31-Aug | 2 | 16 | 24 | 24 | 24 | 14 | 23 | 23 | 57 | 31 | 15 | 20 | 17 | 6 | 14 | 25 | 16 | 12 | 7 | 7 | 14 | 4 | 3 | 10 | 17.0 | 57 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | 7.7 | 8.2 | 8.5 | 9.1 | 10.3 | 6.4 | 8.8 | 17.9 | 13.6 | 10.2 | 8.9 | 8.5 | 9.8 | 9.0 | 8.3 | 7.5 | 8.8 | 9.7 | 9.7 | 9.2 | 11.2 | 7.6 | 7.6 | 10.1 | Diurnal Average |
| | | | | | | | | | | | | | | | | | | | | | | | | 39 | 30 | 40 | 26 | 39 | 25 | 33 | 45 | 57 | 34 | 25 | 47 | 69 | 82 | 59 | 33 | 33 | 45 | 44 | 52 | 38 | 46 | 34 | 40 | Diurnal Maximum |
| Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Sawbones Bay - August 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Sawbones Bay - August 2017**

| Concentration Ranges ($\mu\text{g}/\text{m}^3$) | Number of Hours | % | Cumulative % |
|---|------------------------|----------|---------------------|
| 1 - 5 | 184 | 24.73 | 24.73 |
| 6 - 15 | 329 | 44.22 | 68.95 |
| 16 - 25 | 75 | 10.08 | 79.03 |
| 26 - 80 | 50 | 6.72 | 85.75 |
| > 81.0 | 1 | 0.13 | 85.89 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Sawbones Bay - August 2017

| Concentration Ranges ($\mu\text{g}/\text{m}^3$) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|--|----------------|-----|----|-----|---|-----|----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 1 - 5 | 8 | 8 | 5 | 2 | 4 | 5 | 11 | 20 | 18 | 11 | 13 | 19 | 24 | 23 | 7 | 5 | 183 |
| 6 - 15 | 9 | 13 | 2 | 1 | 3 | 11 | 20 | 49 | 44 | 21 | 31 | 30 | 38 | 37 | 16 | 4 | 329 |
| 16 - 25 | 1 | 2 | 0 | 0 | 1 | 2 | 4 | 14 | 10 | 7 | 5 | 6 | 5 | 11 | 6 | 1 | 75 |
| 26 - 80 | 2 | 0 | 1 | 0 | 1 | 4 | 1 | 4 | 2 | 10 | 6 | 4 | 5 | 8 | 2 | 0 | 50 |
| > 81.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Totals | 20 | 23 | 8 | 3 | 9 | 22 | 36 | 87 | 74 | 50 | 55 | 59 | 72 | 79 | 31 | 10 | 638 |

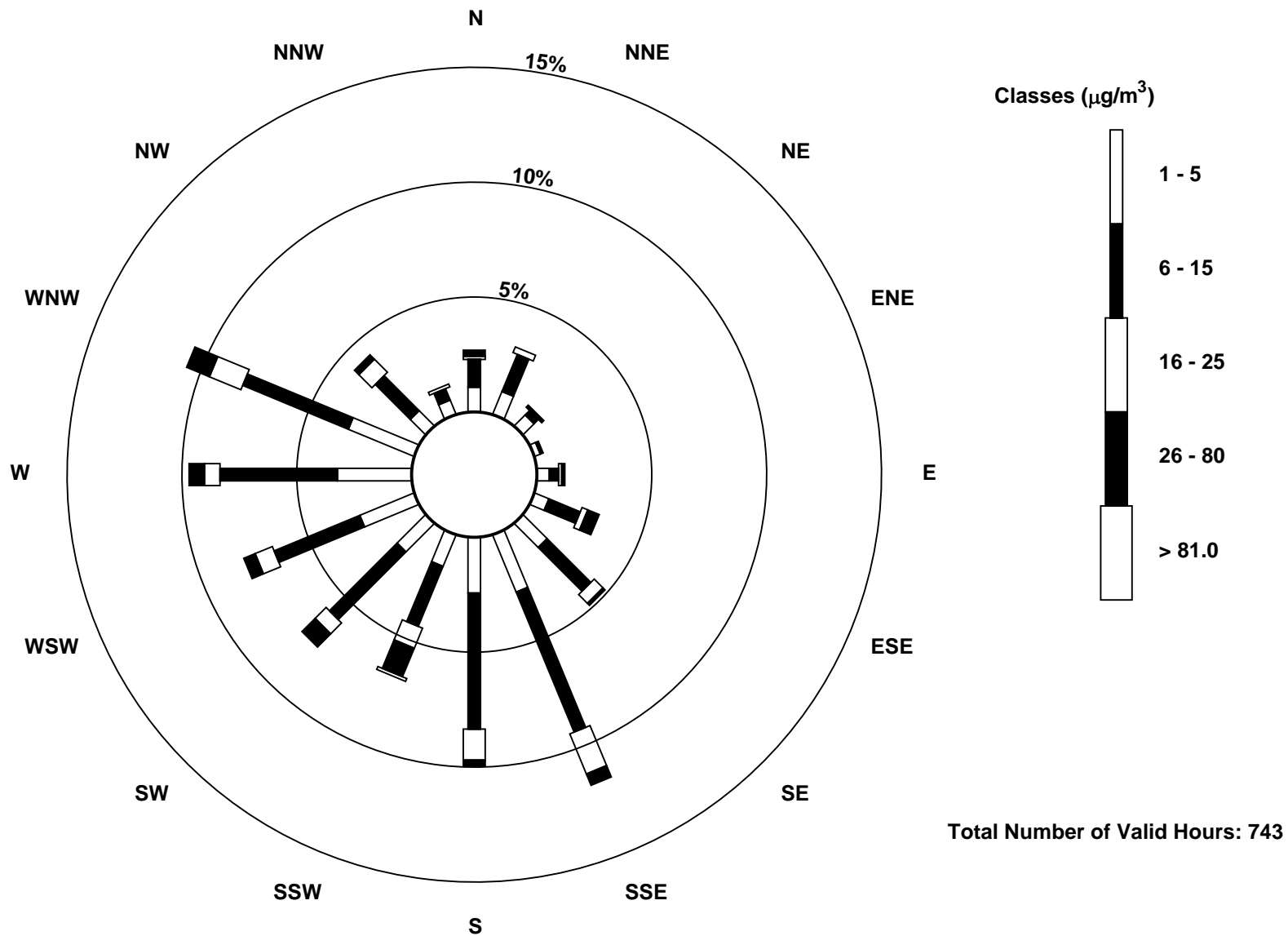
Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Sawbones Bay (AMS 505)





Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

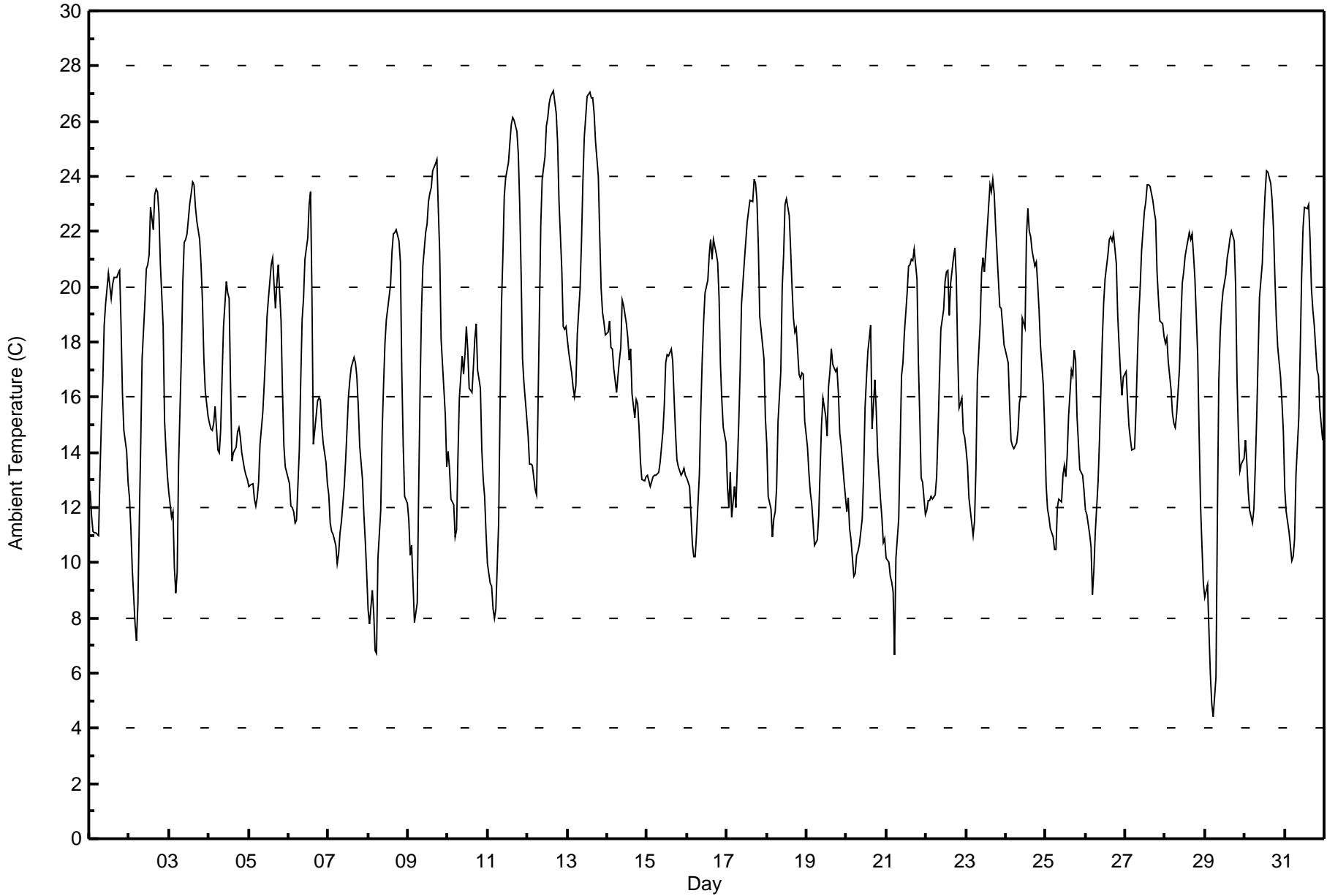
Sawbones Bay - August 2017

| Maximum Value: 27.1 C on Aug 12 16:00 Maximum Daily Average: 21.6 C on Aug 13 | | | | | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 | | | | |
|--|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|------|------|---------------|---------------|
| Minimum Value: 4.4 C on Aug 29 06:00 Minimum Daily Average: 13.0 C on Aug 20 Maximum Diurnal Average: 21.0 C at hour 15 Minimum Diurnal Average: 11.1 C at hour 6 Monthly Average: 16.55 C Percentiles: P ₁ = 7.1 P ₁₀ = 11.0 Q ₁ = 13.1 Median = 16.3 Q ₃ = 20.2 P ₉₀ = 22.8 P ₉₉ = 26.6 | | | | | | | | | | | | | | | | | | | | | | Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 12.6 | 11.7 | 11.1 | 11.1 | 11.1 | 11.0 | 13.2 | 15.1 | 16.5 | 18.6 | 19.4 | 20.5 | 20.0 | 19.6 | 20.1 | 20.4 | 20.4 | 20.5 | 20.6 | 18.6 | 16.1 | 14.8 | 14.0 | 12.9 | 16.2 | 20.6 |
| 2-Aug | 12.4 | 11.2 | 9.8 | 7.8 | 7.2 | 8.5 | 11.5 | 14.3 | 17.4 | 19.4 | 20.6 | 20.8 | 21.1 | 22.9 | 22.0 | 23.4 | 23.5 | 23.4 | 22.7 | 20.9 | 18.5 | 15.2 | 14.1 | 13.2 | 16.7 | 23.5 |
| 3-Aug | 12.6 | 11.7 | 11.8 | 9.8 | 8.9 | 9.7 | 13.6 | 17.6 | 20.2 | 21.6 | 21.7 | 21.9 | 23.0 | 23.4 | 23.8 | 23.7 | 22.9 | 22.4 | 21.7 | 20.8 | 19.5 | 17.4 | 16.2 | 15.3 | 18.0 | 23.8 |
| 4-Aug | 15.1 | 14.9 | 14.8 | 15.0 | 15.7 | 14.1 | 14.0 | 14.9 | 16.8 | 18.6 | 20.2 | 19.8 | 19.6 | 16.5 | 13.7 | 14.0 | 14.2 | 14.8 | 14.9 | 14.6 | 14.0 | 13.4 | 13.2 | 13.0 | 15.4 | 20.2 |
| 5-Aug | 12.7 | 12.8 | 12.9 | 12.3 | 12.1 | 12.3 | 12.9 | 14.3 | 15.5 | 16.5 | 17.6 | 18.9 | 19.6 | 20.8 | 21.1 | 20.1 | 19.2 | 20.1 | 20.8 | 18.8 | 16.2 | 14.2 | 13.5 | 13.3 | 16.2 | 21.1 |
| 6-Aug | 12.8 | 12.1 | 12.0 | 11.8 | 11.4 | 11.5 | 14.1 | 16.6 | 18.8 | 19.6 | 21.0 | 21.8 | 23.0 | 23.5 | 19.7 | 14.3 | 14.8 | 15.9 | 15.9 | 15.9 | 14.9 | 14.4 | 13.6 | 12.9 | 15.9 | 23.5 |
| 7-Aug | 12.4 | 11.4 | 11.1 | 11.0 | 10.6 | 10.0 | 10.3 | 11.1 | 11.5 | 12.8 | 13.7 | 14.9 | 16.0 | 16.6 | 17.1 | 17.4 | 17.2 | 16.7 | 15.7 | 14.2 | 13.0 | 11.8 | 10.8 | 9.6 | 13.2 | 17.4 |
| 8-Aug | 8.3 | 7.8 | 9.0 | 8.2 | 6.8 | 6.7 | 10.1 | 11.9 | 14.8 | 16.4 | 17.9 | 18.8 | 19.2 | 20.1 | 21.3 | 21.9 | 22.0 | 22.1 | 21.7 | 20.9 | 16.9 | 14.3 | 12.4 | 12.2 | 15.1 | 22.1 |
| 9-Aug | 11.5 | 10.3 | 10.6 | 9.3 | 7.8 | 8.5 | 12.5 | 16.2 | 19.1 | 20.7 | 22.0 | 22.3 | 23.1 | 23.4 | 23.6 | 24.2 | 24.5 | 24.6 | 22.8 | 21.3 | 18.1 | 16.3 | 15.4 | 13.5 | 17.6 | 24.6 |
| 10-Aug | 14.0 | 13.4 | 12.3 | 12.1 | 10.9 | 11.2 | 13.8 | 16.0 | 17.5 | 16.9 | 17.6 | 18.6 | 17.7 | 16.3 | 16.2 | 17.1 | 18.1 | 18.6 | 17.0 | 16.3 | 14.1 | 13.0 | 12.4 | 11.1 | 15.1 | 18.6 |
| 11-Aug | 10.0 | 9.3 | 9.2 | 8.3 | 8.0 | 8.3 | 11.4 | 15.7 | 19.3 | 21.1 | 23.3 | 23.9 | 24.5 | 25.2 | 25.9 | 26.1 | 26.0 | 25.6 | 24.8 | 23.0 | 20.5 | 17.4 | 16.5 | 15.3 | 18.3 | 26.1 |
| 12-Aug | 14.6 | 13.6 | 13.6 | 13.5 | 12.7 | 12.4 | 15.5 | 18.9 | 22.2 | 23.9 | 24.7 | 25.9 | 26.1 | 26.6 | 26.9 | 27.1 | 26.7 | 26.3 | 25.2 | 23.1 | 20.6 | 18.6 | 18.5 | 18.6 | 20.7 | 27.1 |
| 13-Aug | 18.1 | 17.6 | 16.9 | 16.4 | 16.0 | 16.4 | 18.2 | 19.9 | 21.6 | 23.8 | 25.4 | 26.2 | 26.9 | 27.1 | 26.8 | 26.8 | 26.3 | 25.3 | 24.0 | 21.9 | 19.9 | 19.1 | 18.7 | 18.3 | 21.6 | 27.1 |
| 14-Aug | 18.4 | 18.8 | 17.8 | 17.7 | 17.0 | 16.2 | 16.8 | 17.3 | 17.8 | 19.5 | 19.3 | 18.7 | 18.2 | 17.3 | 17.8 | 16.1 | 15.3 | 15.9 | 15.8 | 14.9 | 13.7 | 13.0 | 13.0 | 13.1 | 16.6 | 19.5 |
| 15-Aug | 13.2 | 13.0 | 12.8 | 13.1 | 13.1 | 13.1 | 13.2 | 13.3 | 13.6 | 14.8 | 15.7 | 17.2 | 17.5 | 17.5 | 17.7 | 17.3 | 16.0 | 14.7 | 13.7 | 13.5 | 13.1 | 13.3 | 13.4 | 13.2 | 14.5 | 17.7 |
| 16-Aug | 13.1 | 12.8 | 11.8 | 10.7 | 10.2 | 10.2 | 11.1 | 13.2 | 15.5 | 17.3 | 18.7 | 19.8 | 20.3 | 21.2 | 21.7 | 21.0 | 21.7 | 21.2 | 20.9 | 19.6 | 17.2 | 15.8 | 14.9 | 14.4 | 16.4 | 21.7 |
| 17-Aug | 12.8 | 12.0 | 13.3 | 11.7 | 12.8 | 12.0 | 13.5 | 15.0 | 16.9 | 19.4 | 20.9 | 21.6 | 22.3 | 22.7 | 23.1 | 23.1 | 23.9 | 23.7 | 23.1 | 21.4 | 18.9 | 17.9 | 17.4 | 15.2 | 18.1 | 23.9 |
| 18-Aug | 14.3 | 12.4 | 11.9 | 11.0 | 11.6 | 11.9 | 12.7 | 15.1 | 16.9 | 20.0 | 21.1 | 23.0 | 23.2 | 22.6 | 21.4 | 20.0 | 18.9 | 18.3 | 18.5 | 16.8 | 16.7 | 16.9 | 16.8 | 15.2 | 17.0 | 23.2 |
| 19-Aug | 14.2 | 13.3 | 12.6 | 12.1 | 11.4 | 10.7 | 10.8 | 11.7 | 13.4 | 15.0 | 16.0 | 15.3 | 14.6 | 16.4 | 17.0 | 17.7 | 17.2 | 16.9 | 17.1 | 16.2 | 14.7 | 14.2 | 12.9 | 12.4 | 14.3 | 17.7 |
| 20-Aug | 11.8 | 12.3 | 11.2 | 10.9 | 9.5 | 9.6 | 10.3 | 10.4 | 10.7 | 11.6 | 13.2 | 15.6 | 16.7 | 17.6 | 18.6 | 14.8 | 15.7 | 16.6 | 15.5 | 14.0 | 12.3 | 11.6 | 10.7 | 10.9 | 13.0 | 18.6 |
| 21-Aug | 10.2 | 10.0 | 9.5 | 9.3 | 9.0 | 6.6 | 10.2 | 11.6 | 14.2 | 16.8 | 17.2 | 18.3 | 19.8 | 20.8 | 20.8 | 21.0 | 20.9 | 21.4 | 20.3 | 17.3 | 15.3 | 13.1 | 12.9 | 11.8 | 14.9 | 21.4 |
| 22-Aug | 11.9 | 12.2 | 12.2 | 12.4 | 12.3 | 12.4 | 13.1 | 14.8 | 16.7 | 18.4 | 19.2 | 20.2 | 20.5 | 20.6 | 18.9 | 20.1 | 21.0 | 21.4 | 20.4 | 17.6 | 15.6 | 16.0 | 14.8 | 14.6 | 16.6 | 21.4 |
| 23-Aug | 14.1 | 13.5 | 12.3 | 11.4 | 11.0 | 11.5 | 13.4 | 16.6 | 18.7 | 20.5 | 21.1 | 20.5 | 21.3 | 22.1 | 23.7 | 23.4 | 23.9 | 23.4 | 22.2 | 20.2 | 19.3 | 19.2 | 18.6 | 17.9 | 18.3 | 23.9 |
| 24-Aug | 17.7 | 17.3 | 15.6 | 14.4 | 14.2 | 14.1 | 14.3 | 14.8 | 15.8 | 16.1 | 18.9 | 18.5 | 21.9 | 22.9 | 22.0 | 21.8 | 21.3 | 20.7 | 20.9 | 20.1 | 19.1 | 17.9 | 16.4 | 14.8 | 18.0 | 22.9 |
| 25-Aug | 12.8 | 12.0 | 11.7 | 11.2 | 10.9 | 10.5 | 10.5 | 12.0 | 12.3 | 12.2 | 13.2 | 13.5 | 13.1 | 13.9 | 15.3 | 17.0 | 16.8 | 17.7 | 17.4 | 15.3 | 13.4 | 13.3 | 13.2 | 12.6 | 13.4 | 17.7 |
| 26-Aug | 11.9 | 11.7 | 11.0 | 10.6 | 8.9 | 9.7 | 11.1 | 12.9 | 14.5 | 16.2 | 18.0 | 19.4 | 20.3 | 21.1 | 21.7 | 21.8 | 21.7 | 21.9 | 20.9 | 19.0 | 17.9 | 16.9 | 16.1 | 16.7 | 16.3 | 21.9 |
| 27-Aug | 16.9 | 15.9 | 14.9 | 14.5 | 14.1 | 14.1 | 15.5 | 17.4 | 19.0 | 20.0 | 21.3 | 22.7 | 23.1 | 23.7 | 23.7 | 23.6 | 23.1 | 22.7 | 22.4 | 20.5 | 19.6 | 18.8 | 18.7 | 18.2 | 19.4 | 23.7 |
| 28-Aug | 17.9 | 18.2 | 17.3 | 16.3 | 15.4 | 15.1 | 14.9 | 15.4 | 17.0 | 18.8 | 20.2 | 20.6 | 21.1 | 21.4 | 22.0 | 21.7 | 21.9 | 21.2 | 20.3 | 17.5 | 14.7 | 12.1 | 10.6 | 9.3 | 17.5 | 22.0 |
| 29-Aug | 8.8 | 9.2 | 7.5 | 6.0 | 4.9 | 4.4 | 5.8 | 11.6 | 16.6 | 18.3 | 19.2 | 19.9 | 20.4 | 21.1 | 21.3 | 21.8 | 22.0 | 21.6 | 20.0 | 16.6 | 14.6 | 13.3 | 13.6 | 13.8 | 14.7 | 22.0 |
| 30-Aug | 14.4 | 13.6 | 12.6 | 11.9 | 11.5 | 11.9 | 13.5 | 15.3 | 17.5 | 19.6 | 20.9 | 22.3 | 23.4 | 24.2 | 24.2 | 23.7 | 23.1 | 22.1 | 20.3 | 18.8 | 17.8 | 16.7 | 15.8 | 14.7 | 17.9 | 24.2 |
| 31-Aug | 12.7 | 11.8 | 11.2 | 10.6 | 10.1 | 10.2 | 10.9 | 13.2 | 15.2 | 17.7 | 20.3 | 22.1 | 22.9 | 22.8 | 23.0 | 21.8 | 19.9 | 19.2 | 18.6 | 17.0 | 16.8 | 15.5 | 15.0 | 14.4 | 16.4 | 23.0 |
| | | | | | | | | | | | | | | | | | | | | | | Diurnal Average | | | | |
| | | | | | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | |



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Sawbones Bay - August 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Sawbones Bay - August 2017

| Concentration Ranges (C) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| -50 - -20 | 0 | 0.00 | 0.00 |
| -20 - 0 | 0 | 0.00 | 0.00 |
| 0 - 10 | 40 | 5.38 | 5.38 |
| 10 - 20 | 507 | 68.15 | 73.52 |
| > 20 | 197 | 26.48 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



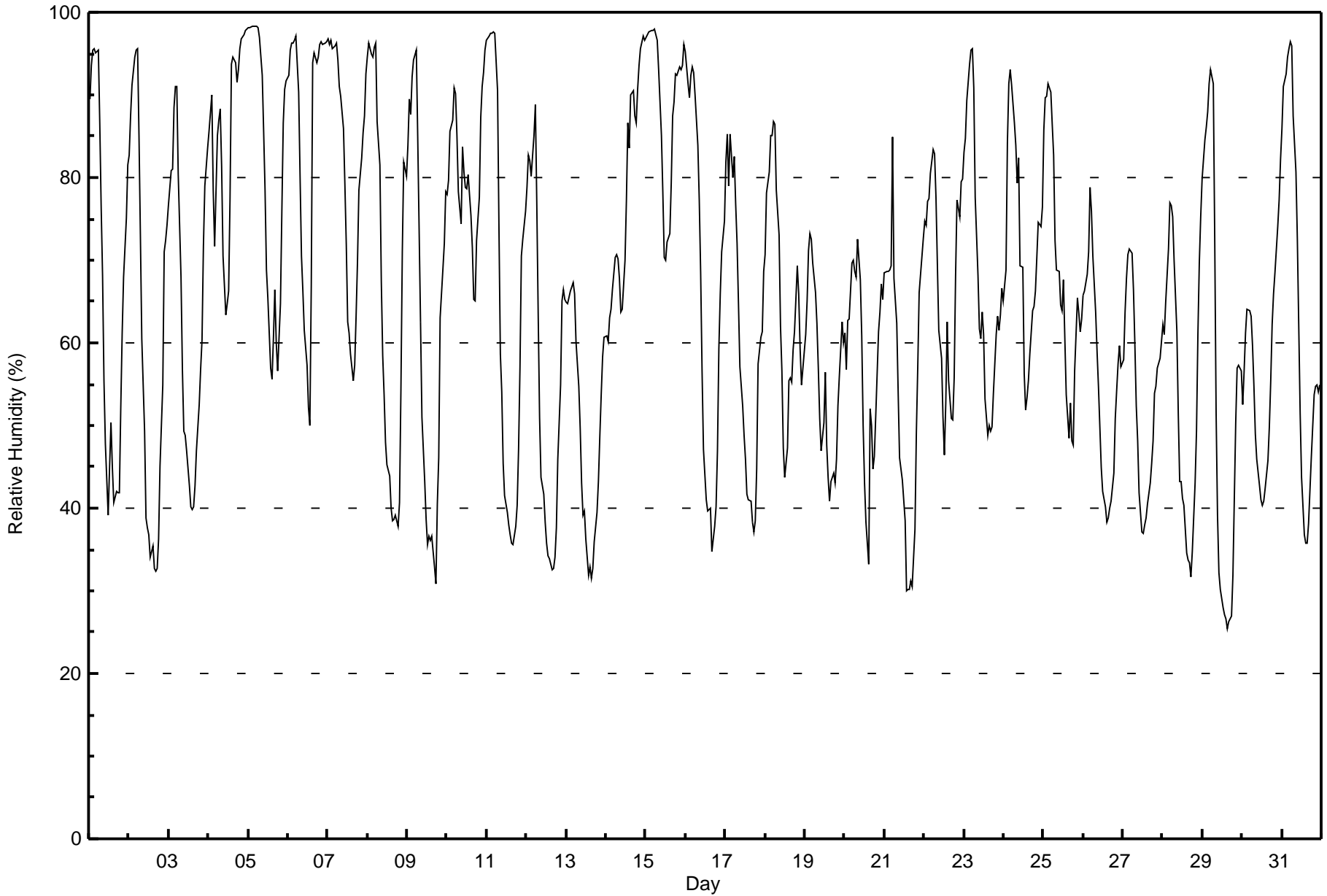
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Sawbones Bay - August 2017

| Maximum Value: 98 % on Aug 5 03:00 Maximum Daily Average: 89.1 % on Aug 15 | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 744 | | | | | | | | |
|---|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|------|------|------|------|------|------|-----------------|---------------|
| Minimum Value: 25 % on Aug 29 16:00 Minimum Daily Average: 49.5 % on Aug 13 Maximum Diurnal Average: 86.5 % at hour 6 Minimum Diurnal Average: 47.7 % at hour 14 Monthly Average: 65.8 % Percentiles: P ₁ = 30 P ₁₀ = 39 Q ₁ = 49 Median = 65 Q ₃ = 83 P ₉₀ = 94 P ₉₉ = 98 | | | | | | | | | | | | | | | | | | Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0 | | | | | | | | |
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | |
| 1-Aug | 90 | 94 | 95 | 96 | 95 | 95 | 87 | 76 | 68 | 55 | 48 | 39 | 45 | 50 | 45 | 41 | 42 | 42 | 42 | 52 | 61 | 68 | 75 | 82 | 65.9 | 96 |
| 2-Aug | 83 | 87 | 91 | 95 | 95 | 96 | 85 | 73 | 60 | 49 | 39 | 38 | 37 | 34 | 35 | 33 | 32 | 33 | 36 | 45 | 55 | 71 | 72 | 74 | 60.4 | 96 |
| 3-Aug | 77 | 81 | 81 | 88 | 91 | 91 | 81 | 68 | 57 | 49 | 49 | 47 | 43 | 40 | 40 | 40 | 43 | 47 | 53 | 57 | 60 | 72 | 79 | 84 | 63.2 | 91 |
| 4-Aug | 86 | 88 | 90 | 78 | 72 | 85 | 87 | 88 | 81 | 70 | 63 | 65 | 66 | 78 | 94 | 95 | 94 | 92 | 93 | 96 | 97 | 97 | 98 | 98 | 85.4 | 98 |
| 5-Aug | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 97 | 92 | 86 | 78 | 69 | 65 | 57 | 56 | 61 | 66 | 60 | 57 | 65 | 76 | 87 | 91 | 92 | 80.9 | 98 |
| 6-Aug | 92 | 95 | 96 | 96 | 97 | 97 | 90 | 80 | 71 | 66 | 61 | 57 | 52 | 50 | 67 | 94 | 95 | 94 | 95 | 96 | 96 | 96 | 96 | 96 | 84.5 | 97 |
| 7-Aug | 97 | 96 | 97 | 96 | 96 | 96 | 94 | 91 | 90 | 86 | 79 | 72 | 63 | 61 | 59 | 55 | 57 | 63 | 70 | 78 | 82 | 85 | 87 | 93 | 81.0 | 97 |
| 8-Aug | 94 | 96 | 95 | 95 | 96 | 96 | 87 | 81 | 67 | 58 | 54 | 48 | 45 | 44 | 40 | 38 | 39 | 39 | 38 | 41 | 54 | 71 | 82 | 80 | 65.8 | 96 |
| 9-Aug | 84 | 89 | 88 | 92 | 94 | 95 | 85 | 74 | 63 | 51 | 43 | 39 | 36 | 37 | 36 | 37 | 33 | 31 | 40 | 46 | 63 | 69 | 72 | 78 | 61.4 | 95 |
| 10-Aug | 78 | 80 | 86 | 87 | 91 | 90 | 85 | 78 | 74 | 84 | 81 | 79 | 79 | 80 | 75 | 72 | 65 | 65 | 72 | 78 | 87 | 91 | 93 | 95 | 81.0 | 95 |
| 11-Aug | 97 | 97 | 97 | 98 | 98 | 98 | 91 | 74 | 59 | 54 | 45 | 42 | 39 | 38 | 37 | 36 | 36 | 38 | 40 | 47 | 57 | 70 | 72 | 76 | 63.9 | 98 |
| 12-Aug | 79 | 83 | 82 | 80 | 85 | 89 | 77 | 64 | 51 | 44 | 42 | 38 | 36 | 34 | 34 | 32 | 33 | 34 | 38 | 46 | 55 | 65 | 66 | 65 | 56.3 | 89 |
| 13-Aug | 65 | 65 | 66 | 67 | 67 | 66 | 60 | 55 | 50 | 43 | 39 | 40 | 36 | 32 | 33 | 32 | 33 | 36 | 40 | 43 | 49 | 54 | 58 | 61 | 49.5 | 67 |
| 14-Aug | 61 | 60 | 63 | 64 | 66 | 70 | 71 | 70 | 68 | 64 | 64 | 70 | 77 | 87 | 84 | 90 | 90 | 87 | 87 | 91 | 94 | 96 | 97 | 97 | 77.8 | 97 |
| 15-Aug | 97 | 97 | 98 | 98 | 98 | 98 | 97 | 97 | 93 | 85 | 78 | 70 | 70 | 72 | 73 | 79 | 88 | 89 | 93 | 92 | 93 | 93 | 94 | 96 | 89.1 | 98 |
| 16-Aug | 95 | 91 | 90 | 92 | 93 | 93 | 90 | 84 | 77 | 68 | 57 | 47 | 41 | 40 | 40 | 40 | 35 | 38 | 40 | 47 | 59 | 66 | 71 | 75 | 65.4 | 95 |
| 17-Aug | 82 | 85 | 79 | 85 | 80 | 83 | 77 | 72 | 65 | 57 | 52 | 49 | 46 | 42 | 41 | 41 | 38 | 37 | 38 | 45 | 57 | 61 | 61 | 69 | 60.1 | 85 |
| 18-Aug | 71 | 78 | 81 | 85 | 85 | 87 | 86 | 79 | 73 | 62 | 57 | 47 | 44 | 47 | 55 | 56 | 55 | 59 | 61 | 69 | 66 | 59 | 55 | 57 | 65.6 | 87 |
| 19-Aug | 61 | 65 | 71 | 73 | 72 | 70 | 66 | 62 | 57 | 51 | 47 | 50 | 56 | 48 | 44 | 41 | 43 | 44 | 43 | 46 | 52 | 56 | 63 | 60 | 55.9 | 73 |
| 20-Aug | 61 | 57 | 63 | 63 | 70 | 70 | 69 | 68 | 73 | 68 | 61 | 50 | 43 | 38 | 33 | 52 | 50 | 45 | 46 | 51 | 61 | 64 | 67 | 65 | 57.8 | 73 |
| 21-Aug | 68 | 69 | 69 | 69 | 69 | 85 | 68 | 62 | 54 | 46 | 45 | 43 | 39 | 30 | 30 | 30 | 31 | 30 | 37 | 49 | 57 | 66 | 68 | 73 | 53.7 | 85 |
| 22-Aug | 75 | 74 | 77 | 77 | 81 | 83 | 83 | 78 | 69 | 62 | 58 | 51 | 47 | 53 | 63 | 56 | 51 | 51 | 56 | 68 | 77 | 75 | 80 | 80 | 67.6 | 83 |
| 23-Aug | 83 | 85 | 89 | 94 | 95 | 96 | 91 | 78 | 68 | 62 | 60 | 64 | 61 | 53 | 49 | 50 | 49 | 50 | 54 | 61 | 63 | 61 | 63 | 67 | 68.6 | 96 |
| 24-Aug | 65 | 69 | 84 | 91 | 93 | 91 | 87 | 84 | 79 | 82 | 69 | 69 | 56 | 52 | 53 | 55 | 59 | 64 | 64 | 66 | 70 | 75 | 74 | 76 | 72.1 | 93 |
| 25-Aug | 86 | 90 | 90 | 91 | 90 | 86 | 83 | 72 | 69 | 69 | 65 | 64 | 68 | 61 | 54 | 49 | 53 | 48 | 48 | 57 | 66 | 64 | 61 | 63 | 68.5 | 91 |
| 26-Aug | 66 | 66 | 68 | 71 | 79 | 76 | 71 | 64 | 59 | 55 | 50 | 45 | 42 | 40 | 38 | 39 | 40 | 41 | 44 | 51 | 54 | 57 | 60 | 57 | 55.5 | 79 |
| 27-Aug | 58 | 64 | 68 | 71 | 71 | 71 | 67 | 60 | 52 | 48 | 42 | 37 | 37 | 38 | 39 | 40 | 43 | 45 | 48 | 54 | 55 | 57 | 58 | 60 | 53.5 | 71 |
| 28-Aug | 62 | 61 | 65 | 71 | 77 | 77 | 75 | 70 | 61 | 51 | 43 | 43 | 41 | 40 | 35 | 34 | 33 | 32 | 35 | 43 | 49 | 61 | 70 | 75 | 54.4 | 77 |
| 29-Aug | 80 | 85 | 86 | 88 | 91 | 93 | 91 | 73 | 52 | 39 | 32 | 30 | 28 | 27 | 27 | 25 | 26 | 27 | 32 | 41 | 50 | 57 | 57 | 57 | 53.9 | 93 |
| 30-Aug | 53 | 57 | 61 | 64 | 64 | 63 | 60 | 55 | 49 | 46 | 43 | 41 | 40 | 41 | 42 | 46 | 50 | 55 | 62 | 66 | 68 | 74 | 77 | 82 | 56.6 | 82 |
| 31-Aug | 86 | 91 | 92 | 95 | 96 | 96 | 96 | 87 | 81 | 72 | 62 | 52 | 44 | 37 | 36 | 36 | 38 | 42 | 46 | 54 | 55 | 55 | 54 | 55 | 64.9 | 96 |
| | 78.3 | 80.4 | 82.5 | 84.2 | 85.4 | 86.5 | 81.7 | 74.6 | 67.2 | 60.8 | 55.0 | 51.4 | 49.1 | 47.7 | 47.9 | 49.1 | 49.7 | 50.3 | 53.2 | 59.4 | 65.8 | 70.7 | 73.3 | 75.4 | Diurnal Average | |
| | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 97 | 93 | 86 | 81 | 79 | 79 | 87 | 94 | 95 | 95 | 94 | 95 | 96 | 97 | 97 | 98 | 98 | Diurnal Maximum | |





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity (RH) - %
Sawbones Bay - August 2017**

| Concentration Ranges (%) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 20 | 0 | 0.00 | 0.00 |
| 20 - 40 | 88 | 11.83 | 11.83 |
| 40 - 60 | 206 | 27.69 | 39.52 |
| 60 - 80 | 238 | 31.99 | 71.51 |
| 80 - 100 | 212 | 28.49 | 100.00 |

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

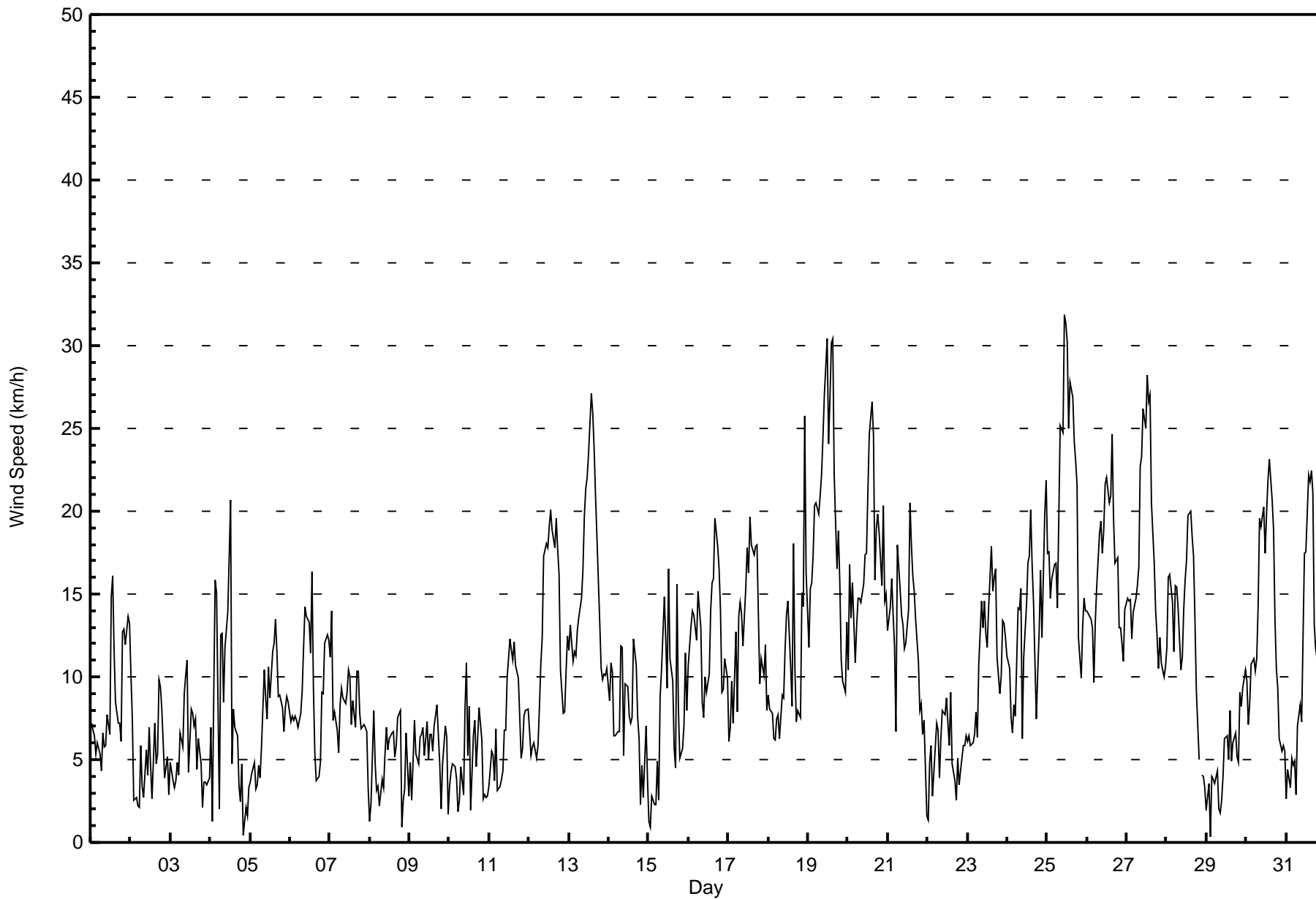
Sawbones Bay - August 2017

| | | |
|--|--|--------------------------------|
| Maximum Speed: 32 km/h on Aug 25 11:00 | Maximum Daily Speed Average: 19.7 km/h on Aug 25 | Hours in Service: 744 |
| Minimum Speed Value: 0 km/h on Aug 29 03:00 | Minimum Daily Speed Average: 1.9 km/h on Aug 22 | Hours of Data: 743 |
| Maximum Diurnal Speed Average: 7.8 km/h at hour 14 | Minimum Diurnal Speed Average: 3.7 km/h at hour 1 | Hours of Missing Data: 1 |
| Monthly Average Velocity: 5.4 km/h 239.5 deg | Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 6 Median = 10 Q ₃ = 15 P ₉₀ = 20 P ₉₉ = 26 | Percent Operational Time: 99.9 |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average | Daily Maximum | |
|--------|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|---------------|-------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | N7 | NW7 | NW6 | WNW5 | NW6 | NW5 | NNW4 | N7 | N6 | N6 | NNE8 | NE7 | N15 | N16 | N12 | NNE8 | N7 | NW7 | NNW6 | WNW13 | WNW13 | WNW12 | WNW14 | WNW13 | NNW7.3 | N16 | |
| 2-Aug | WNW10 | WNW7 | WNW3 | SSW3 | S2 | SW2 | WNW6 | WNW3 | W3 | W6 | N4 | NW7 | NW5 | SSW3 | NW7 | WNW5 | WSW5 | WSW10 | W9 | W8 | SW4 | SSW5 | SSW5 | S3 | W3.8 | WNW10 | |
| 3-Aug | S5 | SSW4 | SSW3 | SSE4 | SSE5 | S4 | S7 | S6 | SSW9 | SSW10 | S11 | SSW4 | S8 | SSE8 | SSE7 | SSW7 | SSE4 | S6 | SSE5 | E2 | ESE4 | ESE4 | SE3 | SE4 | S5.0 | S11 | |
| 4-Aug | ESE7 | NE1 | NNE9 | NW16 | W15 | E2 | N13 | NNE13 | NE8 | NE12 | NNE14 | N17 | N21 | SE5 | SW8 | NE7 | NE6 | ENE3 | SSE2 | NE5 | SSE0 | SSE2 | N2 | ENE3 | NNE4.9 | N21 | |
| 5-Aug | E4 | SE4 | SSE5 | E3 | ESE3 | SE5 | SE4 | SSE6 | S10 | S9 | SSW7 | S11 | S9 | SSW12 | S12 | S13 | SSW12 | SSW9 | SSW9 | S8 | SSE7 | S8 | S9 | SSW9 | S7.0 | S13 | |
| 6-Aug | SSW7 | S8 | SSW7 | SSW8 | S7 | S7 | SSW8 | SSW9 | SW12 | SW14 | WSW14 | WSW13 | SW11 | WSW16 | NNW9 | NNE5 | ESE4 | NNW4 | NW5 | NW9 | NNE9 | NNE12 | NNE13 | NNE12 | WSW3.5 | WSW16 | |
| 7-Aug | NNE11 | NNE14 | NNE7 | NNE8 | N7 | N5 | N8 | NNE9 | N9 | NNE8 | NNE9 | NE10 | NE10 | NNE7 | NNE9 | NNE7 | NNW10 | NNW10 | NW8 | NNW7 | NNW7 | NW7 | NW7 | WNW3 | N7.4 | NNE14 | |
| 8-Aug | SW1 | W2 | WNW8 | WNW5 | WSW3 | SW3 | SW2 | WNW4 | NW3 | WNW5 | W7 | W6 | W6 | WNW7 | SW7 | SW5 | NW6 | WNW8 | NW8 | W1 | E3 | SE3 | S7 | SSW3 | W3.3 | WNW8 | |
| 9-Aug | S5 | S3 | S5 | S7 | S5 | SSW5 | S6 | SW7 | SW7 | WSW5 | SSE7 | SSE5 | S7 | SW7 | NW6 | NW7 | W8 | WNW7 | WSW5 | ESE2 | S5 | S7 | S6 | SSE2 | SSW4.0 | W8 | |
| 10-Aug | SSW3 | SSW4 | S5 | S5 | S4 | ESE2 | ESE3 | SW5 | SSW3 | SSW8 | SW11 | WNW5 | NW8 | WNW2 | WSW7 | SW7 | SSW5 | WNW6 | S8 | S6 | SSW3 | SW3 | NW3 | SSW3 | SW3.4 | SW11 | |
| 11-Aug | S3 | S5 | S5 | S4 | S7 | S3 | SSE3 | S4 | S4 | SSW7 | SSW7 | S10 | S12 | SSE12 | S11 | S12 | SSE11 | SSE10 | SSE8 | SSE5 | SSE6 | S8 | SSE8 | S8 | S7.1 | S12 | |
| 12-Aug | S7 | S5 | SSE6 | SSE6 | SE5 | SE6 | SSE8 | S11 | S12 | S17 | SSE18 | S18 | SSE19 | S20 | S19 | S18 | S20 | S18 | S16 | S10 | SSE8 | SE8 | SSE10 | SSE12 | S12.1 | S20 | |
| 13-Aug | SSE12 | SSE13 | SSE11 | SSE12 | SSE11 | SSE13 | SSE14 | SSE15 | SSE16 | SSE20 | SSE21 | SSE22 | SSE23 | S27 | SSE26 | SSE24 | SSE21 | SSE18 | SSE13 | SE10 | ESE10 | SE10 | SE10 | SE11 | SSE15.6 | S27 | |
| 14-Aug | SE9 | SE11 | SE10 | SSE6 | SE6 | SE7 | SE7 | S12 | SSW12 | SSW5 | WSW10 | SW9 | SW8 | SSW7 | SSW8 | W12 | W11 | WSW8 | SSW6 | S2 | ESE5 | E3 | SE7 | ESE4 | S5.1 | W12 | |
| 15-Aug | ESE1 | ESE1 | SSE3 | SW2 | N2 | WNW5 | NW3 | WNW9 | WNW10 | NW15 | WNW12 | NW9 | WNW17 | NNW11 | NNW10 | NNE6 | WNW4 | WNW16 | NW8 | NNW5 | NW6 | WNW7 | WNW11 | WNW8 | NW6.6 | WNW17 | |
| 16-Aug | WNW11 | WNW13 | WNW14 | WNW14 | WNW13 | WNW12 | W15 | W13 | WNW9 | WNW8 | W10 | W9 | WNW10 | WSW14 | W16 | WNW16 | WNW20 | WNW18 | WNW17 | W14 | WSW9 | SW9 | SW11 | SW10 | W11.8 | WNW20 | |
| 17-Aug | SW6 | SW7 | WSW10 | SW7 | W13 | WSW8 | WSW14 | W14 | W14 | WSW12 | W15 | WNW18 | WNW16 | WNW20 | WNW18 | WNW17 | WNW18 | WNW18 | WNW14 | W10 | SW11 | WSW10 | WSW12 | SW8 | W11.9 | WNW20 | |
| 18-Aug | SW9 | SSW8 | SSW8 | S6 | SSW6 | S7 | SSW8 | SSW6 | SSW9 | S9 | SSW12 | SSW14 | SW15 | SSW11 | WNW8 | WNW18 | WNW11 | SSW7 | SSW8 | SSW8 | SW15 | WSW14 | W26 | W16 | SW8.4 | W26 | |
| 19-Aug | WSW12 | WSW15 | WSW16 | WSW17 | W20 | W20 | W20 | WNW21 | WNW22 | WNW24 | W27 | WNW30 | WNW24 | W27 | W30 | W30 | W22 | W17 | W19 | WNW16 | NW11 | WNW10 | WSW9 | WSW13 | W19.1 | W30 | |
| 20-Aug | W10 | WSW17 | WSW14 | WSW16 | WSW11 | WSW13 | WSW15 | WSW15 | WSW15 | WSW16 | WSW17 | W17 | W21 | W25 | WNW27 | WNW25 | W16 | W19 | WNW20 | W19 | W15 | W20 | W15 | W15 | W16.5 | WNW27 | |
| 21-Aug | W13 | W14 | W16 | W14 | W12 | SW7 | W18 | W15 | W14 | W13 | W12 | W12 | W14 | W21 | WNW18 | W16 | WSW15 | W13 | SW11 | SSW8 | SSW8 | S7 | S7 | ESE2 | W11.3 | W21 | |
| 22-Aug | WSW1 | S5 | S6 | SW3 | S4 | S7 | S7 | SSW4 | SSW6 | SW8 | WNW8 | NW9 | NW7 | WSW6 | NNE9 | NNE5 | W4 | W3 | S5 | SSE3 | ESE4 | SE6 | SE6 | SE6 | SSW1.9 | NNE9 | |
| 23-Aug | SE6 | SE6 | SE6 | SE6 | SSE7 | SE8 | SE6 | SSE11 | S15 | SSE13 | S15 | SSE13 | SSE12 | SSE14 | SSE18 | SSE15 | SSE16 | SSE17 | SSE11 | SSE9 | SE10 | SSE13 | SSE13 | S12 | SSE11.1 | SSE18 | |
| 24-Aug | SSE11 | SW11 | SSW8 | SE7 | ESE8 | SE8 | SE14 | SE14 | SE15 | SSE6 | ESE11 | ESE14 | SE17 | SSE17 | SSE20 | SE17 | SSE15 | SSE7 | S10 | SW13 | W16 | WNW12 | WNW20 | W22 | SSE7.0 | W22 | |
| 25-Aug | W17 | W18 | WSW15 | SW16 | SW17 | SW17 | SW17 | SW14 | SW20 | SW25 | WSW25 | WSW32 | WSW31 | WSW30 | W25 | W28 | WSW27 | WSW24 | WSW23 | WSW22 | SW12 | SSW10 | SW13 | SW15 | SW14 | WSW19.7 | WSW32 |
| 26-Aug | SW14 | WSW14 | SW13 | SW13 | SSW10 | SW13 | SW15 | WSW19 | WSW19 | WSW17 | SW19 | WSW22 | WSW22 | WSW21 | W21 | WSW25 | WSW20 | WSW17 | WSW17 | SW13 | SW13 | SW12 | SW11 | SW14 | WSW16.0 | WSW25 | |
| 27-Aug | SW15 | WSW15 | WSW15 | SW12 | SW14 | SW15 | WSW16 | WSW17 | W23 | W23 | WNW26 | W25 | WNW28 | W27 | WNW27 | WNW21 | WNW17 | W14 | W12 | WSW11 | WSW12 | WSW11 | WSW10 | WSW11 | W16.2 | WNW28 | |
| 28-Aug | W12 | W16 | WNW16 | W15 | WSW12 | W16 | W15 | WNW14 | WNW10 | WNW11 | W14 | W16 | WNW17 | WNW20 | WNW20 | WNW18 | NW17 | NW13 | NW9 | N5 | AF | S4 | SSW4 | S3 | WNW11.8 | WNW20 | |
| 29-Aug | W2 | NNW4 | SSE0 | S4 | S4 | S4 | S4 | SSE2 | SW2 | NNE3 | ENE4 | NNE6 | NNE6 | NE5 | NNE8 | E5 | ESE6 | E7 | E5 | E5 | ESE9 | ESE8 | SE9 | ESE10 | E3.0 | ESE10 | |
| 30-Aug | SE10 | SE7 | SE8 | ESE11 | ESE11 | SE10 | SE11 | SSE14 | SSE20 | SSE19 | SSE20 | SSE17 | SSE20 | SSE22 | SSE23 | SSE21 | SSE19 | SSE14 | SSE11 | SSE9 | SSE6 | SSE6 | SSE6 | SSE6 | SSE12.9 | SSE23 | |
| 31-Aug | N3 | NNE4 | SSE3 | S5 | NW5 | WNW5 | W3 | WNW7 | NW8 | WNW7 | WNW12 | NW18 | NW18 | WNW22 | WNW22 | WNW22 | WNW21 | WSW13 | SW12 | WSW10 | W17 | W15 | W19 | W22 | WNW10.8 | WNW22 | |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|-------|--------|--------|--------|--------|--------|--------|-------|-------|-------|-------|-------|-----------------|
| SW3.7 | WSW4.5 | SW4.5 | SW4.5 | SW4.5 | SW4.4 | SW4.5 | SW5.0 | SW6.3 | SW6.6 | WSW6.9 | WSW6.3 | W6.3 | WSW7.8 | WSW7.3 | WSW6.9 | WSW6.9 | WSW6.6 | WSW5.9 | SW4.2 | SW3.9 | SW4.1 | SW5.0 | SW4.6 | Diurnal Average |
| W17 | W18 | WNW16 | WSW17 | W20 | W20 | W20 | WNW21 | SW25 | WSW25 | WSW32 | WSW31 | WSW30 | S27 | W30 | W30 | WSW24 | WSW23 | WSW22 | W19 | W17 | W20 | W26 | W22 | Diurnal Maximum |

AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Sawbones Bay - August 2017**

| Wind Speed Ranges (km/h) | Number of Hours | % | Cumulative % |
|---------------------------------|------------------------|----------|---------------------|
| 0 - 5 | 159 | 21.40 | 21.40 |
| 6 - 11 | 287 | 38.63 | 60.03 |
| 12 - 19 | 221 | 29.74 | 89.77 |
| 20 - 28 | 70 | 9.42 | 99.19 |
| 29 - 38 | 6 | 0.81 | 100.00 |
| > 38 | 0 | 0.00 | 100.00 |

Total Number of Valid Hours: 743

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Sawbones Bay - August 2017**

| Wind Speed Ranges (km/h) | Wind Direction | | | | | | | | | | | | | | | | Totals |
|-----------------------------|----------------|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|--------|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | |
| 0 - 5 | 6 | 4 | 3 | 3 | 9 | 13 | 8 | 18 | 30 | 18 | 11 | 5 | 7 | 14 | 6 | 4 | 159 |
| 6 - 11 | 8 | 18 | 6 | 0 | 1 | 10 | 31 | 31 | 40 | 34 | 24 | 16 | 12 | 26 | 22 | 8 | 287 |
| 12 - 19 | 5 | 6 | 1 | 0 | 0 | 1 | 4 | 31 | 15 | 5 | 28 | 37 | 49 | 33 | 6 | 0 | 221 |
| 20 - 28 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 3 | 0 | 2 | 10 | 20 | 20 | 0 | 0 | 70 |
| 29 - 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 1 | 0 | 0 | 6 |
| > 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 20 | 28 | 10 | 3 | 10 | 24 | 43 | 94 | 88 | 57 | 65 | 71 | 90 | 94 | 34 | 12 | 743 |

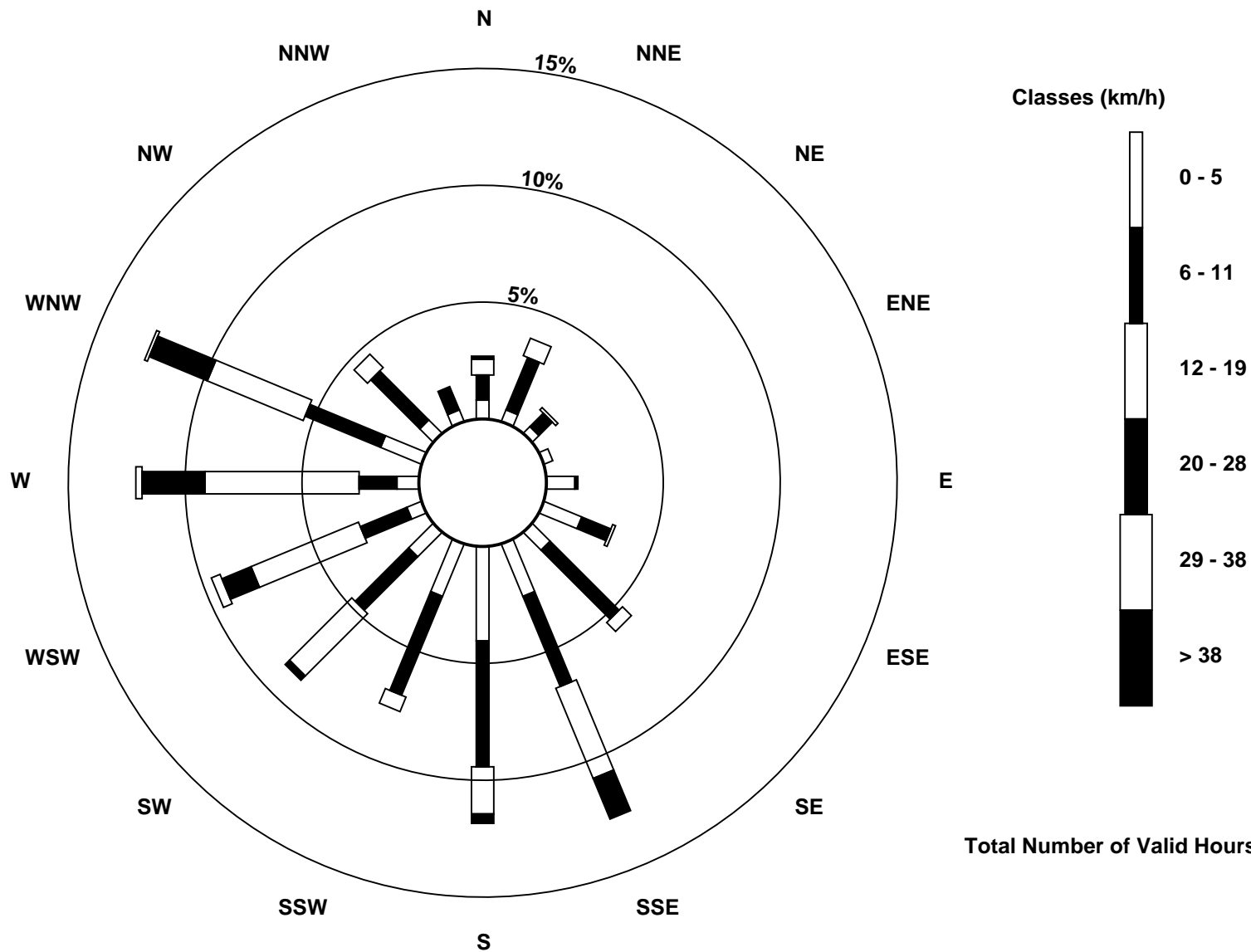
Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Aug 2017

Wind Speed (WS) - km/h
Sawbones Bay (AMS 505)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Sawbones Bay - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Aug 19 00:00 Minimum Value: 0 km/h on Aug 12 02:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 7 | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9 | | | | | | | | | |
|--|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|--|----|----|----|----|----|----|---------------|--|--|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| 1-Aug | 2 | 1 | 1 | 2 | 3 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 5 | 5 | 4 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 3 | 5 | | |
| 2-Aug | 1 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 2 | 3 | | |
| 3-Aug | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 3 | 4 | 4 | 4 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 4 | | |
| 4-Aug | 1 | 2 | 5 | 6 | 4 | 3 | 3 | 4 | 3 | 3 | 3 | 4 | 5 | 5 | 4 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 6 | | |
| 5-Aug | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 3 | 2 | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 4 | | |
| 6-Aug | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 3 | 4 | 4 | 4 | 7 | 5 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 7 | | |
| 7-Aug | 3 | 3 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | | |
| 8-Aug | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 2 | 2 | 1 | 3 | | |
| 9-Aug | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 3 | 1 | 2 | 1 | 1 | 1 | 4 | | |
| 10-Aug | 1 | 1 | 1 | 2 | 2 | 3 | 2 | 3 | 2 | 4 | 4 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 2 | 2 | 1 | 2 | 1 | 2 | 4 | | |
| 11-Aug | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 2 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 4 | | |
| 12-Aug | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 4 | 4 | 4 | 5 | 5 | 4 | 4 | 4 | 3 | 3 | 1 | 1 | 3 | 2 | 5 | | |
| 13-Aug | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 5 | 4 | 2 | 2 | 2 | 2 | 2 | 6 | | |
| 14-Aug | 2 | 2 | 2 | 3 | 2 | 1 | 1 | 3 | 3 | 3 | 4 | 2 | 2 | 2 | 1 | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 4 | | |
| 15-Aug | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 5 | 3 | 3 | 2 | 2 | 2 | 3 | 4 | 2 | 1 | 3 | 3 | 2 | 5 | | |
| 16-Aug | 3 | 2 | 3 | 3 | 3 | 3 | 4 | 3 | 2 | 3 | 4 | 4 | 4 | 3 | 5 | 5 | 5 | 4 | 5 | 4 | 2 | 2 | 2 | 3 | 5 | | |
| 17-Aug | 1 | 3 | 3 | 2 | 3 | 2 | 4 | 3 | 3 | 3 | 4 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 5 | | |
| 18-Aug | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 6 | 4 | 3 | 2 | 2 | 1 | 5 | 4 | 6 | 10 | 10 | | |
| 19-Aug | 5 | 4 | 3 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 7 | 6 | 5 | 7 | 7 | 7 | 6 | 4 | 4 | 5 | 3 | 3 | 4 | 4 | 7 | | |
| 20-Aug | 4 | 4 | 5 | 5 | 3 | 3 | 3 | 4 | 4 | 3 | 4 | 5 | 5 | 6 | 5 | 8 | 4 | 4 | 5 | 5 | 4 | 4 | 6 | 3 | 8 | | |
| 21-Aug | 3 | 3 | 3 | 3 | 5 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 5 | 5 | 4 | 5 | 4 | 3 | 3 | 1 | 2 | 1 | 1 | 1 | 5 | | |
| 22-Aug | 1 | 1 | 1 | 2 | 2 | 1 | 2 | 1 | 2 | 3 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 3 | | |
| 23-Aug | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 5 | 4 | 4 | 4 | 3 | 2 | 3 | 3 | 3 | 3 | 5 | | |
| 24-Aug | 3 | 5 | 2 | 1 | 2 | 4 | 3 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 4 | 4 | 3 | 3 | 4 | 4 | 5 | 6 | 5 | 6 | | |
| 25-Aug | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 5 | 6 | 6 | 7 | 7 | 8 | 7 | 7 | 7 | 6 | 6 | 5 | 3 | 2 | 3 | 3 | 3 | 8 | | |
| 26-Aug | 2 | 3 | 3 | 2 | 1 | 3 | 3 | 4 | 4 | 3 | 4 | 5 | 5 | 5 | 6 | 5 | 5 | 6 | 4 | 2 | 2 | 2 | 2 | 3 | 6 | | |
| 27-Aug | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 4 | 5 | 6 | 6 | 7 | 6 | 6 | 6 | 5 | 4 | 3 | 4 | 4 | 3 | 2 | 2 | 2 | 7 | | |
| 28-Aug | 5 | 4 | 3 | 4 | 3 | 4 | 3 | 2 | 2 | 3 | 4 | 5 | 4 | 5 | 5 | 4 | 4 | 3 | 3 | 1 | AF | 2 | 1 | 1 | 5 | | |
| 29-Aug | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 3 | 2 | 2 | 2 | 3 | | |
| 30-Aug | 2 | 1 | 1 | 2 | 1 | 2 | 3 | 3 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 4 | 3 | 2 | 2 | 2 | 1 | 2 | 2 | 5 | | |
| 31-Aug | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 5 | 3 | 2 | 3 | 4 | 4 | 5 | 5 | 5 | 6 | 3 | 2 | 2 | 4 | 3 | 4 | 3 | 6 | | |
| | | | | | | | | | | | | | | | | | | Diurnal Maximum | | | | | | | | | |
| AF - Analyzer Failure | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Sawbones Bay - August 2017

| | |
|---|--------------------------------|
| Direction of Maximum Speed: 241 deg on Aug 25 11:00 | Hours in Service: 744 |
| Direction of Maximum Daily Speed Average: 244.4 deg on Aug 25 | Hours of Data: 743 |
| Direction of Minimum Speed: 152 deg on Aug 29 03:00 | Hours of Missing Data: 1 |
| Direction of Minimum Daily Speed Average: 1.9 deg on Aug 22 | Percent Operational Time: 99.9 |
| Monthly Average Direction: 244.0 deg | |

| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Average |
|--------|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 355 | 325 | 318 | 292 | 313 | 319 | 338 | 11 | 352 | 9 | 17 | 42 | 5 | 4 | 360 | 22 | 350 | 325 | 327 | 300 | 302 | 289 | 290 | 294 | 334.0 |
| 2-Aug | 295 | 298 | 285 | 194 | 181 | 216 | 296 | 298 | 279 | 280 | 4 | 323 | 309 | 201 | 324 | 282 | 258 | 240 | 265 | 264 | 224 | 203 | 198 | 188 | 271.0 |
| 3-Aug | 182 | 195 | 210 | 156 | 160 | 174 | 174 | 175 | 192 | 200 | 187 | 199 | 179 | 168 | 158 | 196 | 168 | 171 | 162 | 83 | 106 | 110 | 138 | 125 | 173.3 |
| 4-Aug | 122 | 52 | 23 | 323 | 269 | 81 | 2 | 27 | 48 | 34 | 20 | 7 | 2 | 130 | 233 | 34 | 50 | 60 | 162 | 45 | 150 | 152 | 353 | 65 | 15.5 |
| 5-Aug | 101 | 143 | 156 | 80 | 121 | 128 | 129 | 160 | 183 | 178 | 192 | 184 | 183 | 208 | 177 | 182 | 198 | 204 | 211 | 169 | 163 | 185 | 182 | 199 | 179.1 |
| 6-Aug | 192 | 188 | 198 | 198 | 191 | 187 | 199 | 209 | 233 | 230 | 240 | 244 | 229 | 241 | 329 | 21 | 108 | 336 | 322 | 322 | 13 | 25 | 18 | 18 | 247.0 |
| 7-Aug | 15 | 19 | 26 | 18 | 7 | 4 | 8 | 20 | 11 | 21 | 27 | 37 | 46 | 32 | 22 | 18 | 338 | 332 | 321 | 328 | 328 | 320 | 312 | 303 | 5.5 |
| 8-Aug | 229 | 278 | 290 | 283 | 250 | 215 | 235 | 299 | 307 | 297 | 281 | 264 | 279 | 292 | 219 | 233 | 313 | 297 | 309 | 266 | 99 | 144 | 180 | 193 | 270.2 |
| 9-Aug | 183 | 172 | 184 | 177 | 187 | 196 | 190 | 219 | 227 | 240 | 166 | 162 | 188 | 232 | 310 | 304 | 274 | 283 | 237 | 103 | 176 | 188 | 190 | 152 | 209.5 |
| 10-Aug | 192 | 199 | 177 | 182 | 170 | 111 | 108 | 217 | 202 | 210 | 228 | 282 | 322 | 290 | 244 | 223 | 194 | 286 | 189 | 175 | 196 | 223 | 307 | 196 | 217.2 |
| 11-Aug | 179 | 172 | 187 | 186 | 177 | 191 | 168 | 172 | 187 | 192 | 198 | 172 | 172 | 167 | 181 | 179 | 168 | 157 | 151 | 162 | 166 | 179 | 167 | 172 | 173.8 |
| 12-Aug | 175 | 175 | 166 | 160 | 145 | 137 | 167 | 174 | 175 | 173 | 167 | 177 | 165 | 184 | 179 | 182 | 173 | 180 | 175 | 169 | 147 | 138 | 154 | 159 | 170.2 |
| 13-Aug | 164 | 166 | 161 | 164 | 160 | 157 | 151 | 149 | 154 | 157 | 157 | 148 | 159 | 172 | 162 | 159 | 155 | 151 | 152 | 140 | 123 | 129 | 127 | 124 | 154.1 |
| 14-Aug | 140 | 144 | 140 | 148 | 136 | 127 | 125 | 169 | 201 | 201 | 239 | 234 | 220 | 202 | 199 | 263 | 261 | 242 | 204 | 169 | 114 | 101 | 125 | 120 | 183.8 |
| 15-Aug | 122 | 121 | 150 | 230 | 9 | 287 | 312 | 294 | 303 | 304 | 301 | 311 | 303 | 331 | 339 | 15 | 295 | 283 | 316 | 343 | 317 | 295 | 294 | 299 | 307.0 |
| 16-Aug | 291 | 284 | 291 | 292 | 293 | 286 | 279 | 278 | 289 | 285 | 276 | 275 | 301 | 238 | 259 | 289 | 283 | 288 | 293 | 267 | 244 | 235 | 224 | 230 | 275.8 |
| 17-Aug | 218 | 229 | 242 | 227 | 266 | 248 | 255 | 270 | 275 | 249 | 276 | 286 | 292 | 293 | 296 | 298 | 284 | 285 | 293 | 262 | 229 | 248 | 256 | 230 | 270.2 |
| 18-Aug | 218 | 203 | 193 | 180 | 205 | 189 | 193 | 194 | 197 | 189 | 194 | 210 | 225 | 210 | 285 | 301 | 287 | 200 | 202 | 199 | 234 | 248 | 279 | 276 | 230.0 |
| 19-Aug | 257 | 243 | 244 | 253 | 266 | 270 | 279 | 288 | 286 | 282 | 281 | 291 | 298 | 275 | 278 | 274 | 278 | 272 | 269 | 291 | 304 | 284 | 254 | 253 | 275.6 |
| 20-Aug | 265 | 258 | 253 | 256 | 239 | 241 | 246 | 257 | 243 | 240 | 249 | 262 | 277 | 277 | 282 | 288 | 277 | 270 | 289 | 272 | 259 | 266 | 266 | 270 | 265.1 |
| 21-Aug | 266 | 268 | 271 | 275 | 271 | 225 | 262 | 271 | 274 | 276 | 272 | 271 | 261 | 278 | 282 | 271 | 254 | 260 | 223 | 213 | 205 | 184 | 190 | 118 | 261.0 |
| 22-Aug | 243 | 174 | 176 | 225 | 171 | 178 | 184 | 201 | 207 | 228 | 295 | 309 | 314 | 258 | 15 | 22 | 264 | 259 | 172 | 156 | 116 | 125 | 133 | 128 | 203.6 |
| 23-Aug | 136 | 132 | 137 | 127 | 163 | 136 | 131 | 164 | 169 | 167 | 174 | 152 | 161 | 153 | 154 | 158 | 150 | 155 | 153 | 150 | 145 | 154 | 161 | 172 | 155.1 |
| 24-Aug | 158 | 220 | 205 | 135 | 113 | 125 | 126 | 128 | 141 | 168 | 119 | 110 | 129 | 158 | 163 | 151 | 152 | 162 | 185 | 233 | 277 | 299 | 286 | 279 | 168.5 |
| 25-Aug | 275 | 269 | 255 | 232 | 232 | 230 | 216 | 226 | 235 | 237 | 241 | 245 | 254 | 262 | 269 | 253 | 249 | 256 | 241 | 224 | 213 | 226 | 233 | 231 | 244.4 |
| 26-Aug | 232 | 246 | 233 | 223 | 206 | 225 | 232 | 242 | 255 | 237 | 236 | 244 | 249 | 251 | 264 | 249 | 249 | 243 | 240 | 226 | 222 | 219 | 221 | 231 | 239.2 |
| 27-Aug | 234 | 246 | 237 | 235 | 234 | 242 | 257 | 268 | 278 | 284 | 280 | 287 | 278 | 285 | 290 | 290 | 280 | 271 | 252 | 252 | 239 | 247 | 245 | 245 | 265.5 |
| 28-Aug | 260 | 274 | 284 | 260 | 255 | 265 | 275 | 295 | 293 | 285 | 272 | 273 | 290 | 294 | 302 | 294 | 310 | 306 | 312 | 356 | AF | 177 | 192 | 190 | 283.4 |
| 29-Aug | 273 | 331 | 152 | 176 | 175 | 184 | 182 | 162 | 226 | 31 | 60 | 22 | 30 | 47 | 24 | 92 | 118 | 90 | 90 | 97 | 109 | 117 | 127 | 123 | 99.0 |
| 30-Aug | 131 | 134 | 126 | 121 | 121 | 131 | 142 | 156 | 161 | 158 | 161 | 156 | 151 | 157 | 166 | 163 | 168 | 167 | 165 | 159 | 162 | 167 | 162 | 166 | 154.2 |
| 31-Aug | 9 | 17 | 164 | 170 | 304 | 299 | 269 | 289 | 307 | 289 | 301 | 304 | 306 | 300 | 292 | 291 | 288 | 257 | 235 | 240 | 265 | 279 | 272 | 269 | 283.2 |

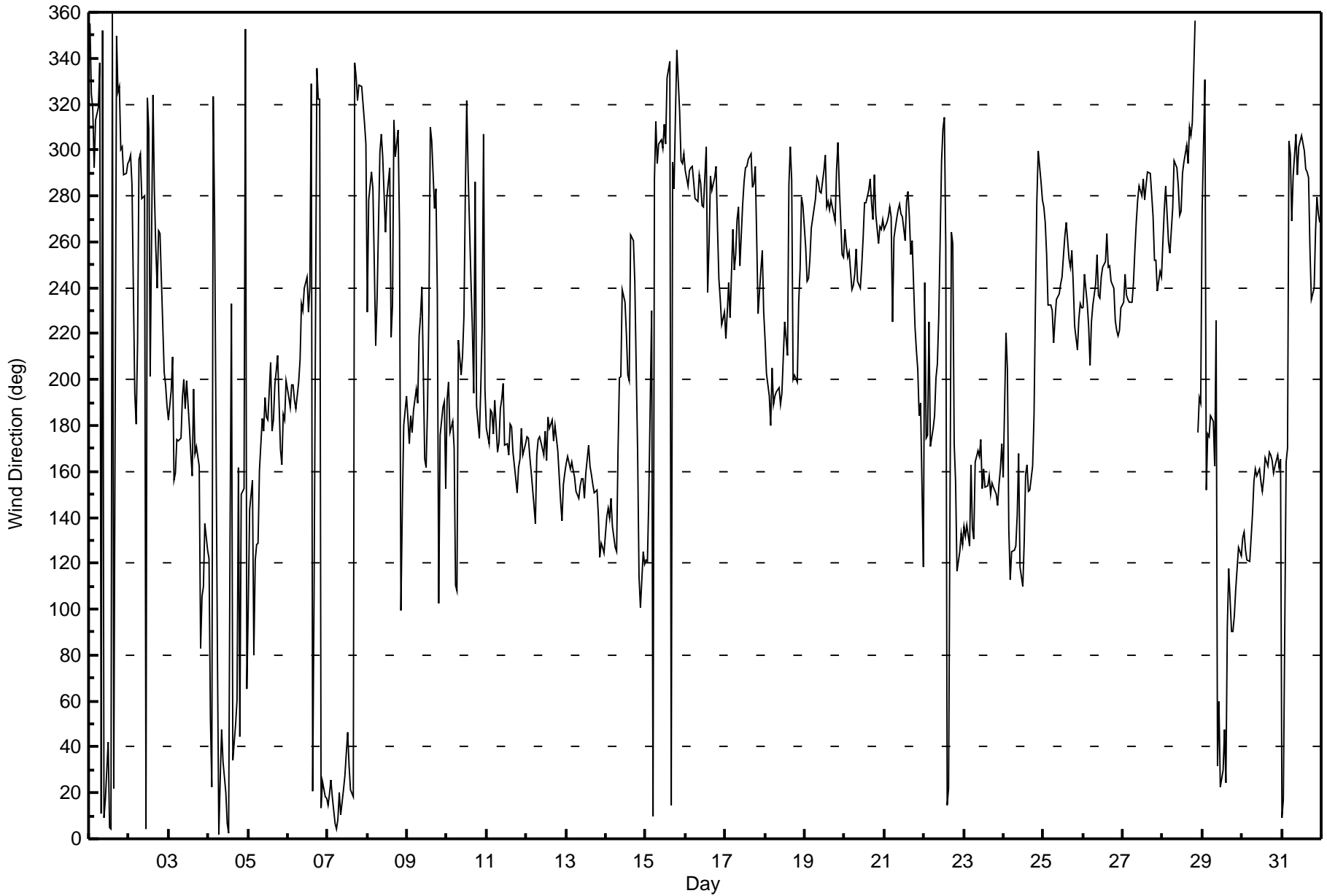
225.7 237.3 229.7 225.9 225.2 217.4 226.9 234.7 233.9 235.6 241.0 252.0 259.5 245.8 258.4 255.8 248.8 248.6 239.4 236.0 229.2 226.6 234.1 232.1
 Diurnal Average

AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Sawbones Bay - August 2017





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Sawbones Bay - August 2017

| Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 89 deg on Aug 29 10:00 Minimum Value: 4 deg on Aug 12 01:00 Percentiles: P ₁ = 7 P ₁₀ = 11 Q ₁ = 13 Median = 17 Q ₃ = 27 P ₉₀ = 54 P ₉₉ = 83 | | | | | | | | | | | | | | | | | | Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9 | | | | | | | |
|--|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|----|----|----|----|----|----|---------------|
| Day | Hourly Period Ending At (MST) | | | | | | | | | | | | | | | | | | | | | | | | Daily Maximum |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1-Aug | 13 | 11 | 14 | 30 | 19 | 15 | 22 | 24 | 45 | 44 | 47 | 60 | 22 | 24 | 30 | 34 | 32 | 19 | 34 | 12 | 11 | 12 | 11 | 9 | 60 |
| 2-Aug | 10 | 9 | 72 | 17 | 32 | 44 | 16 | 27 | 39 | 43 | 83 | 48 | 71 | 88 | 40 | 70 | 66 | 28 | 42 | 20 | 57 | 58 | 34 | 56 | 88 |
| 3-Aug | 21 | 29 | 36 | 25 | 15 | 16 | 9 | 19 | 20 | 26 | 22 | 73 | 57 | 67 | 52 | 35 | 25 | 13 | 13 | 42 | 22 | 30 | 27 | 20 | 73 |
| 4-Aug | 10 | 77 | 25 | 32 | 19 | 86 | 16 | 16 | 26 | 19 | 24 | 19 | 18 | 77 | 53 | 19 | 29 | 53 | 64 | 36 | 88 | 36 | 80 | 33 | 88 |
| 5-Aug | 20 | 18 | 12 | 51 | 19 | 17 | 15 | 30 | 14 | 19 | 24 | 24 | 32 | 24 | 22 | 18 | 14 | 17 | 16 | 13 | 13 | 6 | 8 | 16 | 51 |
| 6-Aug | 14 | 7 | 12 | 11 | 12 | 10 | 13 | 15 | 15 | 15 | 19 | 24 | 30 | 22 | 70 | 71 | 54 | 49 | 17 | 27 | 21 | 15 | 15 | 14 | 71 |
| 7-Aug | 15 | 14 | 14 | 13 | 17 | 16 | 17 | 19 | 17 | 26 | 26 | 25 | 28 | 40 | 25 | 31 | 14 | 12 | 8 | 13 | 9 | 11 | 8 | 14 | 40 |
| 8-Aug | 66 | 34 | 10 | 26 | 29 | 22 | 48 | 28 | 34 | 41 | 44 | 60 | 59 | 63 | 54 | 62 | 45 | 41 | 20 | 88 | 37 | 42 | 37 | 63 | 88 |
| 9-Aug | 17 | 46 | 28 | 9 | 9 | 8 | 10 | 23 | 24 | 44 | 40 | 68 | 57 | 54 | 63 | 57 | 39 | 46 | 73 | 52 | 14 | 10 | 17 | 67 | 73 |
| 10-Aug | 35 | 32 | 18 | 27 | 27 | 75 | 66 | 53 | 79 | 56 | 19 | 50 | 18 | 84 | 52 | 22 | 33 | 54 | 20 | 22 | 70 | 56 | 40 | 59 | 84 |
| 11-Aug | 44 | 12 | 14 | 19 | 8 | 72 | 57 | 18 | 60 | 32 | 39 | 32 | 26 | 33 | 24 | 23 | 27 | 29 | 14 | 24 | 8 | 6 | 7 | 6 | 72 |
| 12-Aug | 4 | 5 | 8 | 7 | 13 | 12 | 12 | 10 | 13 | 14 | 17 | 19 | 19 | 20 | 17 | 18 | 15 | 14 | 10 | 11 | 14 | 13 | 12 | 12 | 20 |
| 13-Aug | 10 | 10 | 11 | 11 | 12 | 12 | 13 | 16 | 15 | 16 | 17 | 19 | 17 | 15 | 17 | 18 | 17 | 16 | 14 | 14 | 11 | 12 | 12 | 12 | 19 |
| 14-Aug | 15 | 15 | 14 | 17 | 18 | 13 | 14 | 14 | 16 | 44 | 31 | 13 | 17 | 16 | 16 | 30 | 27 | 28 | 16 | 75 | 24 | 62 | 10 | 26 | 75 |
| 15-Aug | 58 | 81 | 42 | 38 | 62 | 43 | 83 | 14 | 12 | 13 | 14 | 35 | 15 | 15 | 14 | 23 | 59 | 15 | 22 | 28 | 23 | 16 | 13 | 10 | 83 |
| 16-Aug | 10 | 11 | 11 | 11 | 11 | 12 | 13 | 12 | 22 | 31 | 33 | 36 | 44 | 24 | 27 | 15 | 17 | 16 | 14 | 15 | 12 | 13 | 11 | 12 | 44 |
| 17-Aug | 20 | 27 | 20 | 24 | 16 | 29 | 16 | 14 | 17 | 24 | 26 | 20 | 23 | 16 | 17 | 16 | 21 | 16 | 14 | 34 | 12 | 14 | 15 | 22 | 34 |
| 18-Aug | 14 | 11 | 11 | 10 | 21 | 13 | 12 | 25 | 16 | 17 | 17 | 19 | 18 | 14 | 47 | 10 | 21 | 30 | 19 | 17 | 13 | 19 | 13 | 64 | 64 |
| 19-Aug | 21 | 15 | 16 | 14 | 11 | 10 | 15 | 12 | 14 | 15 | 15 | 13 | 13 | 16 | 15 | 15 | 13 | 15 | 12 | 20 | 15 | 23 | 34 | 15 | 34 |
| 20-Aug | 22 | 13 | 15 | 14 | 14 | 12 | 13 | 15 | 14 | 14 | 15 | 17 | 16 | 16 | 16 | 27 | 18 | 14 | 17 | 14 | 13 | 12 | 16 | 10 | 27 |
| 21-Aug | 13 | 11 | 10 | 12 | 36 | 34 | 10 | 13 | 13 | 19 | 27 | 27 | 27 | 18 | 21 | 24 | 24 | 24 | 14 | 11 | 22 | 22 | 16 | 60 | 60 |
| 22-Aug | 83 | 22 | 15 | 37 | 40 | 10 | 13 | 25 | 23 | 20 | 37 | 33 | 31 | 41 | 20 | 50 | 59 | 67 | 19 | 25 | 19 | 11 | 16 | 20 | 83 |
| 23-Aug | 16 | 13 | 20 | 12 | 17 | 13 | 14 | 14 | 15 | 19 | 17 | 19 | 19 | 17 | 19 | 17 | 18 | 15 | 14 | 13 | 16 | 13 | 12 | 12 | 20 |
| 24-Aug | 13 | 39 | 26 | 13 | 18 | 21 | 12 | 18 | 16 | 47 | 20 | 18 | 23 | 19 | 14 | 16 | 16 | 17 | 20 | 12 | 17 | 16 | 14 | 18 | 47 |
| 25-Aug | 17 | 12 | 17 | 13 | 12 | 12 | 15 | 13 | 15 | 14 | 13 | 13 | 15 | 16 | 15 | 16 | 14 | 16 | 12 | 11 | 11 | 11 | 11 | 10 | 17 |
| 26-Aug | 11 | 13 | 14 | 13 | 12 | 12 | 11 | 12 | 17 | 15 | 15 | 14 | 21 | 20 | 19 | 18 | 17 | 18 | 14 | 10 | 10 | 11 | 11 | 12 | 21 |
| 27-Aug | 10 | 16 | 11 | 11 | 11 | 11 | 13 | 16 | 13 | 14 | 14 | 18 | 13 | 16 | 13 | 13 | 16 | 15 | 13 | 14 | 14 | 14 | 13 | 14 | 18 |
| 28-Aug | 17 | 13 | 16 | 16 | 13 | 10 | 15 | 11 | 18 | 21 | 23 | 21 | 18 | 17 | 15 | 16 | 16 | 15 | 18 | 21 | AF | 48 | 16 | 21 | 48 |
| 29-Aug | 70 | 51 | 83 | 11 | 12 | 17 | 9 | 58 | 76 | 89 | 67 | 56 | 66 | 68 | 47 | 72 | 51 | 31 | 34 | 31 | 18 | 12 | 10 | 10 | 89 |
| 30-Aug | 14 | 11 | 9 | 9 | 9 | 12 | 14 | 13 | 15 | 15 | 15 | 18 | 17 | 17 | 14 | 14 | 13 | 12 | 10 | 16 | 18 | 17 | 22 | 30 | 30 |
| 31-Aug | 59 | 23 | 48 | 20 | 43 | 65 | 72 | 67 | 14 | 14 | 12 | 13 | 15 | 11 | 13 | 12 | 13 | 19 | 13 | 11 | 12 | 12 | 11 | 9 | 72 |
| 83 81 83 51 62 86 83 67 79 89 83 73 71 88 70 72 66 67 73 88 88 62 80 67 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Diurnal Maximum | | | | | | | | | | | | | | | | | | | | | | | | | |
| AF - Analyzer Failure | | | | | | | | | | | | | | | | | | | | | | | | | |



Wood Buffalo Environmental Association

SO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|---------------|
| Station Name: | Sawbones Bay | Station number: | AMS 505 |
| Calibration Date: | August 11, 2017 | Last Cal Date: | July 13, 2017 |
| Start time (MST): | 7:37 | End time (MST): | 11:20 |
| Reason: | Routine | | |

Calibration Standards

| | | | | |
|-----------------------|-------------------|-----|------------------|-------------------|
| Cal Gas Concentration | <u>49.6</u> | ppm | Cal Gas Exp Date | February 22, 2020 |
| Cal Gas Cylinder # | <u>EY0000793</u> | | | |
| Calibrator Make/Model | Teledyne API T700 | | Serial Number | 621 |
| ZAG Make/Model | Teledyne API 701 | | Serial Number | 4428 |

Analyzer Information

Analyzer make: Thermo 43i

Analyzer serial #: 710321323

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|----------------------|--------------|---------------|--------------|--------------|---------------|
| Analyzer Range | 0 - 1000 ppb | | PMT voltage | -628 | -628 |
| Calculated slope | 0.999093 | 0.998254 | Lamp voltage | 783 | 780 |
| Calculated intercept | 0.356660 | 0.715842 | Pressure | 679.9 | 681.0 |
| Analyzer Background | 16.0 | 16.0 | Flow | 0.410 | 0.411 |
| Analyzer Coefficient | 1.015 | 1.020 | Intensity | 91 | 92 |

SO₂ Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|-----------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5000 | 0.0 | 0.0 | -0.4 | ---- |
| as found span | 4930 | 78.8 | 780.3 | 772.2 | 1.011 |
| calibrator zero | 5000 | 0.0 | 0.0 | -0.4 | ---- |
| high point | 4930 | 78.8 | 780.3 | 781.7 | 0.998 |
| second point | 4967 | 39.5 | 391.3 | 389.4 | 1.005 |
| third point | 4990 | 19.8 | 196.0 | 196.5 | 0.998 |
| as left zero | 5000 | 0.0 | 0.0 | 0.2 | ---- |
| as left span | 4930 | 78.8 | 780.3 | 784.3 | 0.995 |

| | | | | | |
|---------------------------|--------|-------------------|--------|-----------|------|
| Average Correction Factor | | | | 1.000 | |
| Corrected As found | 772.60 | Previous response | 780.67 | *% change | 1.0% |

* = > +/-5% change initiates investigation

Notes:

Sample inlet filter replaced after as founds. Slightly adjusted span.

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

SO₂ Calibration Summary

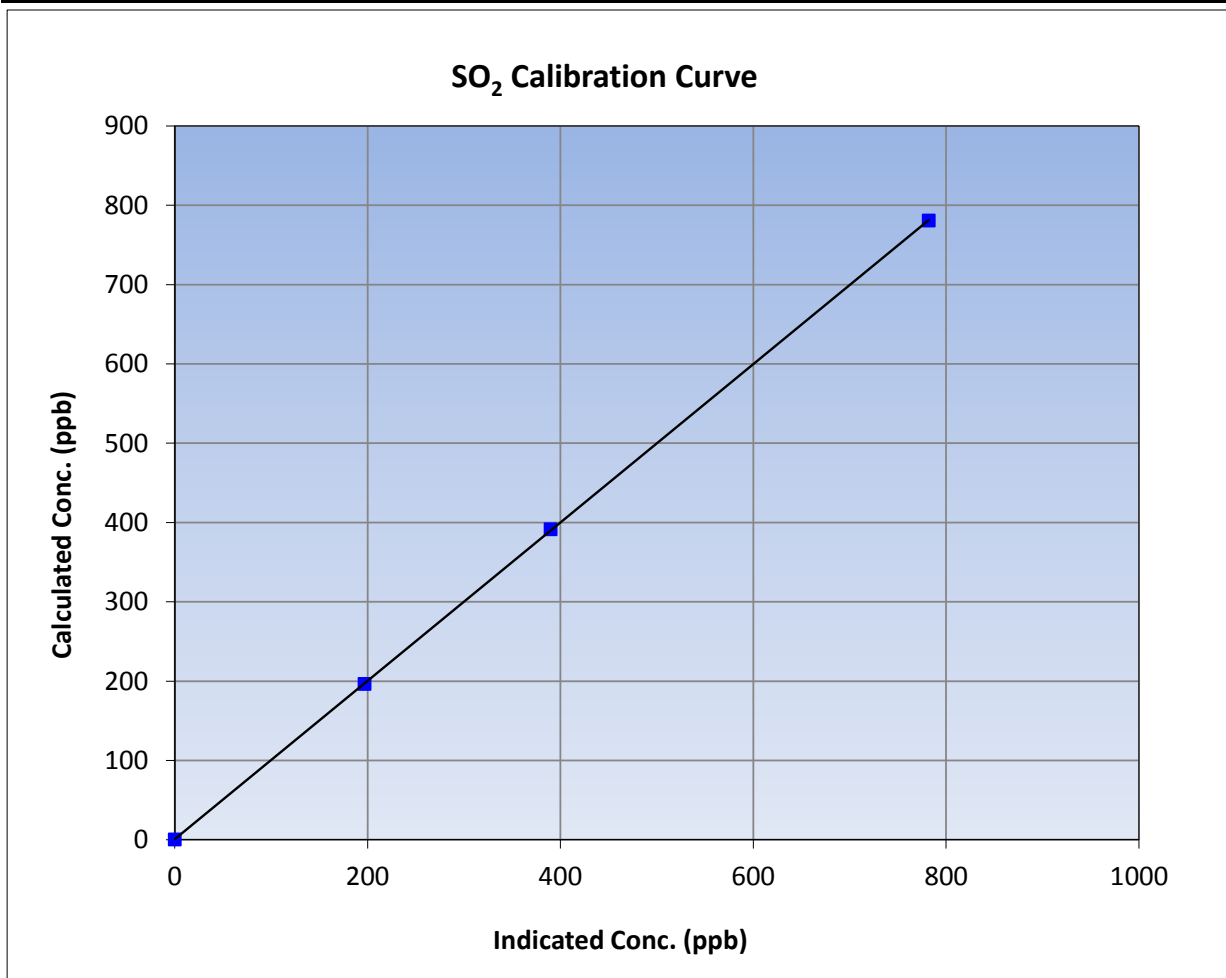
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 11, 2017 | Previous Calibration | July 13, 2017 |
| Station Name | Sawbones Bay | Station Number | AMS 505 |
| Start Time (MST) | 7:37 | End Time (MST) | 11:20 |
| Analyzer make | Thermo 43i | Analyzer serial # | 710321323 |

Calibration Data

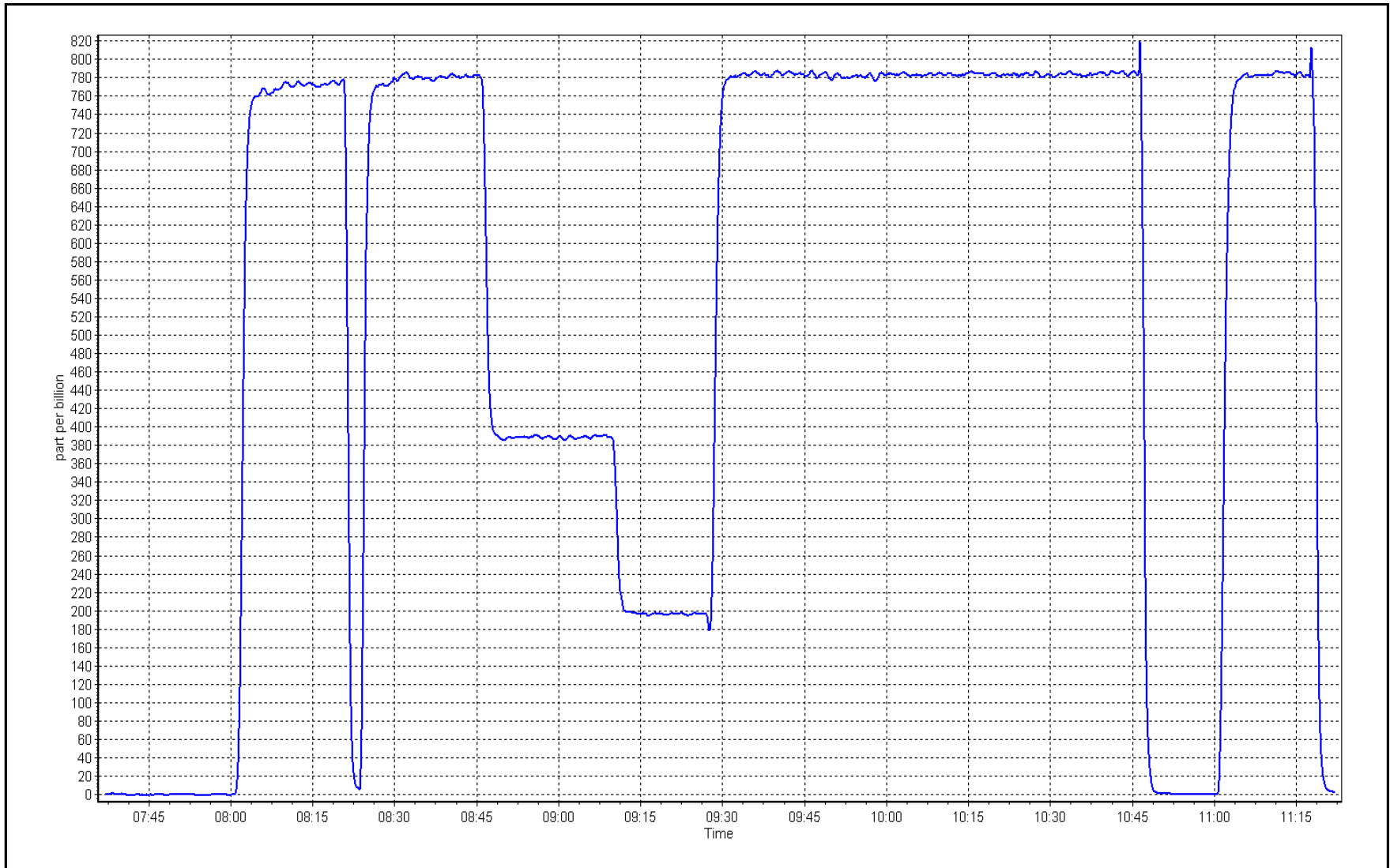
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|-------------|
| 0.0 | -0.4 | ---- | Correlation Coefficient | 0.999985 | ≥0.995 |
| 780.3 | 781.7 | 0.9982 | | | |
| 391.3 | 389.4 | 1.0049 | Slope | 0.998254 | 0.90 - 1.10 |
| 196.0 | 196.5 | 0.9976 | | | |
| | | | Intercept | 0.715842 | +/-30 |



SO2 Calibration Plot

Date: August 11, 2017

Location: Sawbones Bay





Wood Buffalo Environmental Association

H₂S Calibration Report

Version-06-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|--------------|
| Station Name: | Sawbones Bay | Station number: | AMS 505 |
| Calibration Date: | August 11, 2017 | Last Cal Date: | July 4, 2017 |
| Start time (MST): | 11:16 | End time (MST): | 13:15 |
| Reason: | Routine | | |

Calibration Standards

| | | | | |
|-----------------------|------------------|-----|------------------|------------------|
| Cal Gas Concentration | <u>5.03</u> | ppm | Cal Gas Exp Date | December 7, 2019 |
| Cal Gas Cylinder # | <u>DR0000386</u> | | | |
| Calibrator Make/Model | Teledyne T700 | | Serial Number | 621 |
| ZAG Make/Model | Teledyne 701 | | Serial Number | 4428 |

Analyzer Information

Analyzer make: Thermo 450i

Analyzer serial #: 922436966

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|----------------------|--------------|---------------|--------------|--------------|---------------|
| Analyzer Range | 0 - 100 ppb | | PMT voltage | -650 | -650 |
| Calculated slope | 0.986426 | 0.997946 | Lamp voltage | 867 | 866 |
| Calculated intercept | -0.145024 | -0.381064 | Pressure | 548.4 | 552.7 |
| Analyzer Background | 26.7 | 26.7 | Flow | 1.098 | 1.104 |
| Analyzer Coefficient | 1.118 | 1.118 | Intensity | 91 | 91 |

H₂S Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|-----------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5000 | 0.0 | 0.0 | 0.2 | ---- |
| as found span | 4925 | 79.6 | 80.0 | 80.2 | 0.998 |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | ---- |
| high point | 4925 | 79.6 | 80.0 | 80.2 | 0.998 |
| second point | 4965 | 39.8 | 40.0 | 41.1 | 0.973 |
| third point | 4990 | 20.0 | 20.1 | 20.6 | 0.975 |
| as left zero | 5000 | 0.0 | 0.0 | 0.3 | ---- |
| as left span | 4925 | 79.6 | 80.0 | 83.1 | 0.963 |

SO2 Scrubber Check

| | | | Average Correction Factor | 0.982 |
|--------------------|-------|-------------------|---------------------------|----------------|
| Corrected As found | 80.00 | Previous response | 81.25 | *% change 1.6% |

* = > +/-5% change initiates investigation

Notes:

Inlet filter replaced after as founds. No adjustments made.

Calibration Performed By:

Asad Hidayat



Wood Buffalo Environmental Association

H₂S Calibration Summary

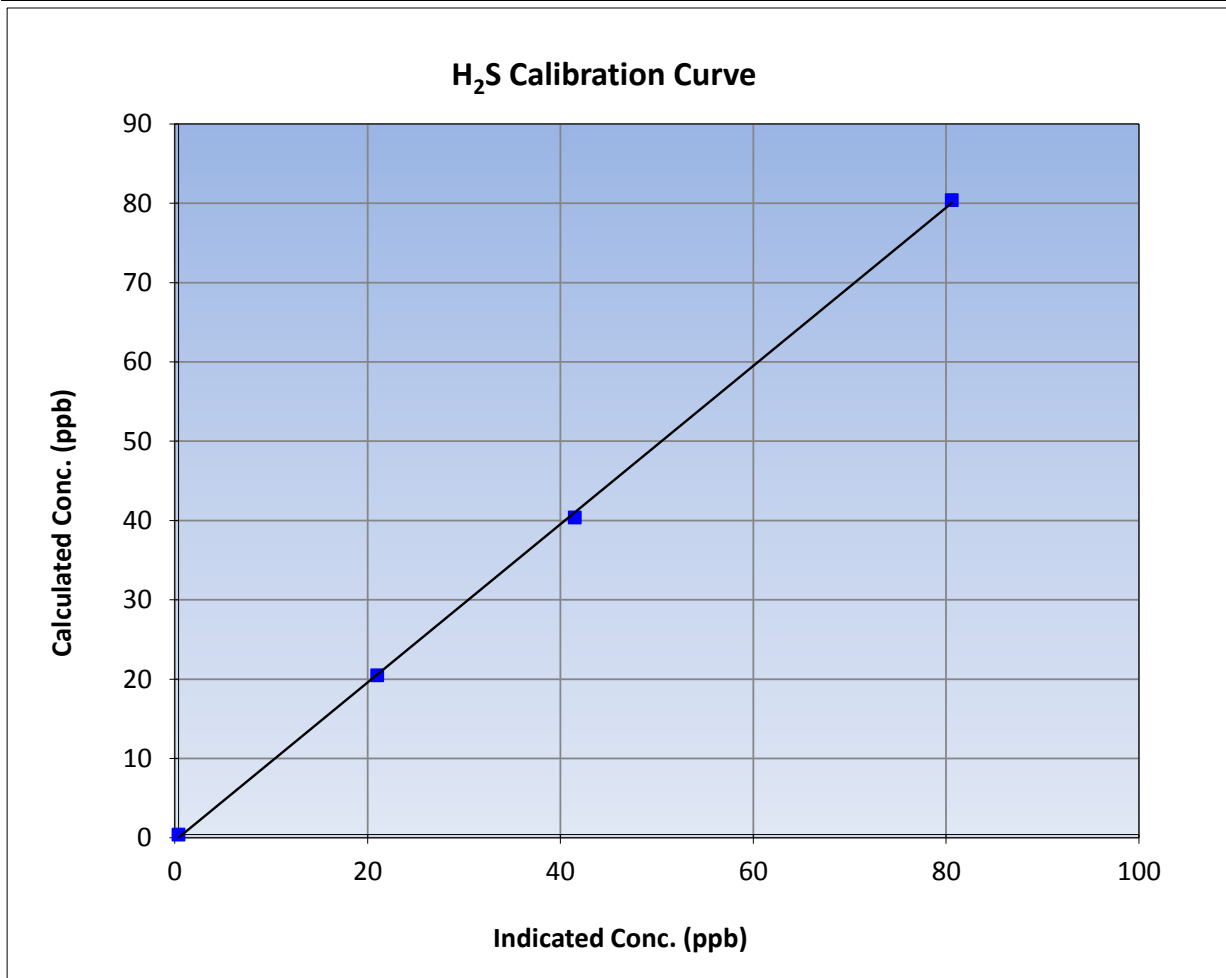
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|--------------|
| Calibration Date | August 11, 2017 | Previous Calibration | July 4, 2017 |
| Station Name | Sawbones Bay | Station Number | AMS 505 |
| Start Time (MST) | 11:16 | End Time (MST) | 13:15 |
| Analyzer make | Thermo 450i | Analyzer serial # | 922436966 |

Calibration Data

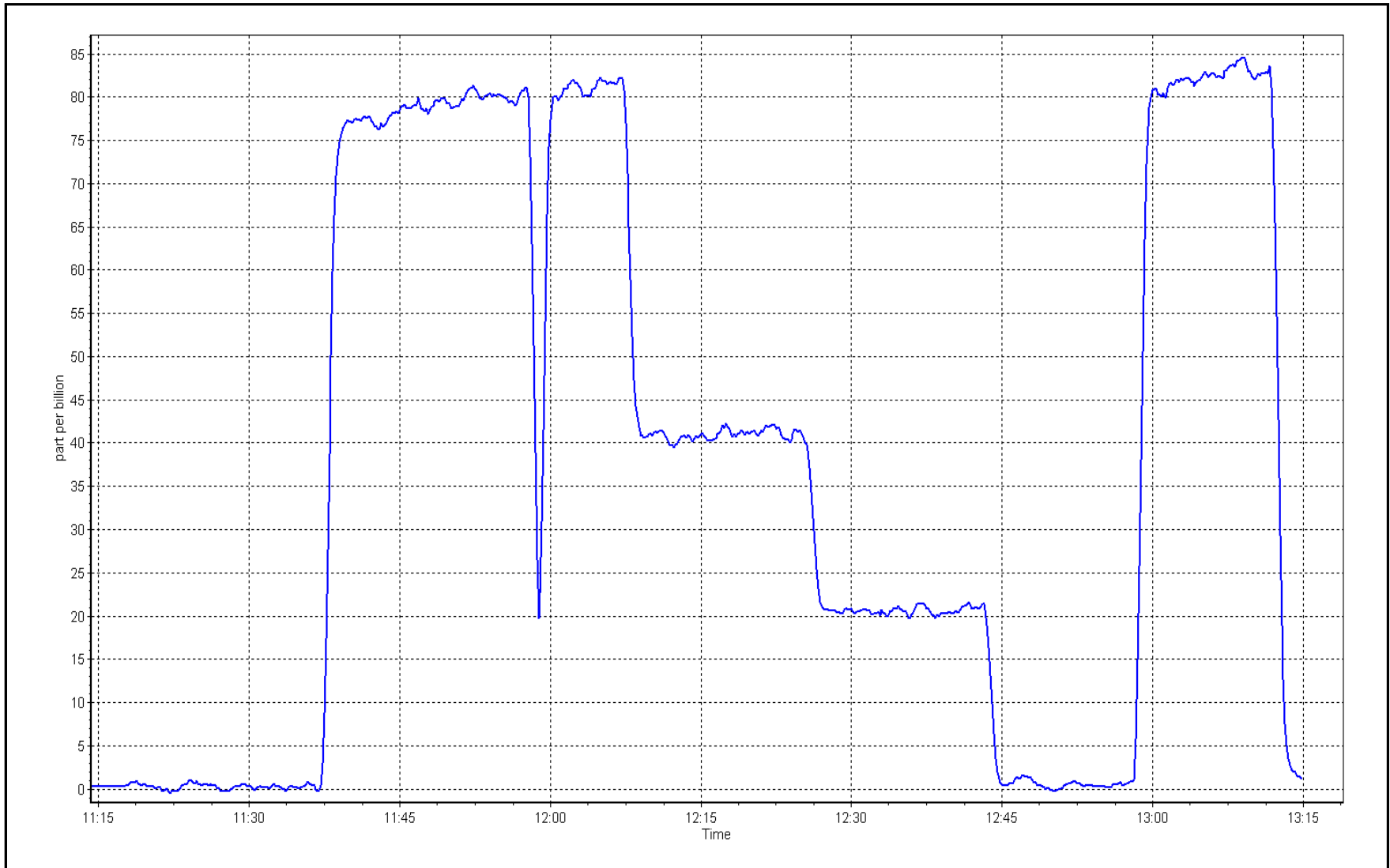
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|-----------|-------------|
| 0.0 | 0.0 | ---- | Correlation Coefficient | 0.999806 | ≥0.995 |
| 80.0 | 80.2 | 0.9976 | | | |
| 40.0 | 41.1 | 0.9732 | Slope | 0.997946 | 0.90 - 1.10 |
| 20.1 | 20.6 | 0.9747 | | | |
| | | | Intercept | -0.381064 | +/-3 |



H₂S Calibration Plot

Date: August 11, 2017

Location: Sawbones Bay





Wood Buffalo Environmental Association

THC Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|---------------|
| Station Name: | Sawbones Bay | Station number: | AMS 505 |
| Calibration Date: | August 11, 2017 | Last Cal Date: | July 13, 2017 |
| Start time (MST): | 7:37 | End time (MST): | 11:20 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|-----------------------|-------------------|---------------------|-------------------|
| Gas Cert Reference | EY0000793 | Cal Gas Expiry Date | February 22, 2020 |
| CH4 Cal Gas Conc. | <u>504.0</u> ppm | CH4 Equiv Conc. | 1054.0 ppm |
| C3H8 Cal Gas Conc. | <u>200.0</u> ppm | Station temp. | 22 Deg C |
| Calibrator Make/Model | Teledyne API T700 | Serial Number | 621 |
| ZAG Make/Model | Teledyne API 701 | Serial Number | 4428 |

Analyzer Information

| | | | |
|----------------------|--------------|---------------------|---------------|
| Analyzer make: | Thermo 51i | Analyzer serial #: | 1327059297 |
| | <u>Start</u> | <u>Finish</u> | <u>Start</u> |
| Analyzer Range | 0 - 25 ppm | Bias voltage supply | -288 |
| Calculated slope | 1.001555 | Sample pressure | 8.0 |
| Calculated intercept | -0.008712 | Fuel pressure | 23.3 |
| Analyzer Background | 3.020 | Air pressure | 34.5 |
| Analyzer Coefficient | 5.111 | Flame temperature | 152.7 |
| | | | <u>Finish</u> |

THC Calibration Data

| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (Ic) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|---------------------------|-------------------------------|-----------------------------|-------------------------------------|------------------------------------|---|
| as found zero | 5000 | 0.0 | 0.00 | -0.07 | ---- |
| as found span | 4930 | 78.8 | 16.58 | 16.90 | 0.981 |
| calibrator zero | 5000 | 0.0 | 0.00 | -0.07 | ---- |
| high point | 4930 | 78.8 | 16.58 | 16.56 | 1.001 |
| second point | 4967 | 39.5 | 8.32 | 8.29 | 1.003 |
| third point | 4990 | 19.8 | 4.17 | 4.15 | 1.004 |
| as left zero | 5000 | 0.0 | 0.00 | -0.03 | ---- |
| as left span | 4930 | 78.8 | 16.58 | 16.60 | 0.999 |
| Average Correction Factor | | | | | 1.003 |
| Corrected As found | 16.97 | Previous response | 16.56 | *% change | -2.4% |

* = > +/-5% change initiates investigation

Notes: Sample inlet filter was replaced after as founds. Adjusted span.

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

THC Calibration Summary

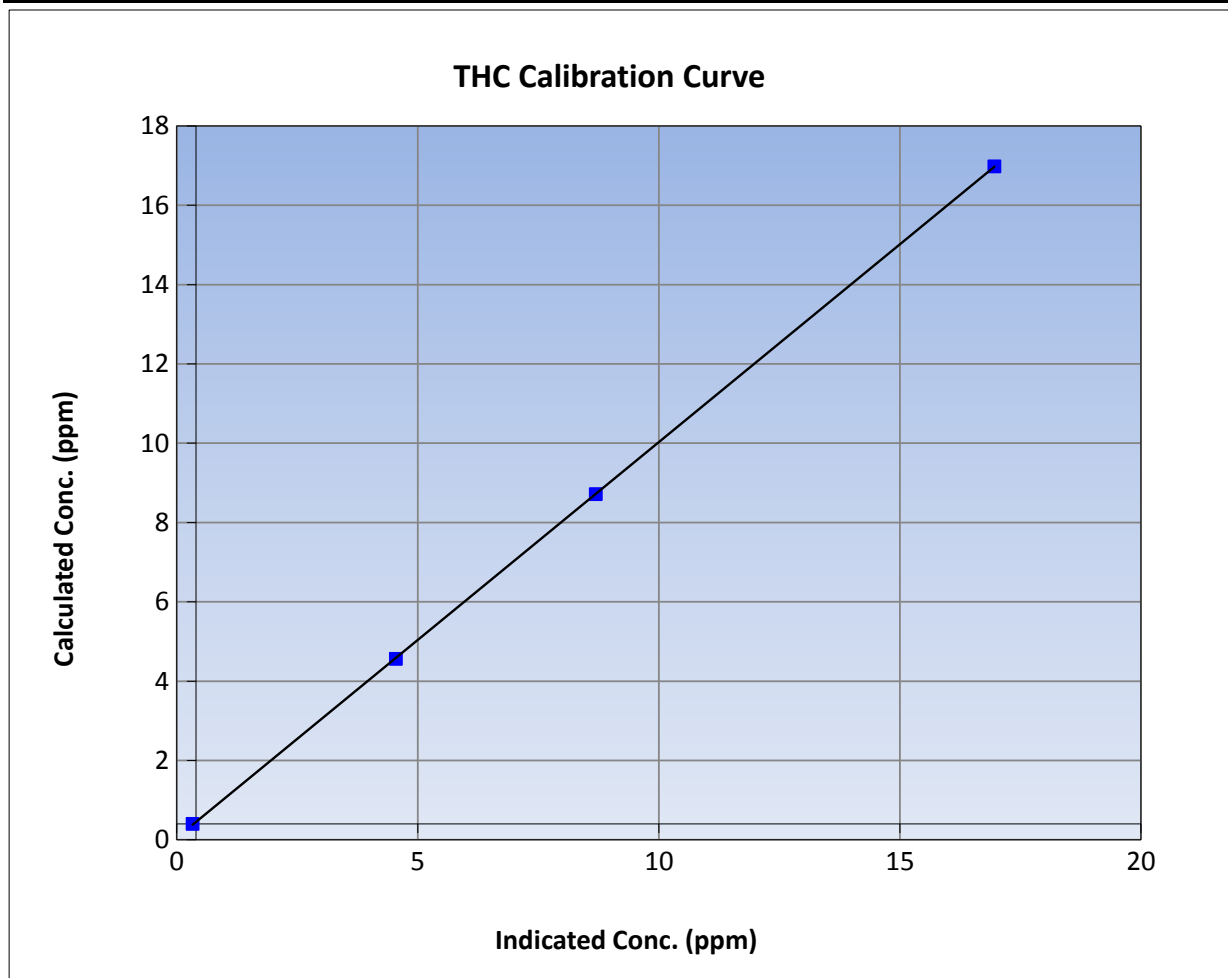
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 11, 2017 | Previous Calibration | July 13, 2017 |
| Station Name | Sawbones Bay | Station Number | AMS 505 |
| Start Time (MST) | 7:37 | End Time (MST) | 11:20 |
| Analyzer make | Thermo 51i | Analyzer serial # | 1327059297 |

Calibration Data

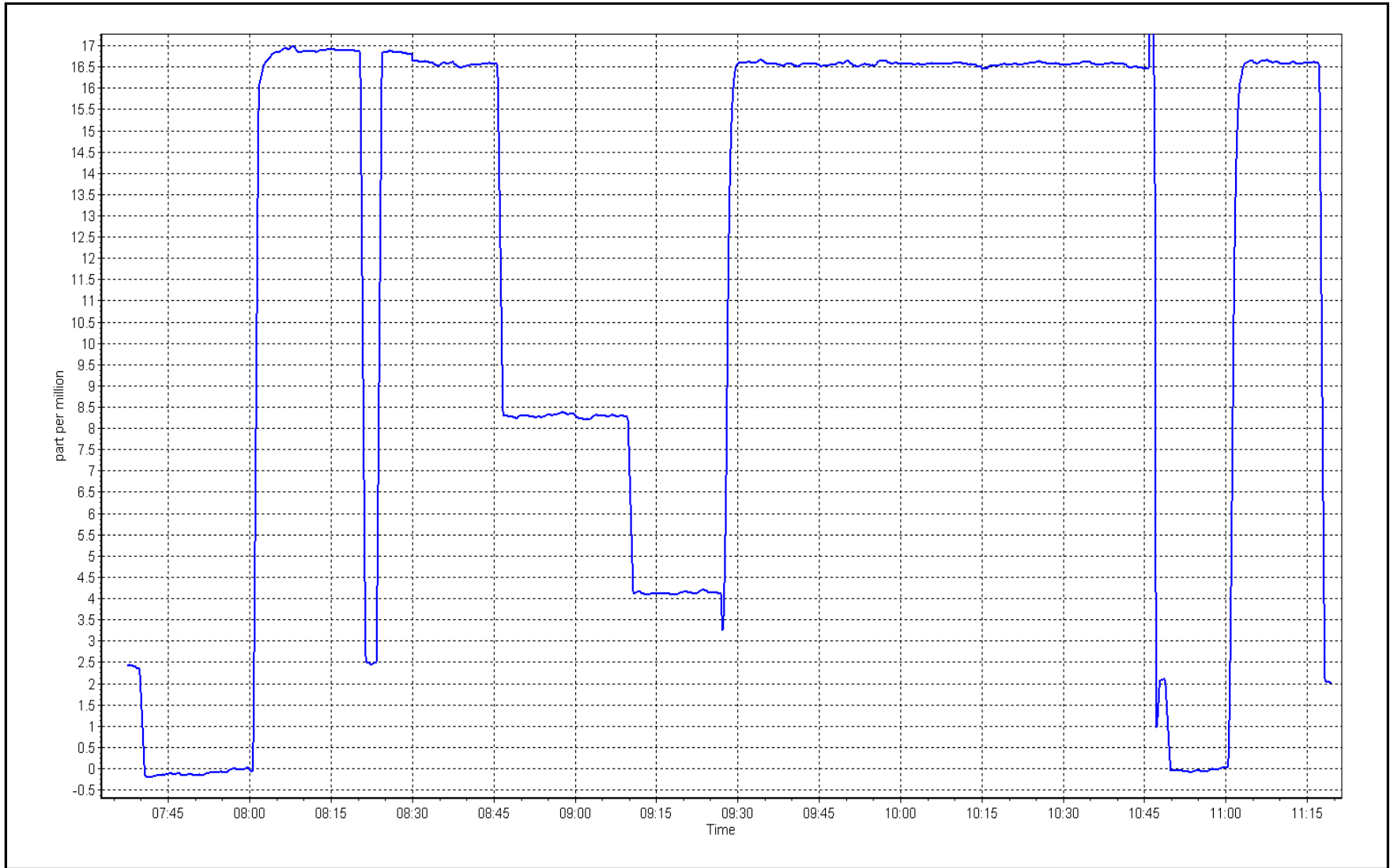
| Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|-------------|
| 0.0 | -0.1 | ---- | Correlation Coefficient | 0.999993 | ≥0.995 |
| 16.6 | 16.6 | 1.0013 | | | |
| 8.3 | 8.3 | 1.0026 | Slope | 0.997756 | 0.90 - 1.10 |
| 4.2 | 4.1 | 1.0043 | | | |
| | | | Intercept | 0.049061 | +/-1.5 |



THC Calibration Plot

Date: August 11, 2017

Location: Sawbones Bay





Wood Buffalo Environmental Association

NO_x - NO - NO₂ Calibration Report

Version-03-2017

Station Information

| | | | |
|-------------------|-----------------|-----------------|---------------|
| Station Name: | Sawbones Bay | Station number: | AMS 505 |
| Calibration Date: | August 11, 2017 | Last Cal Date: | July 13, 2017 |
| Start time (MST): | 7:37 | End time (MST): | 11:20 |
| Reason: | Routine | | |

Calibration Standards

| | | | |
|-------------------|-------------------|---------------------|-------------------|
| NO Gas Cylinder # | EY0000793 | Cal Gas Expiry Date | February 22, 2020 |
| NOX Cal Gas Conc. | <u>50.8</u> ppm | NO Cal Gas Conc. | <u>50.8</u> ppm |
| Calibrator Model | Teledyne API T700 | Serial Number | 621 |
| ZAG make/model | Teledyne API 701 | Serial Number | 4428 |

Analyzer Information

| | | | | |
|-----------------------------|--------------|--------------------|---------------------|---------------|
| Analyzer make: | Thermo 42i | Analyzer serial #: | 1152430008 | |
| | <u>Start</u> | <u>Finish</u> | <u>Start</u> | <u>Finish</u> |
| NO coefficient | 0.885 | 0.897 | NOX Range (ppb) | 0 - 1000 ppb |
| NOX coefficient | 0.999 | 0.998 | PMT Temperature | -3.0 -3.1 |
| NO ₂ coefficient | 1.000 | 1.000 | Reaction cell Press | 150.3 150.6 |
| NO bkgrnd | 2.4 | 2.4 | Sample Flow | 0.658 0.666 |
| NOX bkgrnd | 2.6 | 2.6 | PMT Voltage | -761.0 -760.7 |

Calibration Statistics

| | | |
|----------------------------|--------------|---------------|
| | <u>Start</u> | <u>Finish</u> |
| NO _x Cal Slope | 0.999557 | 0.997021 |
| NO _x Cal Offset | 1.873062 | 1.809685 |
| NO Cal Slope | 0.999880 | 0.995944 |
| NO Cal Offset | 1.935384 | 2.210884 |
| NO ₂ Cal Slope | 0.996260 | 0.996242 |
| NO ₂ Cal Offset | -0.908000 | 0.086653 |



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Version-03-2017

Dilution Calibration Data

| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
|----------------------------------|---------------------------|-----------------------------|---|--|---|--|---------------------------------------|--|---|--|
| as found zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | -0.2 | -0.1 | -0.1 | ---- | ---- |
| as found span | 4930 | 78.8 | 799.2 | 799.2 | 0.0 | 788.1 | 787.4 | 0.7 | 1.0141 | 1.0150 |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | -0.2 | -0.1 | -0.1 | ---- | ---- |
| high point | 4930 | 78.8 | 799.2 | 799.2 | 0.0 | 800.6 | 801.2 | -0.5 | 0.9983 | 0.9975 |
| second point | 4967 | 39.5 | 400.8 | 400.8 | 0.0 | 399.3 | 399.4 | -0.1 | 1.0038 | 1.0035 |
| third point | 4990 | 19.8 | 200.8 | 200.8 | 0.0 | 198.0 | 197.1 | -0.1 | 1.0140 | 1.0186 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | 0.1 | -0.2 | ---- | ---- |
| as left span | 4930 | 78.8 | 799.2 | 325.6 | 473.6 | 801.8 | 324.6 | 477.2 | 0.9968 | 1.0031 |
| Average Correction Factor | | | | | | | | | 1.0053 | 1.0066 |

| | | | | | |
|--|-----------------------------|----------------|--|-----------------|------------------------|
| Corrected As found | NO _x = 788.3 ppb | NO = 787.5 ppb | | *Percent Change | NO _x = 1.2% |
| Previous Response | NO _x = 797.7 ppb | NO = 797.4 ppb | | *Percent Change | NO = 1.3% |
| <i>* = > +/-5% change initiates investigation</i> | | | | | |

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO drop conc (ppb) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | Converter Efficiency <i>Limit = 96-104%</i> |
|----------------------------------|------------------------------|---|--|---------------------------------------|--|---|--|---|--|
| 1st NO ref point | | 0.0 | 800.9 | 799.3 | 1.6 | 0.9979 | 0.9999 | ---- | ---- |
| 1st NO2 (400 ppb O3) | 325.6 | 473.7 | 801.0 | 325.6 | 475.3 | 0.9978 | ---- | 0.9966 | 100.3% |
| 2nd NO2 (200 ppb O3) | 559.7 | 239.6 | 800.4 | 559.7 | 240.7 | 0.9985 | ---- | 0.9954 | 100.5% |
| 3rd NO2 (100 ppb O3) | 678.1 | 121.2 | 799.5 | 678.1 | 121.4 | 0.9996 | ---- | 0.9984 | 100.2% |
| 2nd NO ref point | ---- | 0.0 | 799.7 | 798.4 | 1.4 | 0.9994 | 1.0010 | ---- | ---- |
| Average Correction Factor | | | | | | 0.9988 | 1.0004 | 0.9968 | 100.3% |

Notes: Sample inlet filter replaced after as founds. Adjusted span.

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

NO_x Calibration Summary

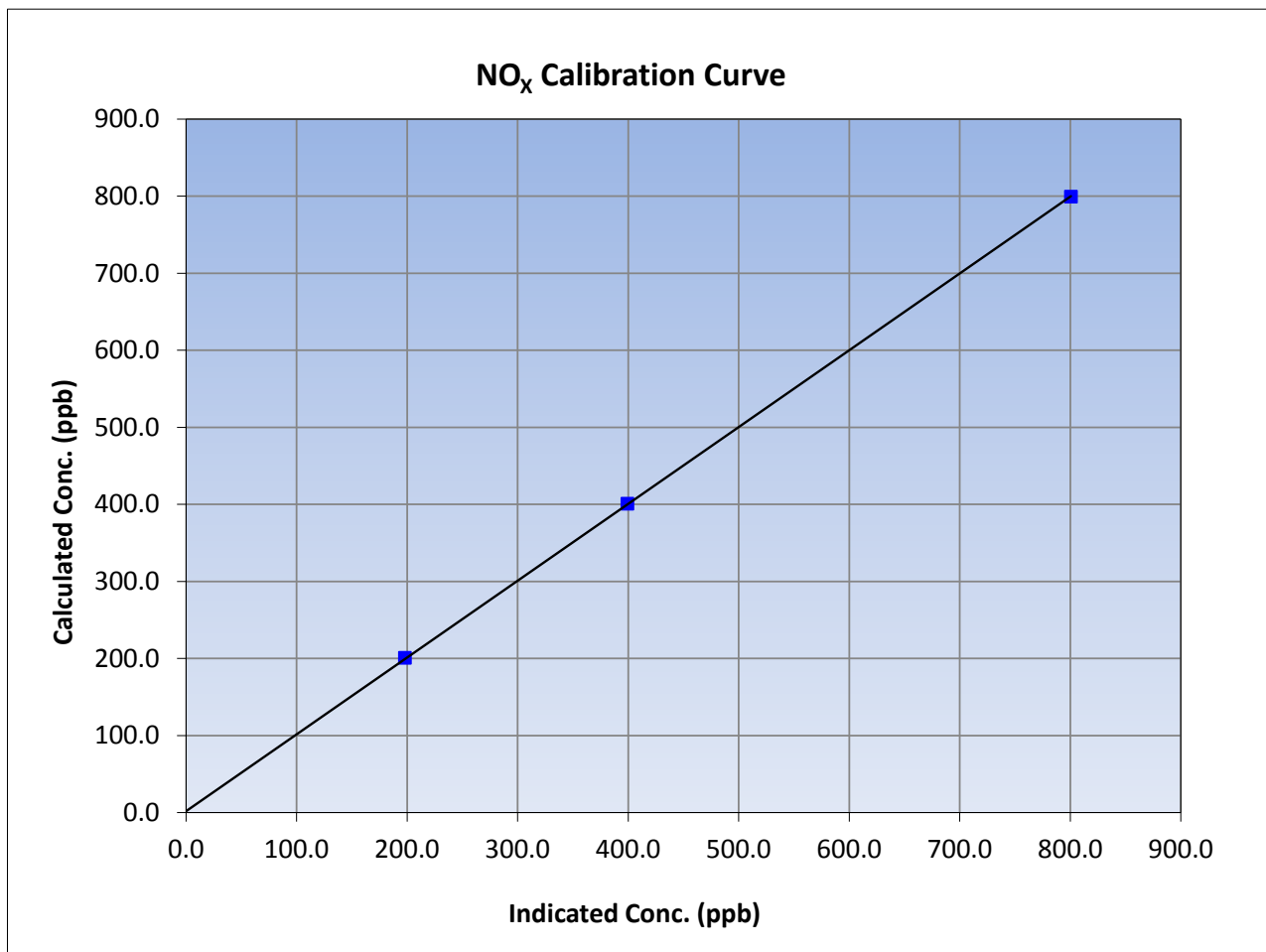
Version-03-2017

Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 11, 2017 | Previous Calibration | July 13, 2017 |
| Station Name | Sawbones Bay | Station Number | AMS 505 |
| Start Time (MST) | 7:37 | End Time (MST) | 11:20 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1152430008 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | -0.2 | ---- | Correlation Coefficient | ≥0.995 | |
| 799.2 | 800.6 | 0.9983 | | | |
| 400.8 | 399.3 | 1.0038 | | | |
| 200.8 | 198.0 | 1.0140 | | | |
| | | | Slope | 0.997021 | 0.90 - 1.10 |
| | | | Intercept | 1.809685 | +/-20 |





Wood Buffalo Environmental Association

NO Calibration Summary

Version-03-2017

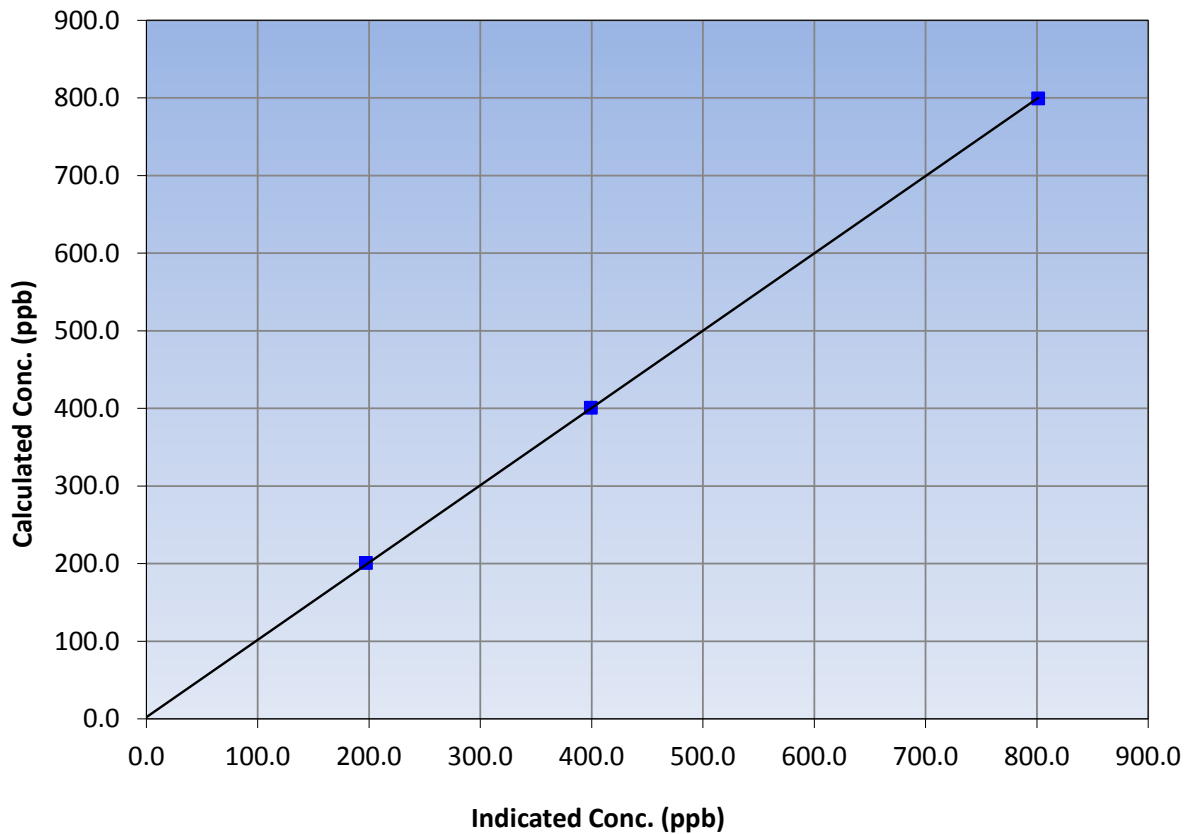
Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 11, 2017 | Previous Calibration | July 13, 2017 |
| Station Name | Sawbones Bay | Station Number | AMS 505 |
| Start Time (MST) | 7:37 | End Time (MST) | 11:20 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1152430008 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | Limits | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|----------|-------------|
| 0.0 | -0.1 | ---- | Correlation Coefficient | 0.999968 | ≥0.995 |
| 799.2 | 801.2 | 0.9975 | | | |
| 400.8 | 399.4 | 1.0035 | Slope | 0.995944 | 0.90 - 1.10 |
| 200.8 | 197.1 | 1.0186 | | | |
| | | | Intercept | 2.210884 | +/-20 |

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

Version-03-2017

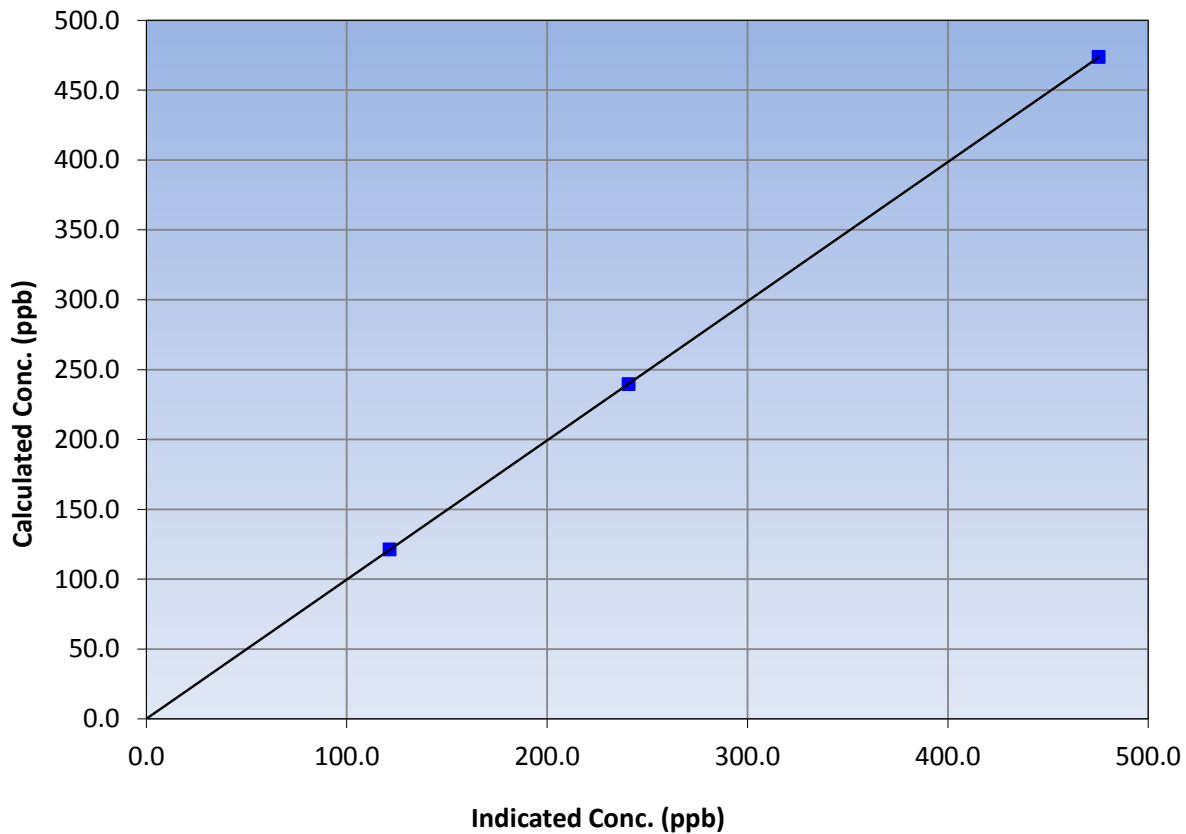
Station Information

| | | | |
|------------------|-----------------|----------------------|---------------|
| Calibration Date | August 11, 2017 | Previous Calibration | July 13, 2017 |
| Station Name | Sawbones Bay | Station Number | AMS 505 |
| Start Time (MST) | 7:37 | End Time (MST) | 11:20 |
| Analyzer make | Thermo 42i | Analyzer serial # | 1152430008 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <i>Limits</i> | |
|-------------------------------------|------------------------------------|---------------------------|-------------------------|---------------|-------------|
| 0.0 | -0.1 | ---- | Correlation Coefficient | ≥0.995 | |
| 473.7 | 475.3 | 0.9966 | | | |
| 239.6 | 240.7 | 0.9954 | | | |
| 121.2 | 121.4 | 0.9984 | | | |
| | | | Slope | 0.996242 | 0.90 - 1.10 |
| | | | Intercept | 0.086653 | +/-20 |

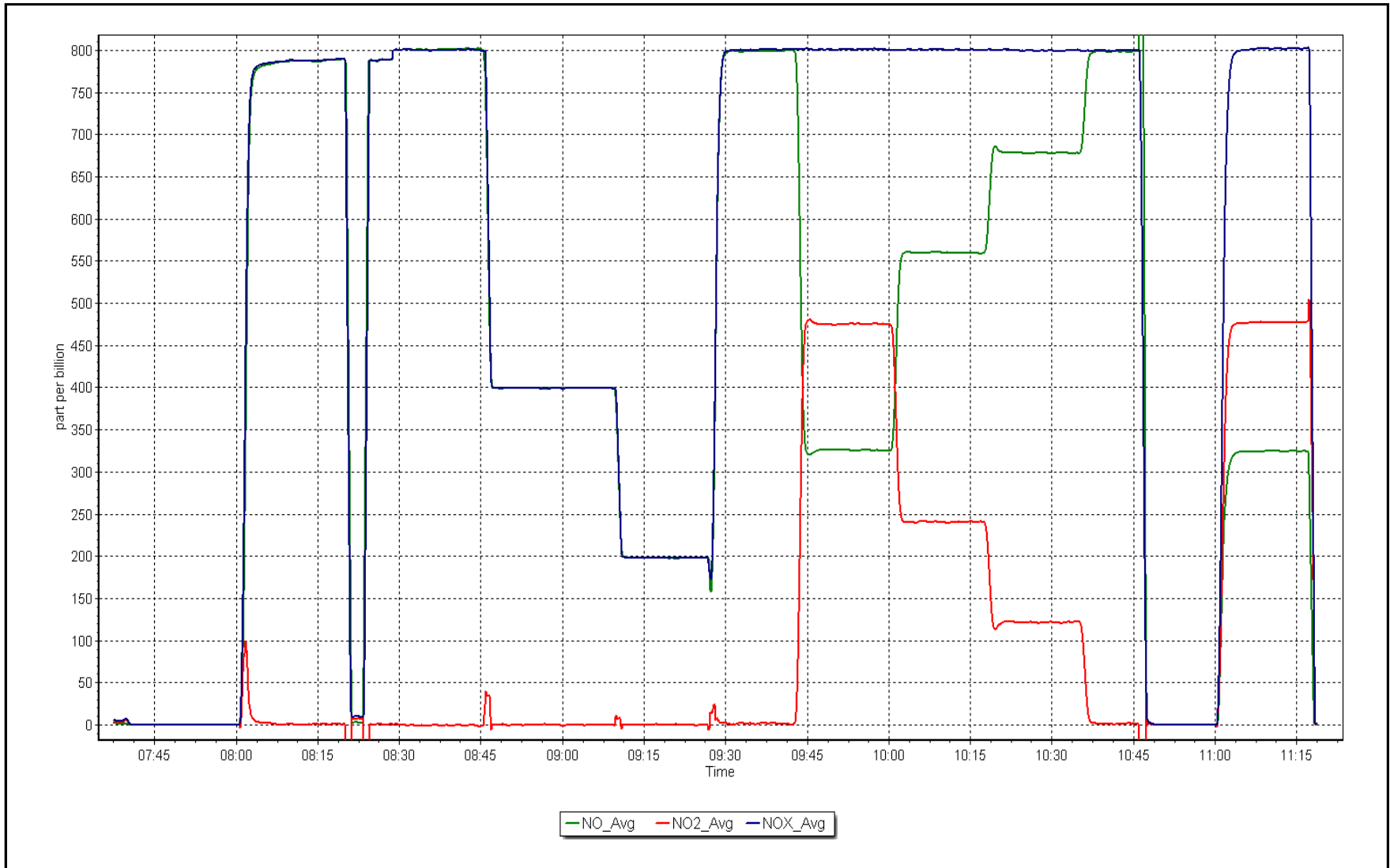
NO₂ Calibration Curve



NO_x Calibration Plot

Date: August 11, 2017

Location: Sawbones Bay





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

INTEGRATED MONITORING PROGRAM MONTHLY REPORT

DATA SUMMARY JULY 2017

Prepared
September 27, 2017

SAMPLE COLLECTION AND DATA COMPILATION BY:

Wood Buffalo Environmental Association
Fort McMurray, Alberta

LABORATORY ANALYSIS BY:

Passive Measurements: Maxxam Analytics Ltd
Edmonton, Alberta

VOCs: InnoTech Alberta, Inc.
Vegreville, Alberta

Particulate Matter: Atmospheric Research & Analysis, Inc.
Morrisville, NC

PAHs: Airzone One Ltd
Mississauga, Ontario

Precipitation: InnoTech Alberta, Inc.
Vegreville, Alberta



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

**INTEGRATED MONITORING PROGRAM
MONTHLY REPORT**

**HNO₃, NH₃, NO₂, O₃ AND SO₂ PASSIVE MEASUREMENTS
DATA SUMMARY
JUNE - JULY 2017**

Prepared
September 27, 2017

SAMPLE COLLECTION AND DATA COMPILATION BY:

Wood Buffalo Environmental Association
Fort McMurray, Alberta

LABORATORY ANALYSIS BY:

Passive measurements: Maxxam Analytics Ltd
Edmonton, Alberta



| FILE CONTENTS DESCRIPTION | Passive Measurements of SO ₂ , NO ₂ , O ₃ , NH ₃ and HNO ₃ |
|---|---|
| SAMPLING INTERVAL | Bimonthly |
| SAMPLING FREQUENCY OF DATA | Bimonthly |
| EXPLANATION OF ZERO VALUES | Zero values are contained in this file and should be treated as values below detection |
| UNITS | ppbv or µg/m ³ |
| OBSERVATION TYPE | Gas |
| FIELD SAMPLING OR MEASUREMENT PRINCIPLE | Diffusion |
| MEDIUM | Filter |
| ANALYTICAL METHODS | IONS by Ion Chromatography (IC) |
| SAMPLE PREPARATION | DI water extraction |
| ANALYTICAL LABORATORY | MAXXAM Analytics Inc |
| USER NOTE 1 | Data are not blank corrected |
| USER NOTE 2 | Concentrations are calculated by equations developed by lab |
| SAMPLING INSTRUMENT TYPE | SO ₂ all-season SO ₂ passive sampling system NO ₂ all-season NO ₂ passive sampling system O ₃ all-season O ₃ passive sampling system NH ₃ Ogawa passive sampler HNO ₃ Ogawa passive sampler |
| FLAGS USED | |
| M1 | Missing value because no value is available |
| M2 | Missing value because invalidated by Data Originator |



Wood Buffalo Environmental Association

Passive Measurements Ambient Air Monitoring Stations

| Site ID | Site Name | Start Date/Time | End Date/Time | Species | | | Passive Measurements | | Ambient Air Monitoring Stations | | |
|---------|--------------------------|------------------|------------------|----------------|---|-------------------------|----------------------|-----------------------|---------------------------------|-----------|----------------------|
| | | | | Ammonia ppb | Nitric Acid $\mu\text{g}/\text{m}^3$ | Nitrogen Dioxide ppb | Ozone ppb | Sulfur Dioxide ppb | RH % | Temp K | Wind Speed cm/sec |
| AMS 1 | Fort McKay-Bertha Ganter | 2017/05/26 11:40 | 2017/08/01 09:55 | 1 | 0.4 | 0.7 | 21.7 | 1 | 60 | 290 | 130 |
| AMS 1 | Fort McKay-Bertha Ganter | 2017/05/26 11:40 | 2017/08/01 09:55 | 1 | 0.5 | 0.7 | 22.6 | 1 | 60 | 290 | 130 |
| AMS 1 | Fort McKay-Bertha Ganter | 2017/05/26 11:40 | 2017/08/01 09:55 | 0.9 | 0.4 | 0.8 | 23.1 | 1.1 | 60 | 290 | 130 |
| AMS 2 | Mildred Lake | 2017/05/26 13:35 | 2017/08/01 12:05 | 2.8 | 0.4 | 1.2 | 25.8 | 2.8 | 60 | 290 | 130 |
| AMS 2 | Mildred Lake | 2017/05/26 13:35 | 2017/08/01 12:05 | 3.6 | 0.4 | 1.1 | 23.5 | 3.4 | 60 | 290 | 130 |
| AMS 2 | Mildred Lake | 2017/05/26 13:35 | 2017/08/01 12:05 | 3.6 | 0.5 | 1.1 | 24.5 | 2.8 | 60 | 290 | 130 |



Wood Buffalo Environmental Association

| Site ID | Start Date/Time | End Date/Time | Passive Measurements | | | | Remote sites | | | |
|---------|------------------|------------------|----------------------|----------------------------------|-------------------------|--------------|-----------------------|---------|-----------|----------------------|
| | | | Ammonia ppb | Nitric Acid µg/m ³ | Nitrogen Dioxide ppb | Ozone ppb | Sulfur Dioxide ppb | RH % | Temp K | Wind Speed cm/sec |
| AS103 | 2017/06/05 12:00 | 2017/08/02 14:40 | 1.3 | 0.5 | 0.3 | 34.6 | 0.2 | 61 | 290 | 130 |
| AS103 | 2017/06/05 12:00 | 2017/08/02 14:40 | 1.3 | 0.3 | 0.3 | 30.1 | 0.3 | 61 | 290 | 130 |
| AS107 | 2017/06/05 11:10 | 2017/07/31 16:55 | 1.8 | 0.4 | 0.6 | 25.8 | 0.7 | 61 | 290 | 130 |
| AS107 | 2017/06/05 11:10 | 2017/07/31 16:55 | 1.6 | 0.4 | 0.3 | 31.8 | 0.7 | 61 | 290 | 130 |
| JP101 | 2017/06/06 12:20 | 2017/07/31 09:50 | 1.1 | 0.3 | <0.1 | 29 | 0.2 | 61 | 290 | 130 |
| JP101 | 2017/06/06 12:20 | 2017/07/31 09:50 | 1.4 | 0.4 | 0.1 | 30.1 | 0.2 | 61 | 290 | 130 |
| JP102 | 2017/06/05 10:05 | 2017/07/31 10:05 | 2 | 0.5 | 0.5 | 27.7 | 0.8 | 63 | 291 | 130 |
| JP102 | 2017/06/05 10:05 | 2017/07/31 10:05 | 1.9 | 0.4 | 0.4 | 29.5 | 0.8 | 63 | 291 | 130 |
| JP104 | 2017/06/01 12:25 | 2017/07/31 13:10 | 1.6 | 0.4 | 1.3 | 27.2 | 1.5 | 64 | 291 | 130 |
| JP104 | 2017/06/01 12:25 | 2017/07/31 13:10 | 2 | 0.6 | 1.5 | 24.2 | 1.3 | 64 | 291 | 130 |
| JP107 | 2017/05/31 12:20 | 2017/08/01 11:10 | 1.5 | 0.3 | 0.2 | 30.8 | 0.3 | 65 | 290 | 130 |
| JP107 | 2017/05/31 12:20 | 2017/08/01 11:10 | 1.2 | 0.3 | 0.2 | 28.7 | 0.3 | 65 | 290 | 130 |
| JP108 | 2017/05/29 13:10 | 2017/08/02 10:40 | 1.1 | 0.2 | <0.1 | 21.2 | 0.2 | 65 | 290 | 130 |
| JP108 | 2017/05/29 13:10 | 2017/08/02 10:40 | 1.2 | 0.2 | <0.1 | 20.1 | 0.2 | 65 | 290 | 130 |
| JP201 | 2017/05/30 09:10 | 2017/07/31 12:30 | 1 | 0.3 | <0.1 | 25.9 | 0.1 | 60 | 291 | 130 |
| JP201 | 2017/05/30 09:10 | 2017/07/31 12:30 | 1 | 0.3 | 0.1 | 27.9 | 0.1 | 60 | 291 | 130 |
| JP205 | 2017/05/31 14:30 | 2017/08/01 12:00 | 1.2 | 0.3 | 0.1 | 30.9 | 0.3 | 65 | 290 | 130 |
| JP205 | 2017/05/31 14:30 | 2017/08/01 12:00 | 1 | 0.3 | 0.1 | 28.6 | 0.3 | 65 | 290 | 130 |
| JP210 | 2017/05/29 16:15 | 2017/08/02 13:40 | 0.8 | 0.3 | 0.1 | 26.2 | 0.2 | 70 | 289 | 130 |
| JP210 | 2017/05/29 16:15 | 2017/08/02 13:40 | 1.6 | 0.3 | <0.1 | 25.1 | 0.2 | 70 | 289 | 130 |
| JP213 | 2017/05/29 11:00 | 2017/08/02 09:30 | 0.8 | 0.3 | <0.1 | 27.7 | 0.2 | 65 | 290 | 130 |
| JP213 | 2017/05/29 11:00 | 2017/08/02 09:30 | 1 | 0.3 | <0.1 | 30 | 0.2 | 65 | 290 | 130 |
| JP309 | 2017/05/30 15:20 | 2017/07/31 15:40 | 1.7 | 0.4 | 0.3 | 27.9 | 0.3 | 64 | 291 | 130 |
| JP309 | 2017/05/30 15:20 | 2017/07/31 15:40 | 1.3 | 0.3 | 0.3 | 25.9 | 0.3 | 64 | 291 | 130 |
| JP311 | 2017/06/02 08:20 | 2017/07/31 09:10 | 1 | 0.4 | 0.2 | 36.3 | 0.3 | 61 | 290 | 130 |
| JP311 | 2017/06/02 08:20 | 2017/07/31 09:10 | 1.3 | 0.4 | 0.2 | 30.8 | 0.4 | 61 | 290 | 130 |
| JP316 | 2017/05/29 14:45 | 2017/08/02 12:20 | 0.9 | 0.3 | 0.1 | 29.3 | 0.2 | 70 | 289 | 130 |
| JP316 | 2017/05/29 14:45 | 2017/08/02 12:20 | 0.7 | 0.3 | 0.1 | 30.8 | 0.2 | 70 | 289 | 130 |
| BM7 | 2017/05/31 10:40 | 2017/08/01 08:20 | 1.1 | 0.2 | 0.1 | 22.7 | 0.1 | 65 | 290 | 130 |
| BM10 | 2017/05/30 13:35 | 2017/07/31 14:15 | 1 | 0.3 | 0.1 | 20.4 | 0.6 | 60 | 291 | 130 |
| BM11 | 2017/05/31 11:20 | 2017/08/01 07:30 | 1.1 | 0.3 | 0.1 | 22.4 | 0.3 | 65 | 290 | 130 |
| JE306 | 2017/05/31 16:35 | 2017/08/01 13:05 | 1.1 | 0.3 | 0.5 | 21.9 | 0.4 | 65 | 290 | 130 |
| JE308 | 2017/05/30 11:20 | 2017/07/31 13:25 | 1.1 | 0.3 | <0.1 | 19.5 | <0.1 | 60 | 291 | 130 |
| JE312 | 2017/05/29 09:45 | 2017/08/02 07:50 | 1 | 0.3 | 0.1 | 26 | 0.3 | 70 | 289 | 130 |
| JE316 | 2017/05/29 15:20 | 2017/08/02 12:50 | 1.4 | 0.3 | <0.1 | 24.3 | 0.2 | 70 | 289 | 130 |
| JE323 | 2017/06/02 13:06 | 2017/08/01 16:20 | 1.5 | 0.3 | 0.3 | 22.2 | 0.3 | 61 | 290 | 130 |
| JP212 | 2017/06/05 09:20 | 2017/08/01 14:55 | 1.7 | 0.3 | 1.2 | 17.9 | 1.4 | 63 | 291 | 130 |
| NE7 | 2017/06/05 08:00 | 2017/08/01 14:30 | 1.5 | 0.3 | 0.5 | 20.8 | 0.5 | 63 | 291 | 130 |
| NE10 | 2017/05/29 01:50 | 2017/08/02 11:30 | 0.8 | 0.2 | <0.1 | 20.9 | 0.2 | 70 | 289 | 130 |
| NE11 | 2017/06/05 08:30 | 2017/08/01 14:30 | 2.1 | 0.5 | 0.8 | 17.9 | 0.5 | 63 | 291 | 130 |
| R2 | 2017/06/01 15:25 | 2017/07/31 15:00 | 1.3 | 0.3 | 1.1 | 19.2 | 1.1 | 64 | 291 | 130 |
| SM7 | 2017/06/06 10:40 | 2017/08/03 09:25 | 2.1 | 0.3 | 0.2 | 20.8 | 0.1 | 61 | 290 | 130 |
| SM8 | 2017/06/06 07:55 | 2017/08/03 12:10 | 1.7 | 0.3 | <0.1 | 21.7 | 0.2 | 61 | 290 | 130 |
| WF4 | 2017/05/30 14:20 | 2017/07/31 16:00 | 1.2 | 0.3 | 0.4 | 15.6 | 1.3 | 64 | 291 | 130 |
| BLANK | 05/19/2017 00:00 | | 0.5 | 0.2 | <0.1 | <0.1 | <0.1 | 62 | 291 | 130 |
| BLANK | 05/19/2017 00:00 | | 1.1 | 0.2 | <0.1 | <0.1 | <0.1 | 62 | 291 | 130 |
| BLANK | 05/19/2017 00:00 | | 0.9 | 0.2 | <0.1 | <0.1 | <0.1 | 62 | 291 | 130 |



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

INTEGRATED MONITORING PROGRAM MONTHLY REPORT

VOLATILE ORGANIC COMPOUNDS DATA SUMMARY JULY 2017

Prepared
September 27, 2017

SAMPLE COLLECTION AND DATA COMPILATION BY:

Wood Buffalo Environmental Association
Fort McMurray, Alberta

LABORATORY ANALYSIS BY:

VOCs: InnoTech Alberta, Inc.
Vegreville, Alberta



| | |
|---|---|
| FILE CONTENTS DESCRIPTION | VOC - Speciated Volatile Organic Compounds |
| SAMPLING INTERVAL | 24 hour |
| SAMPLING FREQUENCY OF DATA | Once every 6 days |
| EXPLANATION OF ZERO VALUES | Zero values are contained in this file and should be treated as values below detection - Method Detection Limits (MDL) are provided with each observation |
| UNITS | ppbv (parts per billion volume) |
| OBSERVATION TYPE | Gas |
| FIELD SAMPLING OR MEASUREMENT PRINCIPLE | Evacuated canister |
| ANALYTICAL METHODS | GC/MS - Gas chromatography/mass spectrometer |
| ANALYTICAL LABORATORY | InnoTech Alberta Inc |
| USER NOTE 1 | Data are not blank corrected |
| SAMPLING INSTRUMENT TYPE | Tisch TE123 |
| FLOW RATE | 10.0 cc/min (cubic centimeters per minute) |
| FLAGS USED | |
| V0 | Valid value |
| V1 | Valid value but comprised wholly or partially of below detection limit data |
| V4 | Valid value despite failing to meet some QC or statistical criteria |
| V5 | Valid value but qualified because of possible contamination |
| V6 | Valid value but qualified due to non-standard sampling conditions |
| M1 | Missing value because no value is available |
| M2 | Missing value because invalidated by Data Originator |



| Station Name Station # Sample Date | Bertha Ganter - | | | Patricia McInnes | |
|--|-----------------|----------------|------|------------------|------|
| | Fort McKay | | | AMS 6 | |
| | AMS 1 | | | AMS 6 | |
| | 06-Jul | | | 06-Jul | |
| Compound Name | MDL (ppbv) | Results (ppbv) | Flag | Results (ppbv) | Flag |
| 1,2,4-Trimethylbenzene | 0.03 | 0.03 | V0 | 0.04 | V0 |
| 1,3,5-Trimethylbenzene | 0.02 | 0 | V1 | 0 | V1 |
| 1,3-Butadiene | 0.02 | 0 | V1 | 0 | V1 |
| 1-Butene | 0.02 | 0.07 | V0 | 0.08 | V0 |
| 1-Pentene | 0.01 | 0 | V1 | 0.01 | V0 |
| 2,2,4-Trimethylpentane | 0.01 | 0 | V1 | 0.07 | V0 |
| 2,2-Dimethylbutane | 0.01 | 0 | V1 | 0 | V1 |
| 2,3,4-Trimethylpentane | 0.01 | 0 | V1 | 0.01 | V0 |
| 2,3-Dimethylbutane | 0.02 | 0.07 | V0 | 0 | V1 |
| 2,3-Dimethylpentane | 0.02 | 0.04 | V0 | 0 | V1 |
| 2,4-Dimethylpentane | 0.01 | 0.01 | V0 | 0 | V1 |
| 2-Methyl-1-pentene | 0.3 | 0 | V1 | 0 | V1 |
| 2-Methyl-2-butene | 0.3 | 0 | V1 | 0 | V1 |
| 2-Methylheptane | 0.01 | 0.04 | V0 | 0.01 | V0 |
| 2-Methylhexane | 0.01 | 0.18 | V0 | 0.12 | V0 |
| 2-Methylpentane | 0.01 | 0.15 | V0 | 0.03 | V0 |
| 3-Methyl-1-butene | 0.3 | 0 | V1 | 0 | V1 |
| 3-Methylheptane | 0.02 | 0 | V1 | 0.02 | V0 |
| 3-Methylhexane | 0.02 | 0.09 | V0 | 0.03 | V0 |
| 3-Methylpentane | 0.01 | 0.13 | V0 | 0.02 | V0 |
| 4-Methyl-1-pentene | 0.3 | 0 | V1 | 0 | V1 |
| Acetaldehyde | 3 | 8 | V0 | 31 | V0 |
| Acetone | 0.4 | 9.2 | V0 | 14.7 | V0 |
| alpha-Pinene | 0.3 | 0 | V1 | 0 | V1 |
| Benzene | 0.01 | 0.07 | V0 | 0.05 | V0 |
| beta-Pinene | 0.3 | 0 | V1 | 0 | V1 |
| cis-2-Butene | 0.02 | 0 | V1 | 0 | V1 |
| cis-2-Hexene | 0.3 | 0 | V1 | 0 | V1 |
| cis-2-Pentene | 0.02 | 0 | V1 | 0 | V1 |
| Cyclohexane | 0.02 | 0.06 | V0 | 0 | V1 |
| Cyclopentane | 0.01 | 0 | V1 | 0 | V1 |
| Cyclopentene | 0.3 | 0 | V1 | 0 | V1 |
| Ethanol | 0.3 | 1.6 | V0 | 11.2 | V0 |
| Ethylbenzene | 0.01 | 0.01 | V0 | 0.03 | V0 |
| Formaldehyde | 3 | 0 | V1 | 0 | V1 |
| Isobutane | 0.02 | 0.45 | V0 | 1.42 | V0 |
| Isobutylene | 0.3 | 0 | V1 | 0 | V1 |
| Isopentane | 0.03 | 0.42 | V0 | 0.33 | V0 |
| Isoprene | 0.01 | 1.01 | V0 | 0.58 | V0 |
| Isopropylalcohol | 0.4 | 0 | V1 | 1 | V0 |
| Isopropylbenzene | 0.01 | 0 | V1 | 0.02 | V0 |
| m,p-Xylene | 0.03 | 0 | V1 | 0.04 | V0 |
| Methanol | 3 | 11 | V0 | 14 | V0 |
| Methylcyclohexane | 0.01 | 0.1 | V0 | 0.02 | V0 |
| Methylcyclopentane | 0.02 | 0.08 | V0 | 0 | V1 |
| Methylethylketone | 0.3 | 0.5 | V0 | 0.9 | V0 |
| Methylisobutylketone | 0.4 | 0 | V1 | 0 | V1 |
| Methylvinylketone | 0.3 | 0 | V1 | 0 | V1 |
| n-Butane | 0.03 | 0.11 | V0 | 0.13 | V0 |
| n-Decane | 0.06 | 0 | V1 | 0 | V1 |
| n-Dodecane | 0.4 | 0 | V1 | 0 | V1 |
| n-Heptane | 0.01 | 0.17 | V0 | 0.03 | V0 |
| n-Hexane | 0.01 | 0.25 | V0 | 0.03 | V0 |
| n-Nonane | 0.01 | 0.02 | V0 | 0.02 | V0 |
| n-Octane | 0.02 | 0.04 | V0 | 0.02 | V0 |
| n-Pentane | 0.1 | 0.1 | V0 | 0.1 | V0 |
| n-Propylbenzene | 0.05 | 0 | V1 | 0 | V1 |
| n-Undecane | 0.5 | 0 | V1 | 0 | V1 |
| Naphthalene | 0.5 | 0 | V1 | 0 | V1 |
| o-Xylene | 0.01 | 0 | V1 | 0.03 | V0 |
| Styrene | 0.04 | 0 | V1 | 0 | V1 |
| Toluene | 0.01 | 0.09 | V0 | 0.13 | V0 |
| trans-2-Butene | 0.01 | 0 | V1 | 0.01 | V0 |
| trans-2-Hexene | 0.3 | 0 | V1 | 0 | V1 |
| trans-2-Pentene | 0.02 | 0 | V1 | 0 | V1 |



| Station Name | Athabasca Valley | | | Anzac | |
|------------------------|------------------|----------------|------|----------------|------|
| Station # | AMS 7 | | | AMS 14 | |
| Sample Date | 06-Jul | | | 06-Jul | |
| Compound Name | MDL (ppbv) | Results (ppbv) | Flag | Results (ppbv) | Flag |
| 1,2,4-Trimethylbenzene | 0.03 | 0.05 | V0 | 0.03 | V0 |
| 1,3,5-Trimethylbenzene | 0.02 | 0 | V1 | 0 | V1 |
| 1,3-Butadiene | 0.02 | 0 | V1 | 0 | V1 |
| 1-Butene | 0.02 | 0.08 | V0 | 0.06 | V0 |
| 1-Pentene | 0.01 | 0.01 | V0 | 0.02 | V0 |
| 2,2,4-Trimethylpentane | 0.01 | 0.02 | V0 | 0.04 | V0 |
| 2,2-Dimethylbutane | 0.01 | 0 | V1 | 0 | V1 |
| 2,3,4-Trimethylpentane | 0.01 | 0 | V1 | 0.02 | V0 |
| 2,3-Dimethylbutane | 0.02 | 0.07 | V0 | 0.03 | V0 |
| 2,3-Dimethylpentane | 0.02 | 0.02 | V0 | 0.05 | V0 |
| 2,4-Dimethylpentane | 0.01 | 0.02 | V0 | 0.03 | V0 |
| 2-Methyl-1-pentene | 0.3 | 0 | V1 | 0 | V1 |
| 2-Methyl-2-butene | 0.3 | 0 | V1 | 0 | V1 |
| 2-Methylheptane | 0.01 | 0.02 | V0 | 0.01 | V0 |
| 2-Methylhexane | 0.01 | 0.18 | V0 | 0.1 | V0 |
| 2-Methylpentane | 0.01 | 0.04 | V0 | 0.08 | V0 |
| 3-Methyl-1-butene | 0.3 | 0 | V1 | 0 | V1 |
| 3-Methylheptane | 0.02 | 0 | V1 | 0 | V1 |
| 3-Methylhexane | 0.02 | 0.03 | V0 | 0.06 | V0 |
| 3-Methylpentane | 0.01 | 0.02 | V0 | 0.06 | V0 |
| 4-Methyl-1-pentene | 0.3 | 0 | V1 | 0 | V1 |
| Acetaldehyde | 3 | 25 | V0 | 14 | V0 |
| Acetone | 0.4 | 9.7 | V0 | 5.9 | V0 |
| alpha-Pinene | 0.3 | 0 | V1 | 0 | V1 |
| Benzene | 0.01 | 0.05 | V0 | 0.06 | V0 |
| beta-Pinene | 0.3 | 0 | V1 | 0 | V1 |
| cis-2-Butene | 0.02 | 0 | V1 | 0 | V1 |
| cis-2-Hexene | 0.3 | 0 | V1 | 0 | V1 |
| cis-2-Pentene | 0.02 | 0 | V1 | 0 | V1 |
| Cyclohexane | 0.02 | 0 | V1 | 0 | V1 |
| Cyclopentane | 0.01 | 0 | V1 | 0 | V1 |
| Cyclopentene | 0.3 | 0 | V1 | 0 | V1 |
| Ethanol | 0.3 | 11.7 | V0 | 8.2 | V0 |
| Ethylbenzene | 0.01 | 0.02 | V0 | 0.02 | V0 |
| Formaldehyde | 3 | 0 | V1 | 0 | V1 |
| Isobutane | 0.02 | 1.16 | V0 | 0.62 | V0 |
| Isobutylene | 0.3 | 0 | V1 | 0 | V1 |
| Isopentane | 0.03 | 0.4 | V0 | 0.46 | V0 |
| Isoprene | 0.01 | 0.53 | V0 | 0.69 | V0 |
| Isopropylalcohol | 0.4 | 0.4 | V0 | 0 | V1 |
| Isopropylbenzene | 0.01 | 0 | V1 | 0 | V1 |
| m,p-Xylene | 0.03 | 0.05 | V0 | 0.06 | V0 |
| Methanol | 3 | 18 | V0 | 16 | V0 |
| Methylcyclohexane | 0.01 | 0.02 | V0 | 0.03 | V0 |
| Methylcyclopentane | 0.02 | 0.03 | V0 | 0.05 | V0 |
| Methylethylketone | 0.3 | 1.1 | V0 | 0.5 | V0 |
| Methylisobutylketone | 0.4 | 0 | V1 | 0 | V1 |
| Methylvinylketone | 0.3 | 0 | V1 | 0 | V1 |
| n-Butane | 0.03 | 0.26 | V0 | 0.41 | V0 |
| n-Decane | 0.06 | 0 | V1 | 0 | V1 |
| n-Dodecane | 0.4 | 0 | V1 | 0 | V1 |
| n-Heptane | 0.01 | 0.06 | V0 | 0.05 | V0 |
| n-Hexane | 0.01 | 0.07 | V0 | 0.08 | V0 |
| n-Nonane | 0.01 | 0.02 | V0 | 0.01 | V0 |
| n-Octane | 0.02 | 0.03 | V0 | 0.03 | V0 |
| n-Pentane | 0.1 | 0.1 | V0 | 0.2 | V0 |
| n-Propylbenzene | 0.05 | 0 | V1 | 0 | V1 |
| n-Undecane | 0.5 | 0 | V1 | 0 | V1 |
| Naphthalene | 0.5 | 0 | V1 | 0 | V1 |
| o-Xylene | 0.01 | 0.02 | V0 | 0.03 | V0 |
| Styrene | 0.04 | 0 | V1 | 0 | V1 |
| Toluene | 0.01 | 0.13 | V0 | 0.19 | V0 |
| trans-2-Butene | 0.01 | 0 | V1 | 0 | V1 |
| trans-2-Hexene | 0.3 | 0 | V1 | 0 | V1 |
| trans-2-Pentene | 0.02 | 0 | V1 | 0 | V1 |



| Station Name Station # Sample Date | Barge Landing AMS 9 06-Jul | Fort McKay South AMS 13 06-Jul | | | |
|--|----------------------------------|--------------------------------------|------|----------------|------|
| Compound Name | MDL (ppbv) | Results (ppbv) | Flag | Results (ppbv) | Flag |
| 1,2,4-Trimethylbenzene | 0.03 | 0.06 | V0 | 0 | V1 |
| 1,3,5-Trimethylbenzene | 0.02 | 0.04 | V0 | 0 | V1 |
| 1,3-Butadiene | 0.02 | 0 | V1 | 0 | V1 |
| 1-Butene | 0.02 | 0.08 | V0 | 0.05 | V0 |
| 1-Pentene | 0.01 | 0 | V1 | 0.01 | V0 |
| 2,2,4-Trimethylpentane | 0.01 | 0.25 | V0 | 0 | V1 |
| 2,2-Dimethylbutane | 0.01 | 0 | V1 | 0 | V1 |
| 2,3,4-Trimethylpentane | 0.01 | 0 | V1 | 0 | V1 |
| 2,3-Dimethylbutane | 0.02 | 0.05 | V0 | 0.03 | V0 |
| 2,3-Dimethylpentane | 0.02 | 0.03 | V0 | 0 | V1 |
| 2,4-Dimethylpentane | 0.01 | 0 | V1 | 0 | V1 |
| 2-Methyl-1-pentene | 0.3 | 0 | V1 | 0 | V1 |
| 2-Methyl-2-butene | 0.3 | 0 | V1 | 0 | V1 |
| 2-Methylheptane | 0.01 | 0.01 | V0 | 0.02 | V0 |
| 2-Methylhexane | 0.01 | 0.18 | V0 | 0.06 | V0 |
| 2-Methylpentane | 0.01 | 0.01 | V0 | 0.03 | V0 |
| 3-Methyl-1-butene | 0.3 | 0 | V1 | 0 | V1 |
| 3-Methylheptane | 0.02 | 0 | V1 | 0 | V1 |
| 3-Methylhexane | 0.02 | 0.08 | V0 | 0.03 | V0 |
| 3-Methylpentane | 0.01 | 0.05 | V0 | 0.03 | V0 |
| 4-Methyl-1-pentene | 0.3 | 0 | V1 | 0 | V1 |
| Acetaldehyde | 3 | 55 | V0 | 7 | V0 |
| Acetone | 0.4 | 13.9 | V0 | 9.2 | V0 |
| alpha-Pinene | 0.3 | 0 | V1 | 0 | V1 |
| Benzene | 0.01 | 0.03 | V0 | 0.05 | V0 |
| beta-Pinene | 0.3 | 0 | V1 | 0 | V1 |
| cis-2-Butene | 0.02 | 0 | V1 | 0 | V1 |
| cis-2-Hexene | 0.3 | 0 | V1 | 0 | V1 |
| cis-2-Pentene | 0.02 | 0 | V1 | 0 | V1 |
| Cyclohexane | 0.02 | 0.06 | V0 | 0.02 | V0 |
| Cyclopentane | 0.01 | 0 | V1 | 0 | V1 |
| Cyclopentene | 0.3 | 0 | V1 | 0 | V1 |
| Ethanol | 0.3 | 10.9 | V0 | 2.1 | V0 |
| Ethylbenzene | 0.01 | 0.08 | V0 | 0.01 | V0 |
| Formaldehyde | 3 | 0 | V1 | 0 | V1 |
| Isobutane | 0.02 | 2.66 | V0 | 0.36 | V0 |
| Isobutylene | 0.3 | 0 | V1 | 0 | V1 |
| Isopentane | 0.03 | 0.52 | V0 | 0.28 | V0 |
| Isoprene | 0.01 | 1.32 | V0 | 1.83 | V0 |
| Isopropylalcohol | 0.4 | 0.8 | V0 | 0 | V1 |
| Isopropylbenzene | 0.01 | 0 | V1 | 0 | V1 |
| m,p-Xylene | 0.03 | 0.09 | V0 | 0 | V1 |
| Methanol | 3 | 20 | V0 | 15 | V0 |
| Methylcyclohexane | 0.01 | 0.03 | V0 | 0.03 | V0 |
| Methylcyclopentane | 0.02 | 0.04 | V0 | 0.03 | V0 |
| Methylethylketone | 0.3 | 2 | V0 | 0.4 | V0 |
| Methylisobutylketone | 0.4 | 0 | V1 | 0 | V1 |
| Methylvinylketone | 0.3 | 0 | V1 | 0 | V1 |
| n-Butane | 0.03 | 0.04 | V0 | 0.08 | V0 |
| n-Decane | 0.06 | 0 | V1 | 0 | V1 |
| n-Dodecane | 0.4 | 0 | V1 | 0 | V1 |
| n-Heptane | 0.01 | 0.07 | V0 | 0.11 | V0 |
| n-Hexane | 0.01 | 0.03 | V0 | 0.1 | V0 |
| n-Nonane | 0.01 | 0.02 | V0 | 0.03 | V0 |
| n-Octane | 0.02 | 0.02 | V0 | 0.05 | V0 |
| n-Pentane | 0.1 | 0 | V1 | 0.1 | V0 |
| n-Propylbenzene | 0.05 | 0 | V1 | 0 | V1 |
| n-Undecane | 0.5 | 0 | V1 | 0 | V1 |
| Naphthalene | 0.5 | 0 | V1 | 0 | V1 |
| o-Xylene | 0.01 | 0.04 | V0 | 0.02 | V0 |
| Styrene | 0.04 | 0 | V1 | 0 | V1 |
| Toluene | 0.01 | 0.43 | V0 | 0.08 | V0 |
| trans-2-Butene | 0.01 | 0.02 | V0 | 0 | V1 |
| trans-2-Hexene | 0.3 | 0 | V1 | 0 | V1 |
| trans-2-Pentene | 0.02 | 0 | V1 | 0 | V1 |



| Station Name Station # Sample Date | Horizon AMS 15 06-Jul | | |
|--|-----------------------------|----------------|------|
| Compound Name | MDL (ppbv) | Results (ppbv) | Flag |
| 1,2,4-Trimethylbenzene | 0.03 | 0.06 | V0 |
| 1,3,5-Trimethylbenzene | 0.02 | 0.06 | V0 |
| 1,3-Butadiene | 0.02 | 0 | V1 |
| 1-Butene | 0.02 | 0.03 | V0 |
| 1-Pentene | 0.01 | 0 | V1 |
| 2,2,4-Trimethylpentane | 0.01 | 0.09 | V0 |
| 2,2-Dimethylbutane | 0.01 | 0.11 | V0 |
| 2,3,4-Trimethylpentane | 0.01 | 0.06 | V0 |
| 2,3-Dimethylbutane | 0.02 | 0.29 | V0 |
| 2,3-Dimethylpentane | 0.02 | 0.11 | V0 |
| 2,4-Dimethylpentane | 0.01 | 0.05 | V0 |
| 2-Methyl-1-pentene | 0.3 | 0 | V1 |
| 2-Methyl-2-butene | 0.3 | 0 | V1 |
| 2-Methylheptane | 0.01 | 0.04 | V0 |
| 2-Methylhexane | 0.01 | 0.06 | V0 |
| 2-Methylpentane | 0.01 | 0.03 | V0 |
| 3-Methyl-1-butene | 0.3 | 0 | V1 |
| 3-Methylheptane | 0.02 | 0.02 | V0 |
| 3-Methylhexane | 0.02 | 0.05 | V0 |
| 3-Methylpentane | 0.01 | 0.38 | V0 |
| 4-Methyl-1-pentene | 0.3 | 0 | V1 |
| Acetaldehyde | 3 | 4 | V0 |
| Acetone | 0.4 | 4.6 | V0 |
| alpha-Pinene | 0.3 | 0 | V1 |
| Benzene | 0.01 | 0.03 | V0 |
| beta-Pinene | 0.3 | 0 | V1 |
| cis-2-Butene | 0.02 | 0 | V1 |
| cis-2-Hexene | 0.3 | 0 | V1 |
| cis-2-Pentene | 0.02 | 0 | V1 |
| Cyclohexane | 0.02 | 0.47 | V0 |
| Cyclopentane | 0.01 | 0.1 | V0 |
| Cyclopentene | 0.3 | 0 | V1 |
| Ethanol | 0.3 | 3.3 | V0 |
| Ethylbenzene | 0.01 | 0.05 | V0 |
| Formaldehyde | 3 | 0 | V1 |
| Isobutane | 0.02 | 2.04 | V0 |
| Isobutylene | 0.3 | 0 | V1 |
| Isopentane | 0.03 | 2.07 | V0 |
| Isoprene | 0.01 | 0.97 | V0 |
| Isopropylalcohol | 0.4 | 0.9 | V0 |
| Isopropylbenzene | 0.01 | 0.02 | V0 |
| m,p-Xylene | 0.03 | 0.07 | V0 |
| Methanol | 3 | 7 | V0 |
| Methylcyclohexane | 0.01 | 0.16 | V0 |
| Methylcyclopentane | 0.02 | 0.29 | V0 |
| Methylethylketone | 0.3 | 0.4 | V0 |
| Methylisobutylketone | 0.4 | 0 | V1 |
| Methylvinylketone | 0.3 | 0 | V1 |
| n-Butane | 0.03 | 0.18 | V0 |
| n-Decane | 0.06 | 0 | V1 |
| n-Dodecane | 0.4 | 0 | V1 |
| n-Heptane | 0.01 | 0.07 | V0 |
| n-Hexane | 0.01 | 0.02 | V0 |
| n-Nonane | 0.01 | 0.05 | V0 |
| n-Octane | 0.02 | 0.04 | V0 |
| n-Pentane | 0.1 | 0 | V1 |
| n-Propylbenzene | 0.05 | 0 | V1 |
| n-Undecane | 0.5 | 0 | V1 |
| Naphthalene | 0.5 | 0 | V1 |
| o-Xylene | 0.01 | 0.04 | V0 |
| Styrene | 0.04 | 0 | V1 |
| Toluene | 0.01 | 0.18 | V0 |
| trans-2-Butene | 0.01 | 0 | V1 |
| trans-2-Hexene | 0.3 | 0 | V1 |
| trans-2-Pentene | 0.02 | 0 | V1 |



| Station Name Station # Sample Date | Bertha Ganter - | | | Patricia McInnes | |
|--|-----------------|----------------|------|------------------|------|
| | Fort McKay | | | AMS 6 | |
| | AMS 1 | | | AMS 6 | |
| | 12-Jul | | | 12-Jul | |
| Compound Name | MDL (ppbv) | Results (ppbv) | Flag | Results (ppbv) | Flag |
| 1,2,4-Trimethylbenzene | 0.03 | 0.06 | V0 | 0 | V1 |
| 1,3,5-Trimethylbenzene | 0.02 | 0.02 | V0 | 0 | V1 |
| 1,3-Butadiene | 0.02 | 0 | V1 | 0 | V1 |
| 1-Butene | 0.02 | 0.14 | V0 | 0.05 | V0 |
| 1-Pentene | 0.01 | 0.02 | V0 | 0 | V1 |
| 2,2,4-Trimethylpentane | 0.01 | 0 | V1 | 0.02 | V0 |
| 2,2-Dimethylbutane | 0.01 | 0.06 | V0 | 0 | V1 |
| 2,3,4-Trimethylpentane | 0.01 | 0.04 | V0 | 0.01 | V0 |
| 2,3-Dimethylbutane | 0.02 | 0.07 | V0 | 0.02 | V0 |
| 2,3-Dimethylpentane | 0.02 | 0.11 | V0 | 0.03 | V0 |
| 2,4-Dimethylpentane | 0.01 | 0.03 | V0 | 0 | V1 |
| 2-Methyl-1-pentene | 0.3 | 0 | V1 | 0 | V1 |
| 2-Methyl-2-butene | 0.3 | 0 | V1 | 0 | V1 |
| 2-Methylheptane | 0.01 | 0.43 | V0 | 0 | V1 |
| 2-Methylhexane | 0.01 | 0.29 | V0 | 0.09 | V0 |
| 2-Methylpentane | 0.01 | 0.18 | V0 | 0.05 | V0 |
| 3-Methyl-1-butene | 0.3 | 0 | V1 | 0 | V1 |
| 3-Methylheptane | 0.02 | 0.19 | V0 | 0 | V1 |
| 3-Methylhexane | 0.02 | 0.34 | V0 | 0 | V1 |
| 3-Methylpentane | 0.01 | 0.13 | V0 | 0.03 | V0 |
| 4-Methyl-1-pentene | 0.3 | 0 | V1 | 0 | V1 |
| Acetaldehyde | 3 | 18 | V0 | 15 | V0 |
| Acetone | 0.4 | 8.7 | V0 | 6.4 | V0 |
| alpha-Pinene | 0.3 | 0 | V1 | 0 | V1 |
| Benzene | 0.01 | 0.11 | V0 | 0.06 | V0 |
| beta-Pinene | 0.3 | 0 | V1 | 0 | V1 |
| cis-2-Butene | 0.02 | 0 | V1 | 0 | V1 |
| cis-2-Hexene | 0.3 | 0 | V1 | 0 | V1 |
| cis-2-Pentene | 0.02 | 0 | V1 | 0 | V1 |
| Cyclohexane | 0.02 | 0.13 | V0 | 0 | V1 |
| Cyclopentane | 0.01 | 0 | V1 | 0 | V1 |
| Cyclopentene | 0.3 | 0 | V1 | 0 | V1 |
| Ethanol | 0.3 | 8.1 | V0 | 7.7 | V0 |
| Ethylbenzene | 0.01 | 0.1 | V0 | 0.01 | V0 |
| Formaldehyde | 3 | 0 | V1 | 0 | V1 |
| Isobutane | 0.02 | 0.92 | V0 | 0.77 | V0 |
| Isobutylene | 0.3 | 0 | V1 | 0 | V1 |
| Isopentane | 0.03 | 0.45 | V0 | 0.39 | V0 |
| Isoprene | 0.01 | 0.88 | V0 | 0.42 | V0 |
| Isopropylalcohol | 0.4 | 0.6 | V0 | 0 | V1 |
| Isopropylbenzene | 0.01 | 0.01 | V0 | 0 | V1 |
| m,p-Xylene | 0.03 | 0.23 | V0 | 0.03 | V0 |
| Methanol | 3 | 21 | V0 | 13 | V0 |
| Methylcyclohexane | 0.01 | 0.46 | V0 | 0.01 | V0 |
| Methylcyclopentane | 0.02 | 0.26 | V0 | 0.02 | V0 |
| Methylethylketone | 0.3 | 0.9 | V0 | 0.5 | V0 |
| Methylisobutylketone | 0.4 | 0 | V1 | 0 | V1 |
| Methylvinylketone | 0.3 | 0 | V1 | 0 | V1 |
| n-Butane | 0.03 | 0.31 | V0 | 0.29 | V0 |
| n-Decane | 0.06 | 0 | V1 | 0 | V1 |
| n-Dodecane | 0.4 | 0 | V1 | 0 | V1 |
| n-Heptane | 0.01 | 0.83 | V0 | 0.03 | V0 |
| n-Hexane | 0.01 | 0.42 | V0 | 0.04 | V0 |
| n-Nonane | 0.01 | 0.21 | V0 | 0 | V1 |
| n-Octane | 0.02 | 0.74 | V0 | 0 | V1 |
| n-Pentane | 0.1 | 0.2 | V0 | 0.2 | V0 |
| n-Propylbenzene | 0.05 | 0 | V1 | 0 | V1 |
| n-Undecane | 0.5 | 0 | V1 | 0 | V1 |
| Naphthalene | 0.5 | 0 | V1 | 0 | V1 |
| o-Xylene | 0.01 | 0.12 | V0 | 0.01 | V0 |
| Styrene | 0.04 | 0 | V1 | 0 | V1 |
| Toluene | 0.01 | 0.46 | V0 | 0.07 | V0 |
| trans-2-Butene | 0.01 | 0.02 | V0 | 0.01 | V0 |
| trans-2-Hexene | 0.3 | 0 | V1 | 0 | V1 |
| trans-2-Pentene | 0.02 | 0 | V1 | 0 | V1 |



| Station Name Station # Sample Date | Athabasca Valley AMS 7 12-Jul | | | Anzac AMS 14 12-Jul | |
|--|-------------------------------------|----------------|------|---------------------------|------|
| Compound Name | MDL (ppbv) | Results (ppbv) | Flag | Results (ppbv) | Flag |
| 1,2,4-Trimethylbenzene | 0.03 | 0.05 | V0 | 0 | V1 |
| 1,3,5-Trimethylbenzene | 0.02 | 0 | V1 | 0 | V1 |
| 1,3-Butadiene | 0.02 | 0 | V1 | 0 | V1 |
| 1-Butene | 0.02 | 0.06 | V0 | 0.1 | V0 |
| 1-Pentene | 0.01 | 0 | V1 | 0.01 | V0 |
| 2,2,4-Trimethylpentane | 0.01 | 0.03 | V0 | 0.02 | V0 |
| 2,2-Dimethylbutane | 0.01 | 0 | V1 | 0.01 | V0 |
| 2,3,4-Trimethylpentane | 0.01 | 0.01 | V0 | 0.01 | V0 |
| 2,3-Dimethylbutane | 0.02 | 0.06 | V0 | 0 | V1 |
| 2,3-Dimethylpentane | 0.02 | 0.03 | V0 | 0.03 | V0 |
| 2,4-Dimethylpentane | 0.01 | 0 | V1 | 0 | V1 |
| 2-Methyl-1-pentene | 0.3 | 0 | V1 | 0 | V1 |
| 2-Methyl-2-butene | 0.3 | 0 | V1 | 0 | V1 |
| 2-Methylheptane | 0.01 | 0 | V1 | 0.01 | V0 |
| 2-Methylhexane | 0.01 | 0.06 | V0 | 0.12 | V0 |
| 2-Methylpentane | 0.01 | 0.06 | V0 | 0.08 | V0 |
| 3-Methyl-1-butene | 0.3 | 0 | V1 | 0 | V1 |
| 3-Methylheptane | 0.02 | 0 | V1 | 0 | V1 |
| 3-Methylhexane | 0.02 | 0.05 | V0 | 0.04 | V0 |
| 3-Methylpentane | 0.01 | 0.04 | V0 | 0.06 | V0 |
| 4-Methyl-1-pentene | 0.3 | 0 | V1 | 0 | V1 |
| Acetaldehyde | 3 | 4 | V0 | 16 | V0 |
| Acetone | 0.4 | 4.2 | V0 | 8.1 | V0 |
| alpha-Pinene | 0.3 | 0 | V1 | 0 | V1 |
| Benzene | 0.01 | 0.09 | V0 | 0.07 | V0 |
| beta-Pinene | 0.3 | 0 | V1 | 0 | V1 |
| cis-2-Butene | 0.02 | 0.02 | V0 | 0.04 | V0 |
| cis-2-Hexene | 0.3 | 0 | V1 | 0 | V1 |
| cis-2-Pentene | 0.02 | 0 | V1 | 0 | V1 |
| Cyclohexane | 0.02 | 0.02 | V0 | 0 | V1 |
| Cyclopentane | 0.01 | 0 | V1 | 0 | V1 |
| Cyclopentene | 0.3 | 0 | V1 | 0 | V1 |
| Ethanol | 0.3 | 2.4 | V0 | 4.2 | V0 |
| Ethylbenzene | 0.01 | 0.02 | V0 | 0.01 | V0 |
| Formaldehyde | 3 | 0 | V1 | 0 | V1 |
| Isobutane | 0.02 | 0.13 | V0 | 0.79 | V0 |
| Isobutylene | 0.3 | 0 | V1 | 0 | V1 |
| Isopentane | 0.03 | 0.38 | V0 | 0.49 | V0 |
| Isoprene | 0.01 | 0.61 | V0 | 0.64 | V0 |
| Isopropylalcohol | 0.4 | 0 | V1 | 0 | V1 |
| Isopropylbenzene | 0.01 | 0 | V1 | 0 | V1 |
| m,p-Xylene | 0.03 | 0.06 | V0 | 0.04 | V0 |
| Methanol | 3 | 8 | V0 | 11 | V0 |
| Methylcyclohexane | 0.01 | 0.02 | V0 | 0.02 | V0 |
| Methylcyclopentane | 0.02 | 0.03 | V0 | 0.03 | V0 |
| Methylethylketone | 0.3 | 0 | V1 | 0.8 | V0 |
| Methylisobutylketone | 0.4 | 0 | V1 | 0 | V1 |
| Methylvinylketone | 0.3 | 0 | V1 | 0 | V1 |
| n-Butane | 0.03 | 0.32 | V0 | 0.25 | V0 |
| n-Decane | 0.06 | 0 | V1 | 0 | V1 |
| n-Dodecane | 0.4 | 0 | V1 | 0 | V1 |
| n-Heptane | 0.01 | 0.05 | V0 | 0.04 | V0 |
| n-Hexane | 0.01 | 0.06 | V0 | 0.08 | V0 |
| n-Nonane | 0.01 | 0 | V1 | 0 | V1 |
| n-Octane | 0.02 | 0 | V1 | 0 | V1 |
| n-Pentane | 0.1 | 0.2 | V0 | 0.3 | V0 |
| n-Propylbenzene | 0.05 | 0 | V1 | 0 | V1 |
| n-Undecane | 0.5 | 0 | V1 | 0 | V1 |
| Naphthalene | 0.5 | 0 | V1 | 0 | V1 |
| o-Xylene | 0.01 | 0.03 | V0 | 0.01 | V0 |
| Styrene | 0.04 | 0 | V1 | 0 | V1 |
| Toluene | 0.01 | 0.09 | V0 | 0.16 | V0 |
| trans-2-Butene | 0.01 | 0 | V1 | 0.05 | V0 |
| trans-2-Hexene | 0.3 | 0 | V1 | 0 | V1 |
| trans-2-Pentene | 0.02 | 0 | V1 | 0 | V1 |



| Station Name Station # Sample Date | Barge Landing AMS 9 12-Jul | Fort McKay South AMS 13 12-Jul | | | |
|--|----------------------------------|--------------------------------------|------|----------------|------|
| Compound Name | MDL (ppbv) | Results (ppbv) | Flag | Results (ppbv) | Flag |
| 1,2,4-Trimethylbenzene | 0.03 | 0.08 | V0 | 0.06 | V0 |
| 1,3,5-Trimethylbenzene | 0.02 | 0.02 | V0 | 0.02 | V0 |
| 1,3-Butadiene | 0.02 | 0 | V1 | 0 | V1 |
| 1-Butene | 0.02 | 0.18 | V0 | 0.13 | V0 |
| 1-Pentene | 0.01 | 0.03 | V0 | 0.02 | V0 |
| 2,2,4-Trimethylpentane | 0.01 | 0 | V1 | 0 | V1 |
| 2,2-Dimethylbutane | 0.01 | 0.07 | V0 | 0.05 | V0 |
| 2,3,4-Trimethylpentane | 0.01 | 0.04 | V0 | 0.04 | V0 |
| 2,3-Dimethylbutane | 0.02 | 0.16 | V0 | 0.06 | V0 |
| 2,3-Dimethylpentane | 0.02 | 0.11 | V0 | 0.12 | V0 |
| 2,4-Dimethylpentane | 0.01 | 0.02 | V0 | 0.02 | V0 |
| 2-Methyl-1-pentene | 0.3 | 0 | V1 | 0 | V1 |
| 2-Methyl-2-butene | 0.3 | 0 | V1 | 0 | V1 |
| 2-Methylheptane | 0.01 | 0.46 | V0 | 0.59 | V0 |
| 2-Methylhexane | 0.01 | 0.4 | V0 | 0.28 | V0 |
| 2-Methylpentane | 0.01 | 0.17 | V0 | 0.13 | V0 |
| 3-Methyl-1-butene | 0.3 | 0 | V1 | 0 | V1 |
| 3-Methylheptane | 0.02 | 0.22 | V0 | 0.23 | V0 |
| 3-Methylhexane | 0.02 | 0.33 | V0 | 0.36 | V0 |
| 3-Methylpentane | 0.01 | 0.12 | V0 | 0.12 | V0 |
| 4-Methyl-1-pentene | 0.3 | 0 | V1 | 0 | V1 |
| Acetaldehyde | 3 | 19 | V0 | 7 | V0 |
| Acetone | 0.4 | 9 | V0 | 8.6 | V0 |
| alpha-Pinene | 0.3 | 0 | V1 | 0.8 | V0 |
| Benzene | 0.01 | 0.12 | V0 | 0.1 | V0 |
| beta-Pinene | 0.3 | 0 | V1 | 0.6 | V0 |
| cis-2-Butene | 0.02 | 0 | V1 | 0 | V1 |
| cis-2-Hexene | 0.3 | 0 | V1 | 0 | V1 |
| cis-2-Pentene | 0.02 | 0 | V1 | 0 | V1 |
| Cyclohexane | 0.02 | 0.14 | V0 | 0.16 | V0 |
| Cyclopentane | 0.01 | 0 | V1 | 0 | V1 |
| Cyclopentene | 0.3 | 0 | V1 | 0 | V1 |
| Ethanol | 0.3 | 6.8 | V0 | 2.2 | V0 |
| Ethylbenzene | 0.01 | 0.12 | V0 | 0.12 | V0 |
| Formaldehyde | 3 | 0 | V1 | 0 | V1 |
| Isobutane | 0.02 | 0.96 | V0 | 0.39 | V0 |
| Isobutylene | 0.3 | 0 | V1 | 0 | V1 |
| Isopentane | 0.03 | 0.46 | V0 | 0.33 | V0 |
| Isoprene | 0.01 | 1.59 | V0 | 1.35 | V0 |
| Isopropylalcohol | 0.4 | 0 | V1 | 0.6 | V0 |
| Isopropylbenzene | 0.01 | 0.02 | V0 | 0.01 | V0 |
| m,p-Xylene | 0.03 | 0.25 | V0 | 0.26 | V0 |
| Methanol | 3 | 12 | V0 | 10 | V0 |
| Methylcyclohexane | 0.01 | 0.48 | V0 | 0.6 | V0 |
| Methylcyclopentane | 0.02 | 0.27 | V0 | 0.27 | V0 |
| Methylethylketone | 0.3 | 0.8 | V0 | 0.5 | V0 |
| Methylisobutylketone | 0.4 | 0 | V1 | 0 | V1 |
| Methylvinylketone | 0.3 | 0 | V1 | 0 | V1 |
| n-Butane | 0.03 | 0.24 | V0 | 0.18 | V0 |
| n-Decane | 0.06 | 0 | V1 | 0 | V1 |
| n-Dodecane | 0.4 | 0 | V1 | 0 | V1 |
| n-Heptane | 0.01 | 0.9 | V0 | 0.96 | V0 |
| n-Hexane | 0.01 | 0.41 | V0 | 0.33 | V0 |
| n-Nonane | 0.01 | 0.25 | V0 | 0.22 | V0 |
| n-Octane | 0.02 | 0.83 | V0 | 0.92 | V0 |
| n-Pentane | 0.1 | 0.2 | V0 | 0.1 | V0 |
| n-Propylbenzene | 0.05 | 0 | V1 | 0 | V1 |
| n-Undecane | 0.5 | 0 | V1 | 0 | V1 |
| Naphthalene | 0.5 | 0 | V1 | 0 | V1 |
| o-Xylene | 0.01 | 0.14 | V0 | 0.13 | V0 |
| Styrene | 0.04 | 0 | V1 | 0 | V1 |
| Toluene | 0.01 | 0.55 | V0 | 0.58 | V0 |
| trans-2-Butene | 0.01 | 0.02 | V0 | 0 | V1 |
| trans-2-Hexene | 0.3 | 0 | V1 | 0 | V1 |
| trans-2-Pentene | 0.02 | 0 | V1 | 0 | V1 |



| Station Name Station # Sample Date | Horizon AMS 15 12-Jul | | |
|--|-----------------------------|----------------|------|
| Compound Name | MDL (ppbv) | Results (ppbv) | Flag |
| 1,2,4-Trimethylbenzene | 0.03 | 0 | V1 |
| 1,3,5-Trimethylbenzene | 0.02 | 0 | V1 |
| 1,3-Butadiene | 0.02 | 0 | V1 |
| 1-Butene | 0.02 | 0.07 | V0 |
| 1-Pentene | 0.01 | 0.02 | V0 |
| 2,2,4-Trimethylpentane | 0.01 | 0 | V1 |
| 2,2-Dimethylbutane | 0.01 | 0.02 | V0 |
| 2,3,4-Trimethylpentane | 0.01 | 0.02 | V0 |
| 2,3-Dimethylbutane | 0.02 | 0.05 | V0 |
| 2,3-Dimethylpentane | 0.02 | 0.04 | V0 |
| 2,4-Dimethylpentane | 0.01 | 0 | V1 |
| 2-Methyl-1-pentene | 0.3 | 0 | V1 |
| 2-Methyl-2-butene | 0.3 | 0 | V1 |
| 2-Methylheptane | 0.01 | 0.15 | V0 |
| 2-Methylhexane | 0.01 | 0 | V1 |
| 2-Methylpentane | 0.01 | 0.03 | V0 |
| 3-Methyl-1-butene | 0.3 | 0 | V1 |
| 3-Methylheptane | 0.02 | 0.06 | V0 |
| 3-Methylhexane | 0.02 | 0.08 | V0 |
| 3-Methylpentane | 0.01 | 0.07 | V0 |
| 4-Methyl-1-pentene | 0.3 | 0 | V1 |
| Acetaldehyde | 3 | 19 | V0 |
| Acetone | 0.4 | 8.7 | V0 |
| alpha-Pinene | 0.3 | 0 | V1 |
| Benzene | 0.01 | 0.06 | V0 |
| beta-Pinene | 0.3 | 0 | V1 |
| cis-2-Butene | 0.02 | 0 | V1 |
| cis-2-Hexene | 0.3 | 0 | V1 |
| cis-2-Pentene | 0.02 | 0 | V1 |
| Cyclohexane | 0.02 | 0.1 | V0 |
| Cyclopentane | 0.01 | 0 | V1 |
| Cyclopentene | 0.3 | 0 | V1 |
| Ethanol | 0.3 | 5.6 | V0 |
| Ethylbenzene | 0.01 | 0.03 | V0 |
| Formaldehyde | 3 | 0 | V1 |
| Isobutane | 0.02 | 1.1 | V0 |
| Isobutylene | 0.3 | 0 | V1 |
| Isopentane | 0.03 | 0.57 | V0 |
| Isoprene | 0.01 | 1.28 | V0 |
| Isopropylalcohol | 0.4 | 0 | V1 |
| Isopropylbenzene | 0.01 | 0 | V1 |
| m,p-Xylene | 0.03 | 0.06 | V0 |
| Methanol | 3 | 16 | V0 |
| Methylcyclohexane | 0.01 | 0.16 | V0 |
| Methylcyclopentane | 0.02 | 0.09 | V0 |
| Methylethylketone | 0.3 | 0.7 | V0 |
| Methylisobutylketone | 0.4 | 0 | V1 |
| Methylvinylketone | 0.3 | 0 | V1 |
| n-Butane | 0.03 | 0.12 | V0 |
| n-Decane | 0.06 | 0 | V1 |
| n-Dodecane | 0.4 | 0 | V1 |
| n-Heptane | 0.01 | 0.23 | V0 |
| n-Hexane | 0.01 | 0.08 | V0 |
| n-Nonane | 0.01 | 0.05 | V0 |
| n-Octane | 0.02 | 0.22 | V0 |
| n-Pentane | 0.1 | 0.1 | V0 |
| n-Propylbenzene | 0.05 | 0 | V1 |
| n-Undecane | 0.5 | 0 | V1 |
| Naphthalene | 0.5 | 0 | V1 |
| o-Xylene | 0.01 | 0.02 | V0 |
| Styrene | 0.04 | 0 | V1 |
| Toluene | 0.01 | 0.19 | V0 |
| trans-2-Butene | 0.01 | 0.01 | V0 |
| trans-2-Hexene | 0.3 | 0 | V1 |
| trans-2-Pentene | 0.02 | 0 | V1 |



| Station Name Station # Sample Date | Bertha Ganter - | | | Patricia McInnes | |
|--|-----------------|----------------|------|------------------|------|
| | Fort McKay | | | AMS 6 | |
| | AMS 1 | | | AMS 6 | |
| | 18-Jul | | | 18-Jul | |
| Compound Name | MDL (ppbv) | Results (ppbv) | Flag | Results (ppbv) | Flag |
| 1,2,4-Trimethylbenzene | 0.03 | 0 | V1 | 0 | V1 |
| 1,3,5-Trimethylbenzene | 0.02 | 0 | V1 | 0 | V1 |
| 1,3-Butadiene | 0.02 | 0 | V1 | 0 | V1 |
| 1-Butene | 0.02 | 0.08 | V0 | 0 | V1 |
| 1-Pentene | 0.01 | 0 | V1 | 0 | V1 |
| 2,2,4-Trimethylpentane | 0.01 | 0 | V1 | 0 | V1 |
| 2,2-Dimethylbutane | 0.01 | 0 | V1 | 0 | V1 |
| 2,3,4-Trimethylpentane | 0.01 | 0 | V1 | 0 | V1 |
| 2,3-Dimethylbutane | 0.02 | 0.09 | V0 | 0.16 | V0 |
| 2,3-Dimethylpentane | 0.02 | 0 | V1 | 0 | V1 |
| 2,4-Dimethylpentane | 0.01 | 0 | V1 | 0 | V1 |
| 2-Methyl-1-pentene | 0.3 | 0 | V1 | 0 | V1 |
| 2-Methyl-2-butene | 0.3 | 0 | V1 | 0 | V1 |
| 2-Methylheptane | 0.01 | 0.04 | V0 | 0 | V1 |
| 2-Methylhexane | 0.01 | 0.05 | V0 | 0 | V1 |
| 2-Methylpentane | 0.01 | 0 | V1 | 0 | V1 |
| 3-Methyl-1-butene | 0.3 | 0 | V1 | 0 | V1 |
| 3-Methylheptane | 0.02 | 0 | V1 | 0 | V1 |
| 3-Methylhexane | 0.02 | 0 | V1 | 0 | V1 |
| 3-Methylpentane | 0.01 | 0.09 | V0 | 0 | V1 |
| 4-Methyl-1-pentene | 0.3 | 0 | V1 | 0 | V1 |
| Acetaldehyde | 3 | 5 | V0 | 6 | V0 |
| Acetone | 0.4 | 2.9 | V0 | 2.2 | V0 |
| alpha-Pinene | 0.3 | 0 | V1 | 0 | V1 |
| Benzene | 0.01 | 0.02 | V0 | 0.03 | V0 |
| beta-Pinene | 0.3 | 0 | V1 | 0 | V1 |
| cis-2-Butene | 0.02 | 0 | V1 | 0 | V1 |
| cis-2-Hexene | 0.3 | 0 | V1 | 0 | V1 |
| cis-2-Pentene | 0.02 | 0 | V1 | 0 | V1 |
| Cyclohexane | 0.02 | 0.11 | V0 | 1.43 | V0 |
| Cyclopentane | 0.01 | 0.08 | V0 | 0 | V1 |
| Cyclopentene | 0.3 | 0 | V1 | 0 | V1 |
| Ethanol | 0.3 | 1 | V0 | 1.3 | V0 |
| Ethylbenzene | 0.01 | 0.01 | V0 | 0 | V1 |
| Formaldehyde | 3 | 0 | V1 | 0 | V1 |
| Isobutane | 0.02 | 0.48 | V0 | 0.21 | V0 |
| Isobutylene | 0.3 | 0 | V1 | 0 | V1 |
| Isopentane | 0.03 | 0.54 | V0 | 0.2 | V0 |
| Isoprene | 0.01 | 0.34 | V0 | 0.12 | V0 |
| Isopropylalcohol | 0.4 | 0 | V1 | 0 | V1 |
| Isopropylbenzene | 0.01 | 0 | V1 | 0 | V1 |
| m,p-Xylene | 0.03 | 0 | V1 | 0 | V1 |
| Methanol | 3 | 7 | V0 | 3 | V0 |
| Methylcyclohexane | 0.01 | 0.07 | V0 | 0 | V1 |
| Methylcyclopentane | 0.02 | 0.08 | V0 | 0 | V1 |
| Methylethylketone | 0.3 | 0 | V1 | 0 | V1 |
| Methylisobutylketone | 0.4 | 0 | V1 | 0 | V1 |
| Methylvinylketone | 0.3 | 0 | V1 | 0 | V1 |
| n-Butane | 0.03 | 0 | V1 | 0 | V1 |
| n-Decane | 0.06 | 0 | V1 | 0 | V1 |
| n-Dodecane | 0.4 | 0 | V1 | 0 | V1 |
| n-Heptane | 0.01 | 0.08 | V0 | 0 | V1 |
| n-Hexane | 0.01 | 0 | V1 | 0 | V1 |
| n-Nonane | 0.01 | 0 | V1 | 0 | V1 |
| n-Octane | 0.02 | 0.05 | V0 | 0 | V1 |
| n-Pentane | 0.1 | 0 | V1 | 0 | V1 |
| n-Propylbenzene | 0.05 | 0 | V1 | 0 | V1 |
| n-Undecane | 0.5 | 0 | V1 | 0 | V1 |
| Naphthalene | 0.5 | 0 | V1 | 0 | V1 |
| o-Xylene | 0.01 | 0 | V1 | 0 | V1 |
| Styrene | 0.04 | 0 | V1 | 0 | V1 |
| Toluene | 0.01 | 0.05 | V0 | 0.05 | V0 |
| trans-2-Butene | 0.01 | 0 | V1 | 0 | V1 |
| trans-2-Hexene | 0.3 | 0 | V1 | 0 | V1 |
| trans-2-Pentene | 0.02 | 0 | V1 | 0 | V1 |



| Station Name | Athabasca Valley | | | Anzac | |
|------------------------|------------------|----------------|------|----------------|------|
| Station # | AMS 7 | | | AMS 14 | |
| Sample Date | 18-Jul | | | 18-Jul | |
| Compound Name | MDL (ppbv) | Results (ppbv) | Flag | Results (ppbv) | Flag |
| 1,2,4-Trimethylbenzene | 0.03 | 0.03 | V0 | 0 | V1 |
| 1,3,5-Trimethylbenzene | 0.02 | 0 | V1 | 0 | V1 |
| 1,3-Butadiene | 0.02 | 0 | V1 | 0 | V1 |
| 1-Butene | 0.02 | 0.08 | V0 | 0 | V1 |
| 1-Pentene | 0.01 | 0 | V1 | 0 | V1 |
| 2,2,4-Trimethylpentane | 0.01 | 0 | V1 | 0.03 | V0 |
| 2,2-Dimethylbutane | 0.01 | 0 | V1 | 0 | V1 |
| 2,3,4-Trimethylpentane | 0.01 | 0 | V1 | 0 | V1 |
| 2,3-Dimethylbutane | 0.02 | 0.07 | V0 | 0.03 | V0 |
| 2,3-Dimethylpentane | 0.02 | 0 | V1 | 0 | V1 |
| 2,4-Dimethylpentane | 0.01 | 0 | V1 | 0 | V1 |
| 2-Methyl-1-pentene | 0.3 | 0 | V1 | 0 | V1 |
| 2-Methyl-2-butene | 0.3 | 0 | V1 | 0 | V1 |
| 2-Methylheptane | 0.01 | 0.03 | V0 | 0 | V1 |
| 2-Methylhexane | 0.01 | 0.09 | V0 | 0 | V1 |
| 2-Methylpentane | 0.01 | 0 | V1 | 0 | V1 |
| 3-Methyl-1-butene | 0.3 | 0 | V1 | 0 | V1 |
| 3-Methylheptane | 0.02 | 0 | V1 | 0 | V1 |
| 3-Methylhexane | 0.02 | 0 | V1 | 0 | V1 |
| 3-Methylpentane | 0.01 | 0.03 | V0 | 0 | V1 |
| 4-Methyl-1-pentene | 0.3 | 0 | V1 | 0 | V1 |
| Acetaldehyde | 3 | 9 | V0 | 4 | V0 |
| Acetone | 0.4 | 2.9 | V0 | 2 | V0 |
| alpha-Pinene | 0.3 | 0 | V1 | 0 | V1 |
| Benzene | 0.01 | 0.04 | V0 | 0.03 | V0 |
| beta-Pinene | 0.3 | 0 | V1 | 0 | V1 |
| cis-2-Butene | 0.02 | 0 | V1 | 0 | V1 |
| cis-2-Hexene | 0.3 | 0 | V1 | 0 | V1 |
| cis-2-Pentene | 0.02 | 0 | V1 | 0 | V1 |
| Cyclohexane | 0.02 | 0.04 | V0 | 0 | V1 |
| Cyclopentane | 0.01 | 0.06 | V0 | 0 | V1 |
| Cyclopentene | 0.3 | 0 | V1 | 0 | V1 |
| Ethanol | 0.3 | 1.8 | V0 | 0.8 | V0 |
| Ethylbenzene | 0.01 | 0.02 | V0 | 0 | V1 |
| Formaldehyde | 3 | 0 | V1 | 0 | V1 |
| Isobutane | 0.02 | 0.09 | V0 | 0.18 | V0 |
| Isobutylene | 0.3 | 0 | V1 | 0 | V1 |
| Isopentane | 0.03 | 0.26 | V0 | 0.26 | V0 |
| Isoprene | 0.01 | 0.15 | V0 | 0.11 | V0 |
| Isopropylalcohol | 0.4 | 0 | V1 | 0 | V1 |
| Isopropylbenzene | 0.01 | 0 | V1 | 0 | V1 |
| m,p-Xylene | 0.03 | 0.04 | V0 | 0 | V1 |
| Methanol | 3 | 7 | V0 | 0 | V1 |
| Methylcyclohexane | 0.01 | 0.04 | V0 | 0 | V1 |
| Methylcyclopentane | 0.02 | 0.04 | V0 | 0 | V1 |
| Methylethylketone | 0.3 | 0.3 | V0 | 0 | V1 |
| Methylisobutylketone | 0.4 | 0 | V1 | 0 | V1 |
| Methylvinylketone | 0.3 | 0 | V1 | 0 | V1 |
| n-Butane | 0.03 | 0.04 | V0 | 0.13 | V0 |
| n-Decane | 0.06 | 0 | V1 | 0 | V1 |
| n-Dodecane | 0.4 | 0 | V1 | 0 | V1 |
| n-Heptane | 0.01 | 0.07 | V0 | 0 | V1 |
| n-Hexane | 0.01 | 0 | V1 | 0 | V1 |
| n-Nonane | 0.01 | 0 | V1 | 0 | V1 |
| n-Octane | 0.02 | 0.04 | V0 | 0 | V1 |
| n-Pentane | 0.1 | 0 | V1 | 0 | V1 |
| n-Propylbenzene | 0.05 | 0 | V1 | 0 | V1 |
| n-Undecane | 0.5 | 0 | V1 | 0 | V1 |
| Naphthalene | 0.5 | 0 | V1 | 0 | V1 |
| o-Xylene | 0.01 | 0.03 | V0 | 0 | V1 |
| Styrene | 0.04 | 0 | V1 | 0 | V1 |
| Toluene | 0.01 | 0.09 | V0 | 0.1 | V0 |
| trans-2-Butene | 0.01 | 0 | V1 | 0 | V1 |
| trans-2-Hexene | 0.3 | 0 | V1 | 0 | V1 |
| trans-2-Pentene | 0.02 | 0 | V1 | 0 | V1 |



| Station Name Station # Sample Date | Barge Landing AMS 9 18-Jul | Fort McKay South AMS 13 18-Jul | | | |
|--|----------------------------------|--------------------------------------|------|----------------|------|
| Compound Name | MDL (ppbv) | Results (ppbv) | Flag | Results (ppbv) | Flag |
| 1,2,4-Trimethylbenzene | 0.03 | 0 | V1 | 0 | V1 |
| 1,3,5-Trimethylbenzene | 0.02 | 0 | V1 | 0 | V1 |
| 1,3-Butadiene | 0.02 | 0 | V1 | 0 | V1 |
| 1-Butene | 0.02 | 0 | V1 | 0 | V1 |
| 1-Pentene | 0.01 | 0 | V1 | 0 | V1 |
| 2,2,4-Trimethylpentane | 0.01 | 0 | V1 | 0 | V1 |
| 2,2-Dimethylbutane | 0.01 | 0 | V1 | 0 | V1 |
| 2,3,4-Trimethylpentane | 0.01 | 0 | V1 | 0 | V1 |
| 2,3-Dimethylbutane | 0.02 | 0.12 | V0 | 0.18 | V0 |
| 2,3-Dimethylpentane | 0.02 | 0 | V1 | 0 | V1 |
| 2,4-Dimethylpentane | 0.01 | 0 | V1 | 0 | V1 |
| 2-Methyl-1-pentene | 0.3 | 0 | V1 | 0 | V1 |
| 2-Methyl-2-butene | 0.3 | 0 | V1 | 0 | V1 |
| 2-Methylheptane | 0.01 | 0 | V1 | 0 | V1 |
| 2-Methylhexane | 0.01 | 0 | V1 | 0 | V1 |
| 2-Methylpentane | 0.01 | 0 | V1 | 0 | V1 |
| 3-Methyl-1-butene | 0.3 | 0 | V1 | 0 | V1 |
| 3-Methylheptane | 0.02 | 0 | V1 | 0 | V1 |
| 3-Methylhexane | 0.02 | 0 | V1 | 0 | V1 |
| 3-Methylpentane | 0.01 | 0.12 | V0 | 0 | V1 |
| 4-Methyl-1-pentene | 0.3 | 0 | V1 | 0 | V1 |
| Acetaldehyde | 3 | 5 | V0 | 7 | V0 |
| Acetone | 0.4 | 2 | V0 | 2.5 | V0 |
| alpha-Pinene | 0.3 | 0 | V1 | 0 | V1 |
| Benzene | 0.01 | 0.02 | V0 | 0.02 | V0 |
| beta-Pinene | 0.3 | 0 | V1 | 0 | V1 |
| cis-2-Butene | 0.02 | 0 | V1 | 0 | V1 |
| cis-2-Hexene | 0.3 | 0 | V1 | 0 | V1 |
| cis-2-Pentene | 0.02 | 0 | V1 | 0 | V1 |
| Cyclohexane | 0.02 | 0.17 | V0 | 1.33 | V0 |
| Cyclopentane | 0.01 | 0.04 | V0 | 0 | V1 |
| Cyclopentene | 0.3 | 0 | V1 | 0 | V1 |
| Ethanol | 0.3 | 0.9 | V0 | 1.3 | V0 |
| Ethylbenzene | 0.01 | 0 | V1 | 0.02 | V0 |
| Formaldehyde | 3 | 0 | V1 | 0 | V1 |
| Isobutane | 0.02 | 0.7 | V0 | 0.35 | V0 |
| Isobutylene | 0.3 | 0 | V1 | 0 | V1 |
| Isopentane | 0.03 | 0.79 | V0 | 0.29 | V0 |
| Isoprene | 0.01 | 0.37 | V0 | 0.46 | V0 |
| Isopropylalcohol | 0.4 | 0 | V1 | 0 | V1 |
| Isopropylbenzene | 0.01 | 0 | V1 | 0 | V1 |
| m,p-Xylene | 0.03 | 0 | V1 | 0.06 | V0 |
| Methanol | 3 | 4 | V0 | 7 | V0 |
| Methylcyclohexane | 0.01 | 0.07 | V0 | 0.05 | V0 |
| Methylcyclopentane | 0.02 | 0.12 | V0 | 0 | V1 |
| Methylethylketone | 0.3 | 0 | V1 | 0 | V1 |
| Methylisobutylketone | 0.4 | 0 | V1 | 0 | V1 |
| Methylvinylketone | 0.3 | 0 | V1 | 0 | V1 |
| n-Butane | 0.03 | 0.06 | V0 | 0 | V1 |
| n-Decane | 0.06 | 0 | V1 | 0 | V1 |
| n-Dodecane | 0.4 | 0 | V1 | 0 | V1 |
| n-Heptane | 0.01 | 0 | V1 | 0.09 | V0 |
| n-Hexane | 0.01 | 0 | V1 | 0 | V1 |
| n-Nonane | 0.01 | 0 | V1 | 0 | V1 |
| n-Octane | 0.02 | 0 | V1 | 0.05 | V0 |
| n-Pentane | 0.1 | 0 | V1 | 0 | V1 |
| n-Propylbenzene | 0.05 | 0 | V1 | 0 | V1 |
| n-Undecane | 0.5 | 0 | V1 | 0 | V1 |
| Naphthalene | 0.5 | 0 | V1 | 0 | V1 |
| o-Xylene | 0.01 | 0 | V1 | 0.02 | V0 |
| Styrene | 0.04 | 0 | V1 | 0 | V1 |
| Toluene | 0.01 | 0.03 | V0 | 0.09 | V0 |
| trans-2-Butene | 0.01 | 0 | V1 | 0 | V1 |
| trans-2-Hexene | 0.3 | 0 | V1 | 0 | V1 |
| trans-2-Pentene | 0.02 | 0 | V1 | 0 | V1 |



| Station Name Station # Sample Date | Horizon AMS 15 18-Jul | | |
|--|-----------------------------|----------------|------|
| Compound Name | MDL (ppbv) | Results (ppbv) | Flag |
| 1,2,4-Trimethylbenzene | 0.03 | 0 | V1 |
| 1,3,5-Trimethylbenzene | 0.02 | 0 | V1 |
| 1,3-Butadiene | 0.02 | 0 | V1 |
| 1-Butene | 0.02 | 0 | V1 |
| 1-Pentene | 0.01 | 0 | V1 |
| 2,2,4-Trimethylpentane | 0.01 | 0 | V1 |
| 2,2-Dimethylbutane | 0.01 | 0.12 | V0 |
| 2,3,4-Trimethylpentane | 0.01 | 0 | V1 |
| 2,3-Dimethylbutane | 0.02 | 0.23 | V0 |
| 2,3-Dimethylpentane | 0.02 | 0.1 | V0 |
| 2,4-Dimethylpentane | 0.01 | 0 | V1 |
| 2-Methyl-1-pentene | 0.3 | 0 | V1 |
| 2-Methyl-2-butene | 0.3 | 0 | V1 |
| 2-Methylheptane | 0.01 | 0.05 | V0 |
| 2-Methylhexane | 0.01 | 0.09 | V0 |
| 2-Methylpentane | 0.01 | 0 | V1 |
| 3-Methyl-1-butene | 0.3 | 0 | V1 |
| 3-Methylheptane | 0.02 | 0 | V1 |
| 3-Methylhexane | 0.02 | 0 | V1 |
| 3-Methylpentane | 0.01 | 0.39 | V0 |
| 4-Methyl-1-pentene | 0.3 | 0 | V1 |
| Acetaldehyde | 3 | 9 | V0 |
| Acetone | 0.4 | 3.6 | V0 |
| alpha-Pinene | 0.3 | 0 | V1 |
| Benzene | 0.01 | 0.04 | V0 |
| beta-Pinene | 0.3 | 0 | V1 |
| cis-2-Butene | 0.02 | 0 | V1 |
| cis-2-Hexene | 0.3 | 0 | V1 |
| cis-2-Pentene | 0.02 | 0 | V1 |
| Cyclohexane | 0.02 | 0.59 | V0 |
| Cyclopentane | 0.01 | 0.11 | V0 |
| Cyclopentene | 0.3 | 0 | V1 |
| Ethanol | 0.3 | 1.4 | V0 |
| Ethylbenzene | 0.01 | 0.01 | V0 |
| Formaldehyde | 3 | 0 | V1 |
| Isobutane | 0.02 | 1.6 | V0 |
| Isobutylene | 0.3 | 0 | V1 |
| Isopentane | 0.03 | 2.39 | V0 |
| Isoprene | 0.01 | 0.3 | V0 |
| Isopropylalcohol | 0.4 | 0 | V1 |
| Isopropylbenzene | 0.01 | 0 | V1 |
| m,p-Xylene | 0.03 | 0 | V1 |
| Methanol | 3 | 4 | V0 |
| Methylcyclohexane | 0.01 | 0.24 | V0 |
| Methylcyclopentane | 0.02 | 0.34 | V0 |
| Methylethylketone | 0.3 | 0.3 | V0 |
| Methylisobutylketone | 0.4 | 0 | V1 |
| Methylvinylketone | 0.3 | 0 | V1 |
| n-Butane | 0.03 | 0.11 | V0 |
| n-Decane | 0.06 | 0 | V1 |
| n-Dodecane | 0.4 | 0 | V1 |
| n-Heptane | 0.01 | 0 | V1 |
| n-Hexane | 0.01 | 0 | V1 |
| n-Nonane | 0.01 | 0 | V1 |
| n-Octane | 0.02 | 0 | V1 |
| n-Pentane | 0.1 | 0 | V1 |
| n-Propylbenzene | 0.05 | 0 | V1 |
| n-Undecane | 0.5 | 0 | V1 |
| Naphthalene | 0.5 | 0 | V1 |
| o-Xylene | 0.01 | 0 | V1 |
| Styrene | 0.04 | 0 | V1 |
| Toluene | 0.01 | 0.11 | V0 |
| trans-2-Butene | 0.01 | 0.21 | V0 |
| trans-2-Hexene | 0.3 | 0 | V1 |
| trans-2-Pentene | 0.02 | 0 | V1 |



| Station Name Station # Sample Date | Bertha Ganter - | | | Patricia McInnes | |
|--|-----------------|----------------|------|------------------|------|
| | Fort McKay | | | AMS 6 | |
| | AMS 1 | | | AMS 6 | |
| | 24-Jul | | | 24-Jul | |
| Compound Name | MDL (ppbv) | Results (ppbv) | Flag | Results (ppbv) | Flag |
| 1,2,4-Trimethylbenzene | 0.03 | 0 | V1 | 0 | V1 |
| 1,3,5-Trimethylbenzene | 0.02 | 0 | V1 | 0 | V1 |
| 1,3-Butadiene | 0.02 | 0 | V1 | 0 | V1 |
| 1-Butene | 0.02 | 0.07 | V0 | 0.09 | V0 |
| 1-Pentene | 0.01 | 0 | V1 | 0 | V1 |
| 2,2,4-Trimethylpentane | 0.01 | 0 | V1 | 0 | V1 |
| 2,2-Dimethylbutane | 0.01 | 0.02 | V0 | 0 | V1 |
| 2,3,4-Trimethylpentane | 0.01 | 0 | V1 | 0 | V1 |
| 2,3-Dimethylbutane | 0.02 | 0.08 | V0 | 0.05 | V0 |
| 2,3-Dimethylpentane | 0.02 | 0.03 | V0 | 0 | V1 |
| 2,4-Dimethylpentane | 0.01 | 0 | V1 | 0 | V1 |
| 2-Methyl-1-pentene | 0.3 | 0 | V1 | 0 | V1 |
| 2-Methyl-2-butene | 0.3 | 0 | V1 | 0 | V1 |
| 2-Methylheptane | 0.01 | 0.02 | V0 | 0.01 | V0 |
| 2-Methylhexane | 0.01 | 0.02 | V0 | 0 | V1 |
| 2-Methylpentane | 0.01 | 0 | V1 | 0.03 | V0 |
| 3-Methyl-1-butene | 0.3 | 0 | V1 | 0 | V1 |
| 3-Methylheptane | 0.02 | 0 | V1 | 0 | V1 |
| 3-Methylhexane | 0.02 | 0.03 | V0 | 0 | V1 |
| 3-Methylpentane | 0.01 | 0.06 | V0 | 0.02 | V0 |
| 4-Methyl-1-pentene | 0.3 | 0 | V1 | 0 | V1 |
| Acetaldehyde | 3 | 3 | V0 | 7 | V0 |
| Acetone | 0.4 | 2.4 | V0 | 3.4 | V0 |
| alpha-Pinene | 0.3 | 0 | V1 | 0 | V1 |
| Benzene | 0.01 | 0.08 | V0 | 0.08 | V0 |
| beta-Pinene | 0.3 | 0 | V1 | 0 | V1 |
| cis-2-Butene | 0.02 | 0 | V1 | 0 | V1 |
| cis-2-Hexene | 0.3 | 0 | V1 | 0 | V1 |
| cis-2-Pentene | 0.02 | 0 | V1 | 0 | V1 |
| Cyclohexane | 0.02 | 0.08 | V0 | 1.39 | V0 |
| Cyclopentane | 0.01 | 0 | V1 | 0 | V1 |
| Cyclopentene | 0.3 | 0 | V1 | 0 | V1 |
| Ethanol | 0.3 | 1.2 | V0 | 0.7 | V0 |
| Ethylbenzene | 0.01 | 0.01 | V0 | 0 | V1 |
| Formaldehyde | 3 | 0 | V1 | 0 | V1 |
| Isobutane | 0.02 | 0.26 | V0 | 0.22 | V0 |
| Isobutylene | 0.3 | 0 | V1 | 0 | V1 |
| Isopentane | 0.03 | 0.37 | V0 | 0.32 | V0 |
| Isoprene | 0.01 | 0.53 | V0 | 0.27 | V0 |
| Isopropylalcohol | 0.4 | 0 | V1 | 0 | V1 |
| Isopropylbenzene | 0.01 | 0 | V1 | 0 | V1 |
| m,p-Xylene | 0.03 | 0 | V1 | 0 | V1 |
| Methanol | 3 | 9 | V0 | 4 | V0 |
| Methylcyclohexane | 0.01 | 0.06 | V0 | 0.02 | V0 |
| Methylcyclopentane | 0.02 | 0.06 | V0 | 0.02 | V0 |
| Methylethylketone | 0.3 | 0 | V1 | 0 | V1 |
| Methylisobutylketone | 0.4 | 0 | V1 | 0 | V1 |
| Methylvinylketone | 0.3 | 0 | V1 | 0 | V1 |
| n-Butane | 0.03 | 0 | V1 | 0.14 | V0 |
| n-Decane | 0.06 | 0 | V1 | 0 | V1 |
| n-Dodecane | 0.4 | 0 | V1 | 0 | V1 |
| n-Heptane | 0.01 | 0.04 | V0 | 0.03 | V0 |
| n-Hexane | 0.01 | 0 | V1 | 0.06 | V0 |
| n-Nonane | 0.01 | 0.02 | V0 | 0 | V1 |
| n-Octane | 0.02 | 0.03 | V0 | 0 | V1 |
| n-Pentane | 0.1 | 0 | V1 | 0.2 | V0 |
| n-Propylbenzene | 0.05 | 0 | V1 | 0 | V1 |
| n-Undecane | 0.5 | 0 | V1 | 0 | V1 |
| Naphthalene | 0.5 | 0 | V1 | 0 | V1 |
| o-Xylene | 0.01 | 0.01 | V0 | 0.01 | V0 |
| Styrene | 0.04 | 0 | V1 | 0 | V1 |
| Toluene | 0.01 | 0.06 | V0 | 0.07 | V0 |
| trans-2-Butene | 0.01 | 0 | V1 | 0 | V1 |
| trans-2-Hexene | 0.3 | 0 | V1 | 0 | V1 |
| trans-2-Pentene | 0.02 | 0 | V1 | 0 | V1 |



| Station Name Station # Sample Date | Athabasca Valley AMS 7 24-Jul | | | Anzac AMS 14 24-Jul | |
|--|-------------------------------------|----------------|------|---------------------------|------|
| Compound Name | MDL (ppbv) | Results (ppbv) | Flag | Results (ppbv) | Flag |
| 1,2,4-Trimethylbenzene | 0.03 | 0 | V1 | 0 | V1 |
| 1,3,5-Trimethylbenzene | 0.02 | 0 | V1 | 0 | V1 |
| 1,3-Butadiene | 0.02 | 0 | V1 | 0 | V1 |
| 1-Butene | 0.02 | 0.08 | V0 | 0.1 | V0 |
| 1-Pentene | 0.01 | 0 | V1 | 0 | V1 |
| 2,2,4-Trimethylpentane | 0.01 | 0 | V1 | 0.02 | V0 |
| 2,2-Dimethylbutane | 0.01 | 0.02 | V0 | 0 | V1 |
| 2,3,4-Trimethylpentane | 0.01 | 0 | V1 | 0 | V1 |
| 2,3-Dimethylbutane | 0.02 | 0.06 | V0 | 0 | V1 |
| 2,3-Dimethylpentane | 0.02 | 0 | V1 | 0 | V1 |
| 2,4-Dimethylpentane | 0.01 | 0 | V1 | 0 | V1 |
| 2-Methyl-1-pentene | 0.3 | 0 | V1 | 0 | V1 |
| 2-Methyl-2-butene | 0.3 | 0 | V1 | 0 | V1 |
| 2-Methylheptane | 0.01 | 0 | V1 | 0 | V1 |
| 2-Methylhexane | 0.01 | 0.07 | V0 | 0 | V1 |
| 2-Methylpentane | 0.01 | 0.02 | V0 | 0 | V1 |
| 3-Methyl-1-butene | 0.3 | 0 | V1 | 0 | V1 |
| 3-Methylheptane | 0.02 | 0 | V1 | 0 | V1 |
| 3-Methylhexane | 0.02 | 0 | V1 | 0 | V1 |
| 3-Methylpentane | 0.01 | 0.01 | V0 | 0 | V1 |
| 4-Methyl-1-pentene | 0.3 | 0 | V1 | 0 | V1 |
| Acetaldehyde | 3 | 7 | V0 | 19 | V0 |
| Acetone | 0.4 | 8.2 | V0 | 4.8 | V0 |
| alpha-Pinene | 0.3 | 0 | V1 | 0 | V1 |
| Benzene | 0.01 | 0.1 | V0 | 0.09 | V0 |
| beta-Pinene | 0.3 | 0 | V1 | 0 | V1 |
| cis-2-Butene | 0.02 | 0 | V1 | 0 | V1 |
| cis-2-Hexene | 0.3 | 0 | V1 | 0 | V1 |
| cis-2-Pentene | 0.02 | 0 | V1 | 0 | V1 |
| Cyclohexane | 0.02 | 0 | V1 | 0 | V1 |
| Cyclopentane | 0.01 | 0 | V1 | 0 | V1 |
| Cyclopentene | 0.3 | 0 | V1 | 0 | V1 |
| Ethanol | 0.3 | 2.8 | V0 | 3.8 | V0 |
| Ethylbenzene | 0.01 | 0.01 | V0 | 0 | V1 |
| Formaldehyde | 3 | 0 | V1 | 0 | V1 |
| Isobutane | 0.02 | 0.18 | V0 | 0.45 | V0 |
| Isobutylene | 0.3 | 0 | V1 | 0 | V1 |
| Isopentane | 0.03 | 0.31 | V0 | 0.21 | V0 |
| Isoprene | 0.01 | 0.36 | V0 | 0.21 | V0 |
| Isopropylalcohol | 0.4 | 0.4 | V0 | 0 | V1 |
| Isopropylbenzene | 0.01 | 0 | V1 | 0 | V1 |
| m,p-Xylene | 0.03 | 0 | V1 | 0 | V1 |
| Methanol | 3 | 7 | V0 | 12 | V0 |
| Methylcyclohexane | 0.01 | 0 | V1 | 0 | V1 |
| Methylcyclopentane | 0.02 | 0 | V1 | 0 | V1 |
| Methylethylketone | 0.3 | 0.3 | V0 | 0.4 | V0 |
| Methylisobutylketone | 0.4 | 0 | V1 | 0 | V1 |
| Methylvinylketone | 0.3 | 0 | V1 | 0 | V1 |
| n-Butane | 0.03 | 0 | V1 | 0.03 | V0 |
| n-Decane | 0.06 | 0 | V1 | 0 | V1 |
| n-Dodecane | 0.4 | 0 | V1 | 0 | V1 |
| n-Heptane | 0.01 | 0.02 | V0 | 0 | V1 |
| n-Hexane | 0.01 | 0.05 | V0 | 0.02 | V0 |
| n-Nonane | 0.01 | 0 | V1 | 0 | V1 |
| n-Octane | 0.02 | 0 | V1 | 0 | V1 |
| n-Pentane | 0.1 | 0.2 | V0 | 0 | V1 |
| n-Propylbenzene | 0.05 | 0 | V1 | 0 | V1 |
| n-Undecane | 0.5 | 0 | V1 | 0 | V1 |
| Naphthalene | 0.5 | 0 | V1 | 0 | V1 |
| o-Xylene | 0.01 | 0.01 | V0 | 0 | V1 |
| Styrene | 0.04 | 0 | V1 | 0 | V1 |
| Toluene | 0.01 | 0.07 | V0 | 0.12 | V0 |
| trans-2-Butene | 0.01 | 0 | V1 | 0 | V1 |
| trans-2-Hexene | 0.3 | 0 | V1 | 0 | V1 |
| trans-2-Pentene | 0.02 | 0 | V1 | 0 | V1 |



| Station Name Station # Sample Date | Barge Landing AMS 9 24-Jul | Fort McKay South AMS 13 24-Jul | | | |
|--|----------------------------------|--------------------------------------|------|----------------|------|
| Compound Name | MDL (ppbv) | Results (ppbv) | Flag | Results (ppbv) | Flag |
| 1,2,4-Trimethylbenzene | 0.03 | 0 | V1 | 0 | V1 |
| 1,3,5-Trimethylbenzene | 0.02 | 0 | V1 | 0 | V1 |
| 1,3-Butadiene | 0.02 | 0 | V1 | 0 | V1 |
| 1-Butene | 0.02 | 0.08 | V0 | 0.06 | V0 |
| 1-Pentene | 0.01 | 0 | V1 | 0 | V1 |
| 2,2,4-Trimethylpentane | 0.01 | 0 | V1 | 0 | V1 |
| 2,2-Dimethylbutane | 0.01 | 0.02 | V0 | 0 | V1 |
| 2,3,4-Trimethylpentane | 0.01 | 0 | V1 | 0 | V1 |
| 2,3-Dimethylbutane | 0.02 | 0.07 | V0 | 0.03 | V0 |
| 2,3-Dimethylpentane | 0.02 | 0 | V1 | 0 | V1 |
| 2,4-Dimethylpentane | 0.01 | 0 | V1 | 0 | V1 |
| 2-Methyl-1-pentene | 0.3 | 0 | V1 | 0 | V1 |
| 2-Methyl-2-butene | 0.3 | 0 | V1 | 0 | V1 |
| 2-Methylheptane | 0.01 | 0 | V1 | 0.01 | V0 |
| 2-Methylhexane | 0.01 | 0 | V1 | 0 | V1 |
| 2-Methylpentane | 0.01 | 0 | V1 | 0 | V1 |
| 3-Methyl-1-butene | 0.3 | 0 | V1 | 0 | V1 |
| 3-Methylheptane | 0.02 | 0 | V1 | 0 | V1 |
| 3-Methylhexane | 0.02 | 0 | V1 | 0 | V1 |
| 3-Methylpentane | 0.01 | 0.04 | V0 | 0.03 | V0 |
| 4-Methyl-1-pentene | 0.3 | 0 | V1 | 0 | V1 |
| Acetaldehyde | 3 | 12 | V0 | 0 | V1 |
| Acetone | 0.4 | 3.4 | V0 | 2.3 | V0 |
| alpha-Pinene | 0.3 | 0 | V1 | 0 | V1 |
| Benzene | 0.01 | 0.08 | V0 | 0.08 | V0 |
| beta-Pinene | 0.3 | 0 | V1 | 0 | V1 |
| cis-2-Butene | 0.02 | 0 | V1 | 0 | V1 |
| cis-2-Hexene | 0.3 | 0 | V1 | 0 | V1 |
| cis-2-Pentene | 0.02 | 0 | V1 | 0 | V1 |
| Cyclohexane | 0.02 | 0.04 | V0 | 0.04 | V0 |
| Cyclopentane | 0.01 | 0 | V1 | 0 | V1 |
| Cyclopentene | 0.3 | 0 | V1 | 0 | V1 |
| Ethanol | 0.3 | 2.1 | V0 | 0.7 | V0 |
| Ethylbenzene | 0.01 | 0 | V1 | 0.02 | V0 |
| Formaldehyde | 3 | 0 | V1 | 0 | V1 |
| Isobutane | 0.02 | 0.41 | V0 | 0.17 | V0 |
| Isobutylene | 0.3 | 0 | V1 | 0 | V1 |
| Isopentane | 0.03 | 0.33 | V0 | 0.23 | V0 |
| Isoprene | 0.01 | 0.49 | V0 | 0.6 | V0 |
| Isopropylalcohol | 0.4 | 0 | V1 | 0 | V1 |
| Isopropylbenzene | 0.01 | 0 | V1 | 0 | V1 |
| m,p-Xylene | 0.03 | 0 | V1 | 0 | V1 |
| Methanol | 3 | 7 | V0 | 5 | V0 |
| Methylcyclohexane | 0.01 | 0.02 | V0 | 0.04 | V0 |
| Methylcyclopentane | 0.02 | 0.03 | V0 | 0.04 | V0 |
| Methylethylketone | 0.3 | 0 | V1 | 0 | V1 |
| Methylisobutylketone | 0.4 | 0 | V1 | 0 | V1 |
| Methylvinylketone | 0.3 | 0 | V1 | 0 | V1 |
| n-Butane | 0.03 | 0 | V1 | 0 | V1 |
| n-Decane | 0.06 | 0 | V1 | 0 | V1 |
| n-Dodecane | 0.4 | 0 | V1 | 0 | V1 |
| n-Heptane | 0.01 | 0 | V1 | 0.02 | V0 |
| n-Hexane | 0.01 | 0 | V1 | 0.01 | V0 |
| n-Nonane | 0.01 | 0 | V1 | 0 | V1 |
| n-Octane | 0.02 | 0 | V1 | 0 | V1 |
| n-Pentane | 0.1 | 0 | V1 | 0 | V1 |
| n-Propylbenzene | 0.05 | 0 | V1 | 0 | V1 |
| n-Undecane | 0.5 | 0 | V1 | 0 | V1 |
| Naphthalene | 0.5 | 0 | V1 | 0 | V1 |
| o-Xylene | 0.01 | 0 | V1 | 0.01 | V0 |
| Styrene | 0.04 | 0 | V1 | 0 | V1 |
| Toluene | 0.01 | 0.04 | V0 | 0.08 | V0 |
| trans-2-Butene | 0.01 | 0 | V1 | 0 | V1 |
| trans-2-Hexene | 0.3 | 0 | V1 | 0 | V1 |
| trans-2-Pentene | 0.02 | 0 | V1 | 0 | V1 |



| Station Name Station # Sample Date | Horizon AMS 15 24-Jul | | |
|--|-----------------------------|----------------|------|
| Compound Name | MDL (ppbv) | Results (ppbv) | Flag |
| 1,2,4-Trimethylbenzene | 0.03 | 0 | V1 |
| 1,3,5-Trimethylbenzene | 0.02 | 0 | V1 |
| 1,3-Butadiene | 0.02 | 0 | V1 |
| 1-Butene | 0.02 | 0.1 | V0 |
| 1-Pentene | 0.01 | 0 | V1 |
| 2,2,4-Trimethylpentane | 0.01 | 0 | V1 |
| 2,2-Dimethylbutane | 0.01 | 0.07 | V0 |
| 2,3,4-Trimethylpentane | 0.01 | 0.01 | V0 |
| 2,3-Dimethylbutane | 0.02 | 0.14 | V0 |
| 2,3-Dimethylpentane | 0.02 | 0.06 | V0 |
| 2,4-Dimethylpentane | 0.01 | 0 | V1 |
| 2-Methyl-1-pentene | 0.3 | 0 | V1 |
| 2-Methyl-2-butene | 0.3 | 0 | V1 |
| 2-Methylheptane | 0.01 | 0 | V1 |
| 2-Methylhexane | 0.01 | 0.06 | V0 |
| 2-Methylpentane | 0.01 | 0 | V1 |
| 3-Methyl-1-butene | 0.3 | 0 | V1 |
| 3-Methylheptane | 0.02 | 0 | V1 |
| 3-Methylhexane | 0.02 | 0 | V1 |
| 3-Methylpentane | 0.01 | 0.25 | V0 |
| 4-Methyl-1-pentene | 0.3 | 0 | V1 |
| Acetaldehyde | 3 | 8 | V0 |
| Acetone | 0.4 | 3.6 | V0 |
| alpha-Pinene | 0.3 | 0 | V1 |
| Benzene | 0.01 | 0.07 | V0 |
| beta-Pinene | 0.3 | 0 | V1 |
| cis-2-Butene | 0.02 | 0 | V1 |
| cis-2-Hexene | 0.3 | 0 | V1 |
| cis-2-Pentene | 0.02 | 0 | V1 |
| Cyclohexane | 0.02 | 0.33 | V0 |
| Cyclopentane | 0.01 | 0.06 | V0 |
| Cyclopentene | 0.3 | 0 | V1 |
| Ethanol | 0.3 | 1.2 | V0 |
| Ethylbenzene | 0.01 | 0 | V1 |
| Formaldehyde | 3 | 0 | V1 |
| Isobutane | 0.02 | 0.85 | V0 |
| Isobutylene | 0.3 | 0 | V1 |
| Isopentane | 0.03 | 1.25 | V0 |
| Isoprene | 0.01 | 0.4 | V0 |
| Isopropylalcohol | 0.4 | 0 | V1 |
| Isopropylbenzene | 0.01 | 0 | V1 |
| m,p-Xylene | 0.03 | 0 | V1 |
| Methanol | 3 | 7 | V0 |
| Methylcyclohexane | 0.01 | 0.13 | V0 |
| Methylcyclopentane | 0.02 | 0.21 | V0 |
| Methylethylketone | 0.3 | 0 | V1 |
| Methylisobutylketone | 0.4 | 0 | V1 |
| Methylvinylketone | 0.3 | 0 | V1 |
| n-Butane | 0.03 | 0.08 | V0 |
| n-Decane | 0.06 | 0 | V1 |
| n-Dodecane | 0.4 | 0 | V1 |
| n-Heptane | 0.01 | 0.02 | V0 |
| n-Hexane | 0.01 | 0.02 | V0 |
| n-Nonane | 0.01 | 0 | V1 |
| n-Octane | 0.02 | 0 | V1 |
| n-Pentane | 0.1 | 0 | V1 |
| n-Propylbenzene | 0.05 | 0 | V1 |
| n-Undecane | 0.5 | 0 | V1 |
| Naphthalene | 0.5 | 0 | V1 |
| o-Xylene | 0.01 | 0 | V1 |
| Styrene | 0.04 | 0 | V1 |
| Toluene | 0.01 | 0.11 | V0 |
| trans-2-Butene | 0.01 | 0 | V1 |
| trans-2-Hexene | 0.3 | 0 | V1 |
| trans-2-Pentene | 0.02 | 0 | V1 |



| Station Name Station # Sample Date | Bertha Ganter - | | | Patricia McInnes | |
|--|-----------------|----------------|------|------------------|------|
| | Fort McKay | | | AMS 6 | |
| | MDL (ppbv) | Results (ppbv) | Flag | Results (ppbv) | Flag |
| 1,2,4-Trimethylbenzene | 0.03 | 0.03 | V0 | 0 | V1 |
| 1,3,5-Trimethylbenzene | 0.02 | 0 | V1 | 0 | V1 |
| 1,3-Butadiene | 0.02 | 0 | V1 | 0 | V1 |
| 1-Butene | 0.02 | 0.06 | V0 | 0.14 | V0 |
| 1-Pentene | 0.01 | 0.01 | V0 | 0 | V1 |
| 2,2,4-Trimethylpentane | 0.01 | 0 | V1 | 0.07 | V0 |
| 2,2-Dimethylbutane | 0.01 | 0.05 | V0 | 0.01 | V0 |
| 2,3,4-Trimethylpentane | 0.01 | 0.02 | V0 | 0 | V1 |
| 2,3-Dimethylbutane | 0.02 | 0.12 | V0 | 0 | V1 |
| 2,3-Dimethylpentane | 0.02 | 0.04 | V0 | 0.03 | V0 |
| 2,4-Dimethylpentane | 0.01 | 0.01 | V0 | 0.01 | V0 |
| 2-Methyl-1-pentene | 0.3 | 0 | V1 | 0 | V1 |
| 2-Methyl-2-butene | 0.3 | 0 | V1 | 0 | V1 |
| 2-Methylheptane | 0.01 | 0.06 | V0 | 0.02 | V0 |
| 2-Methylhexane | 0.01 | 0 | V1 | 0.07 | V0 |
| 2-Methylpentane | 0.01 | 0.17 | V0 | 0.05 | V0 |
| 3-Methyl-1-butene | 0.3 | 0 | V1 | 0 | V1 |
| 3-Methylheptane | 0.02 | 0.04 | V0 | 0 | V1 |
| 3-Methylhexane | 0.02 | 0.07 | V0 | 0.04 | V0 |
| 3-Methylpentane | 0.01 | 0.16 | V0 | 0.04 | V0 |
| 4-Methyl-1-pentene | 0.3 | 0 | V1 | 0 | V1 |
| Acetaldehyde | 3 | 12 | V0 | 7 | V0 |
| Acetone | 0.4 | 3.7 | V0 | 5.1 | V0 |
| alpha-Pinene | 0.3 | 0 | V1 | 0 | V1 |
| Benzene | 0.01 | 0.08 | V0 | 0.07 | V0 |
| beta-Pinene | 0.3 | 0 | V1 | 0 | V1 |
| cis-2-Butene | 0.02 | 0 | V1 | 0.03 | V0 |
| cis-2-Hexene | 0.3 | 0 | V1 | 0 | V1 |
| cis-2-Pentene | 0.02 | 0 | V1 | 0 | V1 |
| Cyclohexane | 0.02 | 0.1 | V0 | 0.03 | V0 |
| Cyclopentane | 0.01 | 0.06 | V0 | 0.01 | V0 |
| Cyclopentene | 0.3 | 0 | V1 | 0 | V1 |
| Ethanol | 0.3 | 5.6 | V0 | 4.3 | V0 |
| Ethylbenzene | 0.01 | 0.05 | V0 | 0.05 | V0 |
| Formaldehyde | 3 | 0 | V1 | 0 | V1 |
| Isobutane | 0.02 | 0.83 | V0 | 0.11 | V0 |
| Isobutylene | 0.3 | 0 | V1 | 0 | V1 |
| Isopentane | 0.03 | 0.71 | V0 | 0.38 | V0 |
| Isoprene | 0.01 | 1.47 | V0 | 0.93 | V0 |
| Isopropylalcohol | 0.4 | 0 | V1 | 0 | V1 |
| Isopropylbenzene | 0.01 | 0 | V1 | 0 | V1 |
| m,p-Xylene | 0.03 | 0.07 | V0 | 0.06 | V0 |
| Methanol | 3 | 17 | V0 | 17 | V0 |
| Methylcyclohexane | 0.01 | 0.1 | V0 | 0.02 | V0 |
| Methylcyclopentane | 0.02 | 0.1 | V0 | 0.04 | V0 |
| Methylethylketone | 0.3 | 0.5 | V0 | 0.5 | V0 |
| Methylisobutylketone | 0.4 | 0 | V1 | 0 | V1 |
| Methylvinylketone | 0.3 | 0.9 | V0 | 0.7 | V0 |
| n-Butane | 0.03 | 0.18 | V0 | 0.43 | V0 |
| n-Decane | 0.06 | 0 | V1 | 0 | V1 |
| n-Dodecane | 0.4 | 0 | V1 | 0 | V1 |
| n-Heptane | 0.01 | 0.14 | V0 | 0.06 | V0 |
| n-Hexane | 0.01 | 0.13 | V0 | 0.08 | V0 |
| n-Nonane | 0.01 | 0.03 | V0 | 0 | V1 |
| n-Octane | 0.02 | 0.09 | V0 | 0.03 | V0 |
| n-Pentane | 0.1 | 0.4 | V0 | 0.2 | V0 |
| n-Propylbenzene | 0.05 | 0 | V1 | 0 | V1 |
| n-Undecane | 0.5 | 0 | V1 | 0 | V1 |
| Naphthalene | 0.5 | 0 | V1 | 0 | V1 |
| o-Xylene | 0.01 | 0.02 | V0 | 0.03 | V0 |
| Styrene | 0.04 | 0 | V1 | 0 | V1 |
| Toluene | 0.01 | 0.18 | V0 | 0.33 | V0 |
| trans-2-Butene | 0.01 | 0 | V1 | 0.05 | V0 |
| trans-2-Hexene | 0.3 | 0 | V1 | 0 | V1 |
| trans-2-Pentene | 0.02 | 0 | V1 | 0 | V1 |



| Station Name | Athabasca Valley | | | Anzac | |
|------------------------|------------------|----------------|------|----------------|------|
| Station # | AMS 7 | | | AMS 14 | |
| Sample Date | 30-Jul | | | 30-Jul | |
| Compound Name | MDL (ppbv) | Results (ppbv) | Flag | Results (ppbv) | Flag |
| 1,2,4-Trimethylbenzene | 0.03 | 0 | V1 | 0 | V1 |
| 1,3,5-Trimethylbenzene | 0.02 | 0 | V1 | 0 | V1 |
| 1,3-Butadiene | 0.02 | 0 | V1 | 0 | V1 |
| 1-Butene | 0.02 | 0.15 | V0 | 0.04 | V0 |
| 1-Pentene | 0.01 | 0.01 | V0 | 0.01 | V0 |
| 2,2,4-Trimethylpentane | 0.01 | 0.02 | V0 | 0 | V1 |
| 2,2-Dimethylbutane | 0.01 | 0.01 | V0 | 0 | V1 |
| 2,3,4-Trimethylpentane | 0.01 | 0 | V1 | 0 | V1 |
| 2,3-Dimethylbutane | 0.02 | 0.04 | V0 | 0.04 | V0 |
| 2,3-Dimethylpentane | 0.02 | 0.02 | V0 | 0 | V1 |
| 2,4-Dimethylpentane | 0.01 | 0.01 | V0 | 0 | V1 |
| 2-Methyl-1-pentene | 0.3 | 0 | V1 | 0 | V1 |
| 2-Methyl-2-butene | 0.3 | 0 | V1 | 0 | V1 |
| 2-Methylheptane | 0.01 | 0.01 | V0 | 0.01 | V0 |
| 2-Methylhexane | 0.01 | 0.07 | V0 | 0 | V1 |
| 2-Methylpentane | 0.01 | 0.05 | V0 | 0.07 | V0 |
| 3-Methyl-1-butene | 0.3 | 0 | V1 | 0 | V1 |
| 3-Methylheptane | 0.02 | 0 | V1 | 0 | V1 |
| 3-Methylhexane | 0.02 | 0.05 | V0 | 0.03 | V0 |
| 3-Methylpentane | 0.01 | 0.04 | V0 | 0.04 | V0 |
| 4-Methyl-1-pentene | 0.3 | 0 | V1 | 0 | V1 |
| Acetaldehyde | 3 | 8 | V0 | 8 | V0 |
| Acetone | 0.4 | 6.4 | V0 | 3.6 | V0 |
| alpha-Pinene | 0.3 | 0 | V1 | 0 | V1 |
| Benzene | 0.01 | 0.07 | V0 | 0.08 | V0 |
| beta-Pinene | 0.3 | 0 | V1 | 0 | V1 |
| cis-2-Butene | 0.02 | 0.05 | V0 | 0 | V1 |
| cis-2-Hexene | 0.3 | 0 | V1 | 0 | V1 |
| cis-2-Pentene | 0.02 | 0 | V1 | 0 | V1 |
| Cyclohexane | 0.02 | 0 | V1 | 0 | V1 |
| Cyclopentane | 0.01 | 0.02 | V0 | 0.02 | V0 |
| Cyclopentene | 0.3 | 0 | V1 | 0 | V1 |
| Ethanol | 0.3 | 7.3 | V0 | 1.6 | V0 |
| Ethylbenzene | 0.01 | 0.01 | V0 | 0.01 | V0 |
| Formaldehyde | 3 | 0 | V1 | 0 | V1 |
| Isobutane | 0.02 | 0.36 | V0 | 0.48 | V0 |
| Isobutylene | 0.3 | 0 | V1 | 0 | V1 |
| Isopentane | 0.03 | 0.46 | V0 | 0.53 | V0 |
| Isoprene | 0.01 | 0.74 | V0 | 0.95 | V0 |
| Isopropylalcohol | 0.4 | 0 | V1 | 0 | V1 |
| Isopropylbenzene | 0.01 | 0 | V1 | 0 | V1 |
| m,p-Xylene | 0.03 | 0.04 | V0 | 0 | V1 |
| Methanol | 3 | 26 | V0 | 9 | V0 |
| Methylcyclohexane | 0.01 | 0.01 | V0 | 0.02 | V0 |
| Methylcyclopentane | 0.02 | 0.03 | V0 | 0.03 | V0 |
| Methylethylketone | 0.3 | 0.4 | V0 | 0 | V1 |
| Methylisobutylketone | 0.4 | 0 | V1 | 0 | V1 |
| Methylvinylketone | 0.3 | 0.9 | V0 | 0.8 | V0 |
| n-Butane | 0.03 | 0.49 | V0 | 0.43 | V0 |
| n-Decane | 0.06 | 0 | V1 | 0 | V1 |
| n-Dodecane | 0.4 | 0 | V1 | 0 | V1 |
| n-Heptane | 0.01 | 0.13 | V0 | 0.05 | V0 |
| n-Hexane | 0.01 | 0.07 | V0 | 0.07 | V0 |
| n-Nonane | 0.01 | 0 | V1 | 0 | V1 |
| n-Octane | 0.02 | 0 | V1 | 0 | V1 |
| n-Pentane | 0.1 | 0.3 | V0 | 0.4 | V0 |
| n-Propylbenzene | 0.05 | 0 | V1 | 0 | V1 |
| n-Undecane | 0.5 | 0 | V1 | 0 | V1 |
| Naphthalene | 0.5 | 0 | V1 | 0 | V1 |
| o-Xylene | 0.01 | 0.02 | V0 | 0 | V1 |
| Styrene | 0.04 | 0 | V1 | 0 | V1 |
| Toluene | 0.01 | 0.09 | V0 | 0.15 | V0 |
| trans-2-Butene | 0.01 | 0.08 | V0 | 0 | V1 |
| trans-2-Hexene | 0.3 | 0 | V1 | 0 | V1 |
| trans-2-Pentene | 0.02 | 0 | V1 | 0 | V1 |



| Station Name Station # Sample Date | Barge Landing AMS 9 30-Jul | Fort McKay South AMS 13 30-Jul | | | |
|--|----------------------------------|--------------------------------------|------|----------------|------|
| Compound Name | MDL (ppbv) | Results (ppbv) | Flag | Results (ppbv) | Flag |
| 1,2,4-Trimethylbenzene | 0.03 | 0 | V1 | 0 | V1 |
| 1,3,5-Trimethylbenzene | 0.02 | 0 | V1 | 0 | V1 |
| 1,3-Butadiene | 0.02 | 0 | V1 | 0 | V1 |
| 1-Butene | 0.02 | 0.05 | V0 | 0.22 | V0 |
| 1-Pentene | 0.01 | 0.01 | V0 | 0.02 | V0 |
| 2,2,4-Trimethylpentane | 0.01 | 0 | V1 | 0 | V1 |
| 2,2-Dimethylbutane | 0.01 | 0.07 | V0 | 0.11 | V0 |
| 2,3,4-Trimethylpentane | 0.01 | 0.01 | V0 | 0.02 | V0 |
| 2,3-Dimethylbutane | 0.02 | 0.2 | V0 | 0.1 | V0 |
| 2,3-Dimethylpentane | 0.02 | 0.04 | V0 | 0.05 | V0 |
| 2,4-Dimethylpentane | 0.01 | 0.01 | V0 | 0.01 | V0 |
| 2-Methyl-1-pentene | 0.3 | 0 | V1 | 0 | V1 |
| 2-Methyl-2-butene | 0.3 | 0 | V1 | 0 | V1 |
| 2-Methylheptane | 0.01 | 0.05 | V0 | 0.12 | V0 |
| 2-Methylhexane | 0.01 | 0 | V1 | 0.11 | V0 |
| 2-Methylpentane | 0.01 | 0.31 | V0 | 0.39 | V0 |
| 3-Methyl-1-butene | 0.3 | 0 | V1 | 0 | V1 |
| 3-Methylheptane | 0.02 | 0.02 | V0 | 0.05 | V0 |
| 3-Methylhexane | 0.02 | 0.05 | V0 | 0.12 | V0 |
| 3-Methylpentane | 0.01 | 0.22 | V0 | 0.29 | V0 |
| 4-Methyl-1-pentene | 0.3 | 0 | V1 | 0 | V1 |
| Acetaldehyde | 3 | 17 | V0 | 8 | V0 |
| Acetone | 0.4 | 4 | V0 | 10.7 | V0 |
| alpha-Pinene | 0.3 | 0 | V1 | 0.3 | V0 |
| Benzene | 0.01 | 0.11 | V0 | 0.13 | V0 |
| beta-Pinene | 0.3 | 0 | V1 | 0.3 | V0 |
| cis-2-Butene | 0.02 | 0 | V1 | 0.06 | V0 |
| cis-2-Hexene | 0.3 | 0 | V1 | 0 | V1 |
| cis-2-Pentene | 0.02 | 0 | V1 | 0 | V1 |
| Cyclohexane | 0.02 | 0.08 | V0 | 0.14 | V0 |
| Cyclopentane | 0.01 | 0.09 | V0 | 0.13 | V0 |
| Cyclopentene | 0.3 | 0 | V1 | 0 | V1 |
| Ethanol | 0.3 | 4.5 | V0 | 4.2 | V0 |
| Ethylbenzene | 0.01 | 0.02 | V0 | 0.02 | V0 |
| Formaldehyde | 3 | 0 | V1 | 0 | V1 |
| Isobutane | 0.02 | 1.01 | V0 | 0.55 | V0 |
| Isobutylene | 0.3 | 0 | V1 | 0 | V1 |
| Isopentane | 0.03 | 0.81 | V0 | 1.19 | V0 |
| Isoprene | 0.01 | 1.69 | V0 | 1.97 | V0 |
| Isopropylalcohol | 0.4 | 0 | V1 | 0 | V1 |
| Isopropylbenzene | 0.01 | 0 | V1 | 0 | V1 |
| m,p-Xylene | 0.03 | 0.03 | V0 | 0.05 | V0 |
| Methanol | 3 | 13 | V0 | 29 | V0 |
| Methylcyclohexane | 0.01 | 0.08 | V0 | 0.12 | V0 |
| Methylcyclopentane | 0.02 | 0.1 | V0 | 0.18 | V0 |
| Methylethylketone | 0.3 | 0.4 | V0 | 0.5 | V0 |
| Methylisobutylketone | 0.4 | 0 | V1 | 0 | V1 |
| Methylvinylketone | 0.3 | 1 | V0 | 0 | V1 |
| n-Butane | 0.03 | 0.15 | V0 | 0.35 | V0 |
| n-Decane | 0.06 | 0 | V1 | 0 | V1 |
| n-Dodecane | 0.4 | 0 | V1 | 0 | V1 |
| n-Heptane | 0.01 | 0.13 | V0 | 0.25 | V0 |
| n-Hexane | 0.01 | 0.19 | V0 | 0.34 | V0 |
| n-Nonane | 0.01 | 0.02 | V0 | 0.05 | V0 |
| n-Octane | 0.02 | 0.08 | V0 | 0.18 | V0 |
| n-Pentane | 0.1 | 0.7 | V0 | 1.1 | V0 |
| n-Propylbenzene | 0.05 | 0 | V1 | 0 | V1 |
| n-Undecane | 0.5 | 0 | V1 | 0 | V1 |
| Naphthalene | 0.5 | 0 | V1 | 0 | V1 |
| o-Xylene | 0.01 | 0.01 | V0 | 0.03 | V0 |
| Styrene | 0.04 | 0 | V1 | 0 | V1 |
| Toluene | 0.01 | 0.09 | V0 | 0.18 | V0 |
| trans-2-Butene | 0.01 | 0 | V1 | 0.09 | V0 |
| trans-2-Hexene | 0.3 | 0 | V1 | 0 | V1 |
| trans-2-Pentene | 0.02 | 0 | V1 | 0 | V1 |



| Station Name Station # Sample Date | Horizon AMS 15 30-Jul | | |
|--|-----------------------------|----------------|------|
| Compound Name | MDL (ppbv) | Results (ppbv) | Flag |
| 1,2,4-Trimethylbenzene | 0.03 | 0 | V1 |
| 1,3,5-Trimethylbenzene | 0.02 | 0 | V1 |
| 1,3-Butadiene | 0.02 | 0 | V1 |
| 1-Butene | 0.02 | 0.15 | V0 |
| 1-Pentene | 0.01 | 0.01 | V0 |
| 2,2,4-Trimethylpentane | 0.01 | 0 | V1 |
| 2,2-Dimethylbutane | 0.01 | 0.06 | V0 |
| 2,3,4-Trimethylpentane | 0.01 | 0.01 | V0 |
| 2,3-Dimethylbutane | 0.02 | 0.11 | V0 |
| 2,3-Dimethylpentane | 0.02 | 0.06 | V0 |
| 2,4-Dimethylpentane | 0.01 | 0.02 | V0 |
| 2-Methyl-1-pentene | 0.3 | 0 | V1 |
| 2-Methyl-2-butene | 0.3 | 0 | V1 |
| 2-Methylheptane | 0.01 | 0.04 | V0 |
| 2-Methylhexane | 0.01 | 0.07 | V0 |
| 2-Methylpentane | 0.01 | 0.06 | V0 |
| 3-Methyl-1-butene | 0.3 | 0 | V1 |
| 3-Methylheptane | 0.02 | 0 | V1 |
| 3-Methylhexane | 0.02 | 0.08 | V0 |
| 3-Methylpentane | 0.01 | 0.22 | V0 |
| 4-Methyl-1-pentene | 0.3 | 0 | V1 |
| Acetaldehyde | 3 | 7 | V0 |
| Acetone | 0.4 | 4.8 | V0 |
| alpha-Pinene | 0.3 | 0 | V1 |
| Benzene | 0.01 | 0.05 | V0 |
| beta-Pinene | 0.3 | 0 | V1 |
| cis-2-Butene | 0.02 | 0.04 | V0 |
| cis-2-Hexene | 0.3 | 0 | V1 |
| cis-2-Pentene | 0.02 | 0 | V1 |
| Cyclohexane | 0.02 | 0.25 | V0 |
| Cyclopentane | 0.01 | 0.07 | V0 |
| Cyclopentene | 0.3 | 0 | V1 |
| Ethanol | 0.3 | 4.5 | V0 |
| Ethylbenzene | 0.01 | 0 | V1 |
| Formaldehyde | 3 | 0 | V1 |
| Isobutane | 0.02 | 0.84 | V0 |
| Isobutylene | 0.3 | 0 | V1 |
| Isopentane | 0.03 | 1.39 | V0 |
| Isoprene | 0.01 | 1.98 | V0 |
| Isopropylalcohol | 0.4 | 0 | V1 |
| Isopropylbenzene | 0.01 | 0 | V1 |
| m,p-Xylene | 0.03 | 0 | V1 |
| Methanol | 3 | 22 | V0 |
| Methylcyclohexane | 0.01 | 0.09 | V0 |
| Methylcyclopentane | 0.02 | 0.18 | V0 |
| Methylethylketone | 0.3 | 0.3 | V0 |
| Methylisobutylketone | 0.4 | 0 | V1 |
| Methylvinylketone | 0.3 | 0.6 | V0 |
| n-Butane | 0.03 | 0.69 | V0 |
| n-Decane | 0.06 | 0 | V1 |
| n-Dodecane | 0.4 | 0 | V1 |
| n-Heptane | 0.01 | 0.13 | V0 |
| n-Hexane | 0.01 | 0.09 | V0 |
| n-Nonane | 0.01 | 0.02 | V0 |
| n-Octane | 0.02 | 0.06 | V0 |
| n-Pentane | 0.1 | 0.4 | V0 |
| n-Propylbenzene | 0.05 | 0 | V1 |
| n-Undecane | 0.5 | 0 | V1 |
| Naphthalene | 0.5 | 0 | V1 |
| o-Xylene | 0.01 | 0.01 | V0 |
| Styrene | 0.04 | 0 | V1 |
| Toluene | 0.01 | 0.12 | V0 |
| trans-2-Butene | 0.01 | 0.06 | V0 |
| trans-2-Hexene | 0.3 | 0 | V1 |
| trans-2-Pentene | 0.02 | 0 | V1 |



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION
 Volatile Organic Compounds (VOCs) - Summary

2017
 Indicated Sites and Dates

| Station Name Station # Sample Date | Bertha Ganter - | Bertha Ganter - | Bertha Ganter - | Bertha Ganter - |
|--|---|---|---|---|
| | Fort McKay AMS 1 Jul 06 - Jul 30 Average | Fort McKay AMS 1 Jul 06 - Jul 30 Std Dev | Fort McKay AMS 1 Jul 06 - Jul 30 Total Samples (#) | Fort McKay AMS 1 Jul 06 - Jul 30 Total ≥ MDL (#) |
| Compound Name | ppbv | ppbv | | |
| 1,2,4-Trimethylbenzene | 0.02 | 0.03 | 5 | 3 |
| 1,3,5-Trimethylbenzene | 0.00 | 0.01 | 5 | 1 |
| 1,3-Butadiene | 0.00 | 0.00 | 5 | 0 |
| 1-Butene | 0.08 | 0.03 | 5 | 5 |
| 1-Pentene | 0.01 | 0.01 | 5 | 2 |
| 2,2,4-Trimethylpentane | 0.00 | 0.00 | 5 | 0 |
| 2,2-Dimethylbutane | 0.03 | 0.03 | 5 | 3 |
| 2,3,4-Trimethylpentane | 0.01 | 0.02 | 5 | 2 |
| 2,3-Dimethylbutane | 0.09 | 0.02 | 5 | 5 |
| 2,3-Dimethylpentane | 0.04 | 0.04 | 5 | 4 |
| 2,4-Dimethylpentane | 0.01 | 0.01 | 5 | 3 |
| 2-Methyl-1-pentene | 0.00 | 0.00 | 5 | 0 |
| 2-Methyl-2-butene | 0.00 | 0.00 | 5 | 0 |
| 2-Methylheptane | 0.12 | 0.17 | 5 | 5 |
| 2-Methylhexane | 0.11 | 0.12 | 5 | 4 |
| 2-Methylpentane | 0.10 | 0.09 | 5 | 3 |
| 3-Methyl-1-butene | 0.00 | 0.00 | 5 | 0 |
| 3-Methylheptane | 0.05 | 0.08 | 5 | 2 |
| 3-Methylhexane | 0.11 | 0.14 | 5 | 4 |
| 3-Methylpentane | 0.11 | 0.04 | 5 | 5 |
| 4-Methyl-1-pentene | 0.00 | 0.00 | 5 | 0 |
| Acetaldehyde | 9.20 | 5.97 | 5 | 5 |
| Acetone | 5.38 | 3.30 | 5 | 5 |
| alpha-Pinene | 0.00 | 0.00 | 5 | 0 |
| Benzene | 0.07 | 0.03 | 5 | 5 |
| beta-Pinene | 0.00 | 0.00 | 5 | 0 |
| cis-2-Butene | 0.00 | 0.00 | 5 | 0 |
| cis-2-Hexene | 0.00 | 0.00 | 5 | 0 |
| cis-2-Pentene | 0.00 | 0.00 | 5 | 0 |
| Cyclohexane | 0.10 | 0.03 | 5 | 5 |
| Cyclopentane | 0.03 | 0.04 | 5 | 2 |
| Cyclopentene | 0.00 | 0.00 | 5 | 0 |
| Ethanol | 3.50 | 3.19 | 5 | 5 |
| Ethylbenzene | 0.04 | 0.04 | 5 | 5 |
| Formaldehyde | 0.00 | 0.00 | 5 | 0 |
| Isobutane | 0.59 | 0.28 | 5 | 5 |
| Isobutylene | 0.00 | 0.00 | 5 | 0 |
| Isopentane | 0.50 | 0.13 | 5 | 5 |
| Isoprene | 0.85 | 0.44 | 5 | 5 |
| Isopropylalcohol | 0.12 | 0.27 | 5 | 1 |
| Isopropylbenzene | 0.00 | 0.00 | 5 | 1 |
| m,p-Xylene | 0.06 | 0.10 | 5 | 2 |
| Methanol | 13.00 | 5.83 | 5 | 5 |
| Methylcyclohexane | 0.16 | 0.17 | 5 | 5 |
| Methylcyclopentane | 0.12 | 0.08 | 5 | 5 |
| Methylethylketone | 0.38 | 0.38 | 5 | 3 |
| Methylisobutylketone | 0.00 | 0.00 | 5 | 0 |
| Methylvinylketone | 0.18 | 0.40 | 5 | 1 |
| n-Butane | 0.12 | 0.13 | 5 | 3 |
| n-Decane | 0.00 | 0.00 | 5 | 0 |
| n-Dodecane | 0.00 | 0.00 | 5 | 0 |
| n-Heptane | 0.25 | 0.33 | 5 | 5 |
| n-Hexane | 0.16 | 0.18 | 5 | 3 |
| n-Nonane | 0.06 | 0.09 | 5 | 4 |
| n-Octane | 0.19 | 0.31 | 5 | 5 |
| n-Pentane | 0.14 | 0.17 | 5 | 3 |
| n-Propylbenzene | 0.00 | 0.00 | 5 | 0 |
| n-Undecane | 0.00 | 0.00 | 5 | 0 |
| Naphthalene | 0.00 | 0.00 | 5 | 0 |
| o-Xylene | 0.03 | 0.05 | 5 | 3 |
| Styrene | 0.00 | 0.00 | 5 | 0 |
| Toluene | 0.17 | 0.17 | 5 | 5 |
| trans-2-Butene | 0.00 | 0.01 | 5 | 1 |
| trans-2-Hexene | 0.00 | 0.00 | 5 | 0 |
| trans-2-Pentene | 0.00 | 0.00 | 5 | 0 |



| Station Name Station # Sample Date | Patricia McInnes AMS 6 Jul 06 - Jul 30 Average | Patricia McInnes AMS 6 Jul 06 - Jul 30 Std Dev | Patricia McInnes AMS 6 Jul 06 - Jul 30 Total Samples (#) | Patricia McInnes AMS 6 Jul 06 - Jul 30 Total ≥ MDL (#) |
|--|---|---|---|---|
| Compound Name | ppbv | ppbv | | |
| 1,2,4-Trimethylbenzene | 0.01 | 0.02 | 5 | 1 |
| 1,3,5-Trimethylbenzene | 0.00 | 0.00 | 5 | 0 |
| 1,3-Butadiene | 0.00 | 0.00 | 5 | 0 |
| 1-Butene | 0.07 | 0.05 | 5 | 4 |
| 1-Pentene | 0.00 | 0.00 | 5 | 1 |
| 2,2,4-Trimethylpentane | 0.03 | 0.04 | 5 | 3 |
| 2,2-Dimethylbutane | 0.00 | 0.00 | 5 | 1 |
| 2,3,4-Trimethylpentane | 0.00 | 0.01 | 5 | 2 |
| 2,3-Dimethylbutane | 0.05 | 0.07 | 5 | 3 |
| 2,3-Dimethylpentane | 0.01 | 0.02 | 5 | 2 |
| 2,4-Dimethylpentane | 0.00 | 0.00 | 5 | 1 |
| 2-Methyl-1-pentene | 0.00 | 0.00 | 5 | 0 |
| 2-Methyl-2-butene | 0.00 | 0.00 | 5 | 0 |
| 2-Methylheptane | 0.01 | 0.01 | 5 | 3 |
| 2-Methylhexane | 0.06 | 0.05 | 5 | 3 |
| 2-Methylpentane | 0.03 | 0.02 | 5 | 4 |
| 3-Methyl-1-butene | 0.00 | 0.00 | 5 | 0 |
| 3-Methylheptane | 0.00 | 0.01 | 5 | 1 |
| 3-Methylhexane | 0.01 | 0.02 | 5 | 2 |
| 3-Methylpentane | 0.02 | 0.01 | 5 | 4 |
| 4-Methyl-1-pentene | 0.00 | 0.00 | 5 | 0 |
| Acetaldehyde | 13.20 | 10.59 | 5 | 5 |
| Acetone | 6.36 | 4.93 | 5 | 5 |
| alpha-Pinene | 0.00 | 0.00 | 5 | 0 |
| Benzene | 0.06 | 0.02 | 5 | 5 |
| beta-Pinene | 0.00 | 0.00 | 5 | 0 |
| cis-2-Butene | 0.01 | 0.01 | 5 | 1 |
| cis-2-Hexene | 0.00 | 0.00 | 5 | 0 |
| cis-2-Pentene | 0.00 | 0.00 | 5 | 0 |
| Cyclohexane | 0.57 | 0.77 | 5 | 3 |
| Cyclopentane | 0.00 | 0.00 | 5 | 1 |
| Cyclopentene | 0.00 | 0.00 | 5 | 0 |
| Ethanol | 5.04 | 4.43 | 5 | 5 |
| Ethylbenzene | 0.02 | 0.02 | 5 | 3 |
| Formaldehyde | 0.00 | 0.00 | 5 | 0 |
| Isobutane | 0.55 | 0.55 | 5 | 5 |
| Isobutylene | 0.00 | 0.00 | 5 | 0 |
| Isopentane | 0.32 | 0.08 | 5 | 5 |
| Isoprene | 0.46 | 0.31 | 5 | 5 |
| Isopropylalcohol | 0.20 | 0.45 | 5 | 1 |
| Isopropylbenzene | 0.00 | 0.01 | 5 | 1 |
| m,p-Xylene | 0.03 | 0.03 | 5 | 3 |
| Methanol | 10.20 | 6.30 | 5 | 5 |
| Methylcyclohexane | 0.01 | 0.01 | 5 | 4 |
| Methylcyclopentane | 0.02 | 0.02 | 5 | 3 |
| Methylethylketone | 0.38 | 0.38 | 5 | 3 |
| Methylisobutylketone | 0.00 | 0.00 | 5 | 0 |
| Methylvinylketone | 0.14 | 0.31 | 5 | 1 |
| n-Butane | 0.20 | 0.17 | 5 | 4 |
| n-Decane | 0.00 | 0.00 | 5 | 0 |
| n-Dodecane | 0.00 | 0.00 | 5 | 0 |
| n-Heptane | 0.03 | 0.02 | 5 | 4 |
| n-Hexane | 0.04 | 0.03 | 5 | 4 |
| n-Nonane | 0.00 | 0.01 | 5 | 1 |
| n-Octane | 0.01 | 0.01 | 5 | 2 |
| n-Pentane | 0.14 | 0.09 | 5 | 4 |
| n-Propylbenzene | 0.00 | 0.00 | 5 | 0 |
| n-Undecane | 0.00 | 0.00 | 5 | 0 |
| Naphthalene | 0.00 | 0.00 | 5 | 0 |
| o-Xylene | 0.02 | 0.01 | 5 | 4 |
| Styrene | 0.00 | 0.00 | 5 | 0 |
| Toluene | 0.13 | 0.12 | 5 | 5 |
| trans-2-Butene | 0.01 | 0.02 | 5 | 3 |
| trans-2-Hexene | 0.00 | 0.00 | 5 | 0 |
| trans-2-Pentene | 0.00 | 0.00 | 5 | 0 |



| Station Name Station # Sample Date | Athabasca Valley AMS 7 Jul 06 - Jul 30 Average | Athabasca Valley AMS 7 Jul 06 - Jul 30 Std Dev | Athabasca Valley AMS 7 Jul 06 - Jul 30 Total Samples (#) | Athabasca Valley AMS 7 Jul 06 - Jul 30 Total ≥ MDL (#) |
|--|---|---|---|---|
| Compound Name | ppbv | ppbv | | |
| 1,2,4-Trimethylbenzene | 0.03 | 0.03 | 5 | 3 |
| 1,3,5-Trimethylbenzene | 0.00 | 0.00 | 5 | 0 |
| 1,3-Butadiene | 0.00 | 0.00 | 5 | 0 |
| 1-Butene | 0.09 | 0.03 | 5 | 5 |
| 1-Pentene | 0.00 | 0.01 | 5 | 2 |
| 2,2,4-Trimethylpentane | 0.01 | 0.01 | 5 | 3 |
| 2,2-Dimethylbutane | 0.01 | 0.01 | 5 | 2 |
| 2,3,4-Trimethylpentane | 0.00 | 0.00 | 5 | 1 |
| 2,3-Dimethylbutane | 0.06 | 0.01 | 5 | 5 |
| 2,3-Dimethylpentane | 0.01 | 0.01 | 5 | 3 |
| 2,4-Dimethylpentane | 0.01 | 0.01 | 5 | 2 |
| 2-Methyl-1-pentene | 0.00 | 0.00 | 5 | 0 |
| 2-Methyl-2-butene | 0.00 | 0.00 | 5 | 0 |
| 2-Methylheptane | 0.01 | 0.01 | 5 | 3 |
| 2-Methylhexane | 0.09 | 0.05 | 5 | 5 |
| 2-Methylpentane | 0.03 | 0.02 | 5 | 4 |
| 3-Methyl-1-butene | 0.00 | 0.00 | 5 | 0 |
| 3-Methylheptane | 0.00 | 0.00 | 5 | 0 |
| 3-Methylhexane | 0.03 | 0.03 | 5 | 3 |
| 3-Methylpentane | 0.03 | 0.01 | 5 | 5 |
| 4-Methyl-1-pentene | 0.00 | 0.00 | 5 | 0 |
| Acetaldehyde | 10.60 | 8.26 | 5 | 5 |
| Acetone | 6.28 | 2.79 | 5 | 5 |
| alpha-Pinene | 0.00 | 0.00 | 5 | 0 |
| Benzene | 0.07 | 0.03 | 5 | 5 |
| beta-Pinene | 0.00 | 0.00 | 5 | 0 |
| cis-2-Butene | 0.01 | 0.02 | 5 | 2 |
| cis-2-Hexene | 0.00 | 0.00 | 5 | 0 |
| cis-2-Pentene | 0.00 | 0.00 | 5 | 0 |
| Cyclohexane | 0.01 | 0.02 | 5 | 2 |
| Cyclopentane | 0.02 | 0.03 | 5 | 2 |
| Cyclopentene | 0.00 | 0.00 | 5 | 0 |
| Ethanol | 5.20 | 4.24 | 5 | 5 |
| Ethylbenzene | 0.02 | 0.01 | 5 | 5 |
| Formaldehyde | 0.00 | 0.00 | 5 | 0 |
| Isobutane | 0.38 | 0.45 | 5 | 5 |
| Isobutylene | 0.00 | 0.00 | 5 | 0 |
| Isopentane | 0.36 | 0.08 | 5 | 5 |
| Isoprene | 0.48 | 0.23 | 5 | 5 |
| Isopropylalcohol | 0.16 | 0.22 | 5 | 2 |
| Isopropylbenzene | 0.00 | 0.00 | 5 | 0 |
| m,p-Xylene | 0.04 | 0.02 | 5 | 4 |
| Methanol | 13.20 | 8.53 | 5 | 5 |
| Methylcyclohexane | 0.02 | 0.01 | 5 | 4 |
| Methylcyclopentane | 0.03 | 0.02 | 5 | 4 |
| Methylethylketone | 0.42 | 0.41 | 5 | 4 |
| Methylisobutylketone | 0.00 | 0.00 | 5 | 0 |
| Methylvinylketone | 0.18 | 0.40 | 5 | 1 |
| n-Butane | 0.22 | 0.20 | 5 | 4 |
| n-Decane | 0.00 | 0.00 | 5 | 0 |
| n-Dodecane | 0.00 | 0.00 | 5 | 0 |
| n-Heptane | 0.07 | 0.04 | 5 | 5 |
| n-Hexane | 0.05 | 0.03 | 5 | 4 |
| n-Nonane | 0.00 | 0.01 | 5 | 1 |
| n-Octane | 0.01 | 0.02 | 5 | 2 |
| n-Pentane | 0.16 | 0.11 | 5 | 4 |
| n-Propylbenzene | 0.00 | 0.00 | 5 | 0 |
| n-Undecane | 0.00 | 0.00 | 5 | 0 |
| Naphthalene | 0.00 | 0.00 | 5 | 0 |
| o-Xylene | 0.02 | 0.01 | 5 | 5 |
| Styrene | 0.00 | 0.00 | 5 | 0 |
| Toluene | 0.09 | 0.02 | 5 | 5 |
| trans-2-Butene | 0.02 | 0.04 | 5 | 1 |
| trans-2-Hexene | 0.00 | 0.00 | 5 | 0 |
| trans-2-Pentene | 0.00 | 0.00 | 5 | 0 |



| Station Name Station # Sample Date | Anzac AMS 14 Jul 06 - Jul 30 Average | Anzac AMS 14 Jul 06 - Jul 30 Std Dev | Anzac AMS 14 Jul 06 - Jul 30 Total Samples (#) | Anzac AMS 14 Jul 06 - Jul 30 Total ≥ MDL (#) |
|--|---|---|---|---|
| Compound Name | ppbv | ppbv | | |
| 1,2,4-Trimethylbenzene | 0.01 | 0.01 | 5 | 1 |
| 1,3,5-Trimethylbenzene | 0.00 | 0.00 | 5 | 0 |
| 1,3-Butadiene | 0.00 | 0.00 | 5 | 0 |
| 1-Butene | 0.06 | 0.04 | 5 | 4 |
| 1-Pentene | 0.01 | 0.01 | 5 | 3 |
| 2,2,4-Trimethylpentane | 0.02 | 0.01 | 5 | 4 |
| 2,2-Dimethylbutane | 0.00 | 0.00 | 5 | 1 |
| 2,3,4-Trimethylpentane | 0.01 | 0.01 | 5 | 2 |
| 2,3-Dimethylbutane | 0.02 | 0.02 | 5 | 3 |
| 2,3-Dimethylpentane | 0.02 | 0.02 | 5 | 2 |
| 2,4-Dimethylpentane | 0.01 | 0.01 | 5 | 1 |
| 2-Methyl-1-pentene | 0.00 | 0.00 | 5 | 0 |
| 2-Methyl-2-butene | 0.00 | 0.00 | 5 | 0 |
| 2-Methylheptane | 0.01 | 0.01 | 5 | 3 |
| 2-Methylhexane | 0.04 | 0.06 | 5 | 2 |
| 2-Methylpentane | 0.05 | 0.04 | 5 | 3 |
| 3-Methyl-1-butene | 0.00 | 0.00 | 5 | 0 |
| 3-Methylheptane | 0.00 | 0.00 | 5 | 0 |
| 3-Methylhexane | 0.03 | 0.03 | 5 | 3 |
| 3-Methylpentane | 0.03 | 0.03 | 5 | 3 |
| 4-Methyl-1-pentene | 0.00 | 0.00 | 5 | 0 |
| Acetaldehyde | 12.20 | 6.10 | 5 | 5 |
| Acetone | 4.88 | 2.31 | 5 | 5 |
| alpha-Pinene | 0.00 | 0.00 | 5 | 0 |
| Benzene | 0.07 | 0.02 | 5 | 5 |
| beta-Pinene | 0.00 | 0.00 | 5 | 0 |
| cis-2-Butene | 0.01 | 0.02 | 5 | 1 |
| cis-2-Hexene | 0.00 | 0.00 | 5 | 0 |
| cis-2-Pentene | 0.00 | 0.00 | 5 | 0 |
| Cyclohexane | 0.00 | 0.00 | 5 | 0 |
| Cyclopentane | 0.00 | 0.01 | 5 | 1 |
| Cyclopentene | 0.00 | 0.00 | 5 | 0 |
| Ethanol | 3.72 | 2.89 | 5 | 5 |
| Ethylbenzene | 0.01 | 0.01 | 5 | 3 |
| Formaldehyde | 0.00 | 0.00 | 5 | 0 |
| Isobutane | 0.50 | 0.23 | 5 | 5 |
| Isobutylene | 0.00 | 0.00 | 5 | 0 |
| Isopentane | 0.39 | 0.14 | 5 | 5 |
| Isoprene | 0.52 | 0.35 | 5 | 5 |
| Isopropylalcohol | 0.00 | 0.00 | 5 | 0 |
| Isopropylbenzene | 0.00 | 0.00 | 5 | 0 |
| m,p-Xylene | 0.02 | 0.03 | 5 | 2 |
| Methanol | 9.60 | 5.94 | 5 | 4 |
| Methylcyclohexane | 0.01 | 0.01 | 5 | 3 |
| Methylcyclopentane | 0.02 | 0.02 | 5 | 3 |
| Methylethylketone | 0.34 | 0.34 | 5 | 3 |
| Methylisobutylketone | 0.00 | 0.00 | 5 | 0 |
| Methylvinylketone | 0.16 | 0.36 | 5 | 1 |
| n-Butane | 0.25 | 0.17 | 5 | 5 |
| n-Decane | 0.00 | 0.00 | 5 | 0 |
| n-Dodecane | 0.00 | 0.00 | 5 | 0 |
| n-Heptane | 0.03 | 0.03 | 5 | 3 |
| n-Hexane | 0.05 | 0.04 | 5 | 4 |
| n-Nonane | 0.00 | 0.00 | 5 | 1 |
| n-Octane | 0.01 | 0.01 | 5 | 1 |
| n-Pentane | 0.18 | 0.18 | 5 | 3 |
| n-Propylbenzene | 0.00 | 0.00 | 5 | 0 |
| n-Undecane | 0.00 | 0.00 | 5 | 0 |
| Naphthalene | 0.00 | 0.00 | 5 | 0 |
| o-Xylene | 0.01 | 0.01 | 5 | 2 |
| Styrene | 0.00 | 0.00 | 5 | 0 |
| Toluene | 0.14 | 0.04 | 5 | 5 |
| trans-2-Butene | 0.01 | 0.02 | 5 | 1 |
| trans-2-Hexene | 0.00 | 0.00 | 5 | 0 |
| trans-2-Pentene | 0.00 | 0.00 | 5 | 0 |



| Station Name Station # Sample Date | Barge Landing AMS 9 Jul 06 - Jul 30 Average | Barge Landing AMS 9 Jul 06 - Jul 30 Std Dev | Barge Landing AMS 9 Jul 06 - Jul 30 Total Samples (#) | Barge Landing AMS 9 Jul 06 - Jul 30 Total ≥ MDL (#) |
|--|--|--|--|--|
| Compound Name | ppbv | ppbv | | |
| 1,2,4-Trimethylbenzene | 0.03 | 0.04 | 5 | 2 |
| 1,3,5-Trimethylbenzene | 0.01 | 0.02 | 5 | 2 |
| 1,3-Butadiene | 0.00 | 0.00 | 5 | 0 |
| 1-Butene | 0.08 | 0.07 | 5 | 4 |
| 1-Pentene | 0.01 | 0.01 | 5 | 2 |
| 2,2,4-Trimethylpentane | 0.05 | 0.11 | 5 | 1 |
| 2,2-Dimethylbutane | 0.03 | 0.04 | 5 | 3 |
| 2,3,4-Trimethylpentane | 0.01 | 0.02 | 5 | 2 |
| 2,3-Dimethylbutane | 0.12 | 0.06 | 5 | 5 |
| 2,3-Dimethylpentane | 0.04 | 0.05 | 5 | 3 |
| 2,4-Dimethylpentane | 0.01 | 0.01 | 5 | 2 |
| 2-Methyl-1-pentene | 0.00 | 0.00 | 5 | 0 |
| 2-Methyl-2-butene | 0.00 | 0.00 | 5 | 0 |
| 2-Methylheptane | 0.10 | 0.20 | 5 | 3 |
| 2-Methylhexane | 0.12 | 0.18 | 5 | 2 |
| 2-Methylpentane | 0.10 | 0.14 | 5 | 3 |
| 3-Methyl-1-butene | 0.00 | 0.00 | 5 | 0 |
| 3-Methylheptane | 0.05 | 0.10 | 5 | 2 |
| 3-Methylhexane | 0.09 | 0.14 | 5 | 3 |
| 3-Methylpentane | 0.11 | 0.07 | 5 | 5 |
| 4-Methyl-1-pentene | 0.00 | 0.00 | 5 | 0 |
| Acetaldehyde | 21.60 | 19.44 | 5 | 5 |
| Acetone | 6.46 | 4.93 | 5 | 5 |
| alpha-Pinene | 0.00 | 0.00 | 5 | 0 |
| Benzene | 0.07 | 0.05 | 5 | 5 |
| beta-Pinene | 0.00 | 0.00 | 5 | 0 |
| cis-2-Butene | 0.00 | 0.00 | 5 | 0 |
| cis-2-Hexene | 0.00 | 0.00 | 5 | 0 |
| cis-2-Pentene | 0.00 | 0.00 | 5 | 0 |
| Cyclohexane | 0.10 | 0.05 | 5 | 5 |
| Cyclopentane | 0.03 | 0.04 | 5 | 2 |
| Cyclopentene | 0.00 | 0.00 | 5 | 0 |
| Ethanol | 5.04 | 3.98 | 5 | 5 |
| Ethylbenzene | 0.04 | 0.05 | 5 | 3 |
| Formaldehyde | 0.00 | 0.00 | 5 | 0 |
| Isobutane | 1.15 | 0.88 | 5 | 5 |
| Isobutylene | 0.00 | 0.00 | 5 | 0 |
| Isopentane | 0.58 | 0.21 | 5 | 5 |
| Isoprene | 1.09 | 0.62 | 5 | 5 |
| Isopropylalcohol | 0.16 | 0.36 | 5 | 1 |
| Isopropylbenzene | 0.00 | 0.01 | 5 | 1 |
| m,p-Xylene | 0.07 | 0.11 | 5 | 3 |
| Methanol | 11.20 | 6.14 | 5 | 5 |
| Methylcyclohexane | 0.14 | 0.19 | 5 | 5 |
| Methylcyclopentane | 0.11 | 0.10 | 5 | 5 |
| Methylethylketone | 0.64 | 0.83 | 5 | 3 |
| Methylisobutylketone | 0.00 | 0.00 | 5 | 0 |
| Methylvinylketone | 0.20 | 0.45 | 5 | 1 |
| n-Butane | 0.10 | 0.10 | 5 | 4 |
| n-Decane | 0.00 | 0.00 | 5 | 0 |
| n-Dodecane | 0.00 | 0.00 | 5 | 0 |
| n-Heptane | 0.22 | 0.38 | 5 | 3 |
| n-Hexane | 0.13 | 0.18 | 5 | 3 |
| n-Nonane | 0.06 | 0.11 | 5 | 3 |
| n-Octane | 0.19 | 0.36 | 5 | 3 |
| n-Pentane | 0.18 | 0.30 | 5 | 2 |
| n-Propylbenzene | 0.00 | 0.00 | 5 | 0 |
| n-Undecane | 0.00 | 0.00 | 5 | 0 |
| Naphthalene | 0.00 | 0.00 | 5 | 0 |
| o-Xylene | 0.04 | 0.06 | 5 | 3 |
| Styrene | 0.00 | 0.00 | 5 | 0 |
| Toluene | 0.23 | 0.24 | 5 | 5 |
| trans-2-Butene | 0.01 | 0.01 | 5 | 2 |
| trans-2-Hexene | 0.00 | 0.00 | 5 | 0 |
| trans-2-Pentene | 0.00 | 0.00 | 5 | 0 |



| Station Name Station # Sample Date | Fort McKay South AMS 13 Jul 06 - Jul 30 Average | Fort McKay South AMS 13 Jul 06 - Jul 30 Std Dev | Fort McKay South AMS 13 Jul 06 - Jul 30 Total Samples (#) | Fort McKay South AMS 13 Jul 06 - Jul 30 Total ≥ MDL (#) |
|--|--|--|--|--|
| Compound Name | ppbv | ppbv | | |
| 1,2,4-Trimethylbenzene | 0.01 | 0.03 | 5 | 1 |
| 1,3,5-Trimethylbenzene | 0.00 | 0.01 | 5 | 1 |
| 1,3-Butadiene | 0.00 | 0.00 | 5 | 0 |
| 1-Butene | 0.09 | 0.09 | 5 | 4 |
| 1-Pentene | 0.01 | 0.01 | 5 | 3 |
| 2,2,4-Trimethylpentane | 0.00 | 0.00 | 5 | 0 |
| 2,2-Dimethylbutane | 0.03 | 0.05 | 5 | 2 |
| 2,3,4-Trimethylpentane | 0.01 | 0.02 | 5 | 2 |
| 2,3-Dimethylbutane | 0.08 | 0.06 | 5 | 5 |
| 2,3-Dimethylpentane | 0.03 | 0.05 | 5 | 2 |
| 2,4-Dimethylpentane | 0.01 | 0.01 | 5 | 2 |
| 2-Methyl-1-pentene | 0.00 | 0.00 | 5 | 0 |
| 2-Methyl-2-butene | 0.00 | 0.00 | 5 | 0 |
| 2-Methylheptane | 0.15 | 0.25 | 5 | 4 |
| 2-Methylhexane | 0.09 | 0.12 | 5 | 3 |
| 2-Methylpentane | 0.11 | 0.17 | 5 | 3 |
| 3-Methyl-1-butene | 0.00 | 0.00 | 5 | 0 |
| 3-Methylheptane | 0.06 | 0.10 | 5 | 2 |
| 3-Methylhexane | 0.10 | 0.15 | 5 | 3 |
| 3-Methylpentane | 0.09 | 0.12 | 5 | 4 |
| 4-Methyl-1-pentene | 0.00 | 0.00 | 5 | 0 |
| Acetaldehyde | 5.80 | 3.27 | 5 | 4 |
| Acetone | 6.66 | 3.96 | 5 | 5 |
| alpha-Pinene | 0.22 | 0.35 | 5 | 2 |
| Benzene | 0.08 | 0.04 | 5 | 5 |
| beta-Pinene | 0.18 | 0.27 | 5 | 2 |
| cis-2-Butene | 0.01 | 0.03 | 5 | 1 |
| cis-2-Hexene | 0.00 | 0.00 | 5 | 0 |
| cis-2-Pentene | 0.00 | 0.00 | 5 | 0 |
| Cyclohexane | 0.34 | 0.56 | 5 | 5 |
| Cyclopentane | 0.03 | 0.06 | 5 | 1 |
| Cyclopentene | 0.00 | 0.00 | 5 | 0 |
| Ethanol | 2.10 | 1.32 | 5 | 5 |
| Ethylbenzene | 0.04 | 0.05 | 5 | 5 |
| Formaldehyde | 0.00 | 0.00 | 5 | 0 |
| Isobutane | 0.36 | 0.14 | 5 | 5 |
| Isobutylene | 0.00 | 0.00 | 5 | 0 |
| Isopentane | 0.46 | 0.41 | 5 | 5 |
| Isoprene | 1.24 | 0.69 | 5 | 5 |
| Isopropylalcohol | 0.12 | 0.27 | 5 | 1 |
| Isopropylbenzene | 0.00 | 0.00 | 5 | 1 |
| m,p-Xylene | 0.07 | 0.11 | 5 | 3 |
| Methanol | 13.20 | 9.60 | 5 | 5 |
| Methylcyclohexane | 0.17 | 0.24 | 5 | 5 |
| Methylcyclopentane | 0.10 | 0.12 | 5 | 4 |
| Methylethylketone | 0.28 | 0.26 | 5 | 3 |
| Methylisobutylketone | 0.00 | 0.00 | 5 | 0 |
| Methylvinylketone | 0.00 | 0.00 | 5 | 0 |
| n-Butane | 0.12 | 0.15 | 5 | 3 |
| n-Decane | 0.00 | 0.00 | 5 | 0 |
| n-Dodecane | 0.00 | 0.00 | 5 | 0 |
| n-Heptane | 0.29 | 0.39 | 5 | 5 |
| n-Hexane | 0.16 | 0.17 | 5 | 4 |
| n-Nonane | 0.06 | 0.09 | 5 | 3 |
| n-Octane | 0.24 | 0.39 | 5 | 4 |
| n-Pentane | 0.26 | 0.47 | 5 | 3 |
| n-Propylbenzene | 0.00 | 0.00 | 5 | 0 |
| n-Undecane | 0.00 | 0.00 | 5 | 0 |
| Naphthalene | 0.00 | 0.00 | 5 | 0 |
| o-Xylene | 0.04 | 0.05 | 5 | 5 |
| Styrene | 0.00 | 0.00 | 5 | 0 |
| Toluene | 0.20 | 0.22 | 5 | 5 |
| trans-2-Butene | 0.02 | 0.04 | 5 | 1 |
| trans-2-Hexene | 0.00 | 0.00 | 5 | 0 |
| trans-2-Pentene | 0.00 | 0.00 | 5 | 0 |



| Station Name Station # Sample Date | Horizon AMS 15 Jul 06 - Jul 30 Average | Horizon AMS 15 Jul 06 - Jul 30 Std Dev | Horizon AMS 15 Jul 06 - Jul 30 Total Samples (#) | Horizon AMS 15 Jul 06 - Jul 30 Total ≥ MDL (#) |
|--|---|---|---|---|
| Compound Name | ppbv | ppbv | | |
| 1,2,4-Trimethylbenzene | 0.01 | 0.03 | 5 | 1 |
| 1,3,5-Trimethylbenzene | 0.01 | 0.03 | 5 | 1 |
| 1,3-Butadiene | 0.00 | 0.00 | 5 | 0 |
| 1-Butene | 0.07 | 0.06 | 5 | 4 |
| 1-Pentene | 0.01 | 0.01 | 5 | 2 |
| 2,2,4-Trimethylpentane | 0.02 | 0.04 | 5 | 1 |
| 2,2-Dimethylbutane | 0.08 | 0.04 | 5 | 5 |
| 2,3,4-Trimethylpentane | 0.02 | 0.02 | 5 | 4 |
| 2,3-Dimethylbutane | 0.16 | 0.10 | 5 | 5 |
| 2,3-Dimethylpentane | 0.07 | 0.03 | 5 | 5 |
| 2,4-Dimethylpentane | 0.01 | 0.02 | 5 | 2 |
| 2-Methyl-1-pentene | 0.00 | 0.00 | 5 | 0 |
| 2-Methyl-2-butene | 0.00 | 0.00 | 5 | 0 |
| 2-Methylheptane | 0.06 | 0.06 | 5 | 4 |
| 2-Methylhexane | 0.06 | 0.03 | 5 | 4 |
| 2-Methylpentane | 0.02 | 0.03 | 5 | 3 |
| 3-Methyl-1-butene | 0.00 | 0.00 | 5 | 0 |
| 3-Methylheptane | 0.02 | 0.03 | 5 | 2 |
| 3-Methylhexane | 0.04 | 0.04 | 5 | 3 |
| 3-Methylpentane | 0.26 | 0.13 | 5 | 5 |
| 4-Methyl-1-pentene | 0.00 | 0.00 | 5 | 0 |
| Acetaldehyde | 9.40 | 5.68 | 5 | 5 |
| Acetone | 5.06 | 2.11 | 5 | 5 |
| alpha-Pinene | 0.00 | 0.00 | 5 | 0 |
| Benzene | 0.05 | 0.02 | 5 | 5 |
| beta-Pinene | 0.00 | 0.00 | 5 | 0 |
| cis-2-Butene | 0.01 | 0.02 | 5 | 1 |
| cis-2-Hexene | 0.00 | 0.00 | 5 | 0 |
| cis-2-Pentene | 0.00 | 0.00 | 5 | 0 |
| Cyclohexane | 0.35 | 0.19 | 5 | 5 |
| Cyclopentane | 0.07 | 0.04 | 5 | 4 |
| Cyclopentene | 0.00 | 0.00 | 5 | 0 |
| Ethanol | 3.20 | 1.92 | 5 | 5 |
| Ethylbenzene | 0.02 | 0.02 | 5 | 3 |
| Formaldehyde | 0.00 | 0.00 | 5 | 0 |
| Isobutane | 1.29 | 0.52 | 5 | 5 |
| Isobutylene | 0.00 | 0.00 | 5 | 0 |
| Isopentane | 1.53 | 0.72 | 5 | 5 |
| Isoprene | 0.99 | 0.69 | 5 | 5 |
| Isopropylalcohol | 0.18 | 0.40 | 5 | 1 |
| Isopropylbenzene | 0.00 | 0.01 | 5 | 1 |
| m,p-Xylene | 0.03 | 0.04 | 5 | 2 |
| Methanol | 11.20 | 7.53 | 5 | 5 |
| Methylcyclohexane | 0.16 | 0.06 | 5 | 5 |
| Methylcyclopentane | 0.22 | 0.10 | 5 | 5 |
| Methylethylketone | 0.34 | 0.25 | 5 | 4 |
| Methylisobutylketone | 0.00 | 0.00 | 5 | 0 |
| Methylvinylketone | 0.12 | 0.27 | 5 | 1 |
| n-Butane | 0.24 | 0.26 | 5 | 5 |
| n-Decane | 0.00 | 0.00 | 5 | 0 |
| n-Dodecane | 0.00 | 0.00 | 5 | 0 |
| n-Heptane | 0.09 | 0.09 | 5 | 4 |
| n-Hexane | 0.04 | 0.04 | 5 | 4 |
| n-Nonane | 0.02 | 0.03 | 5 | 3 |
| n-Octane | 0.06 | 0.09 | 5 | 3 |
| n-Pentane | 0.10 | 0.17 | 5 | 2 |
| n-Propylbenzene | 0.00 | 0.00 | 5 | 0 |
| n-Undecane | 0.00 | 0.00 | 5 | 0 |
| Naphthalene | 0.00 | 0.00 | 5 | 0 |
| o-Xylene | 0.01 | 0.02 | 5 | 3 |
| Styrene | 0.00 | 0.00 | 5 | 0 |
| Toluene | 0.14 | 0.04 | 5 | 5 |
| trans-2-Butene | 0.06 | 0.09 | 5 | 3 |
| trans-2-Hexene | 0.00 | 0.00 | 5 | 0 |
| trans-2-Pentene | 0.00 | 0.00 | 5 | 0 |



Wood Buffalo Environmental Association

VOC (ppb) summary

2017 July

| Compound | % Det | N | N < Det. | Min. | 10% | 25% | 50% | 60% | 75% | 80% | 90% | 95% | 99% | Max. | Mean | Std. Dev. | Median | Outlier | Test |
|------------------------|--------|----|----------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----------|--------|---------|------|
| 1,2,4-Trimethylbenzene | 34.3% | 35 | 23 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.05 | 0.06 | 0.06 | 0.08 | 0.08 | 0.02 | 0.03 | 0.00 | 0.14 | |
| 1,3,5-Trimethylbenzene | 14.3% | 35 | 30 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.04 | 0.06 | 0.06 | 0.00 | 0.01 | 0.00 | 0.07 | |
| 1,3-Butadiene | 0.0% | 35 | 35 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 1-Butene | 85.7% | 35 | 5 | 0.00 | 0.00 | 0.05 | 0.08 | 0.08 | 0.10 | 0.13 | 0.15 | 0.18 | 0.22 | 0.22 | 0.08 | 0.05 | 0.08 | 0.34 | |
| 1-Pentene | 42.9% | 35 | 20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.01 | 0.02 | 0.02 | 0.03 | 0.03 | 0.01 | 0.01 | 0.00 | 0.05 | |
| 2,2,4-Trimethylpentane | 34.3% | 35 | 23 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.03 | 0.07 | 0.09 | 0.25 | 0.25 | 0.02 | 0.05 | 0.00 | 0.25 | |
| 2,2-Dimethylbutane | 48.6% | 35 | 18 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.05 | 0.06 | 0.07 | 0.11 | 0.12 | 0.12 | 0.03 | 0.04 | 0.00 | 0.21 | |
| 2,3,4-Trimethylpentane | 42.9% | 35 | 20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.02 | 0.04 | 0.04 | 0.06 | 0.06 | 0.01 | 0.01 | 0.00 | 0.08 | |
| 2,3-Dimethylbutane | 88.6% | 35 | 4 | 0.00 | 0.00 | 0.03 | 0.07 | 0.07 | 0.12 | 0.14 | 0.18 | 0.23 | 0.29 | 0.29 | 0.08 | 0.07 | 0.07 | 0.42 | |
| 2,3-Dimethylpentane | 60.0% | 35 | 14 | 0.00 | 0.00 | 0.00 | 0.03 | 0.03 | 0.05 | 0.06 | 0.11 | 0.11 | 0.12 | 0.12 | 0.03 | 0.04 | 0.03 | 0.22 | |
| 2,4-Dimethylpentane | 37.1% | 35 | 22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.02 | 0.02 | 0.03 | 0.05 | 0.05 | 0.01 | 0.01 | 0.00 | 0.07 | |
| 2-Methyl-1-pentene | 0.0% | 35 | 35 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 2-Methyl-2-butene | 0.0% | 35 | 35 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 2-Methylheptane | 71.4% | 35 | 10 | 0.00 | 0.00 | 0.00 | 0.01 | 0.02 | 0.04 | 0.05 | 0.15 | 0.46 | 0.59 | 0.59 | 0.06 | 0.14 | 0.01 | 0.76 | |
| 2-Methylhexane | 65.7% | 35 | 12 | 0.00 | 0.00 | 0.00 | 0.06 | 0.07 | 0.11 | 0.12 | 0.18 | 0.29 | 0.40 | 0.40 | 0.08 | 0.09 | 0.06 | 0.55 | |
| 2-Methylpentane | 65.7% | 35 | 12 | 0.00 | 0.00 | 0.00 | 0.03 | 0.05 | 0.08 | 0.13 | 0.17 | 0.31 | 0.39 | 0.39 | 0.06 | 0.09 | 0.03 | 0.51 | |
| 3-Methyl-1-butene | 0.0% | 35 | 35 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 3-Methylheptane | 25.7% | 35 | 26 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.02 | 0.06 | 0.22 | 0.23 | 0.23 | 0.02 | 0.06 | 0.00 | 0.33 | |
| 3-Methylhexane | 60.0% | 35 | 14 | 0.00 | 0.00 | 0.00 | 0.03 | 0.05 | 0.07 | 0.08 | 0.12 | 0.34 | 0.36 | 0.36 | 0.06 | 0.09 | 0.03 | 0.53 | |
| 3-Methylpentane | 88.6% | 35 | 4 | 0.00 | 0.00 | 0.03 | 0.05 | 0.07 | 0.13 | 0.16 | 0.25 | 0.38 | 0.39 | 0.39 | 0.09 | 0.10 | 0.05 | 0.62 | |
| 4-Methyl-1-pentene | 0.0% | 35 | 35 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Acetaldehyde | 97.1% | 35 | 1 | 0.00 | 4.00 | 7.00 | 8.00 | 9.00 | 16.00 | 18.00 | 19.00 | 31.00 | 55.00 | 55.00 | 11.71 | 10.05 | 8.00 | 61.99 | |
| Acetone | 100.0% | 35 | 0 | 2.00 | 2.30 | 3.40 | 4.80 | 6.40 | 8.70 | 9.00 | 9.70 | 13.90 | 14.70 | 14.70 | 5.87 | 3.37 | 4.80 | 22.74 | |
| alpha-Pinene | 5.7% | 35 | 33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.30 | 0.80 | 0.80 | 0.03 | 0.14 | 0.00 | 0.75 | |
| Benzene | 100.0% | 35 | 0 | 0.02 | 0.03 | 0.04 | 0.07 | 0.08 | 0.08 | 0.09 | 0.11 | 0.12 | 0.13 | 0.13 | 0.07 | 0.03 | 0.07 | 0.21 | |
| beta-Pinene | 5.7% | 35 | 33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.30 | 0.60 | 0.60 | 0.03 | 0.11 | 0.00 | 0.59 | |
| cis-2-Butene | 17.1% | 35 | 29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.05 | 0.06 | 0.06 | 0.01 | 0.02 | 0.00 | 0.09 | |
| cis-2-Hexene | 0.0% | 35 | 35 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| cis-2-Pentene | 0.0% | 35 | 35 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Cyclohexane | 71.4% | 35 | 10 | 0.00 | 0.00 | 0.00 | 0.06 | 0.10 | 0.16 | 0.25 | 0.59 | 1.39 | 1.43 | 1.43 | 0.21 | 0.39 | 0.06 | 2.15 | |
| Cyclopentane | 37.1% | 35 | 22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 0.09 | 0.11 | 0.13 | 0.13 | 0.02 | 0.04 | 0.00 | 0.22 | |
| Cyclopentene | 0.0% | 35 | 35 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Ethanol | 100.0% | 35 | 0 | 0.70 | 0.90 | 1.30 | 2.80 | 4.20 | 5.60 | 7.30 | 8.20 | 11.20 | 11.70 | 11.70 | 3.97 | 3.21 | 2.80 | 20.02 | |
| Ethylbenzene | 77.1% | 35 | 8 | 0.00 | 0.00 | 0.01 | 0.01 | 0.02 | 0.03 | 0.05 | 0.08 | 0.12 | 0.12 | 0.12 | 0.03 | 0.03 | 0.01 | 0.19 | |
| Formaldehyde | 0.0% | 35 | 35 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Isobutane | 100.0% | 35 | 0 | 0.09 | 0.17 | 0.26 | 0.48 | 0.77 | 0.92 | 1.01 | 1.42 | 2.04 | 2.66 | 2.66 | 0.69 | 0.57 | 0.48 | 3.52 | |
| Isobutylene | 0.0% | 35 | 35 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Isopentane | 100.0% | 35 | 0 | 0.20 | 0.26 | 0.32 | 0.42 | 0.46 | 0.57 | 0.79 | 1.25 | 2.07 | 2.39 | 2.39 | 0.59 | 0.50 | 0.42 | 3.09 | |
| Isoprene | 100.0% | 35 | 0 | 0.11 | 0.21 | 0.37 | 0.61 | 0.88 | 1.28 | 1.35 | 1.69 | 1.97 | 1.98 | 1.98 | 0.80 | 0.55 | 0.61 | 3.55 | |
| Isopropylalcohol | 20.0% | 35 | 28 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.60 | 0.90 | 1.00 | 1.00 | 0.13 | 0.29 | 0.00 | 1.58 | |
| Isopropylbenzene | 14.3% | 35 | 30 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.02 | 0.02 | 0.02 | 0.00 | 0.01 | 0.00 | 0.03 | |
| m,p-Xylene | 54.3% | 35 | 16 | 0.00 | 0.00 | 0.00 | 0.03 | 0.04 | 0.06 | 0.06 | 0.09 | 0.25 | 0.26 | 0.26 | 0.05 | 0.07 | 0.03 | 0.39 | |
| Methanol | 97.1% | 35 | 1 | 0.00 | 4.00 | 7.00 | 11.00 | 13.00 | 16.00 | 17.00 | 21.00 | 26.00 | 29.00 | 29.00 | 11.66 | 6.73 | 11.00 | 45.31 | |
| Methylcyclohexane | 88.6% | 35 | 4 | 0.00 | 0.00 | 0.02 | 0.04 | 0.07 | 0.10 | 0.13 | 0.24 | 0.48 | 0.60 | 0.60 | 0.09 | 0.14 | 0.04 | 0.81 | |
| Methylcyclopentane | 82.9% | 35 | 6 | 0.00 | 0.00 | 0.03 | 0.04 | 0.08 | 0.12 | 0.18 | 0.27 | 0.29 | 0.34 | 0.34 | 0.09 | 0.10 | 0.04 | 0.58 | |
| Methylethylketone | 65.7% | 35 | 12 | 0.00 | 0.00 | 0.00 | 0.40 | 0.50 | 0.50 | 0.70 | 0.90 | 1.10 | 2.00 | 2.00 | 0.40 | 0.42 | 0.40 | 2.50 | |
| Methylisobutylketone | 0.0% | 35 | 35 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Methylvinylketone | 17.1% | 35 | 29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.80 | 0.90 | 1.00 | 1.00 | 0.14 | 0.32 | 0.00 | 1.73 | |
| n-Butane | 80.0% | 35 | 7 | 0.00 | 0.00 | 0.04 | 0.13 | 0.18 | 0.29 | 0.32 | 0.43 | 0.49 | 0.69 | 0.69 | 0.18 | 0.17 | 0.13 | 1.02 | |
| n-Decane | 0.0% | 35 | 35 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| n-Dodecane | 0.0% | 35 | 35 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| n-Heptane | 82.9% | 35 | 6 | 0.00 | 0.00 | 0.02 | 0.06 | 0.07 | 0.13 | 0.14 | 0.25 | 0.90 | 0.96 | 0.96 | 0.14 | 0.24 | 0.06 | 1.36 | |
| n-Hexane | 74.3% | 35 | 9 | 0.00 | 0.00 | 0.00 | 0.06 | 0.07 | 0.09 | 0.13 | 0.33 | 0.41 | 0.42 | 0.42 | 0.09 | 0.12 | 0.06 | 0.68 | |
| n-Nonane | 45.7% | 35 | 19 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.02 | 0.03 | 0.05 | 0.22 | 0.25 | 0.25 | 0.03 | 0.06 | 0.00 | 0.35 | |
| n-Octane | 57.1% | 35 | 15 | 0.00 | 0.00 | 0.00 | 0.03 | 0.04 | 0.05 | 0.08 | 0.22 | 0.83 | 0.92 | 0.92 | 0.10 | 0.23 | 0.03 | 1.26 | |
| n-Pentane | 60.0% | 35 | 14 | 0.00 | 0.00 | 0.00 | 0.10 | 0.20 | 0.20 | 0.30 | 0.40 | 0.70 | 1.10 | 1.10 | 0.17 | 0.23 | 0.10 | 1.31 | |
| n-Propylbenzene | 0.0% | 35 | 35 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| n-Undecane | 0.0% | 35 | 35 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Naphthalene | 0.0% | 35 | 35 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| o-Xylene | 71.4% | 35 | 10 | 0.00 | 0.00 | 0.00 | 0.01 | 0.02 | 0.03 | 0.03 | 0.04 | 0.13 | 0.14 | 0.14 | 0.02 | 0.04 | 0.01 | 0.20 | |
| Styrene | 0.0% | 35 | 35 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Toluene | 100.0% | 35 | 0 | 0.03 | 0.05 | 0.08 | 0.11 | 0.13 | 0.18 | 0.19 | 0.43 | 0.55 | 0.58 | 0.58 | 0.16 | 0.14 | 0.11 | 0.86 | |
| trans-2-Butene | 34.3% | 35 | 23 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.02 | 0.06 | 0.09 | 0.21 | 0.21 | 0.02 | 0.04 | 0.00 | 0.22 | |
| trans-2-Hexene | 0.0% | 35 | 35 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| trans-2-Pentene | 0.0% | 35 | 35 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

INTEGRATED MONITORING PROGRAM MONTHLY REPORT

PARTICULATE MATTER - IONS DATA SUMMARY JULY 2017

Prepared
September 27, 2017

SAMPLE COLLECTION AND DATA COMPILATION BY:

Wood Buffalo Environmental Association
Fort McMurray, Alberta

LABORATORY ANALYSIS BY:

PM ions: Atmospheric Research & Analysis, Inc.
Morrisville, NC



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

INTEGRATED MONITORING PROGRAM MONTHLY REPORT

PARTICULATE MATTER (PM_{2.5}) - IONS DATA SUMMARY JULY 2017

Prepared
September 27, 2017

SAMPLE COLLECTION AND DATA COMPILATION BY:

Wood Buffalo Environmental Association
Fort McMurray, Alberta

LABORATORY ANALYSIS BY:

PM ions: Atmospheric Research & Analysis, Inc.
Morrisville, NC



| | |
|---|---|
| FILE CONTENTS DESCRIPTION | Partisol Sampler Measurements of Mass, Ions by IC and Metals by ICP-MS |
| SAMPLING INTERVAL | 24 hour |
| SAMPLING FREQUENCY OF DATA | Once every 6 days |
| EXPLANATION OF ZERO VALUES | Zero values are contained in this file and should be treated as values below detection - Method Detection Limits (MDL) are provided with each observation |
| UNITS | $\mu\text{g}/\text{m}^3$ (microgram per cubic meter) |
| OBSERVATION TYPE | Particles |
| FIELD SAMPLING OR MEASUREMENT PRINCIPLE | Filtration with PM_{10} Inlet for PM_{10} and with PM_{10} Inlet/Very Sharp Cut Cyclone for $\text{PM}_{2.5}$ |
| PARTICLE DIAMETER | $< 2.5 \mu\text{m}$ or $< 10 \mu\text{m}$ |
| MEDIUM | 47 mm Teflon Filter |
| ANALYTICAL METHODS | MASS by Microbalance ELEMENTS by Inductively Coupled Plasma Mass Spectrometry (ICP/MS) IONS by Ion Chromatography (IC) |
| SAMPLE PREPARATION | DI Water extraction for IC analysis and Acid Digestion for ICP/MS Analysis |
| ANALYTICAL LABORATORY | Atmospheric Research & Analysis Inc |
| USER NOTE 1 | Data are not blank corrected |
| USER NOTE 2 | Volume is given at actual conditions of temperature and pressure during sampling as measured by the sampler |
| USER NOTE 3 | Blank sample concentration ($\mu\text{g}/\text{m}^3$) is calculated using expected actual volume of sampler |
| VOLUME STANDARDIZATION | Actual Volume at Ambient Conditions (since 01-Jan-2011) |
| SAMPLING INSTRUMENT TYPE | For PM_{10} FRM Partisol PM_{10} sampler For $\text{PM}_{2.5}$ FRM Partisol $\text{PM}_{2.5}$ sampler |
| FLAGS USED | |
| V0 | Valid value |
| V1 | Valid value but comprised wholly or partially of below detection limit data |
| V4 | Valid value despite failing to meet some QC or statistical criteria |
| V5 | Valid value but qualified because of possible contamination |
| V6 | Valid value but qualified due to non-standard sampling conditions |
| M1 | Missing value because no value is available |
| M2 | Missing value because invalidated by Data Originator |



| Bertha Ganter - Fort | | | | | | | |
|------------------------------------|-----------------|------------------------------|---------|------------------------------|---------|------------------------------|---------|
| Station Name | McKay | | | Patricia McInnes | | Travel Blank | |
| Station # | AMS 1 | | | AMS 6 | | | |
| Sample Date | 06-Jul | | | 06-Jul | | 06-Jul | |
| Particulate Size | PM2.5 | | | PM2.5 | | | |
| Total Air Volume (m ³) | 24 | | | 20.5 | | 24 | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 2.56 | V0 | -9999 | V4 | 0.10 | V0 |
| Calcium | 0.16 | 0.10 | V0 | -9999 | V6 | 0.00 | V1 |
| Magnesium | 0.03 | 0.00 | V0 | -9999 | V6 | 0.00 | V1 |
| Potassium | 0.09 | 0.01 | V0 | -9999 | V6 | 0.00 | V1 |
| Sodium | 0.05 | 0.00 | V1 | -9999 | V6 | 0.00 | V1 |
| Chloride | 0.12 | 0.00 | V1 | -9999 | V6 | 0.00 | V1 |
| Fluoride | 0.15 | 0.00 | V1 | -9999 | V6 | 0.00 | V1 |
| Nitrate | 0.20 | 0.00 | V1 | -9999 | V6 | 0.03 | V0 |
| Sulphate | 0.25 | 0.06 | V0 | -9999 | V6 | 0.00 | V1 |
| Phosphate | 0.26 | 0.00 | V1 | -9999 | V6 | 0.00 | V1 |
| Ammonium (as N) | 0.02 | 0.02 | V0 | -9999 | V6 | 0.00 | V1 |



| Station Name | Athabasca Valley | | | Anzac | | Travel Blank | |
|------------------------------------|------------------|------------------------------|---------|------------------------------|---------|------------------------------|---------|
| Station # | AMS 7 | | | AMS 14 | | 06-Jul | |
| Sample Date | 06-Jul | | | 06-Jul | | 06-Jul | |
| Particulate Size | PM2.5 | | | PM2.5 | | PM2.5 | |
| Total Air Volume (m ³) | 24 | | | 24 | | 24 | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 5.21 | V4 | 2.16 | V0 | 0.10 | V0 |
| Calcium | 0.16 | 0.17 | V0 | 0.01 | V0 | 0.00 | V1 |
| Magnesium | 0.03 | 0.01 | V0 | 0.00 | V0 | 0.00 | V1 |
| Potassium | 0.09 | 0.02 | V0 | 0.01 | V0 | 0.00 | V1 |
| Sodium | 0.05 | 0.02 | V0 | 0.01 | V0 | 0.00 | V1 |
| Chloride | 0.12 | 0.01 | V0 | 0.00 | V1 | 0.00 | V1 |
| Fluoride | 0.15 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Nitrate | 0.20 | 0.02 | V0 | 0.00 | V1 | 0.03 | V0 |
| Sulphate | 0.25 | 0.38 | V0 | 0.10 | V0 | 0.00 | V1 |
| Phosphate | 0.26 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Ammonium (as N) | 0.02 | 0.08 | V0 | 0.03 | V0 | 0.00 | V1 |



| Bertha Ganter - Fort | | | | | | | |
|------------------------------------|-----------------|------------------------------|---------|------------------------------|---------|------------------------------|---------|
| Station Name | McKay | | | Patricia McInnes | | Travel Blank | |
| Station # | AMS 1 | | | AMS 6 | | 12-Jul | |
| Sample Date | 12-Jul | | | 12-Jul | | 12-Jul | |
| Particulate Size | PM2.5 | | | PM2.5 | | PM2.5 | |
| Total Air Volume (m ³) | 24 | | | 24 | | 24 | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 10.94 | V0 | 5.98 | V0 | 0.02 | V1 |
| Calcium | 0.16 | 0.18 | V0 | 0.02 | V0 | 0.00 | V1 |
| Magnesium | 0.03 | 0.01 | V0 | 0.00 | V0 | 0.00 | V1 |
| Potassium | 0.09 | 0.05 | V0 | 0.02 | V0 | 0.00 | V1 |
| Sodium | 0.05 | 0.01 | V0 | 0.00 | V0 | 0.00 | V1 |
| Chloride | 0.12 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Fluoride | 0.15 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Nitrate | 0.20 | 0.03 | V0 | 0.01 | V0 | 0.03 | V0 |
| Sulphate | 0.25 | 1.09 | V0 | 0.45 | V0 | 0.00 | V1 |
| Phosphate | 0.26 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Ammonium (as N) | 0.02 | 0.30 | V0 | 0.16 | V0 | 0.00 | V1 |



| Station Name | Athabasca Valley | | | Anzac | | Travel Blank | |
|------------------------------------|------------------|------------------------------|---------|------------------------------|---------|------------------------------|---------|
| Station # | AMS 7 | | | AMS 14 | | 12-Jul | |
| Sample Date | 12-Jul | | | 12-Jul | | 12-Jul | |
| Particulate Size | PM2.5 | | | PM2.5 | | PM2.5 | |
| Total Air Volume (m ³) | 23.4 | | | 24 | | 24 | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 8.70 | V0 | 5.81 | V0 | 0.02 | V1 |
| Calcium | 0.16 | 0.17 | V0 | 0.01 | V0 | 0.00 | V1 |
| Magnesium | 0.03 | 0.01 | V0 | 0.00 | V0 | 0.00 | V1 |
| Potassium | 0.09 | 0.02 | V0 | 0.02 | V0 | 0.00 | V1 |
| Sodium | 0.05 | 0.01 | V0 | 0.00 | V0 | 0.00 | V1 |
| Chloride | 0.12 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Fluoride | 0.15 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Nitrate | 0.20 | 0.02 | V0 | 0.02 | V0 | 0.03 | V0 |
| Sulphate | 0.25 | 0.49 | V0 | 0.58 | V0 | 0.00 | V1 |
| Phosphate | 0.26 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Ammonium (as N) | 0.02 | 0.13 | V0 | 0.18 | V0 | 0.00 | V1 |



| Bertha Ganter - Fort | | | | | | | |
|------------------------------------|-----------------|------------------------------|---------|------------------------------|---------|------------------------------|---------|
| Station Name | McKay | | | Patricia McInnes | | Travel Blank | |
| Station # | AMS 1 | | | AMS 6 | | 18-Jul | |
| Sample Date | 18-Jul | | | 18-Jul | | 18-Jul | |
| Particulate Size | PM2.5 | | | PM2.5 | | PM2.5 | |
| Total Air Volume (m ³) | 24 | | | 24 | | 24 | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 1.75 | V0 | 2.47 | V4 | 0.53 | V0 |
| Calcium | 0.16 | 0.01 | V0 | 0.02 | V0 | 0.00 | V1 |
| Magnesium | 0.03 | 0.00 | V0 | 0.00 | V0 | 0.00 | V1 |
| Potassium | 0.09 | 0.01 | V0 | 0.01 | V0 | 0.00 | V1 |
| Sodium | 0.05 | 0.01 | V0 | 0.01 | V0 | 0.00 | V0 |
| Chloride | 0.12 | 0.01 | V0 | 0.01 | V0 | 0.00 | V1 |
| Fluoride | 0.15 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Nitrate | 0.20 | 0.01 | V0 | 0.01 | V0 | 0.02 | V0 |
| Sulphate | 0.25 | 0.06 | V0 | 0.33 | V0 | 0.00 | V1 |
| Phosphate | 0.26 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Ammonium (as N) | 0.02 | 0.02 | V0 | 0.10 | V0 | 0.00 | V1 |



| Station Name | Athabasca Valley | | | Anzac | | Travel Blank | |
|------------------------------------|------------------|------------------------------|---------|------------------------------|---------|------------------------------|---------|
| Station # | AMS 7 | | | AMS 14 | | 18-Jul | |
| Sample Date | 18-Jul | | | 18-Jul | | 18-Jul | |
| Particulate Size | PM2.5 | | | PM2.5 | | PM2.5 | |
| Total Air Volume (m ³) | 24 | | | 24 | | 24 | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 4.28 | V0 | 2.59 | V0 | 0.53 | V0 |
| Calcium | 0.16 | 0.13 | V0 | 0.02 | V0 | 0.00 | V1 |
| Magnesium | 0.03 | 0.01 | V0 | 0.00 | V0 | 0.00 | V1 |
| Potassium | 0.09 | 0.01 | V0 | 0.01 | V0 | 0.00 | V1 |
| Sodium | 0.05 | 0.04 | V0 | 0.01 | V0 | 0.00 | V0 |
| Chloride | 0.12 | 0.01 | V0 | 0.00 | V1 | 0.00 | V1 |
| Fluoride | 0.15 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Nitrate | 0.20 | 0.02 | V0 | 0.02 | V0 | 0.02 | V0 |
| Sulphate | 0.25 | 0.36 | V0 | 0.37 | V0 | 0.00 | V1 |
| Phosphate | 0.26 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Ammonium (as N) | 0.02 | 0.09 | V0 | 0.11 | V0 | 0.00 | V1 |



| Bertha Ganter - Fort | | | | | | | |
|------------------------------------|-----------------|------------------------------|---------|------------------------------|---------|------------------------------|---------|
| Station Name | McKay | | | Patricia McInnes | | Travel Blank | |
| Station # | AMS 1 | | | AMS 6 | | 24-Jul | |
| Sample Date | 24-Jul | | | 24-Jul | | 24-Jul | |
| Particulate Size | PM2.5 | | | PM2.5 | | PM2.5 | |
| Total Air Volume (m ³) | 24 | | | 24 | | 24 | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 11.21 | V0 | 10.55 | V0 | 0.07 | V0 |
| Calcium | 0.16 | 0.24 | V0 | 0.02 | V0 | 0.00 | V1 |
| Magnesium | 0.03 | 0.01 | V0 | 0.00 | V0 | 0.00 | V1 |
| Potassium | 0.09 | 0.03 | V0 | 0.03 | V0 | 0.00 | V1 |
| Sodium | 0.05 | 0.01 | V0 | 0.01 | V0 | 0.00 | V1 |
| Chloride | 0.12 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Fluoride | 0.15 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Nitrate | 0.20 | 0.01 | V0 | 0.01 | V0 | 0.00 | V1 |
| Sulphate | 0.25 | 0.16 | V0 | 0.60 | V0 | 0.00 | V1 |
| Phosphate | 0.26 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Ammonium (as N) | 0.02 | 0.06 | V0 | 0.20 | V0 | 0.00 | V1 |



| Station Name | Athabasca Valley | | | Anzac | | Travel Blank | |
|------------------------------------|------------------|------------------------------|---------|------------------------------|---------|------------------------------|---------|
| Station # | AMS 7 | | | AMS 14 | | 24-Jul | |
| Sample Date | 24-Jul | | | 24-Jul | | 24-Jul | |
| Particulate Size | PM2.5 | | | PM2.5 | | PM2.5 | |
| Total Air Volume (m ³) | 24 | | | 23.9 | | 24 | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 12.46 | V0 | 9.70 | V0 | 0.07 | V0 |
| Calcium | 0.16 | 0.15 | V0 | 0.02 | V0 | 0.00 | V1 |
| Magnesium | 0.03 | 0.01 | V0 | 0.00 | V0 | 0.00 | V1 |
| Potassium | 0.09 | 0.04 | V0 | 0.03 | V0 | 0.00 | V1 |
| Sodium | 0.05 | 0.03 | V0 | 0.01 | V0 | 0.00 | V1 |
| Chloride | 0.12 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Fluoride | 0.15 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Nitrate | 0.20 | 0.02 | V0 | 0.02 | V0 | 0.00 | V1 |
| Sulphate | 0.25 | 0.38 | V0 | 0.26 | V0 | 0.00 | V1 |
| Phosphate | 0.26 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Ammonium (as N) | 0.02 | 0.11 | V0 | 0.10 | V0 | 0.00 | V1 |



| Bertha Ganter - Fort | | | | | | | |
|------------------------------------|-----------------|------------------------------|---------|------------------------------|---------|------------------------------|---------|
| Station Name | McKay | | | Patricia McInnes | | Travel Blank | |
| Station # | AMS 1 | | | AMS 6 | | 30-Jul | |
| Sample Date | 30-Jul | | | 30-Jul | | 30-Jul | |
| Particulate Size | PM2.5 | | | PM2.5 | | PM2.5 | |
| Total Air Volume (m ³) | 24 | | | 24 | | 24 | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 7.04 | V0 | 8.02 | V0 | 0.17 | V0 |
| Calcium | 0.16 | 0.02 | V0 | 0.01 | V0 | 0.00 | V1 |
| Magnesium | 0.03 | 0.00 | V0 | 0.00 | V0 | 0.00 | V1 |
| Potassium | 0.09 | 0.02 | V0 | 0.03 | V0 | 0.00 | V1 |
| Sodium | 0.05 | 0.01 | V0 | 0.01 | V0 | 0.00 | V1 |
| Chloride | 0.12 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Fluoride | 0.15 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Nitrate | 0.20 | 0.01 | V0 | 0.02 | V0 | 0.00 | V1 |
| Sulphate | 0.25 | 1.02 | V0 | 0.36 | V0 | 0.00 | V1 |
| Phosphate | 0.26 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Ammonium (as N) | 0.02 | 0.29 | V0 | 0.12 | V0 | 0.00 | V1 |



| Station Name | Athabasca Valley | | | Anzac | | Travel Blank | |
|------------------------------------|------------------|------------------------------|---------|------------------------------|---------|------------------------------|---------|
| Station # | AMS 7 | | | AMS 14 | | 30-Jul | |
| Sample Date | 30-Jul | | | 30-Jul | | 30-Jul | |
| Particulate Size | PM2.5 | | | PM2.5 | | PM2.5 | |
| Total Air Volume (m ³) | 24 | | | 24 | | 24 | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 9.01 | V0 | 10.13 | V0 | 0.17 | V0 |
| Calcium | 0.16 | 0.07 | V0 | 0.02 | V0 | 0.00 | V1 |
| Magnesium | 0.03 | 0.01 | V0 | 0.00 | V0 | 0.00 | V1 |
| Potassium | 0.09 | 0.03 | V0 | 0.04 | V0 | 0.00 | V1 |
| Sodium | 0.05 | 0.01 | V0 | 0.00 | V0 | 0.00 | V1 |
| Chloride | 0.12 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Fluoride | 0.15 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Nitrate | 0.20 | 0.02 | V0 | 0.02 | V0 | 0.00 | V1 |
| Sulphate | 0.25 | 0.37 | V0 | 0.36 | V0 | 0.00 | V1 |
| Phosphate | 0.26 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Ammonium (as N) | 0.02 | 0.11 | V0 | 0.12 | V0 | 0.00 | V1 |



| Station Name | Bertha Ganter - Fort McKay | Bertha Ganter - Fort McKay | Bertha Ganter - Fort McKay | Bertha Ganter - Fort McKay |
|--------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Station # | AMS 1 | AMS 1 | AMS 1 | AMS 1 |
| Sample Date | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 |
| Particulate Size | PM2.5 | PM2.5 | PM2.5 | PM2.5 |
| Compound Name | Average µg/m ³ | Std Dev µg/m ³ | Total Samples (#) | Total ≥ MDL (#) |
| Particulate Matter | 6.70 | 4.47 | 5 | 5 |
| Calcium | 0.11 | 0.10 | 5 | 5 |
| Magnesium | 0.00 | 0.00 | 5 | 5 |
| Potassium | 0.02 | 0.02 | 5 | 5 |
| Sodium | 0.01 | 0.01 | 5 | 4 |
| Chloride | 0.00 | 0.00 | 5 | 1 |
| Fluoride | 0.00 | 0.00 | 5 | 0 |
| Nitrate | 0.01 | 0.01 | 5 | 4 |
| Sulphate | 0.48 | 0.53 | 5 | 5 |
| Phosphate | 0.00 | 0.00 | 5 | 0 |
| Ammonium (as N) | 0.14 | 0.14 | 5 | 5 |



| Station Name | Patricia McInnes | Patricia McInnes | Patricia McInnes | Patricia McInnes |
|--------------------|------------------------------|------------------------------|-------------------|------------------|
| Station # | AMS 6 | AMS 6 | AMS 6 | AMS 6 |
| Sample Date | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 |
| Particulate Size | PM2.5 | PM2.5 | PM2.5 | PM2.5 |
| Compound Name | Average µg/m ³ | Std Dev µg/m ³ | Total Samples (#) | Total ≥ MDL (#) |
| Particulate Matter | 6.75 | 3.41 | 4 | 5 |
| Calcium | 0.02 | 0.00 | 4 | 5 |
| Magnesium | 0.00 | 0.00 | 4 | 5 |
| Potassium | 0.02 | 0.01 | 4 | 5 |
| Sodium | 0.01 | 0.00 | 4 | 5 |
| Chloride | 0.00 | 0.00 | 4 | 1 |
| Fluoride | 0.00 | 0.00 | 4 | 0 |
| Nitrate | 0.01 | 0.00 | 4 | 4 |
| Sulphate | 0.43 | 0.12 | 4 | 5 |
| Phosphate | 0.00 | 0.00 | 4 | 0 |
| Ammonium (as N) | 0.14 | 0.04 | 4 | 5 |



| Station Name | Athabasca Valley | Athabasca Valley | Athabasca Valley | Athabasca Valley |
|--------------------|------------------------------|------------------------------|-------------------|------------------|
| Station # | AMS 7 | AMS 7 | AMS 7 | AMS 7 |
| Sample Date | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 |
| Particulate Size | PM2.5 | PM2.5 | PM2.5 | PM2.5 |
| Compound Name | Average µg/m ³ | Std Dev µg/m ³ | Total Samples (#) | Total ≥ MDL (#) |
| Particulate Matter | 7.93 | 3.28 | 5 | 5 |
| Calcium | 0.14 | 0.04 | 5 | 5 |
| Magnesium | 0.01 | 0.00 | 5 | 5 |
| Potassium | 0.03 | 0.01 | 5 | 5 |
| Sodium | 0.02 | 0.01 | 5 | 5 |
| Chloride | 0.00 | 0.00 | 5 | 2 |
| Fluoride | 0.00 | 0.00 | 5 | 0 |
| Nitrate | 0.02 | 0.00 | 5 | 5 |
| Sulphate | 0.40 | 0.05 | 5 | 5 |
| Phosphate | 0.00 | 0.00 | 5 | 0 |
| Ammonium (as N) | 0.11 | 0.02 | 5 | 5 |



| Station Name | Anzac | Anzac | Anzac | Anzac |
|--------------------|------------------------------|------------------------------|-------------------|-----------------|
| Station # | AMS 14 | AMS 14 | AMS 14 | AMS 14 |
| Sample Date | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 |
| Particulate Size | PM2.5 | PM2.5 | PM2.5 | PM2.5 |
| Compound Name | Average µg/m ³ | Std Dev µg/m ³ | Total Samples (#) | Total ≥ MDL (#) |
| Particulate Matter | 6.08 | 3.78 | 5 | 5 |
| Calcium | 0.02 | 0.00 | 5 | 5 |
| Magnesium | 0.00 | 0.00 | 5 | 5 |
| Potassium | 0.02 | 0.01 | 5 | 5 |
| Sodium | 0.01 | 0.00 | 5 | 5 |
| Chloride | 0.00 | 0.00 | 5 | 0 |
| Fluoride | 0.00 | 0.00 | 5 | 0 |
| Nitrate | 0.02 | 0.01 | 5 | 4 |
| Sulphate | 0.34 | 0.18 | 5 | 5 |
| Phosphate | 0.00 | 0.00 | 5 | 0 |
| Ammonium (as N) | 0.11 | 0.05 | 5 | 5 |



Wood Buffalo Environmental Association

PM2.5 Ion (µg/sample) Summary

2017 July

| Compound | % Det | N | N < Det. | Min. | 10% | 25% | 50% | 60% | 75% | 80% | 90% | 95% | 99% | Max. | Mean | Std. Dev. | Median | Outlier Test |
|--------------------|--------|----|----------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|------|-----------|--------|--------------|
| Particulate Matter | 100.0% | 20 | 0 | 34 | 52 | 62 | 169 | 204 | 243 | 253 | 269 | 299 | 299 | 299 | 158 | 87 | 169 | 595 |
| Calcium | 100.0% | 20 | 0 | 0.30 | 0.33 | 0.42 | 0.57 | 1.59 | 3.51 | 3.99 | 4.35 | 5.82 | 5.82 | 5.82 | 1.71 | 1.77 | 0.57 | 10.57 |
| Magnesium | 100.0% | 20 | 0 | 0.03 | 0.03 | 0.06 | 0.09 | 0.09 | 0.21 | 0.24 | 0.30 | 0.33 | 0.33 | 0.33 | 0.12 | 0.10 | 0.09 | 0.60 |
| Potassium | 100.0% | 20 | 0 | 0.12 | 0.18 | 0.24 | 0.51 | 0.60 | 0.69 | 0.75 | 1.05 | 1.20 | 1.20 | 1.20 | 0.52 | 0.31 | 0.51 | 2.08 |
| Sodium | 95.0% | 20 | 1 | 0.03 | 0.09 | 0.12 | 0.21 | 0.24 | 0.30 | 0.33 | 0.63 | 0.99 | 0.99 | 0.99 | 0.25 | 0.23 | 0.21 | 1.37 |
| Chloride | 20.0% | 20 | 16 | 0.03 | 0.03 | 0.03 | 0.09 | 0.09 | 0.09 | 0.12 | 0.15 | 0.15 | 0.15 | 0.15 | 0.07 | 0.04 | 0.09 | 0.27 |
| Fluoride | 0.0% | 20 | 20 | 0.00 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.06 | 0.09 | 0.09 | 0.09 | 0.03 | 0.02 | 0.03 | |
| Nitrate | 85.0% | 20 | 3 | 0.09 | 0.18 | 0.27 | 0.36 | 0.39 | 0.51 | 0.51 | 0.57 | 0.75 | 0.75 | 0.75 | 0.37 | 0.16 | 0.36 | 1.18 |
| Sulphate | 100.0% | 20 | 0 | 0.84 | 1.44 | 6.24 | 8.88 | 9.12 | 11.40 | 13.95 | 24.36 | 26.19 | 26.19 | 26.19 | 9.36 | 6.69 | 8.88 | 42.83 |
| Phosphate | 0.0% | 20 | 20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | |
| Ammonium (as N) | 100.0% | 20 | 0 | 0.37 | 0.47 | 2.03 | 2.66 | 2.94 | 3.73 | 4.24 | 6.90 | 7.24 | 7.24 | 7.24 | 2.80 | 1.89 | 2.66 | 12.25 |



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

INTEGRATED MONITORING PROGRAM MONTHLY REPORT

PARTICULATE MATTER (PM₁₀) - IONS DATA SUMMARY JULY 2017

Prepared
September 27, 2017

SAMPLE COLLECTION AND DATA COMPILATION BY:

Wood Buffalo Environmental Association
Fort McMurray, Alberta

LABORATORY ANALYSIS BY:

PM ions: Atmospheric Research & Analysis, Inc.
Morrisville, NC



| | |
|---|---|
| FILE CONTENTS DESCRIPTION | Partisol Sampler Measurements of Mass, Ions by IC and Metals by ICP-MS |
| SAMPLING INTERVAL | 24 hour |
| SAMPLING FREQUENCY OF DATA | Once every 6 days |
| EXPLANATION OF ZERO VALUES | Zero values are contained in this file and should be treated as values below detection - Method Detection Limits (MDL) are provided with each observation |
| UNITS | $\mu\text{g}/\text{m}^3$ (microgram per cubic meter) |
| OBSERVATION TYPE | Particles |
| FIELD SAMPLING OR MEASUREMENT PRINCIPLE | Filtration with PM_{10} Inlet for PM_{10} and with PM_{10} Inlet/Very Sharp Cut Cyclone for $\text{PM}_{2.5}$ |
| PARTICLE DIAMETER | $< 2.5 \mu\text{m}$ or $< 10 \mu\text{m}$ |
| MEDIUM | 47 mm Teflon Filter |
| ANALYTICAL METHODS | MASS by Microbalance ELEMENTS by Inductively Coupled Plasma Mass Spectrometry (ICP/MS) IONS by Ion Chromatography (IC) |
| SAMPLE PREPARATION | DI Water extraction for IC analysis and Acid Digestion for ICP/MS Analysis |
| ANALYTICAL LABORATORY | Atmospheric Research & Analysis Inc |
| USER NOTE 1 | Data are not blank corrected |
| USER NOTE 2 | Volume is given at actual conditions of temperature and pressure during sampling as measured by the sampler |
| USER NOTE 3 | Blank sample concentration ($\mu\text{g}/\text{m}^3$) is calculated using expected actual volume of sampler |
| VOLUME STANDARDIZATION | Actual Volume at Ambient Conditions (since 01-Jan-2011) |
| SAMPLING INSTRUMENT TYPE | For PM_{10} FRM Partisol PM_{10} sampler For $\text{PM}_{2.5}$ FRM Partisol $\text{PM}_{2.5}$ sampler |
| FLAGS USED | |
| V0 | Valid value |
| V1 | Valid value but comprised wholly or partially of below detection limit data |
| V4 | Valid value despite failing to meet some QC or statistical criteria |
| V5 | Valid value but qualified because of possible contamination |
| V6 | Valid value but qualified due to non-standard sampling conditions |
| M1 | Missing value because no value is available |
| M2 | Missing value because invalidated by Data Originator |



| Bertha Ganter - Fort | | | | | | | |
|------------------------------------|-----------------|------------------------------|---------|------------------------------|---------|------------------------------|---------|
| Station Name | McKay | | | Patricia McInnes | | Travel Blank | |
| Station # | AMS 1 | | | AMS 6 | | | |
| Sample Date | 06-Jul | | | 06-Jul | | 06-Jul | |
| Particulate Size | PM10 | | | PM10 | | | |
| Total Air Volume (m ³) | 24 | | | 15.2 | | 24 | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 11.89 | V0 | -9999 | V6 | 0.13 | V0 |
| Calcium | 0.16 | 1.45 | V0 | -9999 | V6 | 0.00 | V1 |
| Magnesium | 0.03 | 0.03 | V0 | -9999 | V6 | 0.00 | V1 |
| Potassium | 0.09 | 0.02 | V0 | -9999 | V6 | 0.00 | V1 |
| Sodium | 0.05 | 0.02 | V0 | -9999 | V6 | 0.00 | V1 |
| Chloride | 0.12 | 0.01 | V0 | -9999 | V6 | 0.00 | V1 |
| Fluoride | 0.15 | 0.00 | V1 | -9999 | V6 | 0.00 | V1 |
| Nitrate | 0.20 | 0.02 | V0 | -9999 | V6 | 0.00 | V1 |
| Sulphate | 0.25 | 0.10 | V0 | -9999 | V6 | 0.00 | V1 |
| Phosphate | 0.26 | 0.00 | V1 | -9999 | V6 | 0.00 | V1 |
| Ammonium (as N) | 0.02 | 0.02 | V0 | -9999 | V6 | 0.00 | V1 |



| Station Name | Athabasca Valley | | | Anzac | | Travel Blank | |
|------------------------------------|------------------|------------------------------|---------|------------------------------|---------|------------------------------|---------|
| Station # | AMS 7 | | | AMS 14 | | 06-Jul | |
| Sample Date | 06-Jul | | | 06-Jul | | 06-Jul | |
| Particulate Size | PM10 | | | PM10 | | PM10 | |
| Total Air Volume (m ³) | 24 | | | 24 | | 24 | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 15.65 | V0 | 5.67 | V0 | 0.13 | V0 |
| Calcium | 0.16 | 0.75 | V0 | 0.14 | V0 | 0.00 | V1 |
| Magnesium | 0.03 | 0.10 | V0 | 0.02 | V0 | 0.00 | V1 |
| Potassium | 0.09 | 0.05 | V0 | 0.03 | V0 | 0.00 | V1 |
| Sodium | 0.05 | 0.04 | V0 | 0.01 | V0 | 0.00 | V1 |
| Chloride | 0.12 | 0.03 | V0 | 0.01 | V0 | 0.00 | V1 |
| Fluoride | 0.15 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Nitrate | 0.20 | 0.05 | V0 | 0.01 | V0 | 0.00 | V1 |
| Sulphate | 0.25 | 0.39 | V0 | 0.12 | V0 | 0.00 | V1 |
| Phosphate | 0.26 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Ammonium (as N) | 0.02 | 0.08 | V0 | 0.03 | V0 | 0.00 | V1 |



| Station Name | Fort McKay South | | | Horizon | | Travel Blank | |
|------------------------------------|------------------|------------------------------|---------|------------------------------|---------|------------------------------|---------|
| Station # | AMS 13 | | | AMS 15 | | 06-Jul | |
| Sample Date | 06-Jul | | | 06-Jul | | 06-Jul | |
| Particulate Size | PM10 | | | PM10 | | PM10 | |
| Total Air Volume (m ³) | 24 | | | 24 | | 24 | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 3.48 | V0 | 13.79 | V0 | 0.13 | V0 |
| Calcium | 0.16 | 0.06 | V0 | 0.18 | V0 | 0.00 | V1 |
| Magnesium | 0.03 | 0.01 | V0 | 0.03 | V0 | 0.00 | V1 |
| Potassium | 0.09 | 0.01 | V0 | 0.02 | V0 | 0.00 | V1 |
| Sodium | 0.05 | 0.01 | V0 | 0.05 | V0 | 0.00 | V1 |
| Chloride | 0.12 | 0.00 | V1 | 0.01 | V0 | 0.00 | V1 |
| Fluoride | 0.15 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Nitrate | 0.20 | 0.00 | V1 | 0.02 | V0 | 0.00 | V1 |
| Sulphate | 0.25 | 0.06 | V0 | 0.16 | V0 | 0.00 | V1 |
| Phosphate | 0.26 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Ammonium (as N) | 0.02 | 0.02 | V0 | 0.02 | V0 | 0.00 | V1 |



| Station Name | Muskeg River | | | Travel Blank | |
|------------------------------------|-----------------|------------------------------|---------|------------------------------|---------|
| Station # | AMS 16 | | | 06-Jul | |
| Sample Date | 06-Jul | | | 06-Jul | |
| Particulate Size | PM10 | | | 24 | |
| Total Air Volume (m ³) | 24 | | | 24 | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 29.48 | V0 | 0.13 | V0 |
| Calcium | 0.16 | 1.59 | V0 | 0.00 | V1 |
| Magnesium | 0.03 | 0.13 | V0 | 0.00 | V1 |
| Potassium | 0.09 | 0.02 | V0 | 0.00 | V1 |
| Sodium | 0.05 | 0.07 | V0 | 0.00 | V1 |
| Chloride | 0.12 | 0.07 | V0 | 0.00 | V1 |
| Fluoride | 0.15 | 0.00 | V1 | 0.00 | V1 |
| Nitrate | 0.20 | 0.05 | V0 | 0.00 | V1 |
| Sulphate | 0.25 | 0.23 | V0 | 0.00 | V1 |
| Phosphate | 0.26 | 0.00 | V1 | 0.00 | V1 |
| Ammonium (as N) | 0.02 | 0.02 | V0 | 0.00 | V1 |



| Bertha Ganter - Fort | | | | | | | |
|------------------------------------|-----------------|------------------------------|---------|------------------------------|---------|------------------------------|---------|
| Station Name | McKay | | | Patricia McInnes | | Travel Blank | |
| Station # | AMS 1 | | | AMS 6 | | | |
| Sample Date | 12-Jul | | | 12-Jul | | 12-Jul | |
| Particulate Size | PM10 | | | PM10 | | | |
| Total Air Volume (m ³) | 24 | | | 24 | | 24 | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 47.33 | V0 | 13.46 | V0 | 0.04 | V0 |
| Calcium | 0.16 | 3.16 | V0 | 0.36 | V0 | 0.00 | V1 |
| Magnesium | 0.03 | 0.09 | V0 | 0.06 | V0 | 0.00 | V1 |
| Potassium | 0.09 | 0.10 | V0 | 0.08 | V0 | 0.01 | V0 |
| Sodium | 0.05 | 0.13 | V0 | 0.02 | V0 | 0.00 | V1 |
| Chloride | 0.12 | 0.05 | V0 | 0.03 | V0 | 0.01 | V0 |
| Fluoride | 0.15 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Nitrate | 0.20 | 0.28 | V0 | 0.06 | V0 | 0.00 | V1 |
| Sulphate | 0.25 | 1.38 | V0 | 0.47 | V0 | 0.00 | V1 |
| Phosphate | 0.26 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Ammonium (as N) | 0.02 | 0.28 | V0 | 0.15 | V0 | 0.00 | V1 |



| Station Name | Athabasca Valley | | | Anzac | | Travel Blank | |
|------------------------------------|------------------|------------------------------|---------|------------------------------|---------|------------------------------|---------|
| Station # | AMS 7 | | | AMS 14 | | 12-Jul | |
| Sample Date | 12-Jul | | | 12-Jul | | 12-Jul | |
| Particulate Size | PM10 | | | PM10 | | PM10 | |
| Total Air Volume (m ³) | 23.4 | | | 24 | | 24 | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 18.17 | V0 | 9.83 | V0 | 0.04 | V0 |
| Calcium | 0.16 | 0.61 | V0 | 0.06 | V0 | 0.00 | V1 |
| Magnesium | 0.03 | 0.07 | V0 | 0.01 | V0 | 0.00 | V1 |
| Potassium | 0.09 | 0.10 | V0 | 0.07 | V0 | 0.01 | V0 |
| Sodium | 0.05 | 0.03 | V0 | 0.01 | V0 | 0.00 | V1 |
| Chloride | 0.12 | 0.04 | V0 | 0.01 | V0 | 0.01 | V0 |
| Fluoride | 0.15 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Nitrate | 0.20 | 0.09 | V0 | 0.05 | V0 | 0.00 | V1 |
| Sulphate | 0.25 | 0.47 | V0 | 0.62 | V0 | 0.00 | V1 |
| Phosphate | 0.26 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Ammonium (as N) | 0.02 | 0.13 | V0 | 0.18 | V0 | 0.00 | V1 |



| Station Name | Fort McKay South | | | Horizon | | Travel Blank | |
|------------------------------------|------------------|------------------------------|---------|------------------------------|---------|------------------------------|---------|
| Station # | AMS 13 | | | AMS 15 | | 12-Jul | |
| Sample Date | 12-Jul | | | 12-Jul | | 12-Jul | |
| Particulate Size | PM10 | | | PM10 | | PM10 | |
| Total Air Volume (m ³) | 24 | | | 24 | | 24 | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 30.55 | V0 | 15.98 | V0 | 0.04 | V0 |
| Calcium | 0.16 | 0.81 | V0 | 0.14 | V0 | 0.00 | V1 |
| Magnesium | 0.03 | 0.08 | V0 | 0.02 | V0 | 0.00 | V1 |
| Potassium | 0.09 | 0.08 | V0 | 0.07 | V0 | 0.01 | V0 |
| Sodium | 0.05 | 0.10 | V0 | 0.03 | V0 | 0.00 | V1 |
| Chloride | 0.12 | 0.03 | V0 | 0.01 | V0 | 0.01 | V0 |
| Fluoride | 0.15 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Nitrate | 0.20 | 0.16 | V0 | 0.07 | V0 | 0.00 | V1 |
| Sulphate | 0.25 | 1.34 | V0 | 0.78 | V0 | 0.00 | V1 |
| Phosphate | 0.26 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Ammonium (as N) | 0.02 | 0.32 | V0 | 0.22 | V0 | 0.00 | V1 |



| Station Name | Muskeg River | | | Travel Blank | |
|------------------------------------|-----------------|------------------------------|---------|------------------------------|---------|
| Station # | AMS 16 | | | 12-Jul | |
| Sample Date | 12-Jul | | | 12-Jul | |
| Particulate Size | PM10 | | | 24 | |
| Total Air Volume (m ³) | 24 | | | 24 | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 48.79 | V0 | 0.04 | V0 |
| Calcium | 0.16 | 2.72 | V0 | 0.00 | V1 |
| Magnesium | 0.03 | 0.10 | V0 | 0.00 | V1 |
| Potassium | 0.09 | 0.08 | V0 | 0.01 | V0 |
| Sodium | 0.05 | 0.06 | V0 | 0.00 | V1 |
| Chloride | 0.12 | 0.03 | V0 | 0.01 | V0 |
| Fluoride | 0.15 | 0.00 | V1 | 0.00 | V1 |
| Nitrate | 0.20 | 0.28 | V0 | 0.00 | V1 |
| Sulphate | 0.25 | 2.92 | V0 | 0.00 | V1 |
| Phosphate | 0.26 | 0.00 | V1 | 0.00 | V1 |
| Ammonium (as N) | 0.02 | 0.66 | V0 | 0.00 | V1 |



| Bertha Ganter - Fort | | | | | | | |
|------------------------------------|-----------------|------------------------------|---------|------------------------------|---------|------------------------------|---------|
| Station Name | McKay | | | Patricia McInnes | | Travel Blank | |
| Station # | AMS 1 | | | AMS 6 | | 18-Jul | |
| Sample Date | 18-Jul | | | 18-Jul | | 18-Jul | |
| Particulate Size | PM10 | | | PM10 | | PM10 | |
| Total Air Volume (m ³) | 24 | | | 24 | | 24 | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 4.64 | V0 | 11.33 | V0 | 0.53 | V0 |
| Calcium | 0.16 | 0.16 | V0 | 0.70 | V0 | 0.00 | V1 |
| Magnesium | 0.03 | 0.01 | V0 | 0.12 | V0 | 0.00 | V1 |
| Potassium | 0.09 | 0.02 | V0 | 0.02 | V0 | 0.00 | V1 |
| Sodium | 0.05 | 0.03 | V0 | 0.06 | V0 | 0.00 | V1 |
| Chloride | 0.12 | 0.02 | V0 | 0.08 | V0 | 0.00 | V1 |
| Fluoride | 0.15 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Nitrate | 0.20 | 0.02 | V0 | 0.03 | V0 | 0.00 | V1 |
| Sulphate | 0.25 | 0.07 | V0 | 0.36 | V0 | 0.00 | V1 |
| Phosphate | 0.26 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Ammonium (as N) | 0.02 | 0.01 | V0 | 0.08 | V0 | 0.00 | V1 |



| Station Name | Athabasca Valley | | | Anzac | | Travel Blank | |
|------------------------------------|------------------|------------------------------|---------|------------------------------|---------|------------------------------|---------|
| Station # | AMS 7 | | | AMS 14 | | 18-Jul | |
| Sample Date | 18-Jul | | | 18-Jul | | 18-Jul | |
| Particulate Size | PM10 | | | PM10 | | PM10 | |
| Total Air Volume (m ³) | 24 | | | 24 | | 24 | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 8.09 | V0 | 5.57 | V0 | 0.53 | V0 |
| Calcium | 0.16 | 0.38 | V0 | 0.19 | V0 | 0.00 | V1 |
| Magnesium | 0.03 | 0.04 | V0 | 0.02 | V0 | 0.00 | V1 |
| Potassium | 0.09 | 0.02 | V0 | 0.02 | V0 | 0.00 | V1 |
| Sodium | 0.05 | 0.03 | V0 | 0.02 | V0 | 0.00 | V1 |
| Chloride | 0.12 | 0.02 | V0 | 0.01 | V0 | 0.00 | V1 |
| Fluoride | 0.15 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Nitrate | 0.20 | 0.04 | V0 | 0.04 | V0 | 0.00 | V1 |
| Sulphate | 0.25 | 0.34 | V0 | 0.38 | V0 | 0.00 | V1 |
| Phosphate | 0.26 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Ammonium (as N) | 0.02 | 0.07 | V0 | 0.09 | V0 | 0.00 | V1 |



| Station Name | Fort McKay South | | | Horizon | | Travel Blank | |
|------------------------------------|------------------|------------------------------|---------|------------------------------|---------|------------------------------|---------|
| Station # | AMS 13 | | | AMS 15 | | 18-Jul | |
| Sample Date | 18-Jul | | | 18-Jul | | 18-Jul | |
| Particulate Size | PM10 | | | PM10 | | PM10 | |
| Total Air Volume (m ³) | 24 | | | 24 | | 24 | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 2.78 | V0 | 5.83 | V0 | 0.53 | V0 |
| Calcium | 0.16 | 0.02 | V0 | 0.05 | V0 | 0.00 | V1 |
| Magnesium | 0.03 | 0.01 | V0 | 0.01 | V0 | 0.00 | V1 |
| Potassium | 0.09 | 0.02 | V0 | 0.02 | V0 | 0.00 | V1 |
| Sodium | 0.05 | 0.02 | V0 | 0.03 | V0 | 0.00 | V1 |
| Chloride | 0.12 | 0.01 | V0 | 0.02 | V0 | 0.00 | V1 |
| Fluoride | 0.15 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Nitrate | 0.20 | 0.02 | V0 | 0.02 | V0 | 0.00 | V1 |
| Sulphate | 0.25 | 0.06 | V0 | 0.09 | V0 | 0.00 | V1 |
| Phosphate | 0.26 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Ammonium (as N) | 0.02 | 0.02 | V0 | 0.02 | V0 | 0.00 | V1 |



| Station Name | Muskeg River | | | Travel Blank | |
|------------------------------------|-----------------|------------------------------|---------|------------------------------|---------|
| Station # | AMS 16 | | | 18-Jul | |
| Sample Date | 18-Jul | | | 18-Jul | |
| Particulate Size | PM10 | | | 24 | |
| Total Air Volume (m ³) | 24 | | | 24 | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 13.60 | V0 | 0.53 | V0 |
| Calcium | 0.16 | 0.67 | V0 | 0.00 | V1 |
| Magnesium | 0.03 | 0.06 | V0 | 0.00 | V1 |
| Potassium | 0.09 | 0.02 | V0 | 0.00 | V1 |
| Sodium | 0.05 | 0.05 | V0 | 0.00 | V1 |
| Chloride | 0.12 | 0.04 | V0 | 0.00 | V1 |
| Fluoride | 0.15 | 0.00 | V1 | 0.00 | V1 |
| Nitrate | 0.20 | 0.03 | V0 | 0.00 | V1 |
| Sulphate | 0.25 | 0.18 | V0 | 0.00 | V1 |
| Phosphate | 0.26 | 0.00 | V1 | 0.00 | V1 |
| Ammonium (as N) | 0.02 | 0.01 | V0 | 0.00 | V1 |



| Bertha Ganter - Fort | | | | | | | |
|------------------------------------|-----------------|------------------------------|---------|------------------------------|---------|------------------------------|---------|
| Station Name | McKay | | | Patricia McInnes | | Travel Blank | |
| Station # | AMS 1 | | | AMS 6 | | | |
| Sample Date | 24-Jul | | | 24-Jul | 24-Jul | | |
| Particulate Size | PM10 | | | PM10 | | | |
| Total Air Volume (m ³) | 24 | | | 24 | 24 | | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 59.96 | V0 | 27.24 | V0 | -0.05 | V1 |
| Calcium | 0.16 | 3.70 | V0 | 0.57 | V0 | 0.00 | V1 |
| Magnesium | 0.03 | 0.06 | V0 | 0.06 | V0 | 0.00 | V1 |
| Potassium | 0.09 | 0.06 | V0 | 0.05 | V0 | 0.00 | V1 |
| Sodium | 0.05 | 0.05 | V0 | 0.09 | V0 | 0.00 | V1 |
| Chloride | 0.12 | 0.03 | V0 | 0.03 | V0 | 0.00 | V1 |
| Fluoride | 0.15 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Nitrate | 0.20 | 0.08 | V0 | 0.06 | V0 | 0.00 | V1 |
| Sulphate | 0.25 | 0.33 | V0 | 0.80 | V0 | 0.00 | V1 |
| Phosphate | 0.26 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Ammonium (as N) | 0.02 | 0.07 | V0 | 0.20 | V0 | 0.00 | V1 |



| Station Name | Athabasca Valley | | | Anzac | | Travel Blank | |
|------------------------------------|------------------|------------------------------|---------|------------------------------|---------|------------------------------|---------|
| Station # | AMS 7 | | | AMS 14 | | 24-Jul | |
| Sample Date | 24-Jul | | | 24-Jul | | 24-Jul | |
| Particulate Size | PM10 | | | PM10 | | PM10 | |
| Total Air Volume (m ³) | 24 | | | 23.6 | | 24 | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 30.00 | V0 | 17.86 | V0 | -0.05 | V1 |
| Calcium | 0.16 | 0.91 | V0 | 0.22 | V0 | 0.00 | V1 |
| Magnesium | 0.03 | 0.05 | V0 | 0.02 | V0 | 0.00 | V1 |
| Potassium | 0.09 | 0.07 | V0 | 0.06 | V0 | 0.00 | V1 |
| Sodium | 0.05 | 0.10 | V0 | 0.03 | V0 | 0.00 | V1 |
| Chloride | 0.12 | 0.03 | V0 | 0.01 | V0 | 0.00 | V1 |
| Fluoride | 0.15 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Nitrate | 0.20 | 0.09 | V0 | 0.04 | V0 | 0.00 | V1 |
| Sulphate | 0.25 | 0.53 | V0 | 0.33 | V0 | 0.00 | V1 |
| Phosphate | 0.26 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Ammonium (as N) | 0.02 | 0.11 | V0 | 0.10 | V0 | 0.00 | V1 |



| Station Name | Fort McKay South | | | Horizon | | Travel Blank | |
|------------------------------------|------------------|------------------------------|---------|------------------------------|---------|------------------------------|---------|
| Station # | AMS 13 | | | AMS 15 | | 24-Jul | |
| Sample Date | 24-Jul | | | 24-Jul | | 24-Jul | |
| Particulate Size | PM10 | | | PM10 | | PM10 | |
| Total Air Volume (m ³) | 24 | | | 24 | | 24 | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 25.33 | V0 | 38.16 | V0 | -0.05 | V1 |
| Calcium | 0.16 | 0.85 | V0 | 0.56 | V0 | 0.00 | V1 |
| Magnesium | 0.03 | 0.07 | V0 | 0.08 | V0 | 0.00 | V1 |
| Potassium | 0.09 | 0.05 | V0 | 0.06 | V0 | 0.00 | V1 |
| Sodium | 0.05 | 0.03 | V0 | 0.07 | V0 | 0.00 | V1 |
| Chloride | 0.12 | 0.01 | V0 | 0.02 | V0 | 0.00 | V1 |
| Fluoride | 0.15 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Nitrate | 0.20 | 0.05 | V0 | 0.05 | V0 | 0.00 | V1 |
| Sulphate | 0.25 | 0.26 | V0 | 0.48 | V0 | 0.00 | V1 |
| Phosphate | 0.26 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Ammonium (as N) | 0.02 | 0.06 | V0 | 0.09 | V0 | 0.00 | V1 |



| Station Name | Muskeg River | | | Travel Blank | |
|------------------------------------|-----------------|------------------------------|---------|------------------------------|---------|
| Station # | AMS 16 | | | 24-Jul | |
| Sample Date | 24-Jul | | | 24-Jul | |
| Particulate Size | PM10 | | | 24 | |
| Total Air Volume (m ³) | 24 | | | 24 | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 78.77 | V0 | -0.05 | V1 |
| Calcium | 0.16 | 2.47 | V0 | 0.00 | V1 |
| Magnesium | 0.03 | 0.18 | V0 | 0.00 | V1 |
| Potassium | 0.09 | 0.08 | V0 | 0.00 | V1 |
| Sodium | 0.05 | 0.62 | V4 | 0.00 | V1 |
| Chloride | 0.12 | 0.32 | V4 | 0.00 | V1 |
| Fluoride | 0.15 | 0.00 | V1 | 0.00 | V1 |
| Nitrate | 0.20 | 0.11 | V0 | 0.00 | V1 |
| Sulphate | 0.25 | 1.48 | V0 | 0.00 | V1 |
| Phosphate | 0.26 | 0.00 | V1 | 0.00 | V1 |
| Ammonium (as N) | 0.02 | 0.06 | V0 | 0.00 | V1 |



| Bertha Ganter - Fort | | | | | | | |
|------------------------------------|-----------------|------------------------------|---------|------------------------------|---------|------------------------------|---------|
| Station Name | McKay | | | Patricia McInnes | | Travel Blank | |
| Station # | AMS 1 | | | AMS 6 | | | |
| Sample Date | 30-Jul | | | 30-Jul | | 30-Jul | |
| Particulate Size | PM10 | | | PM10 | | | |
| Total Air Volume (m ³) | 24 | | | 24 | | 24 | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 13.68 | V0 | 12.66 | V0 | 0.20 | V0 |
| Calcium | 0.16 | 0.32 | V0 | 0.19 | V0 | 0.00 | V1 |
| Magnesium | 0.03 | 0.02 | V0 | 0.03 | V0 | 0.00 | V1 |
| Potassium | 0.09 | 0.04 | V0 | 0.07 | V0 | 0.00 | V1 |
| Sodium | 0.05 | 0.02 | V0 | 0.03 | V0 | 0.00 | V1 |
| Chloride | 0.12 | 0.01 | V0 | 0.03 | V0 | 0.00 | V1 |
| Fluoride | 0.15 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Nitrate | 0.20 | 0.05 | V0 | 0.05 | V0 | 0.00 | V1 |
| Sulphate | 0.25 | 1.08 | V0 | 0.39 | V0 | 0.00 | V1 |
| Phosphate | 0.26 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Ammonium (as N) | 0.02 | 0.31 | V0 | 0.12 | V0 | 0.00 | V1 |



| Station Name | Athabasca Valley | | | Anzac | | Travel Blank | |
|------------------------------------|------------------|------------------------------|---------|------------------------------|---------|------------------------------|---------|
| Station # | AMS 7 | | | AMS 14 | | 30-Jul | |
| Sample Date | 30-Jul | | | 30-Jul | | 30-Jul | |
| Particulate Size | PM10 | | | PM10 | | PM10 | |
| Total Air Volume (m ³) | 24 | | | 24 | | 24 | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 14.80 | V0 | 13.80 | V0 | 0.20 | V0 |
| Calcium | 0.16 | 0.27 | V0 | 0.06 | V0 | 0.00 | V1 |
| Magnesium | 0.03 | 0.04 | V0 | 0.01 | V0 | 0.00 | V1 |
| Potassium | 0.09 | 0.08 | V0 | 0.07 | V0 | 0.00 | V1 |
| Sodium | 0.05 | 0.02 | V0 | 0.01 | V0 | 0.00 | V1 |
| Chloride | 0.12 | 0.02 | V0 | 0.00 | V1 | 0.00 | V1 |
| Fluoride | 0.15 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Nitrate | 0.20 | 0.06 | V0 | 0.05 | V0 | 0.00 | V1 |
| Sulphate | 0.25 | 0.37 | V0 | 0.38 | V0 | 0.00 | V1 |
| Phosphate | 0.26 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Ammonium (as N) | 0.02 | 0.11 | V0 | 0.13 | V0 | 0.00 | V1 |



| Station Name | Fort McKay South | | | Horizon | | Travel Blank | |
|------------------------------------|------------------|------------------------------|---------|------------------------------|---------|------------------------------|---------|
| Station # | AMS 13 | | | AMS 15 | | | |
| Sample Date | 30-Jul | | | 30-Jul | | 30-Jul | |
| Particulate Size | PM10 | | | PM10 | | | |
| Total Air Volume (m ³) | 24 | | | 24 | | 24 | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 11.60 | V0 | 9.46 | V0 | 0.20 | V0 |
| Calcium | 0.16 | 0.15 | V0 | 0.07 | V0 | 0.00 | V1 |
| Magnesium | 0.03 | 0.01 | V0 | 0.01 | V0 | 0.00 | V1 |
| Potassium | 0.09 | 0.04 | V0 | 0.04 | V0 | 0.00 | V1 |
| Sodium | 0.05 | 0.02 | V0 | 0.01 | V0 | 0.00 | V1 |
| Chloride | 0.12 | 0.01 | V0 | 0.01 | V0 | 0.00 | V1 |
| Fluoride | 0.15 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Nitrate | 0.20 | 0.04 | V0 | 0.03 | V0 | 0.00 | V1 |
| Sulphate | 0.25 | 1.04 | V0 | 0.24 | V0 | 0.00 | V1 |
| Phosphate | 0.26 | 0.00 | V1 | 0.00 | V1 | 0.00 | V1 |
| Ammonium (as N) | 0.02 | 0.31 | V0 | 0.07 | V0 | 0.00 | V1 |



| Station Name | Muskeg River | | | Travel Blank | |
|------------------------------------|-----------------|------------------------------|---------|------------------------------|---------|
| Station # | AMS 16 | | | 30-Jul | |
| Sample Date | 30-Jul | | | 30-Jul | |
| Particulate Size | PM10 | | | 24 | |
| Total Air Volume (m ³) | 24 | | | 24 | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 25.82 | V0 | 0.20 | V0 |
| Calcium | 0.16 | 1.28 | V0 | 0.00 | V1 |
| Magnesium | 0.03 | 0.08 | V0 | 0.00 | V1 |
| Potassium | 0.09 | 0.05 | V0 | 0.00 | V1 |
| Sodium | 0.05 | 0.07 | V0 | 0.00 | V1 |
| Chloride | 0.12 | 0.03 | V0 | 0.00 | V1 |
| Fluoride | 0.15 | 0.00 | V1 | 0.00 | V1 |
| Nitrate | 0.20 | 0.08 | V0 | 0.00 | V1 |
| Sulphate | 0.25 | 1.08 | V0 | 0.00 | V1 |
| Phosphate | 0.26 | 0.00 | V1 | 0.00 | V1 |
| Ammonium (as N) | 0.02 | 0.24 | V0 | 0.00 | V1 |



| Station Name | Bertha Ganter - Fort McKay | Bertha Ganter - Fort McKay | Bertha Ganter - Fort McKay | Bertha Ganter - Fort McKay |
|--------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Station # | AMS 1 | AMS 1 | AMS 1 | AMS 1 |
| Sample Date | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 |
| Particulate Size | PM10 | PM10 | PM10 | PM10 |
| Compound Name | Average µg/m ³ | Std Dev µg/m ³ | Total Samples (#) | Total ≥ MDL (#) |
| Particulate Matter | 27.50 | 24.52 | 5 | 5 |
| Calcium | 1.76 | 1.62 | 5 | 5 |
| Magnesium | 0.04 | 0.03 | 5 | 5 |
| Potassium | 0.05 | 0.03 | 5 | 5 |
| Sodium | 0.05 | 0.05 | 5 | 5 |
| Chloride | 0.02 | 0.02 | 5 | 5 |
| Fluoride | 0.00 | 0.00 | 5 | 0 |
| Nitrate | 0.09 | 0.11 | 5 | 5 |
| Sulphate | 0.59 | 0.60 | 5 | 5 |
| Phosphate | 0.00 | 0.00 | 5 | 0 |
| Ammonium (as N) | 0.14 | 0.15 | 5 | 5 |



| Station Name | Patricia McInnes | Patricia McInnes | Patricia McInnes | Patricia McInnes |
|-------------------------|-------------------------|-------------------------|--------------------------|-------------------------|
| Station # | AMS 6 | AMS 6 | AMS 6 | AMS 6 |
| Sample Date | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 |
| Particulate Size | PM10 | PM10 | PM10 | PM10 |
| Compound Name | Average | Std Dev | Total Samples (#) | Total ≥ MDL (#) |
| | µg/m³ | µg/m³ | | |
| Particulate Matter | 16.17 | 7.43 | 4 | 5 |
| Calcium | 0.46 | 0.23 | 4 | 5 |
| Magnesium | 0.07 | 0.04 | 4 | 5 |
| Potassium | 0.05 | 0.03 | 4 | 5 |
| Sodium | 0.05 | 0.03 | 4 | 5 |
| Chloride | 0.04 | 0.03 | 4 | 5 |
| Fluoride | 0.00 | 0.00 | 4 | 0 |
| Nitrate | 0.05 | 0.02 | 4 | 5 |
| Sulphate | 0.51 | 0.20 | 4 | 5 |
| Phosphate | 0.00 | 0.00 | 4 | 0 |
| Ammonium (as N) | 0.14 | 0.05 | 4 | 5 |



| Station Name | Athabasca Valley | Athabasca Valley | Athabasca Valley | Athabasca Valley |
|--------------------|------------------------------|------------------------------|-------------------|------------------|
| Station # | AMS 7 | AMS 7 | AMS 7 | AMS 7 |
| Sample Date | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 |
| Particulate Size | PM10 | PM10 | PM10 | PM10 |
| Compound Name | Average µg/m ³ | Std Dev µg/m ³ | Total Samples (#) | Total ≥ MDL (#) |
| Particulate Matter | 17.34 | 8.00 | 5 | 5 |
| Calcium | 0.58 | 0.26 | 5 | 5 |
| Magnesium | 0.06 | 0.03 | 5 | 5 |
| Potassium | 0.06 | 0.03 | 5 | 5 |
| Sodium | 0.04 | 0.03 | 5 | 5 |
| Chloride | 0.03 | 0.01 | 5 | 5 |
| Fluoride | 0.00 | 0.00 | 5 | 0 |
| Nitrate | 0.07 | 0.02 | 5 | 5 |
| Sulphate | 0.42 | 0.08 | 5 | 5 |
| Phosphate | 0.00 | 0.00 | 5 | 0 |
| Ammonium (as N) | 0.10 | 0.02 | 5 | 5 |



| Station Name | Anzac | Anzac | Anzac | Anzac |
|--------------------|------------------------------|------------------------------|-------------------|-----------------|
| Station # | AMS 14 | AMS 14 | AMS 14 | AMS 14 |
| Sample Date | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 |
| Particulate Size | PM10 | PM10 | PM10 | PM10 |
| Compound Name | Average µg/m ³ | Std Dev µg/m ³ | Total Samples (#) | Total ≥ MDL (#) |
| Particulate Matter | 10.55 | 5.32 | 5 | 5 |
| Calcium | 0.13 | 0.07 | 5 | 5 |
| Magnesium | 0.01 | 0.00 | 5 | 5 |
| Potassium | 0.05 | 0.02 | 5 | 5 |
| Sodium | 0.01 | 0.01 | 5 | 5 |
| Chloride | 0.01 | 0.01 | 5 | 4 |
| Fluoride | 0.00 | 0.00 | 5 | 0 |
| Nitrate | 0.04 | 0.01 | 5 | 5 |
| Sulphate | 0.37 | 0.18 | 5 | 5 |
| Phosphate | 0.00 | 0.00 | 5 | 0 |
| Ammonium (as N) | 0.11 | 0.05 | 5 | 5 |



| Station Name | Fort McKay South | Fort McKay South | Fort McKay South | Fort McKay South |
|--------------------|------------------------------|------------------------------|-------------------|------------------|
| Station # | AMS 13 | AMS 13 | AMS 13 | AMS 13 |
| Sample Date | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 |
| Particulate Size | PM10 | PM10 | PM10 | PM10 |
| Compound Name | Average µg/m ³ | Std Dev µg/m ³ | Total Samples (#) | Total ≥ MDL (#) |
| Particulate Matter | 14.75 | 12.67 | 5 | 5 |
| Calcium | 0.38 | 0.42 | 5 | 5 |
| Magnesium | 0.03 | 0.04 | 5 | 5 |
| Potassium | 0.04 | 0.03 | 5 | 5 |
| Sodium | 0.03 | 0.04 | 5 | 5 |
| Chloride | 0.01 | 0.01 | 5 | 4 |
| Fluoride | 0.00 | 0.00 | 5 | 0 |
| Nitrate | 0.05 | 0.06 | 5 | 4 |
| Sulphate | 0.55 | 0.60 | 5 | 5 |
| Phosphate | 0.00 | 0.00 | 5 | 0 |
| Ammonium (as N) | 0.15 | 0.15 | 5 | 5 |



| Station Name | Horizon | Horizon | Horizon | Horizon |
|--------------------|------------------------------|------------------------------|-------------------|-----------------|
| Station # | AMS 15 | AMS 15 | AMS 15 | AMS 15 |
| Sample Date | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 |
| Particulate Size | PM10 | PM10 | PM10 | PM10 |
| Compound Name | Average µg/m ³ | Std Dev µg/m ³ | Total Samples (#) | Total ≥ MDL (#) |
| Particulate Matter | 16.65 | 12.65 | 5 | 5 |
| Calcium | 0.20 | 0.21 | 5 | 5 |
| Magnesium | 0.03 | 0.03 | 5 | 5 |
| Potassium | 0.04 | 0.02 | 5 | 5 |
| Sodium | 0.04 | 0.02 | 5 | 5 |
| Chloride | 0.01 | 0.01 | 5 | 5 |
| Fluoride | 0.00 | 0.00 | 5 | 0 |
| Nitrate | 0.04 | 0.02 | 5 | 5 |
| Sulphate | 0.35 | 0.28 | 5 | 5 |
| Phosphate | 0.00 | 0.00 | 5 | 0 |
| Ammonium (as N) | 0.08 | 0.08 | 5 | 5 |



| Station Name | Muskeg River | Muskeg River | Muskeg River | Muskeg River |
|--------------------|------------------------------|------------------------------|-------------------|-----------------|
| Station # | AMS 16 | AMS 16 | AMS 16 | AMS 16 |
| Sample Date | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 |
| Particulate Size | PM10 | PM10 | PM10 | PM10 |
| Compound Name | Average µg/m ³ | Std Dev µg/m ³ | Total Samples (#) | Total ≥ MDL (#) |
| Particulate Matter | 39.29 | 25.43 | 5 | 5 |
| Calcium | 1.74 | 0.85 | 5 | 5 |
| Magnesium | 0.11 | 0.05 | 5 | 5 |
| Potassium | 0.05 | 0.03 | 5 | 5 |
| Sodium | 0.17 | 0.25 | 5 | 5 |
| Chloride | 0.10 | 0.12 | 5 | 5 |
| Fluoride | 0.00 | 0.00 | 5 | 0 |
| Nitrate | 0.11 | 0.10 | 5 | 5 |
| Sulphate | 1.18 | 1.12 | 5 | 5 |
| Phosphate | 0.00 | 0.00 | 5 | 0 |
| Ammonium (as N) | 0.20 | 0.28 | 5 | 5 |



Wood Buffalo Environmental Association

PM10 Ion (µg/sample) Summary

2017 July

| Compound | % Det | N | N < Det. | Min. | 10% | 25% | 50% | 60% | 75% | 80% | 90% | 95% | 99% | Max. | Mean | Std. Dev. | Median | Outlier Test |
|--------------------|--------|----|----------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-----------|--------|--------------|
| Particulate Matter | 100.0% | 35 | 0 | 67 | 134 | 236 | 331 | 384 | 654 | 720 | 1136 | 1439 | 1890 | 1890 | 487 | 405 | 331 | 2514 |
| Calcium | 100.0% | 35 | 0 | 0.57 | 1.47 | 3.51 | 9.03 | 16.14 | 21.72 | 30.63 | 59.19 | 75.75 | 88.74 | 88.74 | 18.38 | 22.29 | 9.03 | 129.82 |
| Magnesium | 100.0% | 35 | 0 | 0.12 | 0.24 | 0.36 | 0.99 | 1.47 | 1.86 | 2.16 | 2.88 | 3.39 | 4.41 | 4.41 | 1.28 | 1.07 | 0.99 | 6.61 |
| Potassium | 100.0% | 35 | 0 | 0.33 | 0.42 | 0.51 | 1.17 | 1.35 | 1.74 | 1.80 | 1.89 | 2.31 | 2.34 | 2.34 | 1.15 | 0.61 | 1.17 | 4.22 |
| Sodium | 100.0% | 35 | 0 | 0.15 | 0.21 | 0.42 | 0.72 | 1.08 | 1.56 | 1.59 | 2.34 | 3.03 | 14.94 | 14.94 | 1.38 | 2.47 | 0.72 | 13.72 |
| Chloride | 94.3% | 35 | 2 | 0.09 | 0.15 | 0.24 | 0.51 | 0.72 | 0.78 | 0.84 | 1.62 | 2.97 | 7.59 | 7.59 | 0.83 | 1.31 | 0.51 | 7.39 |
| Fluoride | 0.0% | 35 | 35 | 0.03 | 0.03 | 0.03 | 0.06 | 0.06 | 0.06 | 0.06 | 0.09 | 0.09 | 0.12 | 0.12 | 0.05 | 0.02 | 0.06 | |
| Nitrate | 97.1% | 35 | 1 | 0.18 | 0.39 | 0.69 | 1.11 | 1.26 | 1.56 | 2.01 | 2.52 | 6.66 | 6.72 | 6.72 | 1.50 | 1.49 | 1.11 | 8.95 |
| Sulphate | 100.0% | 35 | 0 | 1.38 | 2.07 | 4.29 | 9.18 | 11.01 | 18.69 | 25.05 | 32.13 | 35.58 | 70.17 | 70.17 | 13.30 | 13.76 | 9.18 | 82.12 |
| Phosphate | 0.0% | 35 | 35 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | |
| Ammonium (as N) | 100.0% | 35 | 0 | 0.23 | 0.42 | 0.58 | 2.12 | 2.70 | 4.33 | 5.29 | 7.48 | 7.57 | 15.91 | 15.91 | 3.05 | 3.16 | 2.12 | 18.87 |



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

INTEGRATED MONITORING PROGRAM MONTHLY REPORT

PARTICULATE MATTER - METALS DATA SUMMARY JULY 2017

Prepared
September 27, 2017

SAMPLE COLLECTION AND DATA COMPILATION BY:

Wood Buffalo Environmental Association
Fort McMurray, Alberta

LABORATORY ANALYSIS BY:

PM ions: Atmospheric Research & Analysis, Inc.
Morrisville, NC



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

INTEGRATED MONITORING PROGRAM MONTHLY REPORT

PARTICULATE MATTER (PM_{2.5}) - METALS DATA SUMMARY JULY 2017

Prepared
September 27, 2017

SAMPLE COLLECTION AND DATA COMPILATION BY:

Wood Buffalo Environmental Association
Fort McMurray, Alberta

LABORATORY ANALYSIS BY:

PM metals: Atmospheric Research & Analysis, Inc.
Morrisville, NC



| | |
|---|---|
| FILE CONTENTS DESCRIPTION | Partisol Sampler Measurements of Mass, Ions by IC and Metals by ICP-MS |
| SAMPLING INTERVAL | 24 hour |
| SAMPLING FREQUENCY OF DATA | Once every 6 days |
| EXPLANATION OF ZERO VALUES | Zero values are contained in this file and should be treated as values below detection - Method Detection Limits (MDL) are provided with each observation |
| UNITS | $\mu\text{g}/\text{m}^3$ (microgram per cubic meter) |
| OBSERVATION TYPE | Particles |
| FIELD SAMPLING OR MEASUREMENT PRINCIPLE | Filtration with PM_{10} Inlet for PM_{10} and with PM_{10} Inlet/Very Sharp Cut Cyclone for $\text{PM}_{2.5}$ |
| PARTICLE DIAMETER | $< 2.5 \mu\text{m}$ or $< 10 \mu\text{m}$ |
| MEDIUM | 47 mm Teflon Filter |
| ANALYTICAL METHODS | MASS by Microbalance ELEMENTS by Inductively Coupled Plasma Mass Spectrometry (ICP/MS) IONS by Ion Chromatography (IC) |
| SAMPLE PREPARATION | DI Water extraction for IC analysis and Acid Digestion for ICP/MS Analysis |
| ANALYTICAL LABORATORY | Atmospheric Research & Analysis Inc |
| USER NOTE 1 | Data are not blank corrected |
| USER NOTE 2 | Volume is given at actual conditions of temperature and pressure during sampling as measured by the sampler |
| USER NOTE 3 | Blank sample concentration ($\mu\text{g}/\text{m}^3$) is calculated using expected actual volume of sampler |
| VOLUME STANDARDIZATION | Actual Volume at Ambient Conditions (since 01-Jan-2011) |
| SAMPLING INSTRUMENT TYPE | For PM_{10} FRM Partisol PM_{10} sampler For $\text{PM}_{2.5}$ FRM Partisol $\text{PM}_{2.5}$ sampler |
| FLAGS USED | |
| V0 | Valid value |
| V1 | Valid value but comprised wholly or partially of below detection limit data |
| V4 | Valid value despite failing to meet some QC or statistical criteria |
| V5 | Valid value but qualified because of possible contamination |
| V6 | Valid value but qualified due to non-standard sampling conditions |
| M1 | Missing value because no value is available |
| M2 | Missing value because invalidated by Data Originator |



| Compound Name | Bertha Ganter - Fort | | | | | | | |
|------------------------------------|------------------------------|-----------|------------------------------|------------------|------------------------------|--------------|------------------------------|---------|
| | Station Name | McKay | | Patricia McInnes | | Travel Blank | | |
| | Station # | AMS 1 | | AMS 6 | | | | |
| | Sample Date | 06-Jul | | 06-Jul | | | 06-Jul | |
| Particulate Size | PM2.5 | | PM2.5 | | | | PM2.5 | |
| Total Air Volume (m ³) | 24 | | 24 | | | | 24 | |
| MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 2.59 | V0 | 2.83 | V0 | | 0.23 | V0 |
| Aluminum | 0.1380326 | 0.0229391 | V0 | 0.0461726 | V0 | | 0.0000000 | V1 |
| Antimony | 0.0001784 | 0.0000000 | V1 | 0.0000328 | V0 | | 0.0000000 | V1 |
| Arsenic | 0.0001060 | 0.0000161 | V0 | 0.0000267 | V0 | | 0.0000000 | V1 |
| Barium | 0.0092847 | 0.0000000 | V1 | 0.0004910 | V0 | | 0.0000000 | V1 |
| Beryllium | 0.0000946 | 0.0000000 | V1 | 0.0000000 | V1 | | 0.0000000 | V1 |
| Bismuth | 0.0000093 | 0.0000013 | V0 | 0.0000015 | V0 | | 0.0000006 | V0 |
| Cadmium | 0.0000174 | 0.0000041 | V0 | 0.0000157 | V0 | | 0.0000000 | V1 |
| Calcium | 0.4112124 | 0.0742825 | V0 | 0.0589957 | V0 | | 0.0000000 | V1 |
| Cerium | 0.0000174 | 0.0000208 | V0 | 0.0000542 | V0 | | 0.0000000 | V1 |
| Cesium | 0.0000100 | 0.0000018 | V0 | 0.0000030 | V0 | | 0.0000000 | V1 |
| Chromium | 0.0022262 | 0.0002343 | V0 | 0.0001755 | V0 | | 0.0000000 | V1 |
| Cobalt | 0.0000273 | 0.0000081 | V0 | 0.0000137 | V0 | | 0.0000027 | V0 |
| Copper | 0.0017171 | 0.0006215 | V0 | 0.0004928 | V0 | | 0.0001105 | V0 |
| Iron | 0.0393063 | 0.0191042 | V0 | 0.0484334 | V0 | | 0.0000000 | V1 |
| Lanthanum | 0.0000130 | 0.0000096 | V0 | 0.0000260 | V0 | | 0.0000000 | V1 |
| Lead | 0.0008577 | 0.0000000 | V1 | 0.0001127 | V0 | | 0.0000000 | V1 |
| Lithium | 0.0000374 | 0.0000197 | V0 | 0.0000337 | V0 | | 0.0000000 | V1 |
| Magnesium | 0.0091409 | 0.0044599 | V0 | 0.0128967 | V0 | | 0.0003809 | V0 |
| Manganese | 0.0006949 | 0.0003417 | V0 | 0.0007492 | V0 | | 0.0000000 | V1 |
| Molybdenum | 0.0007116 | 0.0000312 | V0 | 0.0000364 | V0 | | 0.0000000 | V1 |
| Neodymium | 0.0000140 | 0.0000071 | V0 | 0.0000179 | V0 | | 0.0000000 | V1 |
| Nickel | 0.0005429 | 0.0001235 | V0 | 0.0002564 | V0 | | 0.0000781 | V0 |
| Niobium | 0.0000202 | 0.0000036 | V0 | 0.0000044 | V0 | | 0.0000000 | V1 |
| Palladium | 0.0000632 | 0.0000066 | V0 | 0.0000032 | V0 | | 0.0000035 | V0 |
| Phosphorus | 0.0459574 | 0.0068903 | V0 | 0.0069945 | V0 | | 0.0064277 | V0 |
| Platinum | 0.0000088 | 0.0000016 | V0 | 0.0000022 | V0 | | 0.0000015 | V0 |
| Potassium | 0.0061261 | 0.0122310 | V0 | 0.0191917 | V0 | | 0.0010955 | V0 |
| Praseodymium | 0.0000070 | 0.0000023 | V0 | 0.0000051 | V0 | | 0.0000000 | V1 |
| Rubidium | 0.0000184 | 0.0000330 | V0 | 0.0000564 | V0 | | 0.0000000 | V1 |
| Samarium | 0.0000133 | 0.0000017 | V0 | 0.0000037 | V0 | | 0.0000000 | V1 |
| Selenium | 0.0003366 | 0.0000407 | V0 | 0.0000511 | V0 | | 0.0000000 | V1 |
| Silicon | 0.7676322 | 0.1256317 | V0 | 0.0596821 | V0 | | 0.0608658 | V0 |
| Silver | 0.0000100 | 0.0000009 | V0 | 0.0000031 | V0 | | 0.0000007 | V0 |
| Sodium | 0.0169447 | 0.0031163 | V0 | 0.0494751 | V0 | | 0.0024375 | V0 |
| Strontium | 0.0003375 | 0.0001084 | V0 | 0.0002147 | V0 | | 0.0000000 | V1 |
| Tantalum | 0.0000394 | 0.0000000 | V1 | 0.0000000 | V1 | | 0.0000000 | V1 |
| Thallium | 0.0000090 | 0.0000004 | V0 | 0.0000006 | V0 | | 0.0000000 | V1 |
| Thorium | 0.0000059 | 0.0000027 | V0 | 0.0000069 | V0 | | 0.0000000 | V1 |
| Tin | 0.0004414 | -9999 | M2 | 0.0000765 | V0 | | 0.0000258 | V0 |
| Titanium | 0.0015201 | 0.0012305 | V0 | 0.0024670 | V0 | | 0.0004199 | V0 |
| Tungsten | 0.0000938 | 0.0000044 | V0 | 0.0000117 | V0 | | 0.0000047 | V0 |
| Uranium | 0.0000048 | 0.0000008 | V0 | 0.0000019 | V0 | | 0.0000000 | V1 |
| Vanadium | 0.0007697 | 0.0000796 | V0 | 0.0001067 | V0 | | 0.0000000 | V1 |
| Zinc | 0.0055897 | 0.0007990 | V0 | 0.0018873 | V0 | | 0.0003704 | V0 |



| Compound Name | Station Name Station # Sample Date Particulate Size Total Air Volume (m ³) | Athabasca Valley | | | Anzac | | Travel Blank | |
|--------------------|--|------------------|--|-----------|---|-----------|--|---------|
| | | MDL (µg/sample) | AMS 7 06-Jul PM2.5 24 Results (µg/m ³) | QC Flag | AMS 14 06-Jul PM2.5 24 Results (µg/m ³) | QC Flag | 06-Jul 24 Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 3.49 | V4 | 2.21 | V0 | 0.23 | V0 | |
| Aluminum | 0.1380326 | 0.0440422 | V0 | 0.0142751 | V0 | 0.0000000 | V1 | |
| Antimony | 0.0001784 | 0.0000818 | V0 | 0.0000157 | V0 | 0.0000000 | V1 | |
| Arsenic | 0.0001060 | 0.0004181 | V0 | 0.0000485 | V0 | 0.0000000 | V1 | |
| Barium | 0.0092847 | 0.0012409 | V0 | 0.0000000 | V1 | 0.0000000 | V1 | |
| Beryllium | 0.0000946 | 0.0000000 | V1 | -9999 | M2 | 0.0000000 | V1 | |
| Bismuth | 0.0000093 | 0.0000032 | V0 | 0.0000010 | V0 | 0.0000006 | V0 | |
| Cadmium | 0.0000174 | 0.0000071 | V0 | 0.0000063 | V0 | 0.0000000 | V1 | |
| Calcium | 0.4112124 | 0.0537499 | V0 | 0.0000000 | V1 | 0.0000000 | V1 | |
| Cerium | 0.0000174 | 0.0000518 | V0 | 0.0000132 | V0 | 0.0000000 | V1 | |
| Cesium | 0.0000100 | 0.0000032 | V0 | 0.0000007 | V0 | 0.0000000 | V1 | |
| Chromium | 0.0022262 | 0.0002190 | V0 | 0.0000000 | V1 | 0.0000000 | V1 | |
| Cobalt | 0.0000273 | 0.0000167 | V0 | 0.0000060 | V0 | 0.0000027 | V0 | |
| Copper | 0.0017171 | 0.0006026 | V0 | 0.0002174 | V0 | 0.0001105 | V0 | |
| Iron | 0.0393063 | 0.0595731 | V0 | 0.0167187 | V0 | 0.0000000 | V1 | |
| Lanthanum | 0.0000130 | 0.0000247 | V0 | 0.0000060 | V0 | 0.0000000 | V1 | |
| Lead | 0.0008577 | 0.0000467 | V0 | 0.0000000 | V1 | 0.0000000 | V1 | |
| Lithium | 0.0000374 | 0.0000361 | V0 | 0.0000120 | V0 | 0.0000000 | V1 | |
| Magnesium | 0.0091409 | 0.0114226 | V0 | 0.0028592 | V0 | 0.0003809 | V0 | |
| Manganese | 0.0006949 | 0.0008942 | V0 | 0.0002453 | V0 | 0.0000000 | V1 | |
| Molybdenum | 0.0007116 | 0.0000409 | V0 | 0.0000000 | V1 | 0.0000000 | V1 | |
| Neodymium | 0.0000140 | 0.0000199 | V0 | 0.0000058 | V0 | 0.0000000 | V1 | |
| Nickel | 0.0005429 | 0.0001221 | V0 | 0.0000555 | V0 | 0.0000781 | V0 | |
| Niobium | 0.0000202 | 0.0000051 | V0 | 0.0000013 | V0 | 0.0000000 | V1 | |
| Palladium | 0.0000632 | 0.0000048 | V0 | 0.0000000 | V1 | 0.0000035 | V0 | |
| Phosphorus | 0.0459574 | 0.0074729 | V0 | 0.0083140 | V0 | 0.0064277 | V0 | |
| Platinum | 0.0000088 | 0.0000013 | V0 | 0.0000016 | V0 | 0.0000015 | V0 | |
| Potassium | 0.0061261 | 0.0271593 | V0 | 0.0127595 | V0 | 0.0010955 | V0 | |
| Praseodymium | 0.0000070 | 0.0000057 | V0 | 0.0000014 | V0 | 0.0000000 | V1 | |
| Rubidium | 0.0000184 | 0.0000713 | V0 | 0.0000215 | V0 | 0.0000000 | V1 | |
| Samarium | 0.0000133 | 0.0000031 | V0 | 0.0000013 | V0 | 0.0000000 | V1 | |
| Selenium | 0.0003366 | 0.0000525 | V0 | 0.0000267 | V0 | 0.0000000 | V1 | |
| Silicon | 0.7676322 | 0.0968165 | V0 | 0.0499187 | V0 | 0.0608658 | V0 | |
| Silver | 0.0000100 | 0.0000012 | V0 | 0.0000010 | V0 | 0.0000007 | V0 | |
| Sodium | 0.0169447 | 0.0075324 | V0 | 0.0106585 | V0 | 0.0024375 | V0 | |
| Strontium | 0.0003375 | 0.0002000 | V0 | 0.0000514 | V0 | 0.0000000 | V1 | |
| Tantalum | 0.0000394 | 0.0000000 | V1 | 0.0000000 | V1 | 0.0000000 | V1 | |
| Thallium | 0.0000090 | 0.0000006 | V0 | 0.0000000 | V1 | 0.0000000 | V1 | |
| Thorium | 0.0000059 | 0.0000059 | V0 | 0.0000016 | V0 | 0.0000000 | V1 | |
| Tin | 0.0004414 | 0.0001373 | V0 | 0.0000592 | V0 | 0.0000258 | V0 | |
| Titanium | 0.0015201 | 0.0022358 | V0 | -9999 | M2 | 0.0004199 | V0 | |
| Tungsten | 0.0000938 | 0.0000110 | V0 | 0.0000041 | V0 | 0.0000047 | V0 | |
| Uranium | 0.0000048 | 0.0000015 | V0 | 0.0000004 | V0 | 0.0000000 | V1 | |
| Vanadium | 0.0007697 | 0.0001026 | V0 | 0.0000410 | V0 | 0.0000000 | V1 | |
| Zinc | 0.0055897 | 0.0016875 | V0 | 0.0003837 | V0 | 0.0003704 | V0 | |



| Compound Name | Bertha Ganter - Fort | | | | | | |
|------------------------------------|------------------------------|-----------|------------------------------|------------------|------------------------------|--------------|----|
| | Station Name | McKay | | Patricia McInnes | | Travel Blank | |
| | Station # | AMS 1 | | AMS 6 | | | |
| | Sample Date | 12-Jul | | 12-Jul | | | |
| Particulate Size | PM2.5 | | PM2.5 | | | | |
| Total Air Volume (m ³) | 24 | | 24 | | | | |
| MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | |
| Particulate Matter | 1.00 | 11.09 | V0 | 5.99 | V0 | 0.01 | V1 |
| Aluminum | 0.1380326 | 0.0945173 | V0 | 0.0193957 | V0 | 0.0000000 | V1 |
| Antimony | 0.0001784 | 0.0000215 | V0 | 0.0000342 | V0 | 0.0000000 | V1 |
| Arsenic | 0.0001060 | 0.0000797 | V0 | 0.0000568 | V0 | 0.0000000 | V1 |
| Barium | 0.0092847 | 0.0009869 | V0 | 0.0004329 | V0 | 0.0000000 | V1 |
| Beryllium | 0.0000946 | 0.0000062 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Bismuth | 0.0000093 | 0.0000039 | V0 | 0.0000028 | V0 | 0.0000006 | V0 |
| Cadmium | 0.0000174 | 0.0000121 | V0 | 0.0000062 | V0 | 0.0000000 | V1 |
| Calcium | 0.4112124 | 0.1551285 | V0 | 0.0258680 | V0 | 0.0000000 | V1 |
| Cerium | 0.0000174 | 0.0000930 | V0 | 0.0000227 | V0 | 0.0000000 | V1 |
| Cesium | 0.0000100 | 0.0000070 | V0 | 0.0000014 | V0 | 0.0000000 | V1 |
| Chromium | 0.0022262 | 0.0002255 | V0 | 0.0001132 | V0 | 0.0001628 | V0 |
| Cobalt | 0.0000273 | 0.0000261 | V0 | 0.0000065 | V0 | 0.0000026 | V0 |
| Copper | 0.0017171 | 0.0010738 | V0 | 0.0003710 | V0 | 0.0001399 | V0 |
| Iron | 0.0393063 | 0.0851027 | V0 | 0.0209706 | V0 | 0.0000000 | V1 |
| Lanthanum | 0.0000130 | 0.0000457 | V0 | 0.0000105 | V0 | 0.0000000 | V1 |
| Lead | 0.0008577 | 0.0000810 | V0 | 0.0000471 | V0 | 0.0000000 | V1 |
| Lithium | 0.0000374 | 0.0000813 | V0 | 0.0000153 | V0 | 0.0000000 | V1 |
| Magnesium | 0.0091409 | 0.0201331 | V0 | 0.0065930 | V0 | 0.0004815 | V0 |
| Manganese | 0.0006949 | 0.0015470 | V0 | 0.0003652 | V0 | 0.0000477 | V0 |
| Molybdenum | 0.0007116 | 0.0001285 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Neodymium | 0.0000140 | 0.0000393 | V0 | 0.0000084 | V0 | 0.0000000 | V1 |
| Nickel | 0.0005429 | 0.0001904 | V0 | 0.0000725 | V0 | 0.0000886 | V0 |
| Niobium | 0.0000202 | 0.0000088 | V0 | 0.0000020 | V0 | 0.0000000 | V1 |
| Palladium | 0.0000632 | 0.0000000 | V1 | 0.0000000 | V1 | 0.0000000 | V1 |
| Phosphorus | 0.0459574 | 0.0091774 | V0 | 0.0080131 | V0 | 0.0060219 | V0 |
| Platinum | 0.0000088 | -9999 | M2 | 0.0000014 | V0 | 0.0000010 | V0 |
| Potassium | 0.0061261 | 0.0669548 | V0 | 0.0198816 | V0 | 0.0003212 | V0 |
| Praseodymium | 0.0000070 | 0.0000102 | V0 | 0.0000021 | V0 | 0.0000000 | V1 |
| Rubidium | 0.0000184 | 0.0001710 | V0 | 0.0000363 | V0 | 0.0000000 | V1 |
| Samarium | 0.0000133 | 0.0000087 | V0 | 0.0000016 | V0 | 0.0000000 | V1 |
| Selenium | 0.0003366 | 0.0001481 | V0 | 0.0000683 | V0 | 0.0000000 | V1 |
| Silicon | 0.7676322 | 0.0877353 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Silver | 0.0000100 | 0.0000029 | V0 | 0.0000011 | V0 | 0.0000004 | V0 |
| Sodium | 0.0169447 | 0.0154977 | V0 | 0.0054336 | V0 | 0.0000000 | V1 |
| Strontium | 0.0003375 | 0.0004269 | V0 | 0.0000964 | V0 | 0.0000000 | V1 |
| Tantalum | 0.0000394 | 0.0000000 | V1 | 0.0000000 | V1 | 0.0000000 | V1 |
| Thallium | 0.0000090 | 0.0000017 | V0 | 0.0000008 | V0 | 0.0000000 | V1 |
| Thorium | 0.0000059 | 0.0000120 | V0 | 0.0000026 | V0 | 0.0000000 | V1 |
| Tin | 0.0004414 | 0.0001482 | V0 | 0.0000658 | V0 | 0.0000316 | V0 |
| Titanium | 0.0015201 | 0.0044731 | V0 | 0.0010757 | V0 | 0.0004806 | V0 |
| Tungsten | 0.0000938 | 0.0000074 | V0 | 0.0000070 | V0 | 0.0000000 | V1 |
| Uranium | 0.0000048 | 0.0000035 | V0 | 0.0000009 | V0 | 0.0000000 | V1 |
| Vanadium | 0.0007697 | 0.0002792 | V0 | 0.0000478 | V0 | 0.0000000 | V1 |
| Zinc | 0.0055897 | 0.0037800 | V0 | 0.0009654 | V0 | 0.0002636 | V0 |



| Compound Name | Station Name | Athabasca Valley | | Anzac | | Travel Blank | |
|------------------------------------|------------------------------|------------------|------------------------------|-----------|------------------------------|--------------|----|
| | Station # | AMS 7 | | AMS 14 | | | |
| | Sample Date | 12-Jul | | 12-Jul | | 12-Jul | |
| | Particulate Size | PM2.5 | | PM2.5 | | | |
| Total Air Volume (m ³) | | 23.4 | | 24 | | 24 | |
| MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | |
| Particulate Matter | 1.00 | 6.54 | V0 | 5.58 | V0 | 0.01 | V1 |
| Aluminum | 0.1380326 | 0.0258270 | V0 | 0.0072051 | V0 | 0.0000000 | V1 |
| Antimony | 0.0001784 | 0.0001297 | V0 | 0.0000288 | V0 | 0.0000000 | V1 |
| Arsenic | 0.0001060 | 0.0000839 | V0 | 0.0000625 | V0 | 0.0000000 | V1 |
| Barium | 0.0092847 | 0.0020036 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Beryllium | 0.0000946 | 0.0000000 | V1 | 0.0000000 | V1 | 0.0000000 | V1 |
| Bismuth | 0.0000093 | 0.0000061 | V0 | 0.0000015 | V0 | 0.0000006 | V0 |
| Cadmium | 0.0000174 | 0.0000064 | V0 | 0.0000051 | V0 | 0.0000000 | V1 |
| Calcium | 0.4112124 | 0.0415340 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Cerium | 0.0000174 | 0.0000356 | V0 | 0.0000091 | V0 | 0.0000000 | V1 |
| Cesium | 0.0000100 | 0.0000018 | V0 | 0.0000006 | V0 | 0.0000000 | V1 |
| Chromium | 0.0022262 | 0.0002422 | V0 | 0.0001250 | V0 | 0.0001628 | V0 |
| Cobalt | 0.0000273 | 0.0000132 | V0 | 0.0000047 | V0 | 0.0000026 | V0 |
| Copper | 0.0017171 | 0.0009516 | V0 | 0.0001804 | V0 | 0.0001399 | V0 |
| Iron | 0.0393063 | 0.0464750 | V0 | 0.0162579 | V0 | 0.0000000 | V1 |
| Lanthanum | 0.0000130 | 0.0000161 | V0 | 0.0000049 | V0 | 0.0000000 | V1 |
| Lead | 0.0008577 | 0.0000724 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Lithium | 0.0000374 | 0.0000242 | V0 | 0.0000069 | V0 | 0.0000000 | V1 |
| Magnesium | 0.0091409 | 0.0091216 | V0 | 0.0028702 | V0 | 0.0004815 | V0 |
| Manganese | 0.0006949 | 0.0007423 | V0 | 0.0002699 | V0 | 0.0000477 | V0 |
| Molybdenum | 0.0007116 | 0.0000516 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Neodymium | 0.0000140 | 0.0000122 | V0 | 0.0000037 | V0 | 0.0000000 | V1 |
| Nickel | 0.0005429 | 0.0001608 | V0 | 0.0000917 | V0 | 0.0000886 | V0 |
| Niobium | 0.0000202 | 0.0000036 | V0 | 0.0000010 | V0 | 0.0000000 | V1 |
| Palladium | 0.0000632 | 0.0000054 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Phosphorus | 0.0459574 | 0.0094892 | V0 | 0.0086367 | V0 | 0.0060219 | V0 |
| Platinum | 0.0000088 | 0.0000018 | V0 | 0.0000011 | V0 | 0.0000010 | V0 |
| Potassium | 0.0061261 | 0.0233419 | V0 | 0.0156455 | V0 | 0.0003212 | V0 |
| Praseodymium | 0.0000070 | 0.0000034 | V0 | 0.0000009 | V0 | 0.0000000 | V1 |
| Rubidium | 0.0000184 | 0.0000467 | V0 | 0.0000211 | V0 | 0.0000000 | V1 |
| Samarium | 0.0000133 | 0.0000019 | V0 | 0.0000007 | V0 | 0.0000000 | V1 |
| Selenium | 0.0003366 | 0.0000832 | V0 | 0.0000705 | V0 | 0.0000000 | V1 |
| Silicon | 0.7676322 | 0.0437226 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Silver | 0.0000100 | 0.0000017 | V0 | 0.0000011 | V0 | 0.0000004 | V0 |
| Sodium | 0.0169447 | 0.0065199 | V0 | 0.0033436 | V0 | 0.0000000 | V1 |
| Strontium | 0.0003375 | 0.0001854 | V0 | 0.0000445 | V0 | 0.0000000 | V1 |
| Tantalum | 0.0000394 | 0.0000000 | V1 | 0.0000000 | V1 | 0.0000000 | V1 |
| Thallium | 0.0000090 | 0.0000008 | V0 | 0.0000005 | V0 | 0.0000000 | V1 |
| Thorium | 0.0000059 | 0.0000038 | V0 | 0.0000013 | V0 | 0.0000000 | V1 |
| Tin | 0.0004414 | 0.0001741 | V0 | 0.0000882 | V0 | 0.0000316 | V0 |
| Titanium | 0.0015201 | 0.0015601 | V0 | 0.0005242 | V0 | 0.0004806 | V0 |
| Tungsten | 0.0000938 | 0.0000118 | V0 | 0.0000130 | V0 | 0.0000000 | V1 |
| Uranium | 0.0000048 | 0.0000015 | V0 | 0.0000005 | V0 | 0.0000000 | V1 |
| Vanadium | 0.0007697 | 0.0000698 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Zinc | 0.0055897 | 0.0015044 | V0 | 0.0005928 | V0 | 0.0002636 | V0 |



| Compound Name | Bertha Ganter - Fort | | | | | | |
|------------------------------------|------------------------------|-----------|------------------------------|-----------|------------------------------|-----------|--------------|
| | Station Name | McKay | | | Patricia McInnes | | Travel Blank |
| | Station # | AMS 1 | | AMS 6 | | | |
| | Sample Date | 18-Jul | | 18-Jul | | 18-Jul | |
| Particulate Size | PM2.5 | | PM2.5 | | | | |
| Total Air Volume (m ³) | 24 | | 24 | | | 24 | |
| MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | |
| Particulate Matter | 1.00 | 1.84 | V0 | 2.53 | V4 | 0.42 | V0 |
| Aluminum | 0.1380326 | 0.0083488 | V0 | 0.0126645 | V0 | 0.0000000 | V1 |
| Antimony | 0.0001784 | 0.0000155 | V0 | 0.0000103 | V0 | 0.0000000 | V1 |
| Arsenic | 0.0001060 | 0.0000314 | V0 | 0.0000511 | V0 | 0.0000052 | V0 |
| Barium | 0.0092847 | 0.0000000 | V1 | 0.0000000 | V1 | 0.0000000 | V1 |
| Beryllium | 0.0000946 | 0.0000000 | V1 | 0.0000000 | V1 | 0.0000000 | V1 |
| Bismuth | 0.0000093 | -9999 | M2 | 0.0000007 | V0 | 0.0000000 | V1 |
| Cadmium | 0.0000174 | 0.0000073 | V0 | 0.0000043 | V0 | 0.0000000 | V1 |
| Calcium | 0.4112124 | 0.0180943 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Cerium | 0.0000174 | 0.0000080 | V0 | 0.0000121 | V0 | 0.0000000 | V1 |
| Cesium | 0.0000100 | 0.0000006 | V0 | 0.0000006 | V0 | 0.0000000 | V1 |
| Chromium | 0.0022262 | 0.0001656 | V0 | 0.0002318 | V0 | 0.0001228 | V0 |
| Cobalt | 0.0000273 | 0.0000039 | V0 | 0.0000064 | V0 | 0.0000000 | V1 |
| Copper | 0.0017171 | 0.0005556 | V0 | 0.0001828 | V0 | 0.0000000 | V1 |
| Iron | 0.0393063 | 0.0092634 | V0 | 0.0118471 | V0 | 0.0000000 | V1 |
| Lanthanum | 0.0000130 | 0.0000033 | V0 | 0.0000054 | V0 | 0.0000000 | V1 |
| Lead | 0.0008577 | 0.0000000 | V1 | 0.0000445 | V0 | 0.0000000 | V1 |
| Lithium | 0.0000374 | 0.0000083 | V0 | 0.0000074 | V0 | 0.0000000 | V1 |
| Magnesium | 0.0091409 | 0.0028061 | V0 | 0.0044917 | V0 | 0.0000000 | V1 |
| Manganese | 0.0006949 | 0.0001732 | V0 | 0.0002160 | V0 | 0.0000000 | V1 |
| Molybdenum | 0.0007116 | 0.0000302 | V0 | 0.0000000 | V1 | 0.0000576 | V0 |
| Neodymium | 0.0000140 | 0.0000031 | V0 | 0.0000039 | V0 | 0.0000000 | V1 |
| Nickel | 0.0005429 | 0.0000992 | V0 | 0.0001230 | V0 | 0.0000565 | V0 |
| Niobium | 0.0000202 | 0.0000000 | V1 | 0.0000009 | V0 | 0.0000000 | V1 |
| Palladium | 0.0000632 | 0.0000000 | V1 | 0.0000000 | V1 | 0.0000042 | V0 |
| Phosphorus | 0.0459574 | 0.0078922 | V0 | 0.0080200 | V0 | 0.0055347 | V0 |
| Platinum | 0.0000088 | 0.0000023 | V0 | 0.0000015 | V0 | 0.0000020 | V0 |
| Potassium | 0.0061261 | 0.0153637 | V0 | 0.0079052 | V0 | 0.0009980 | V0 |
| Praseodymium | 0.0000070 | 0.0000007 | V0 | 0.0000010 | V0 | 0.0000000 | V1 |
| Rubidium | 0.0000184 | 0.0000199 | V0 | 0.0000171 | V0 | 0.0000000 | V1 |
| Samarium | 0.0000133 | 0.0000008 | V0 | 0.0000007 | V0 | 0.0000000 | V1 |
| Selenium | 0.0003366 | 0.0000295 | V0 | 0.0000307 | V0 | 0.0000000 | V1 |
| Silicon | 0.7676322 | 0.0000000 | V1 | 0.0000000 | V1 | 0.0388323 | V0 |
| Silver | 0.0000100 | 0.0000018 | V0 | 0.0000010 | V0 | 0.0000000 | V1 |
| Sodium | 0.0169447 | 0.0164855 | V0 | 0.0096887 | V0 | 0.0015526 | V0 |
| Strontium | 0.0003375 | 0.0000410 | V0 | 0.0000609 | V0 | 0.0000000 | V1 |
| Tantalum | 0.0000394 | 0.0000000 | V1 | 0.0000000 | V1 | 0.0000000 | V1 |
| Thallium | 0.0000090 | 0.0000000 | V1 | 0.0000000 | V1 | 0.0000000 | V1 |
| Thorium | 0.0000059 | 0.0000009 | V0 | 0.0000014 | V0 | 0.0000000 | V1 |
| Tin | 0.0004414 | 0.0000528 | V0 | 0.0000413 | V0 | 0.0000293 | V0 |
| Titanium | 0.0015201 | 0.0005414 | V0 | 0.0005741 | V0 | 0.0013151 | V0 |
| Tungsten | 0.0000938 | 0.0000067 | V0 | 0.0000043 | V0 | 0.0000000 | V1 |
| Uranium | 0.0000048 | 0.0000003 | V0 | 0.0000003 | V0 | 0.0000000 | V1 |
| Vanadium | 0.0007697 | 0.0000000 | V1 | 0.0000000 | V1 | 0.0000000 | V1 |
| Zinc | 0.0055897 | 0.0010179 | V0 | 0.0005284 | V0 | 0.0000000 | V1 |



| Station Name Station # Sample Date Particulate Size Total Air Volume (m ³) | Athabasca Valley | | | Anzac | | Travel Blank | |
|--|--------------------------------|------------------------------|---------|---------------------------------|------------------------------|------------------------------|---|
| | AMS 7 18-Jul PM2.5 24 | Results (µg/m ³) | QC Flag | AMS 14 18-Jul PM2.5 24 | Results (µg/m ³) | QC Flag | 18-Jul 24 Results (µg/m ³) QC Flag |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 2.79 | V0 | 2.59 | V0 | 0.42 | V0 |
| Aluminum | 0.1380326 | 0.0161220 | V0 | 0.0062521 | V0 | 0.0000000 | V1 |
| Antimony | 0.0001784 | 0.0000761 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Arsenic | 0.0001060 | 0.0000233 | V0 | 0.0000320 | V0 | 0.0000052 | V0 |
| Barium | 0.0092847 | 0.0009917 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Beryllium | 0.0000946 | 0.0000000 | V1 | 0.0000000 | V1 | 0.0000000 | V1 |
| Bismuth | 0.0000093 | 0.0000035 | V0 | 0.0000005 | V0 | 0.0000000 | V1 |
| Cadmium | 0.0000174 | 0.0000028 | V0 | 0.0000027 | V0 | 0.0000000 | V1 |
| Calcium | 0.4112124 | 0.0305320 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Cerium | 0.0000174 | 0.0000201 | V0 | 0.0000061 | V0 | 0.0000000 | V1 |
| Cesium | 0.0000100 | 0.0000010 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Chromium | 0.0022262 | 0.0001651 | V0 | 0.0001508 | V0 | 0.0001228 | V0 |
| Cobalt | 0.0000273 | 0.0000079 | V0 | 0.0000046 | V0 | 0.0000000 | V1 |
| Copper | 0.0017171 | 0.0006106 | V0 | 0.0001656 | V0 | 0.0000000 | V1 |
| Iron | 0.0393063 | 0.0287139 | V0 | 0.0058675 | V0 | 0.0000000 | V1 |
| Lanthanum | 0.0000130 | 0.0000082 | V0 | 0.0000027 | V0 | 0.0000000 | V1 |
| Lead | 0.0008577 | 0.0000431 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Lithium | 0.0000374 | 0.0000179 | V0 | 0.0000061 | V0 | 0.0000000 | V1 |
| Magnesium | 0.0091409 | 0.0057034 | V0 | 0.0023473 | V0 | 0.0000000 | V1 |
| Manganese | 0.0006949 | 0.0004611 | V0 | 0.0001407 | V0 | 0.0000000 | V1 |
| Molybdenum | 0.0007116 | 0.0000430 | V0 | -9999 | M2 | 0.0000576 | V0 |
| Neodymium | 0.0000140 | 0.0000073 | V0 | 0.0000025 | V0 | 0.0000000 | V1 |
| Nickel | 0.0005429 | 0.0001184 | V0 | 0.0001022 | V0 | 0.0000565 | V0 |
| Niobium | 0.0000202 | 0.0000025 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Palladium | 0.0000632 | 0.0000066 | V0 | 0.0000000 | V1 | 0.0000042 | V0 |
| Phosphorus | 0.0459574 | 0.0053416 | V0 | 0.0061970 | V0 | 0.0055347 | V0 |
| Platinum | 0.0000088 | 0.0000022 | V0 | 0.0000015 | V0 | 0.0000020 | V0 |
| Potassium | 0.0061261 | 0.0127585 | V0 | 0.0074640 | V0 | 0.0009980 | V0 |
| Praseodymium | 0.0000070 | 0.0000024 | V0 | 0.0000005 | V0 | 0.0000000 | V1 |
| Rubidium | 0.0000184 | 0.0000258 | V0 | 0.0000111 | V0 | 0.0000000 | V1 |
| Samarium | 0.0000133 | 0.0000013 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Selenium | 0.0003366 | 0.0000425 | V0 | 0.0000465 | V0 | 0.0000000 | V1 |
| Silicon | 0.7676322 | 0.1128141 | V0 | 0.0913480 | V0 | 0.0388323 | V0 |
| Silver | 0.0000100 | 0.0000009 | V0 | 0.0000012 | V0 | 0.0000000 | V1 |
| Sodium | 0.0169447 | 0.0128572 | V0 | 0.0058414 | V0 | 0.0015526 | V0 |
| Strontium | 0.0003375 | 0.0001208 | V0 | 0.0000438 | V0 | 0.0000000 | V1 |
| Tantalum | 0.0000394 | 0.0000000 | V1 | 0.0000000 | V1 | 0.0000000 | V1 |
| Thallium | 0.0000090 | 0.0000000 | V1 | 0.0000000 | V1 | 0.0000000 | V1 |
| Thorium | 0.0000059 | 0.0000023 | V0 | 0.0000007 | V0 | 0.0000000 | V1 |
| Tin | 0.0004414 | 0.0001032 | V0 | 0.0000502 | V0 | 0.0000293 | V0 |
| Titanium | 0.0015201 | 0.0011197 | V0 | 0.0024085 | V0 | 0.0013151 | V0 |
| Tungsten | 0.0000938 | 0.0000079 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Uranium | 0.0000048 | 0.0000008 | V0 | 0.0000003 | V0 | 0.0000000 | V1 |
| Vanadium | 0.0007697 | 0.0000935 | V0 | 0.0000585 | V0 | 0.0000000 | V1 |
| Zinc | 0.0055897 | 0.0009338 | V0 | 0.0005571 | V0 | 0.0000000 | V1 |



| Compound Name | Bertha Ganter - Fort | | | | | | |
|------------------------------------|------------------------------|-----------|------------------------------|------------------|------------------------------|--------------|----|
| | Station Name | McKay | | Patricia McInnes | | Travel Blank | |
| | Station # | AMS 1 | | AMS 6 | | 24-Jul | |
| | Sample Date | 24-Jul | | 24-Jul | | 24-Jul | |
| Particulate Size | PM2.5 | | PM2.5 | | 24 | | |
| Total Air Volume (m ³) | 24 | | 24 | | 24 | | |
| MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | |
| Particulate Matter | 1.00 | 11.20 | V0 | 10.58 | V0 | 0.18 | V0 |
| Aluminum | 0.1380326 | 0.1128382 | V0 | 0.0986113 | V0 | 0.0000000 | V1 |
| Antimony | 0.0001784 | 0.0000000 | V1 | 0.0000117 | V0 | 0.0000000 | V1 |
| Arsenic | 0.0001060 | 0.0000975 | V0 | 0.0000984 | V0 | 0.0000000 | V1 |
| Barium | 0.0092847 | 0.0009548 | V0 | 0.0005789 | V0 | 0.0000000 | V1 |
| Beryllium | 0.0000946 | 0.0000043 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Bismuth | 0.0000093 | 0.0000016 | V0 | 0.0000024 | V0 | 0.0000000 | V1 |
| Cadmium | 0.0000174 | 0.0000105 | V0 | 0.0000103 | V0 | 0.0000000 | V1 |
| Calcium | 0.4112124 | 0.2413353 | V0 | 0.0355843 | V0 | 0.0000000 | V1 |
| Cerium | 0.0000174 | 0.0001287 | V0 | 0.0000931 | V0 | 0.0000000 | V1 |
| Cesium | 0.0000100 | 0.0000101 | V0 | 0.0000080 | V0 | 0.0000000 | V1 |
| Chromium | 0.0022262 | 0.0002137 | V0 | 0.0001904 | V0 | 0.0001070 | V0 |
| Cobalt | 0.0000273 | 0.0000367 | V0 | 0.0000292 | V0 | 0.0000020 | V0 |
| Copper | 0.0017171 | 0.0002558 | V0 | 0.0003826 | V0 | 0.0001116 | V0 |
| Iron | 0.0393063 | 0.1311522 | V0 | 0.0491588 | V0 | 0.0000000 | V1 |
| Lanthanum | 0.0000130 | 0.0000607 | V0 | 0.0000406 | V0 | 0.0000000 | V1 |
| Lead | 0.0008577 | 0.0000788 | V0 | 0.0000663 | V0 | 0.0000000 | V1 |
| Lithium | 0.0000374 | 0.0000982 | V0 | 0.0001025 | V0 | 0.0000000 | V1 |
| Magnesium | 0.0091409 | 0.0220266 | V0 | 0.0099167 | V0 | 0.0000000 | V1 |
| Manganese | 0.0006949 | 0.0020214 | V0 | 0.0008569 | V0 | 0.0000000 | V1 |
| Molybdenum | 0.0007116 | 0.0000425 | V0 | 0.0001229 | V0 | 0.0000415 | V0 |
| Neodymium | 0.0000140 | 0.0000529 | V0 | 0.0000360 | V0 | 0.0000000 | V1 |
| Nickel | 0.0005429 | 0.0001816 | V0 | 0.0001848 | V0 | 0.0001820 | V0 |
| Niobium | 0.0000202 | 0.0000132 | V0 | 0.0000099 | V0 | 0.0000000 | V1 |
| Palladium | 0.0000632 | 0.0000087 | V0 | 0.0000050 | V0 | 0.0000047 | V0 |
| Phosphorus | 0.0459574 | 0.0086567 | V0 | 0.0086662 | V0 | 0.0048937 | V0 |
| Platinum | 0.0000088 | 0.0000017 | V0 | 0.0000018 | V0 | 0.0000015 | V0 |
| Potassium | 0.0061261 | 0.0605797 | V0 | 0.0472252 | V0 | 0.0015986 | V0 |
| Praseodymium | 0.0000070 | 0.0000151 | V0 | 0.0000094 | V0 | 0.0000000 | V1 |
| Rubidium | 0.0000184 | 0.0002528 | V0 | 0.0001942 | V0 | 0.0000000 | V1 |
| Samarium | 0.0000133 | 0.0000102 | V0 | 0.0000060 | V0 | 0.0000000 | V1 |
| Selenium | 0.0003366 | 0.0001219 | V0 | 0.0001220 | V0 | 0.0000142 | V0 |
| Silicon | 0.7676322 | 0.3229980 | V0 | 0.3193282 | V0 | 0.0516026 | V0 |
| Silver | 0.0000100 | 0.0000021 | V0 | 0.0000038 | V0 | 0.0000007 | V0 |
| Sodium | 0.0169447 | 0.0119538 | V0 | 0.0286185 | V0 | 0.0042983 | V0 |
| Strontium | 0.0003375 | 0.0004898 | V0 | 0.0002292 | V0 | 0.0000000 | V1 |
| Tantalum | 0.0000394 | 0.0000000 | V1 | 0.0000000 | V1 | 0.0000000 | V1 |
| Thallium | 0.0000090 | 0.0000032 | V0 | 0.0000029 | V0 | 0.0000000 | V1 |
| Thorium | 0.0000059 | 0.0000170 | V0 | 0.0000106 | V0 | 0.0000000 | V1 |
| Tin | 0.0004414 | 0.0000630 | V0 | 0.0000744 | V0 | 0.0000253 | V0 |
| Titanium | 0.0015201 | 0.0049614 | V0 | 0.0031157 | V0 | 0.0010549 | V0 |
| Tungsten | 0.0000938 | 0.0000051 | V0 | 0.0000085 | V0 | 0.0000000 | V1 |
| Uranium | 0.0000048 | 0.0000041 | V0 | 0.0000032 | V0 | 0.0000000 | V1 |
| Vanadium | 0.0007697 | 0.0002341 | V0 | 0.0007008 | V0 | 0.0000000 | V1 |
| Zinc | 0.0055897 | 0.0019731 | V0 | 0.0015947 | V0 | 0.0000000 | V1 |



| Station Name Station # Sample Date Particulate Size Total Air Volume (m ³) | Athabasca Valley | | | Anzac | | Travel Blank | |
|--|--------------------------------|-----------------------------------|---------------------------------|-----------------------------------|-----------------------------------|---------------------------------|---------------------------------|
| | AMS 7 24-Jul PM2.5 24 | AMS 14 24-Jul PM2.5 23.7 | AMS 14 24-Jul PM2.5 24 | AMS 14 24-Jul PM2.5 23.7 | AMS 14 24-Jul PM2.5 23.7 | AMS 14 24-Jul PM2.5 24 | AMS 14 24-Jul PM2.5 24 |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 10.27 | V0 | 9.21 | V0 | 0.18 | V0 |
| Aluminum | 0.1380326 | 0.1100543 | V0 | 0.0597287 | V0 | 0.0000000 | V1 |
| Antimony | 0.0001784 | 0.0000310 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Arsenic | 0.0001060 | 0.0000961 | V0 | 0.0000811 | V0 | 0.0000000 | V1 |
| Barium | 0.0092847 | 0.0008605 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Beryllium | 0.0000946 | 0.0000000 | V1 | 0.0000000 | V1 | 0.0000000 | V1 |
| Bismuth | 0.0000093 | 0.0000030 | V0 | 0.0000014 | V0 | 0.0000000 | V1 |
| Cadmium | 0.0000174 | 0.0000111 | V0 | 0.0000117 | V0 | 0.0000000 | V1 |
| Calcium | 0.4112124 | 0.0487733 | V0 | 0.0225915 | V0 | 0.0000000 | V1 |
| Cerium | 0.0000174 | 0.0000911 | V0 | 0.0000497 | V0 | 0.0000000 | V1 |
| Cesium | 0.0000100 | 0.0000092 | V0 | 0.0000055 | V0 | 0.0000000 | V1 |
| Chromium | 0.0022262 | 0.0002506 | V0 | 0.0002220 | V0 | 0.0001070 | V0 |
| Cobalt | 0.0000273 | 0.0000274 | V0 | 0.0000151 | V0 | 0.0000020 | V0 |
| Copper | 0.0017171 | 0.0006625 | V0 | 0.0001617 | V0 | 0.0001116 | V0 |
| Iron | 0.0393063 | 0.0488999 | V0 | 0.0264846 | V0 | 0.0000000 | V1 |
| Lanthanum | 0.0000130 | 0.0000421 | V0 | 0.0000230 | V0 | 0.0000000 | V1 |
| Lead | 0.0008577 | 0.0000648 | V0 | 0.0000493 | V0 | 0.0000000 | V1 |
| Lithium | 0.0000374 | 0.0001119 | V0 | 0.0000567 | V0 | 0.0000000 | V1 |
| Magnesium | 0.0091409 | 0.0105678 | V0 | 0.0058709 | V0 | 0.0000000 | V1 |
| Manganese | 0.0006949 | 0.0009521 | V0 | 0.0004609 | V0 | 0.0000000 | V1 |
| Molybdenum | 0.0007116 | 0.0000485 | V0 | 0.0000905 | V0 | 0.0000415 | V0 |
| Neodymium | 0.0000140 | 0.0000385 | V0 | 0.0000202 | V0 | 0.0000000 | V1 |
| Nickel | 0.0005429 | 0.0002283 | V0 | 0.0001800 | V0 | 0.0001820 | V0 |
| Niobium | 0.0000202 | 0.0000084 | V0 | 0.0000058 | V0 | 0.0000000 | V1 |
| Palladium | 0.0000632 | 0.0000040 | V0 | 0.0000030 | V0 | 0.0000047 | V0 |
| Phosphorus | 0.0459574 | 0.0090496 | V0 | 0.0078944 | V0 | 0.0048937 | V0 |
| Platinum | 0.0000088 | -9999 | M2 | 0.0000017 | V0 | 0.0000015 | V0 |
| Potassium | 0.0061261 | 0.0612209 | V0 | 0.0390294 | V0 | 0.0015986 | V0 |
| Praseodymium | 0.0000070 | 0.0000098 | V0 | 0.0000053 | V0 | 0.0000000 | V1 |
| Rubidium | 0.0000184 | 0.0002282 | V0 | 0.0001419 | V0 | 0.0000000 | V1 |
| Samarium | 0.0000133 | 0.0000066 | V0 | 0.0000037 | V0 | 0.0000000 | V1 |
| Selenium | 0.0003366 | 0.0001015 | V0 | 0.0000849 | V0 | 0.0000142 | V0 |
| Silicon | 0.7676322 | 0.3662432 | V0 | 0.1613078 | V0 | 0.0516026 | V0 |
| Silver | 0.0000100 | 0.0000021 | V0 | 0.0000016 | V0 | 0.0000007 | V0 |
| Sodium | 0.0169447 | 0.0152354 | V0 | 0.0083913 | V0 | 0.0042983 | V0 |
| Strontium | 0.0003375 | 0.0002731 | V0 | 0.0001259 | V0 | 0.0000000 | V1 |
| Tantalum | 0.0000394 | 0.0000000 | V1 | 0.0000000 | V1 | 0.0000000 | V1 |
| Thallium | 0.0000090 | 0.0000027 | V0 | 0.0000019 | V0 | 0.0000000 | V1 |
| Thorium | 0.0000059 | 0.0000109 | V0 | 0.0000063 | V0 | 0.0000000 | V1 |
| Tin | 0.0004414 | 0.0001110 | V0 | 0.0000552 | V0 | 0.0000253 | V0 |
| Titanium | 0.0015201 | 0.0028122 | V0 | 0.0035136 | V0 | 0.0010549 | V0 |
| Tungsten | 0.0000938 | 0.0000073 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Uranium | 0.0000048 | 0.0000031 | V0 | 0.0000015 | V0 | 0.0000000 | V1 |
| Vanadium | 0.0007697 | 0.0002209 | V0 | 0.0001013 | V0 | 0.0000000 | V1 |
| Zinc | 0.0055897 | 0.0029498 | V0 | 0.0015557 | V0 | 0.0000000 | V1 |



| Compound Name | Bertha Ganter - Fort | | | | | | | | |
|------------------------------------|------------------------------|-----------|------------------------------|-----------|------------------------------|-----------|---------|--------------|--|
| | Station Name | McKay | | | Patricia McInnes | | | Travel Blank | |
| | Station # | AMS 1 | | AMS 6 | | | 30-Jul | | |
| | Sample Date | 30-Jul | | 30-Jul | | | | | |
| Particulate Size | PM2.5 | | PM2.5 | | | PM2.5 | | | |
| Total Air Volume (m ³) | 24 | | 24 | | | 24 | | | |
| MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | QC Flag | | |
| Particulate Matter | 1.00 | 7.67 | V0 | 7.77 | V0 | 0.22 | V0 | | |
| Aluminum | 0.1380326 | 0.0411567 | V0 | 0.0183347 | V0 | 0.0000000 | V1 | | |
| Antimony | 0.0001784 | 0.0000430 | V0 | 0.0000313 | V0 | 0.0000000 | V1 | | |
| Arsenic | 0.0001060 | 0.0000468 | V0 | 0.0000458 | V0 | 0.0000000 | V1 | | |
| Barium | 0.0092847 | 0.0000000 | V1 | 0.0004484 | V0 | 0.0000000 | V1 | | |
| Beryllium | 0.0000946 | 0.0000000 | V1 | 0.0000000 | V1 | 0.0000000 | V1 | | |
| Bismuth | 0.0000093 | 0.0000015 | V0 | 0.0000034 | V0 | 0.0000006 | V0 | | |
| Cadmium | 0.0000174 | 0.0000062 | V0 | 0.0000198 | V0 | 0.0000000 | V1 | | |
| Calcium | 0.4112124 | 0.0524450 | V0 | 0.0186778 | V0 | 0.0000000 | V1 | | |
| Cerium | 0.0000174 | 0.0000371 | V0 | 0.0000224 | V0 | 0.0000007 | V0 | | |
| Cesium | 0.0000100 | 0.0000029 | V0 | 0.0000017 | V0 | 0.0000000 | V1 | | |
| Chromium | 0.0022262 | 0.0001841 | V0 | 0.0001272 | V0 | 0.0001781 | V0 | | |
| Cobalt | 0.0000273 | 0.0000118 | V0 | 0.0000056 | V0 | 0.0000021 | V0 | | |
| Copper | 0.0017171 | 0.0007406 | V0 | 0.0003307 | V0 | 0.0001646 | V0 | | |
| Iron | 0.0393063 | 0.0376061 | V0 | 0.0194258 | V0 | 0.0020037 | V0 | | |
| Lanthanum | 0.0000130 | 0.0000183 | V0 | 0.0000112 | V0 | 0.0000000 | V1 | | |
| Lead | 0.0008577 | 0.0000373 | V0 | 0.0000629 | V0 | 0.0000000 | V1 | | |
| Lithium | 0.0000374 | 0.0000322 | V0 | 0.0000130 | V0 | 0.0000022 | V0 | | |
| Magnesium | 0.0091409 | 0.0076585 | V0 | 0.0047678 | V0 | 0.0004283 | V0 | | |
| Manganese | 0.0006949 | 0.0006185 | V0 | 0.0003595 | V0 | 0.0000000 | V1 | | |
| Molybdenum | 0.0007116 | 0.0000704 | V0 | 0.0000000 | V1 | 0.0000453 | V0 | | |
| Neodymium | 0.0000140 | 0.0000159 | V0 | 0.0000079 | V0 | 0.0000000 | V1 | | |
| Nickel | 0.0005429 | 0.0002359 | V0 | 0.0000876 | V0 | 0.0000672 | V0 | | |
| Niobium | 0.0000202 | 0.0000042 | V0 | 0.0000025 | V0 | 0.0000000 | V1 | | |
| Palladium | 0.0000632 | 0.0000032 | V0 | 0.0000000 | V1 | 0.0000058 | V0 | | |
| Phosphorus | 0.0459574 | 0.0087912 | V0 | 0.0076092 | V0 | 0.0069091 | V0 | | |
| Platinum | 0.0000088 | 0.0000011 | V0 | 0.0000013 | V0 | 0.0000015 | V0 | | |
| Potassium | 0.0061261 | 0.0254308 | V0 | 0.0385210 | V0 | 0.0020569 | V0 | | |
| Praseodymium | 0.0000070 | 0.0000039 | V0 | 0.0000020 | V0 | 0.0000000 | V1 | | |
| Rubidium | 0.0000184 | 0.0000605 | V0 | 0.0000670 | V0 | 0.0000016 | V0 | | |
| Samarium | 0.0000133 | 0.0000028 | V0 | 0.0000014 | V0 | 0.0000000 | V1 | | |
| Selenium | 0.0003366 | 0.0000654 | V0 | 0.0000451 | V0 | 0.0000000 | V1 | | |
| Silicon | 0.7676322 | 0.0893859 | V0 | 0.0487541 | V0 | 0.0000000 | V1 | | |
| Silver | 0.0000100 | 0.0000015 | V0 | 0.0000035 | V0 | 0.0000017 | V0 | | |
| Sodium | 0.0169447 | 0.0102981 | V0 | 0.0091993 | V0 | 0.0038916 | V0 | | |
| Strontium | 0.0003375 | 0.0001437 | V0 | 0.0000913 | V0 | 0.0000000 | V1 | | |
| Tantalum | 0.0000394 | 0.0000000 | V1 | 0.0000000 | V1 | 0.0000000 | V1 | | |
| Thallium | 0.0000090 | 0.0000010 | V0 | 0.0000012 | V0 | 0.0000000 | V1 | | |
| Thorium | 0.0000059 | 0.0000048 | V0 | 0.0000025 | V0 | 0.0000004 | V0 | | |
| Tin | 0.0004414 | 0.0000610 | V0 | 0.0000603 | V0 | 0.0000231 | V0 | | |
| Titanium | 0.0015201 | 0.0019809 | V0 | 0.0010554 | V0 | 0.0009695 | V0 | | |
| Tungsten | 0.0000938 | 0.0000051 | V0 | 0.0000042 | V0 | 0.0000000 | V1 | | |
| Uranium | 0.0000048 | 0.0000014 | V0 | 0.0000009 | V0 | 0.0000002 | V0 | | |
| Vanadium | 0.0007697 | 0.0001262 | V0 | 0.0000704 | V0 | 0.0000000 | V1 | | |
| Zinc | 0.0055897 | 0.0014722 | V0 | 0.0020112 | V0 | 0.0000000 | V1 | | |



| Station Name Station # Sample Date Particulate Size Total Air Volume (m ³) | Athabasca Valley | | | Anzac | | Travel Blank | |
|--|--------------------------------|------------------------------|---------|---------------------------------|------------------------------|------------------------------|---|
| | AMS 7 30-Jul PM2.5 24 | Results (µg/m ³) | QC Flag | AMS 14 30-Jul PM2.5 24 | Results (µg/m ³) | QC Flag | 30-Jul 24 Results (µg/m ³) QC Flag |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 7.96 | V0 | 10.22 | V0 | 0.22 | V0 |
| Aluminum | 0.1380326 | 0.0193610 | V0 | 0.0169030 | V0 | 0.0000000 | V1 |
| Antimony | 0.0001784 | 0.0000673 | V0 | 0.0000176 | V0 | 0.0000000 | V1 |
| Arsenic | 0.0001060 | 0.0000723 | V0 | 0.0000451 | V0 | 0.0000000 | V1 |
| Barium | 0.0092847 | 0.0008655 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Beryllium | 0.0000946 | 0.0000000 | V1 | 0.0000000 | V1 | 0.0000000 | V1 |
| Bismuth | 0.0000093 | 0.0000079 | V0 | 0.0000016 | V0 | 0.0000006 | V0 |
| Cadmium | 0.0000174 | 0.0000138 | V0 | 0.0000180 | V0 | 0.0000000 | V1 |
| Calcium | 0.4112124 | 0.0364375 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Cerium | 0.0000174 | 0.0000273 | V0 | 0.0000196 | V0 | 0.0000007 | V0 |
| Cesium | 0.0000100 | 0.0000018 | V0 | 0.0000014 | V0 | 0.0000000 | V1 |
| Chromium | 0.0022262 | 0.0001937 | V0 | 0.0001303 | V0 | 0.0001781 | V0 |
| Cobalt | 0.0000273 | 0.0000142 | V0 | 0.0000073 | V0 | 0.0000021 | V0 |
| Copper | 0.0017171 | 0.0005352 | V0 | 0.0002283 | V0 | 0.0001646 | V0 |
| Iron | 0.0393063 | 0.0259620 | V0 | 0.0158172 | V0 | 0.0020037 | V0 |
| Lanthanum | 0.0000130 | 0.0000124 | V0 | 0.0000113 | V0 | 0.0000000 | V1 |
| Lead | 0.0008577 | 0.0000866 | V0 | 0.0000594 | V0 | 0.0000000 | V1 |
| Lithium | 0.0000374 | 0.0000134 | V0 | 0.0000093 | V0 | 0.0000022 | V0 |
| Magnesium | 0.0091409 | 0.0053878 | V0 | 0.0042211 | V0 | 0.0004283 | V0 |
| Manganese | 0.0006949 | 0.0004335 | V0 | 0.0003418 | V0 | 0.0000000 | V1 |
| Molybdenum | 0.0007116 | -9999 | M2 | 0.0000831 | V0 | 0.0000453 | V0 |
| Neodymium | 0.0000140 | 0.0000107 | V0 | 0.0000058 | V0 | 0.0000000 | V1 |
| Nickel | 0.0005429 | 0.0001271 | V0 | 0.0000774 | V0 | 0.0000672 | V0 |
| Niobium | 0.0000202 | 0.0000023 | V0 | 0.0000015 | V0 | 0.0000000 | V1 |
| Palladium | 0.0000632 | 0.0000072 | V0 | 0.0000031 | V0 | 0.0000058 | V0 |
| Phosphorus | 0.0459574 | 0.0091038 | V0 | 0.0091790 | V0 | 0.0069091 | V0 |
| Platinum | 0.0000088 | 0.0000022 | V0 | 0.0000013 | V0 | 0.0000015 | V0 |
| Potassium | 0.0061261 | 0.0332243 | V0 | 0.0394454 | V0 | 0.0020569 | V0 |
| Praseodymium | 0.0000070 | 0.0000026 | V0 | 0.0000015 | V0 | 0.0000000 | V1 |
| Rubidium | 0.0000184 | 0.0000471 | V0 | 0.0000548 | V0 | 0.0000016 | V0 |
| Samarium | 0.0000133 | 0.0000020 | V0 | 0.0000011 | V0 | 0.0000000 | V1 |
| Selenium | 0.0003366 | 0.0000753 | V0 | 0.0000523 | V0 | 0.0000000 | V1 |
| Silicon | 0.7676322 | 0.1257630 | V0 | 0.0893921 | V0 | 0.0000000 | V1 |
| Silver | 0.0000100 | 0.0000026 | V0 | 0.0000036 | V0 | 0.0000017 | V0 |
| Sodium | 0.0169447 | 0.0092065 | V0 | 0.0061337 | V0 | 0.0038916 | V0 |
| Strontium | 0.0003375 | 0.0001103 | V0 | 0.0000638 | V0 | 0.0000000 | V1 |
| Tantalum | 0.0000394 | 0.0000000 | V1 | 0.0000000 | V1 | 0.0000000 | V1 |
| Thallium | 0.0000090 | 0.0000007 | V0 | 0.0000011 | V0 | 0.0000000 | V1 |
| Thorium | 0.0000059 | 0.0000026 | V0 | 0.0000018 | V0 | 0.0000004 | V0 |
| Tin | 0.0004414 | 0.0001237 | V0 | 0.0000640 | V0 | 0.0000231 | V0 |
| Titanium | 0.0015201 | 0.0041814 | V0 | 0.0021230 | V0 | 0.0009695 | V0 |
| Tungsten | 0.0000938 | 0.0000060 | V0 | 0.0000039 | V0 | 0.0000000 | V1 |
| Uranium | 0.0000048 | 0.0000008 | V0 | 0.0000008 | V0 | 0.0000002 | V0 |
| Vanadium | 0.0007697 | 0.0000630 | V0 | 0.0000457 | V0 | 0.0000000 | V1 |
| Zinc | 0.0055897 | 0.0021260 | V0 | 0.0018374 | V0 | 0.0000000 | V1 |



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

Particulate Matter (PM2.5) - METALS - Summary

2017

Indicated Sites and Dates

| Station Name | Bertha Ganter - Fort McKay | Bertha Ganter - Fort McKay | Bertha Ganter - Fort McKay | Bertha Ganter - Fort McKay |
|--------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Station # | AMS 1 | AMS 1 | AMS 1 | AMS 1 |
| Sample Date | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 |
| Particulate Size | PM2.5 | PM2.5 | PM2.5 | PM2.5 |
| Compound Name | Average µg/m ³ | Std Dev µg/m ³ | Total Samples (#) | Total ≥ MDL (#) |
| Particulate Matter | 6.88 | 4.49 | 5 | 5 |
| Aluminum | 0.0559600 | 0.0455471 | 5 | 5 |
| Antimony | 0.0000160 | 0.0000178 | 5 | 3 |
| Arsenic | 0.0000543 | 0.0000337 | 5 | 5 |
| Barium | 0.0003883 | 0.0005319 | 5 | 2 |
| Beryllium | 0.0000021 | 0.0000029 | 5 | 2 |
| Bismuth | 0.0000021 | 0.0000012 | 4 | 4 |
| Cadmium | 0.0000080 | 0.0000032 | 5 | 5 |
| Calcium | 0.1082571 | 0.0898684 | 5 | 5 |
| Cerium | 0.0000575 | 0.0000513 | 5 | 5 |
| Cesium | 0.0000045 | 0.0000040 | 5 | 5 |
| Chromium | 0.0002046 | 0.0000289 | 5 | 5 |
| Cobalt | 0.0000173 | 0.0000137 | 5 | 5 |
| Copper | 0.0006495 | 0.0002970 | 5 | 5 |
| Iron | 0.0564457 | 0.0509357 | 5 | 5 |
| Lanthanum | 0.0000275 | 0.0000246 | 5 | 5 |
| Lead | 0.0000394 | 0.0000400 | 5 | 3 |
| Lithium | 0.0000479 | 0.0000395 | 5 | 5 |
| Magnesium | 0.0114168 | 0.0090168 | 5 | 5 |
| Manganese | 0.0009404 | 0.0008042 | 5 | 5 |
| Molybdenum | 0.0000606 | 0.0000413 | 5 | 5 |
| Neodymium | 0.0000237 | 0.0000215 | 5 | 5 |
| Nickel | 0.0001661 | 0.0000547 | 5 | 5 |
| Niobium | 0.0000060 | 0.0000051 | 5 | 4 |
| Palladium | 0.0000037 | 0.0000039 | 5 | 3 |
| Phosphorus | 0.0082816 | 0.0009070 | 5 | 5 |
| Platinum | 0.0000017 | 0.0000005 | 4 | 4 |
| Potassium | 0.0361120 | 0.0258110 | 5 | 5 |
| Praseodymium | 0.0000065 | 0.0000060 | 5 | 5 |
| Rubidium | 0.0001075 | 0.0001007 | 5 | 5 |
| Samarium | 0.0000048 | 0.0000043 | 5 | 5 |
| Selenium | 0.0000811 | 0.0000517 | 5 | 5 |
| Silicon | 0.1251502 | 0.1198807 | 5 | 4 |
| Silver | 0.0000018 | 0.0000007 | 5 | 5 |
| Sodium | 0.0114703 | 0.0053097 | 5 | 5 |
| Strontium | 0.0002420 | 0.0002022 | 5 | 5 |
| Tantalum | 0.0000000 | 0.0000000 | 5 | 0 |
| Thallium | 0.0000012 | 0.0000013 | 5 | 4 |
| Thorium | 0.0000075 | 0.0000068 | 5 | 5 |
| Tin | 0.0000812 | 0.0000448 | 4 | 4 |
| Titanium | 0.0026375 | 0.0019732 | 5 | 5 |
| Tungsten | 0.0000057 | 0.0000013 | 5 | 5 |
| Uranium | 0.0000020 | 0.0000017 | 5 | 5 |
| Vanadium | 0.0001438 | 0.0001136 | 5 | 4 |
| Zinc | 0.0018084 | 0.0011907 | 5 | 5 |



| Station Name | Patricia McInnes | Patricia McInnes | Patricia McInnes | Patricia McInnes |
|--------------------|------------------------------|------------------------------|-------------------|------------------|
| Station # | AMS 6 | AMS 6 | AMS 6 | AMS 6 |
| Sample Date | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 |
| Particulate Size | PM2.5 | PM2.5 | PM2.5 | PM2.5 |
| Compound Name | Average µg/m ³ | Std Dev µg/m ³ | Total Samples (#) | Total ≥ MDL (#) |
| Particulate Matter | 5.94 | 3.40 | 5 | 5 |
| Aluminum | 0.0390358 | 0.0357417 | 5 | 5 |
| Antimony | 0.0000241 | 0.0000120 | 5 | 5 |
| Arsenic | 0.0000557 | 0.0000264 | 5 | 5 |
| Barium | 0.0003902 | 0.0002254 | 5 | 4 |
| Beryllium | 0.0000000 | 0.0000000 | 5 | 0 |
| Bismuth | 0.0000022 | 0.0000011 | 5 | 5 |
| Cadmium | 0.0000113 | 0.0000065 | 5 | 5 |
| Calcium | 0.0278252 | 0.0217575 | 5 | 4 |
| Cerium | 0.0000409 | 0.0000332 | 5 | 5 |
| Cesium | 0.0000029 | 0.0000029 | 5 | 5 |
| Chromium | 0.0001676 | 0.0000482 | 5 | 5 |
| Cobalt | 0.0000123 | 0.0000100 | 5 | 5 |
| Copper | 0.0003520 | 0.0001120 | 5 | 5 |
| Iron | 0.0299672 | 0.0175336 | 5 | 5 |
| Lanthanum | 0.0000187 | 0.0000144 | 5 | 5 |
| Lead | 0.0000667 | 0.0000274 | 5 | 5 |
| Lithium | 0.0000344 | 0.0000393 | 5 | 5 |
| Magnesium | 0.0077332 | 0.0036066 | 5 | 5 |
| Manganese | 0.0005093 | 0.0002773 | 5 | 5 |
| Molybdenum | 0.0000319 | 0.0000533 | 5 | 2 |
| Neodymium | 0.0000148 | 0.0000129 | 5 | 5 |
| Nickel | 0.0001449 | 0.0000759 | 5 | 5 |
| Niobium | 0.0000039 | 0.0000036 | 5 | 5 |
| Palladium | 0.0000017 | 0.0000023 | 5 | 2 |
| Phosphorus | 0.0078606 | 0.0006146 | 5 | 5 |
| Platinum | 0.0000017 | 0.0000004 | 5 | 5 |
| Potassium | 0.0265449 | 0.0159453 | 5 | 5 |
| Praseodymium | 0.0000039 | 0.0000034 | 5 | 5 |
| Rubidium | 0.0000742 | 0.0000698 | 5 | 5 |
| Samarium | 0.0000027 | 0.0000022 | 5 | 5 |
| Selenium | 0.0000634 | 0.0000354 | 5 | 5 |
| Silicon | 0.0855529 | 0.1335224 | 5 | 3 |
| Silver | 0.0000025 | 0.0000014 | 5 | 5 |
| Sodium | 0.0204830 | 0.0185543 | 5 | 5 |
| Strontium | 0.0001385 | 0.0000775 | 5 | 5 |
| Tantalum | 0.0000000 | 0.0000000 | 5 | 0 |
| Thallium | 0.0000011 | 0.0000011 | 5 | 4 |
| Thorium | 0.0000048 | 0.0000039 | 5 | 5 |
| Tin | 0.0000636 | 0.0000141 | 5 | 5 |
| Titanium | 0.0016576 | 0.0010789 | 5 | 5 |
| Tungsten | 0.0000072 | 0.0000031 | 5 | 5 |
| Uranium | 0.0000014 | 0.0000011 | 5 | 5 |
| Vanadium | 0.0001851 | 0.0002908 | 5 | 4 |
| Zinc | 0.0013974 | 0.0006320 | 5 | 5 |



| Station Name | Athabasca Valley | Athabasca Valley | Athabasca Valley | Athabasca Valley |
|--------------------|------------------------------|------------------------------|-------------------|------------------|
| Station # | AMS 7 | AMS 7 | AMS 7 | AMS 7 |
| Sample Date | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 |
| Particulate Size | PM2.5 | PM2.5 | PM2.5 | PM2.5 |
| Compound Name | Average µg/m ³ | Std Dev µg/m ³ | Total Samples (#) | Total ≥ MDL (#) |
| Particulate Matter | 6.21 | 3.11 | 5 | 5 |
| Aluminum | 0.0430813 | 0.0389663 | 5 | 5 |
| Antimony | 0.0000772 | 0.0000354 | 5 | 5 |
| Arsenic | 0.0001388 | 0.0001586 | 5 | 5 |
| Barium | 0.0011924 | 0.0004790 | 5 | 5 |
| Beryllium | 0.0000000 | 0.0000000 | 5 | 0 |
| Bismuth | 0.0000048 | 0.0000022 | 5 | 5 |
| Cadmium | 0.0000082 | 0.0000043 | 5 | 5 |
| Calcium | 0.0422053 | 0.0093059 | 5 | 5 |
| Cerium | 0.0000452 | 0.0000283 | 5 | 5 |
| Cesium | 0.0000034 | 0.0000033 | 5 | 5 |
| Chromium | 0.0002141 | 0.0000352 | 5 | 5 |
| Cobalt | 0.0000159 | 0.0000072 | 5 | 5 |
| Copper | 0.0006725 | 0.0001625 | 5 | 5 |
| Iron | 0.0419248 | 0.0142316 | 5 | 5 |
| Lanthanum | 0.0000207 | 0.0000134 | 5 | 5 |
| Lead | 0.0000627 | 0.0000181 | 5 | 5 |
| Lithium | 0.0000407 | 0.0000407 | 5 | 5 |
| Magnesium | 0.0084406 | 0.0027701 | 5 | 5 |
| Manganese | 0.0006967 | 0.0002404 | 5 | 5 |
| Molybdenum | 0.0000460 | 0.0000049 | 4 | 4 |
| Neodymium | 0.0000177 | 0.0000125 | 5 | 5 |
| Nickel | 0.0001513 | 0.0000462 | 5 | 5 |
| Niobium | 0.0000044 | 0.0000025 | 5 | 5 |
| Palladium | 0.0000056 | 0.0000013 | 5 | 5 |
| Phosphorus | 0.0080914 | 0.0017205 | 5 | 5 |
| Platinum | 0.0000019 | 0.0000005 | 4 | 4 |
| Potassium | 0.0315410 | 0.0181861 | 5 | 5 |
| Praseodymium | 0.0000048 | 0.0000031 | 5 | 5 |
| Rubidium | 0.0000838 | 0.0000823 | 5 | 5 |
| Samarium | 0.0000030 | 0.0000021 | 5 | 5 |
| Selenium | 0.0000710 | 0.0000238 | 5 | 5 |
| Silicon | 0.1490719 | 0.1253499 | 5 | 5 |
| Silver | 0.0000017 | 0.0000007 | 5 | 5 |
| Sodium | 0.0102703 | 0.0036755 | 5 | 5 |
| Strontium | 0.0001779 | 0.0000660 | 5 | 5 |
| Tantalum | 0.0000000 | 0.0000000 | 5 | 0 |
| Thallium | 0.0000010 | 0.0000010 | 5 | 4 |
| Thorium | 0.0000051 | 0.0000035 | 5 | 5 |
| Tin | 0.0001299 | 0.0000279 | 5 | 5 |
| Titanium | 0.0023819 | 0.0011951 | 5 | 5 |
| Tungsten | 0.0000088 | 0.0000025 | 5 | 5 |
| Uranium | 0.0000016 | 0.0000009 | 5 | 5 |
| Vanadium | 0.0001099 | 0.0000641 | 5 | 5 |
| Zinc | 0.0018403 | 0.0007534 | 5 | 5 |



| Station Name | Anzac | Anzac | Anzac | Anzac |
|--------------------|------------------------------|------------------------------|-------------------|-----------------|
| Station # | AMS 14 | AMS 14 | AMS 14 | AMS 14 |
| Sample Date | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 |
| Particulate Size | PM2.5 | PM2.5 | PM2.5 | PM2.5 |
| Compound Name | Average µg/m ³ | Std Dev µg/m ³ | Total Samples (#) | Total ≥ MDL (#) |
| Particulate Matter | 5.96 | 3.68 | 5 | 5 |
| Aluminum | 0.0208728 | 0.0221903 | 5 | 5 |
| Antimony | 0.0000124 | 0.0000124 | 5 | 3 |
| Arsenic | 0.0000538 | 0.0000187 | 5 | 5 |
| Barium | 0.0000000 | 0.0000000 | 5 | 0 |
| Beryllium | 0.0000000 | 0.0000000 | 4 | 0 |
| Bismuth | 0.0000012 | 0.0000004 | 5 | 5 |
| Cadmium | 0.0000088 | 0.0000061 | 5 | 5 |
| Calcium | 0.0045183 | 0.0101032 | 5 | 1 |
| Cerium | 0.0000195 | 0.0000176 | 5 | 5 |
| Cesium | 0.0000016 | 0.0000022 | 5 | 4 |
| Chromium | 0.0001256 | 0.0000802 | 5 | 4 |
| Cobalt | 0.0000075 | 0.0000044 | 5 | 5 |
| Copper | 0.0001907 | 0.0000304 | 5 | 5 |
| Iron | 0.0162292 | 0.0072964 | 5 | 5 |
| Lanthanum | 0.0000096 | 0.0000081 | 5 | 5 |
| Lead | 0.0000217 | 0.0000300 | 5 | 2 |
| Lithium | 0.0000182 | 0.0000216 | 5 | 5 |
| Magnesium | 0.0036337 | 0.0014307 | 5 | 5 |
| Manganese | 0.0002917 | 0.0001189 | 5 | 5 |
| Molybdenum | 0.0000434 | 0.0000502 | 4 | 2 |
| Neodymium | 0.0000076 | 0.0000072 | 5 | 5 |
| Nickel | 0.0001014 | 0.0000473 | 5 | 5 |
| Niobium | 0.0000019 | 0.0000022 | 5 | 4 |
| Palladium | 0.0000012 | 0.0000017 | 5 | 2 |
| Phosphorus | 0.0080442 | 0.0011343 | 5 | 5 |
| Platinum | 0.0000015 | 0.0000002 | 5 | 5 |
| Potassium | 0.0228688 | 0.0152285 | 5 | 5 |
| Praseodymium | 0.0000019 | 0.0000019 | 5 | 5 |
| Rubidium | 0.0000501 | 0.0000539 | 5 | 5 |
| Samarium | 0.0000014 | 0.0000014 | 5 | 4 |
| Selenium | 0.0000562 | 0.0000224 | 5 | 5 |
| Silicon | 0.0783933 | 0.0594136 | 5 | 4 |
| Silver | 0.0000017 | 0.0000011 | 5 | 5 |
| Sodium | 0.0068737 | 0.0027705 | 5 | 5 |
| Strontium | 0.0000659 | 0.0000345 | 5 | 5 |
| Tantalum | 0.0000000 | 0.0000000 | 5 | 0 |
| Thallium | 0.0000007 | 0.0000008 | 5 | 3 |
| Thorium | 0.0000023 | 0.0000022 | 5 | 5 |
| Tin | 0.0000634 | 0.0000148 | 5 | 5 |
| Titanium | 0.0021423 | 0.0012342 | 4 | 4 |
| Tungsten | 0.0000042 | 0.0000053 | 5 | 3 |
| Uranium | 0.0000007 | 0.0000005 | 5 | 5 |
| Vanadium | 0.0000493 | 0.0000364 | 5 | 4 |
| Zinc | 0.0009853 | 0.0006616 | 5 | 5 |



Wood Buffalo Environmental Association

PM2.5 Metal (µg/sample) Summary

2017 July

| Compound | % Det | N | N < Det. | Min. | 10% | 25% | 50% | 60% | 75% | 80% | 90% | 95% | 99% | Max. | Mean | Std. Dev. | Median | Outlier | Test | |
|--------------------|--------|----|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-----------|--------|---------|--------|--|
| Particulate Matter | 100.0% | 20 | | 0 | 44 | 61 | 67 | 153 | 186 | 245 | 246 | 266 | 269 | 269 | 150 | 82 | 153 | 560 | | |
| Aluminum | 100.0% | 20 | | 0 | 0.1501 | 0.2004 | 0.3869 | 0.5505 | 0.9878 | 1.4156 | 2.2684 | 2.6413 | 2.7081 | 2.7081 | 2.7081 | 0.9520 | 0.8635 | 0.5505 | 5.2694 | |
| Antimony | 80.0% | 20 | 4 | 0.0001 | 0.0001 | 0.0003 | 0.0007 | 0.0008 | 0.0010 | 0.0016 | 0.0020 | 0.0030 | 0.0030 | 0.0030 | 0.0008 | 0.0008 | 0.0007 | 0.0046 | | |
| Arsenic | 100.0% | 20 | 0 | 0.0004 | 0.0006 | 0.0011 | 0.0014 | 0.0017 | 0.0020 | 0.0023 | 0.0024 | 0.0100 | 0.0100 | 0.0100 | 0.0100 | 0.0018 | 0.0020 | 0.0014 | 0.0120 | |
| Barium | 55.0% | 20 | 9 | 0.0021 | 0.0039 | 0.0054 | 0.0108 | 0.0139 | 0.0229 | 0.0237 | 0.0298 | 0.0469 | 0.0469 | 0.0469 | 0.0140 | 0.0115 | 0.0108 | 0.0712 | | |
| Beryllium | 15.0% | 20 | 17 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0000 | 0.0001 | 0.0002 | | |
| Bismuth | 100.0% | 20 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0002 | 0.0001 | 0.0000 | 0.0001 | 0.0003 | |
| Cadmium | 100.0% | 20 | 0 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0004 | 0.0005 | 0.0005 | 0.0005 | 0.0002 | 0.0001 | 0.0002 | 0.0008 | |
| Calcium | 75.0% | 20 | 5 | 0.3177 | 0.3612 | 0.4343 | 0.8540 | 0.9719 | 1.2900 | 1.4159 | 3.7231 | 5.7920 | 5.7920 | 5.7920 | 1.1868 | 1.3329 | 0.8540 | 7.8511 | | |
| Cerium | 100.0% | 20 | 0 | 0.0001 | 0.0002 | 0.0005 | 0.0007 | 0.0009 | 0.0013 | 0.0022 | 0.0022 | 0.0031 | 0.0031 | 0.0031 | 0.0010 | 0.0008 | 0.0007 | 0.0052 | | |
| Cesium | 95.0% | 20 | 1 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0001 | 0.0001 | 0.0000 | 0.0004 | | |
| Chromium | 95.0% | 20 | 1 | 0.0021 | 0.0030 | 0.0036 | 0.0046 | 0.0051 | 0.0054 | 0.0056 | 0.0057 | 0.0060 | 0.0060 | 0.0060 | 0.0044 | 0.0011 | 0.0046 | 0.0101 | | |
| Cobalt | 100.0% | 20 | 0 | 0.0001 | 0.0001 | 0.0002 | 0.0003 | 0.0003 | 0.0004 | 0.0006 | 0.0007 | 0.0009 | 0.0009 | 0.0009 | 0.0003 | 0.0002 | 0.0003 | 0.0015 | | |
| Copper | 100.0% | 20 | 0 | 0.0038 | 0.0043 | 0.0055 | 0.0118 | 0.0133 | 0.0149 | 0.0159 | 0.0223 | 0.0258 | 0.0258 | 0.0258 | 0.0112 | 0.0063 | 0.0118 | 0.0427 | | |
| Iron | 100.0% | 20 | 0 | 0.1408 | 0.2843 | 0.4012 | 0.6277 | 0.9025 | 1.1736 | 1.1798 | 2.0425 | 3.1477 | 3.1477 | 3.1477 | 0.8656 | 0.7182 | 0.6277 | 4.4568 | | |
| Lanthanum | 100.0% | 20 | 0 | 0.0001 | 0.0001 | 0.0002 | 0.0003 | 0.0004 | 0.0006 | 0.0010 | 0.0011 | 0.0015 | 0.0015 | 0.0015 | 0.0005 | 0.0004 | 0.0003 | 0.0024 | | |
| Lead | 75.0% | 20 | 5 | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0017 | 0.0019 | 0.0021 | 0.0027 | 0.0027 | 0.0027 | 0.0013 | 0.0006 | 0.0012 | 0.0043 | | |
| Lithium | 100.0% | 20 | 0 | 0.0001 | 0.0002 | 0.0003 | 0.0005 | 0.0008 | 0.0013 | 0.0020 | 0.0025 | 0.0027 | 0.0027 | 0.0027 | 0.0008 | 0.0008 | 0.0005 | 0.0051 | | |
| Magnesium | 100.0% | 20 | 0 | 0.0563 | 0.0686 | 0.1070 | 0.1391 | 0.1838 | 0.2536 | 0.2741 | 0.4832 | 0.5286 | 0.5286 | 0.5286 | 0.1870 | 0.1315 | 0.1391 | 0.8443 | | |
| Manganese | 100.0% | 20 | 0 | 0.0034 | 0.0052 | 0.0082 | 0.0109 | 0.0148 | 0.0206 | 0.0215 | 0.0371 | 0.0485 | 0.0485 | 0.0485 | 0.0146 | 0.0114 | 0.0109 | 0.0718 | | |
| Molybdenum | 75.0% | 20 | 5 | 0.0005 | 0.0006 | 0.0007 | 0.0010 | 0.0012 | 0.0021 | 0.0027 | 0.0031 | 0.0046 | 0.0046 | 0.0046 | 0.0015 | 0.0011 | 0.0010 | 0.0071 | | |
| Neodymium | 100.0% | 20 | 0 | 0.0001 | 0.0001 | 0.0001 | 0.0003 | 0.0004 | 0.0005 | 0.0009 | 0.0009 | 0.0013 | 0.0013 | 0.0013 | 0.0004 | 0.0003 | 0.0003 | 0.0021 | | |
| Nickel | 100.0% | 20 | 0 | 0.0013 | 0.0019 | 0.0024 | 0.0030 | 0.0038 | 0.0044 | 0.0046 | 0.0057 | 0.0062 | 0.0062 | 0.0062 | 0.0034 | 0.0014 | 0.0030 | 0.0103 | | |
| Niobium | 90.0% | 20 | 2 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0003 | 0.0003 | 0.0003 | 0.0001 | 0.0001 | 0.0001 | 0.0005 | | |
| Palladium | 60.0% | 20 | 8 | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0001 | 0.0001 | 0.0001 | 0.0003 | | |
| Phosphorus | 100.0% | 20 | 0 | 0.1282 | 0.1654 | 0.1826 | 0.1995 | 0.2078 | 0.2172 | 0.2185 | 0.2203 | 0.2220 | 0.2220 | 0.2220 | 0.1933 | 0.0256 | 0.1995 | 0.3214 | | |
| Platinum | 100.0% | 20 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0000 | 0.0000 | 0.0000 | 0.0002 | | |
| Potassium | 100.0% | 20 | 0 | 0.1791 | 0.2935 | 0.3687 | 0.6103 | 0.7974 | 0.9467 | 1.1334 | 1.4693 | 1.6069 | 1.6069 | 1.6069 | 0.7011 | 0.4416 | 0.6103 | 2.9090 | | |
| Praseodymium | 100.0% | 20 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0004 | 0.0004 | 0.0004 | 0.0001 | 0.0001 | 0.0001 | 0.0006 | | |
| Rubidium | 100.0% | 20 | 0 | 0.0003 | 0.0005 | 0.0006 | 0.0013 | 0.0015 | 0.0034 | 0.0041 | 0.0055 | 0.0061 | 0.0061 | 0.0061 | 0.0019 | 0.0018 | 0.0013 | 0.0109 | | |
| Samarium | 95.0% | 20 | 1 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0001 | 0.0001 | 0.0000 | 0.0004 | | |
| Selenium | 100.0% | 20 | 0 | 0.0006 | 0.0007 | 0.0011 | 0.0016 | 0.0017 | 0.0020 | 0.0024 | 0.0029 | 0.0036 | 0.0036 | 0.0036 | 0.0016 | 0.0008 | 0.0016 | 0.0057 | | |
| Silicon | 80.0% | 20 | 4 | 0.0000 | 0.0000 | 1.1701 | 2.1454 | 3.2336 | 3.0183 | 3.8230 | 7.7520 | 8.7898 | 8.7898 | 8.7898 | 2.6253 | 2.5970 | 2.1454 | 15.6102 | | |
| Silver | 100.0% | 20 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0000 | 0.0000 | 0.0000 | 0.0002 | | |
| Sodium | 100.0% | 20 | 0 | 0.0748 | 0.1304 | 0.1526 | 0.2325 | 0.2558 | 0.3657 | 0.3719 | 0.6868 | 1.1874 | 1.1874 | 1.1874 | 0.2943 | 0.2513 | 0.2325 | 1.5508 | | |
| Strontium | 100.0% | 20 | 0 | 0.0010 | 0.0011 | 0.0015 | 0.0029 | 0.0034 | 0.0052 | 0.0055 | 0.0102 | 0.0118 | 0.0118 | 0.0118 | 0.0037 | 0.0030 | 0.0029 | 0.0186 | | |
| Tantalum | 0.0% | 20 | 20 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | |
| Thallium | 75.0% | 20 | 5 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | | |
| Thorium | 100.0% | 20 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0002 | 0.0003 | 0.0003 | 0.0004 | 0.0004 | 0.0004 | 0.0001 | 0.0001 | 0.0001 | 0.0007 | | |
| Tin | 100.0% | 20 | 0 | 0.0010 | 0.0013 | 0.0014 | 0.0018 | 0.0021 | 0.0028 | 0.0030 | 0.0036 | 0.0041 | 0.0041 | 0.0041 | 0.0021 | 0.0009 | 0.0018 | 0.0065 | | |
| Titanium | 100.0% | 20 | 0 | 0.0126 | 0.0138 | 0.0269 | 0.0537 | 0.0592 | 0.0833 | 0.1004 | 0.1191 | 0.1247 | 0.1247 | 0.1247 | 0.0565 | 0.0355 | 0.0537 | 0.2340 | | |
| Tungsten | 90.0% | 20 | 2 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0002 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0002 | 0.0001 | 0.0002 | 0.0005 | | |
| Uranium | 100.0% | 20 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0000 | 0.0000 | 0.0000 | 0.0002 | | |
| Vanadium | 85.0% | 20 | 3 | 0.0004 | 0.0007 | 0.0011 | 0.0019 | 0.0024 | 0.0030 | 0.0053 | 0.0067 | 0.0168 | 0.0168 | 0.0168 | 0.0030 | 0.0037 | 0.0019 | 0.0214 | | |
| Zinc | 100.0% | 20 | 0 | 0.0092 | 0.0134 | 0.0224 | 0.0369 | 0.0405 | 0.0474 | 0.0483 | 0.0708 | 0.0907 | 0.0907 | 0.0907 | 0.0361 | 0.0204 | 0.0369 | 0.1381 | | |



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

INTEGRATED MONITORING PROGRAM MONTHLY REPORT

PARTICULATE MATTER (PM₁₀) - METALS DATA SUMMARY JULY 2017

Prepared
September 27, 2017

SAMPLE COLLECTION AND DATA COMPILATION BY:

Wood Buffalo Environmental Association
Fort McMurray, Alberta

LABORATORY ANALYSIS BY:

PM metals: Atmospheric Research & Analysis, Inc.
Morrisville, NC



| | |
|---|---|
| FILE CONTENTS DESCRIPTION | Partisol Sampler Measurements of Mass, Ions by IC and Metals by ICP-MS |
| SAMPLING INTERVAL | 24 hour |
| SAMPLING FREQUENCY OF DATA | Once every 6 days |
| EXPLANATION OF ZERO VALUES | Zero values are contained in this file and should be treated as values below detection - Method Detection Limits (MDL) are provided with each observation |
| UNITS | $\mu\text{g}/\text{m}^3$ (microgram per cubic meter) |
| OBSERVATION TYPE | Particles |
| FIELD SAMPLING OR MEASUREMENT PRINCIPLE | Filtration with PM_{10} Inlet for PM_{10} and with PM_{10} Inlet/Very Sharp Cut Cyclone for $\text{PM}_{2.5}$ |
| PARTICLE DIAMETER | $< 2.5 \mu\text{m}$ or $< 10 \mu\text{m}$ |
| MEDIUM | 47 mm Teflon Filter |
| ANALYTICAL METHODS | MASS by Microbalance ELEMENTS by Inductively Coupled Plasma Mass Spectrometry (ICP/MS) IONS by Ion Chromatography (IC) |
| SAMPLE PREPARATION | DI Water extraction for IC analysis and Acid Digestion for ICP/MS Analysis |
| ANALYTICAL LABORATORY | Atmospheric Research & Analysis Inc |
| USER NOTE 1 | Data are not blank corrected |
| USER NOTE 2 | Volume is given at actual conditions of temperature and pressure during sampling as measured by the sampler |
| USER NOTE 3 | Blank sample concentration ($\mu\text{g}/\text{m}^3$) is calculated using expected actual volume of sampler |
| VOLUME STANDARDIZATION | Actual Volume at Ambient Conditions (since 01-Jan-2011) |
| SAMPLING INSTRUMENT TYPE | For PM_{10} FRM Partisol PM_{10} sampler For $\text{PM}_{2.5}$ FRM Partisol $\text{PM}_{2.5}$ sampler |
| FLAGS USED | |
| V0 | Valid value |
| V1 | Valid value but comprised wholly or partially of below detection limit data |
| V4 | Valid value despite failing to meet some QC or statistical criteria |
| V5 | Valid value but qualified because of possible contamination |
| V6 | Valid value but qualified due to non-standard sampling conditions |
| M1 | Missing value because no value is available |
| M2 | Missing value because invalidated by Data Originator |



| Compound Name | Bertha Ganter - Fort | | | | | | |
|------------------------------------|------------------------------|-----------|------------------------------|------------------|------------------------------|--------------|---------|
| | Station Name | McKay | | Patricia McInnes | | Travel Blank | |
| | Station # | AMS 1 | | AMS 6 | | | |
| | Sample Date | 06-Jul | | 06-Jul | | | 06-Jul |
| Particulate Size | PM10 | | PM10 | | | | |
| Total Air Volume (m ³) | 24 | | 24 | | | 24 | |
| MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | QC Flag |
| Particulate Matter | 1.00 | 11.12 | V0 | 21.03 | V0 | 0.21 | V0 |
| Aluminum | 0.1380326 | 0.2952918 | V0 | 0.6107815 | V0 | 0.0000000 | V1 |
| Antimony | 0.0001784 | 0.0000092 | V0 | 0.0000676 | V0 | 0.0000000 | V1 |
| Arsenic | 0.0001060 | 0.0000669 | V0 | 0.0001608 | V0 | 0.0000000 | V1 |
| Barium | 0.0092847 | 0.0023908 | V0 | 0.0072799 | V0 | 0.0000000 | V1 |
| Beryllium | 0.0000946 | 0.0000105 | V0 | 0.0000191 | V0 | 0.0000000 | V1 |
| Bismuth | 0.0000093 | 0.0000024 | V0 | 0.0000057 | V0 | 0.0000000 | V1 |
| Cadmium | 0.0000174 | 0.0000061 | V0 | 0.0000175 | V0 | 0.0000000 | V1 |
| Calcium | 0.4112124 | 1.0666370 | V0 | 1.0087839 | V0 | 0.0000000 | V1 |
| Cerium | 0.0000174 | 0.0002889 | V0 | 0.0006971 | V0 | 0.0000000 | V1 |
| Cesium | 0.0000100 | 0.0000246 | V0 | 0.0000439 | V0 | 0.0000000 | V1 |
| Chromium | 0.0022262 | 0.0005576 | V0 | 0.0009106 | V0 | 0.0000000 | V1 |
| Cobalt | 0.0000273 | 0.0000830 | V0 | 0.0001942 | V0 | 0.0000015 | V0 |
| Copper | 0.0017171 | 0.0005584 | V0 | 0.0009317 | V0 | 0.0000000 | V1 |
| Iron | 0.0393063 | 0.2406072 | V0 | 0.7514375 | V0 | 0.0018213 | V0 |
| Lanthanum | 0.0000130 | 0.0001439 | V0 | 0.0003507 | V0 | 0.0000000 | V1 |
| Lead | 0.0008577 | 0.0001388 | V0 | 0.0003017 | V0 | 0.0000000 | V1 |
| Lithium | 0.0000374 | 0.0003001 | V0 | 0.0004677 | V0 | 0.0000000 | V1 |
| Magnesium | 0.0091409 | 0.0602883 | V0 | 0.2480055 | V0 | 0.0000000 | V1 |
| Manganese | 0.0006949 | 0.0044289 | V0 | 0.0120290 | V0 | 0.0000000 | V1 |
| Molybdenum | 0.0007116 | 0.0000346 | V0 | 0.0000588 | V0 | 0.0000644 | V0 |
| Neodymium | 0.0000140 | 0.0001302 | V0 | 0.0003016 | V0 | 0.0000000 | V1 |
| Nickel | 0.0005429 | 0.0003793 | V0 | 0.0007289 | V0 | 0.0000738 | V0 |
| Niobium | 0.0000202 | 0.0000331 | V0 | 0.0000731 | V0 | 0.0000000 | V1 |
| Palladium | 0.0000632 | 0.0000079 | V0 | 0.0000110 | V0 | 0.0000028 | V0 |
| Phosphorus | 0.0459574 | 0.0144526 | V0 | 0.0209386 | V0 | 0.0065796 | V0 |
| Platinum | 0.0000088 | 0.0000017 | V0 | 0.0000028 | V0 | 0.0000031 | V0 |
| Potassium | 0.0061261 | 0.1035121 | V0 | 0.1990790 | V0 | 0.0006425 | V0 |
| Praseodymium | 0.0000070 | 0.0000328 | V0 | 0.0000787 | V0 | 0.0000000 | V1 |
| Rubidium | 0.0000184 | 0.0004385 | V0 | 0.0008037 | V0 | 0.0000000 | V1 |
| Samarium | 0.0000133 | 0.0000233 | V0 | 0.0000543 | V0 | 0.0000000 | V1 |
| Selenium | 0.0003366 | 0.0001858 | V0 | 0.0003255 | V0 | 0.0000251 | V0 |
| Silicon | 0.7676322 | 0.9315163 | V0 | 2.5354079 | V0 | 0.0000000 | V1 |
| Silver | 0.0000100 | 0.0000020 | V0 | 0.0000043 | V0 | 0.0000000 | V1 |
| Sodium | 0.0169447 | 0.0283961 | V0 | 0.1359907 | V0 | 0.0009756 | V0 |
| Strontium | 0.0003375 | 0.0015823 | V0 | 0.0032996 | V0 | 0.0000000 | V1 |
| Tantalum | 0.0000394 | 0.0000023 | V0 | 0.0000053 | V0 | 0.0000000 | V1 |
| Thallium | 0.0000090 | 0.0000033 | V0 | 0.0000073 | V0 | 0.0000000 | V1 |
| Thorium | 0.0000059 | 0.0000397 | V0 | 0.0000961 | V0 | 0.0000000 | V1 |
| Tin | 0.0004414 | 0.0000530 | V0 | 0.0001168 | V0 | 0.0000318 | V0 |
| Titanium | 0.0015201 | 0.0116098 | V0 | 0.0227654 | V0 | 0.0013969 | V0 |
| Tungsten | 0.0000938 | 0.0000108 | V0 | 0.0001536 | V0 | 0.0000000 | V1 |
| Uranium | 0.0000048 | 0.0000120 | V0 | 0.0000305 | V0 | 0.0000000 | V1 |
| Vanadium | 0.0007697 | 0.0006280 | V0 | 0.0014556 | V0 | 0.0000000 | V1 |
| Zinc | 0.0055897 | 0.0011752 | V0 | 0.0033062 | V0 | 0.0002330 | V0 |



| Station Name Station # Sample Date Particulate Size Total Air Volume (m ³) | Athabasca Valley | | | Anzac | | Travel Blank | |
|--|-------------------------------|------------------------------|---------|--------------------------------|------------------------------|------------------------------|--------------|
| | AMS 7 06-Jul PM10 24 | Results (µg/m ³) | QC Flag | AMS 14 06-Jul PM10 24 | Results (µg/m ³) | QC Flag | 06-Jul 24 |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 15.18 | V0 | 5.57 | V0 | 0.21 | V0 |
| Aluminum | 0.1380326 | 0.4298295 | V0 | 0.0796439 | V0 | 0.0000000 | V1 |
| Antimony | 0.0001784 | 0.0002658 | V0 | 0.0000653 | V0 | 0.0000000 | V1 |
| Arsenic | 0.0001060 | 0.0005794 | V0 | 0.0000593 | V0 | 0.0000000 | V1 |
| Barium | 0.0092847 | 0.0067865 | V0 | 0.0012633 | V0 | 0.0000000 | V1 |
| Beryllium | 0.0000946 | 0.0000132 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Bismuth | 0.0000093 | 0.0000119 | V0 | 0.0000047 | V0 | 0.0000000 | V1 |
| Cadmium | 0.0000174 | 0.0000105 | V0 | 0.0000064 | V0 | 0.0000000 | V1 |
| Calcium | 0.4112124 | 0.5590980 | V0 | 0.0821347 | V0 | 0.0000000 | V1 |
| Cerium | 0.0000174 | 0.0004924 | V0 | 0.0000750 | V0 | 0.0000000 | V1 |
| Cesium | 0.0000100 | 0.0000324 | V0 | 0.0000054 | V0 | 0.0000000 | V1 |
| Chromium | 0.0022262 | 0.0007072 | V0 | 0.0003042 | V0 | 0.0000000 | V1 |
| Cobalt | 0.0000273 | 0.0001410 | V0 | 0.0000249 | V0 | 0.0000015 | V0 |
| Copper | 0.0017171 | 0.0017819 | V0 | 0.0002861 | V0 | 0.0000000 | V1 |
| Iron | 0.0393063 | 0.5315386 | V0 | 0.0965733 | V0 | 0.0018213 | V0 |
| Lanthanum | 0.0000130 | 0.0002337 | V0 | 0.0000386 | V0 | 0.0000000 | V1 |
| Lead | 0.0008577 | 0.0002413 | V0 | 0.0000487 | V0 | 0.0000000 | V1 |
| Lithium | 0.0000374 | 0.0003629 | V0 | 0.0000660 | V0 | 0.0000000 | V1 |
| Magnesium | 0.0091409 | 0.1380617 | V0 | 0.0198220 | V0 | 0.0000000 | V1 |
| Manganese | 0.0006949 | 0.0081032 | V0 | 0.0014958 | V0 | 0.0000000 | V1 |
| Molybdenum | 0.0007116 | 0.0001116 | V0 | 0.0000408 | V0 | 0.0000644 | V0 |
| Neodymium | 0.0000140 | 0.0002077 | V0 | 0.0000332 | V0 | 0.0000000 | V1 |
| Nickel | 0.0005429 | 0.0005152 | V0 | 0.0001531 | V0 | 0.0000738 | V0 |
| Niobium | 0.0000202 | 0.0000480 | V0 | 0.0000081 | V0 | 0.0000000 | V1 |
| Palladium | 0.0000632 | 0.0000115 | V0 | 0.0000000 | V1 | 0.0000028 | V0 |
| Phosphorus | 0.0459574 | 0.0190162 | V0 | 0.0130558 | V0 | 0.0065796 | V0 |
| Platinum | 0.0000088 | 0.0000047 | V0 | 0.0000041 | V0 | 0.0000031 | V0 |
| Potassium | 0.0061261 | 0.1636668 | V0 | 0.0403123 | V0 | 0.0006425 | V0 |
| Praseodymium | 0.0000070 | 0.0000557 | V0 | 0.0000084 | V0 | 0.0000000 | V1 |
| Rubidium | 0.0000184 | 0.0005783 | V0 | 0.0001093 | V0 | 0.0000000 | V1 |
| Samarium | 0.0000133 | 0.0000373 | V0 | 0.0000060 | V0 | 0.0000000 | V1 |
| Selenium | 0.0003366 | 0.0002456 | V0 | 0.0000532 | V0 | 0.0000251 | V0 |
| Silicon | 0.7676322 | 1.5718456 | V0 | 0.2509080 | V0 | 0.0000000 | V1 |
| Silver | 0.0000100 | 0.0000032 | V0 | 0.0000013 | V0 | 0.0000000 | V1 |
| Sodium | 0.0169447 | 0.0666535 | V0 | 0.0133750 | V0 | 0.0009756 | V0 |
| Strontium | 0.0003375 | 0.0018621 | V0 | 0.0002912 | V0 | 0.0000000 | V1 |
| Tantalum | 0.0000394 | 0.0000035 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Thallium | 0.0000090 | 0.0000048 | V0 | 0.0000008 | V0 | 0.0000000 | V1 |
| Thorium | 0.0000059 | 0.0000624 | V0 | 0.0000093 | V0 | 0.0000000 | V1 |
| Tin | 0.0004414 | 0.0002934 | V0 | 0.0000885 | V0 | 0.0000318 | V0 |
| Titanium | 0.0015201 | 0.0167875 | V0 | 0.0029395 | V0 | 0.0013969 | V0 |
| Tungsten | 0.0000938 | 0.0001139 | V0 | 0.0000511 | V0 | 0.0000000 | V1 |
| Uranium | 0.0000048 | 0.0000178 | V0 | 0.0000030 | V0 | 0.0000000 | V1 |
| Vanadium | 0.0007697 | 0.0009740 | V0 | 0.0001684 | V0 | 0.0000000 | V1 |
| Zinc | 0.0055897 | 0.0078853 | V0 | 0.0007522 | V0 | 0.0002330 | V0 |



| Compound Name | Station Name Station # Sample Date Particulate Size Total Air Volume (m ³) | Fort McKay South | | | Horizon | | Travel Blank | |
|--------------------|--|--------------------------------|------------------------------|-----------|--------------------------------|-----------|------------------------------|---------|
| | | AMS 13 06-Jul PM10 24 | Results (µg/m ³) | QC Flag | AMS 15 06-Jul PM10 24 | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 5.17 | V0 | 14.66 | V0 | 0.21 | V0 | |
| Aluminum | 0.1380326 | 0.1374730 | V0 | 0.7948396 | V0 | 0.0000000 | V1 | |
| Antimony | 0.0001784 | 0.0000000 | V1 | 0.0000300 | V0 | 0.0000000 | V1 | |
| Arsenic | 0.0001060 | 0.0000330 | V0 | 0.0001168 | V0 | 0.0000000 | V1 | |
| Barium | 0.0092847 | 0.0010685 | V0 | 0.0058873 | V0 | 0.0000000 | V1 | |
| Beryllium | 0.0000946 | 0.0000045 | V0 | 0.0000202 | V0 | 0.0000000 | V1 | |
| Bismuth | 0.0000093 | 0.0000014 | V0 | 0.0000036 | V0 | 0.0000000 | V1 | |
| Cadmium | 0.0000174 | 0.0000044 | V0 | 0.0000048 | V0 | 0.0000000 | V1 | |
| Calcium | 0.4112124 | 0.0882086 | V0 | 0.1959396 | V0 | 0.0000000 | V1 | |
| Cerium | 0.0000174 | 0.0001332 | V0 | 0.0007690 | V0 | 0.0000000 | V1 | |
| Cesium | 0.0000100 | 0.0000093 | V0 | 0.0000623 | V0 | 0.0000000 | V1 | |
| Chromium | 0.0022262 | 0.0002588 | V0 | 0.0011155 | V0 | 0.0000000 | V1 | |
| Cobalt | 0.0000273 | 0.0000308 | V0 | 0.0001815 | V0 | 0.0000015 | V0 | |
| Copper | 0.0017171 | 0.0002159 | V0 | 0.0006163 | V0 | 0.0000000 | V1 | |
| Iron | 0.0393063 | 0.0875816 | V0 | 0.4592585 | V0 | 0.0018213 | V0 | |
| Lanthanum | 0.0000130 | 0.0000607 | V0 | 0.0003746 | V0 | 0.0000000 | V1 | |
| Lead | 0.0008577 | 0.0000429 | V0 | 0.0001989 | V0 | 0.0000000 | V1 | |
| Lithium | 0.0000374 | 0.0001164 | V0 | 0.0007952 | V0 | 0.0000000 | V1 | |
| Magnesium | 0.0091409 | 0.0245479 | V0 | 0.1089284 | V0 | 0.0000000 | V1 | |
| Manganese | 0.0006949 | 0.0015365 | V0 | 0.0078229 | V0 | 0.0000000 | V1 | |
| Molybdenum | 0.0007116 | 0.0000000 | V1 | 0.0001012 | V0 | 0.0000644 | V0 | |
| Neodymium | 0.0000140 | 0.0000555 | V0 | 0.0003347 | V0 | 0.0000000 | V1 | |
| Nickel | 0.0005429 | 0.0001746 | V0 | 0.0007780 | V0 | 0.0000738 | V0 | |
| Niobium | 0.0000202 | 0.0000140 | V0 | 0.0000889 | V0 | 0.0000000 | V1 | |
| Palladium | 0.0000632 | 0.0000039 | V0 | 0.0000128 | V0 | 0.0000028 | V0 | |
| Phosphorus | 0.0459574 | 0.0125421 | V0 | 0.0176981 | V0 | 0.0065796 | V0 | |
| Platinum | 0.0000088 | 0.0000015 | V0 | 0.0000019 | V0 | 0.0000031 | V0 | |
| Potassium | 0.0061261 | 0.0474719 | V0 | 0.2033707 | V0 | 0.0006425 | V0 | |
| Praseodymium | 0.0000070 | 0.0000137 | V0 | 0.0000877 | V0 | 0.0000000 | V1 | |
| Rubidium | 0.0000184 | 0.0001650 | V0 | 0.0009881 | V0 | 0.0000000 | V1 | |
| Samarium | 0.0000133 | 0.0000110 | V0 | 0.0000636 | V0 | 0.0000000 | V1 | |
| Selenium | 0.0003366 | 0.0000762 | V0 | 0.0003992 | V0 | 0.0000251 | V0 | |
| Silicon | 0.7676322 | 0.2989119 | V0 | 2.1146670 | V0 | 0.0000000 | V1 | |
| Silver | 0.0000100 | 0.0000014 | V0 | 0.0000035 | V0 | 0.0000000 | V1 | |
| Sodium | 0.0169447 | 0.0169715 | V0 | 0.0804780 | V0 | 0.0009756 | V0 | |
| Strontium | 0.0003375 | 0.0003761 | V0 | 0.0020097 | V0 | 0.0000000 | V1 | |
| Tantalum | 0.0000394 | 0.0000000 | V1 | 0.0000060 | V0 | 0.0000000 | V1 | |
| Thallium | 0.0000090 | 0.0000012 | V0 | 0.0000064 | V0 | 0.0000000 | V1 | |
| Thorium | 0.0000059 | 0.0000161 | V0 | 0.0001019 | V0 | 0.0000000 | V1 | |
| Tin | 0.0004414 | 0.0000492 | V0 | 0.0000737 | V0 | 0.0000318 | V0 | |
| Titanium | 0.0015201 | 0.0041009 | V0 | 0.0288592 | V0 | 0.0013969 | V0 | |
| Tungsten | 0.0000938 | 0.0000076 | V0 | 0.0000247 | V0 | 0.0000000 | V1 | |
| Uranium | 0.0000048 | 0.0000044 | V0 | 0.0000291 | V0 | 0.0000000 | V1 | |
| Vanadium | 0.0007697 | 0.0005104 | V0 | 0.0018975 | V0 | 0.0000000 | V1 | |
| Zinc | 0.0055897 | 0.0009138 | V0 | 0.0018466 | V0 | 0.0002330 | V0 | |



| Compound Name | MDL (µg/sample) | Muskeg River | | Travel Blank | | |
|--------------------|-----------------|--------------|------------------|------------------------------------|------------------------------|---------|
| | | AMS 16 | QC Flag | 06-Jul | QC Flag | |
| Station Name | Station # | Sample Date | Particulate Size | Total Air Volume (m ³) | 24 | 24 |
| AMS 16 | 06-Jul | PM10 | 24 | 24 | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 26.51 | V0 | 0.21 | V0 | |
| Aluminum | 0.1380326 | 1.1391881 | V0 | 0.0000000 | V1 | |
| Antimony | 0.0001784 | 0.0000212 | V0 | 0.0000000 | V1 | |
| Arsenic | 0.0001060 | 0.0001759 | V0 | 0.0000000 | V1 | |
| Barium | 0.0092847 | 0.0085743 | V0 | 0.0000000 | V1 | |
| Beryllium | 0.0000946 | 0.0000343 | V0 | 0.0000000 | V1 | |
| Bismuth | 0.0000093 | 0.0000093 | V0 | 0.0000000 | V1 | |
| Cadmium | 0.0000174 | 0.0000053 | V0 | 0.0000000 | V1 | |
| Calcium | 0.4112124 | 1.1002968 | V0 | 0.0000000 | V1 | |
| Cerium | 0.0000174 | 0.0013170 | V0 | 0.0000000 | V1 | |
| Cesium | 0.0000100 | 0.0000736 | V0 | 0.0000000 | V1 | |
| Chromium | 0.0022262 | 0.0013517 | V0 | 0.0000000 | V1 | |
| Cobalt | 0.0000273 | 0.0003011 | V0 | 0.0000015 | V0 | |
| Copper | 0.0017171 | 0.0006374 | V0 | 0.0000000 | V1 | |
| Iron | 0.0393063 | 1.3384478 | V0 | 0.0018213 | V0 | |
| Lanthanum | 0.0000130 | 0.0006273 | V0 | 0.0000000 | V1 | |
| Lead | 0.0008577 | 0.0003302 | V0 | 0.0000000 | V1 | |
| Lithium | 0.0000374 | 0.0013541 | V0 | 0.0000000 | V1 | |
| Magnesium | 0.0091409 | 0.2115203 | V0 | 0.0000000 | V1 | |
| Manganese | 0.0006949 | 0.0207136 | V0 | 0.0000000 | V1 | |
| Molybdenum | 0.0007116 | 0.0001474 | V0 | 0.0000644 | V0 | |
| Neodymium | 0.0000140 | 0.0005473 | V0 | 0.0000000 | V1 | |
| Nickel | 0.0005429 | 0.0013317 | V0 | 0.0000738 | V0 | |
| Niobium | 0.0000202 | 0.0001398 | V0 | 0.0000000 | V1 | |
| Palladium | 0.0000632 | 0.0000157 | V0 | 0.0000028 | V0 | |
| Phosphorus | 0.0459574 | 0.0183840 | V0 | 0.0065796 | V0 | |
| Platinum | 0.0000088 | 0.0000017 | V0 | 0.0000031 | V0 | |
| Potassium | 0.0061261 | 0.2682092 | V0 | 0.0006425 | V0 | |
| Praseodymium | 0.0000070 | 0.0001440 | V0 | 0.0000000 | V1 | |
| Rubidium | 0.0000184 | 0.0013488 | V0 | 0.0000000 | V1 | |
| Samarium | 0.0000133 | 0.0001003 | V0 | 0.0000000 | V1 | |
| Selenium | 0.0003366 | 0.0006285 | V0 | 0.0000251 | V0 | |
| Silicon | 0.7676322 | 3.0461254 | V0 | 0.0000000 | V1 | |
| Silver | 0.0000100 | 0.0000045 | V0 | 0.0000000 | V1 | |
| Sodium | 0.0169447 | 0.0949299 | V0 | 0.0009756 | V0 | |
| Strontium | 0.0003375 | 0.0034629 | V0 | 0.0000000 | V1 | |
| Tantalum | 0.0000394 | 0.0000085 | V0 | 0.0000000 | V1 | |
| Thallium | 0.0000090 | 0.0000114 | V0 | 0.0000000 | V1 | |
| Thorium | 0.0000059 | 0.0001668 | V0 | 0.0000000 | V1 | |
| Tin | 0.0004414 | 0.0001171 | V0 | 0.0000318 | V0 | |
| Titanium | 0.0015201 | 0.0426210 | V0 | 0.0013969 | V0 | |
| Tungsten | 0.0000938 | 0.0000666 | V0 | 0.0000000 | V1 | |
| Uranium | 0.0000048 | 0.0000433 | V0 | 0.0000000 | V1 | |
| Vanadium | 0.0007697 | 0.0020992 | V0 | 0.0000000 | V1 | |
| Zinc | 0.0055897 | 0.0041626 | V0 | 0.0002330 | V0 | |



| Compound Name | Bertha Ganter - Fort | | | | | | | | |
|------------------------------------|------------------------------|-----------|------------------------------|-----------|------------------------------|-----------|------------------------------|--------------|--|
| | Station Name | McKay | | | Patricia McInnes | | | Travel Blank | |
| | Station # | AMS 1 | AMS 6 | AMS 6 | AMS 6 | AMS 6 | 12-Jul | | |
| | Sample Date | 12-Jul | 12-Jul | 12-Jul | 12-Jul | 12-Jul | 12-Jul | | |
| Particulate Size | PM10 | PM10 | PM10 | PM10 | PM10 | PM10 | PM10 | | |
| Total Air Volume (m ³) | 24 | 24 | 24 | 24 | 24 | 24 | 24 | | |
| MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | |
| Particulate Matter | 1.00 | 47.54 | V0 | 13.35 | V0 | 0.10 | V0 | | |
| Aluminum | 0.1380326 | 1.5142466 | V0 | 0.1975443 | V0 | 0.0000000 | V1 | | |
| Antimony | 0.0001784 | 0.0000679 | V0 | 0.0001597 | V0 | 0.0000000 | V1 | | |
| Arsenic | 0.0001060 | 0.0003558 | V0 | 0.0001090 | V0 | 0.0000000 | V1 | | |
| Barium | 0.0092847 | 0.0135617 | V0 | 0.0033623 | V0 | 0.0000000 | V1 | | |
| Beryllium | 0.0000946 | 0.0000463 | V0 | 0.0000078 | V0 | 0.0000000 | V1 | | |
| Bismuth | 0.0000093 | 0.0000099 | V0 | 0.0000116 | V0 | 0.0000000 | V1 | | |
| Cadmium | 0.0000174 | 0.0000168 | V0 | 0.0000095 | V0 | 0.0000000 | V1 | | |
| Calcium | 0.4112124 | 2.6933957 | V0 | 0.3527910 | V0 | 0.0000000 | V1 | | |
| Cerium | 0.0000174 | 0.0015149 | V0 | 0.0002436 | V0 | 0.0000000 | V1 | | |
| Cesium | 0.0000100 | 0.0001181 | V0 | 0.0000123 | V0 | 0.0000000 | V1 | | |
| Chromium | 0.0022262 | 0.0020113 | V0 | 0.0003780 | V0 | 0.0000000 | V1 | | |
| Cobalt | 0.0000273 | 0.0004066 | V0 | 0.0000592 | V0 | 0.0000000 | V1 | | |
| Copper | 0.0017171 | 0.0027584 | V0 | 0.0011629 | V0 | 0.0001151 | V0 | | |
| Iron | 0.0393063 | 1.3788857 | V0 | 0.2585974 | V0 | 0.0000000 | V1 | | |
| Lanthanum | 0.0000130 | 0.0007376 | V0 | 0.0001248 | V0 | 0.0000000 | V1 | | |
| Lead | 0.0008577 | 0.0005114 | V0 | 0.0001450 | V0 | 0.0000000 | V1 | | |
| Lithium | 0.0000374 | 0.0014058 | V0 | 0.0001626 | V0 | 0.0000000 | V1 | | |
| Magnesium | 0.0091409 | 0.3462065 | V0 | 0.0929802 | V0 | 0.0000000 | V1 | | |
| Manganese | 0.0006949 | 0.0205542 | V0 | 0.0044906 | V0 | 0.0000000 | V1 | | |
| Molybdenum | 0.0007116 | 0.0002259 | V0 | 0.0000550 | V0 | 0.0000607 | V0 | | |
| Neodymium | 0.0000140 | 0.0006859 | V0 | 0.0001046 | V0 | 0.0000000 | V1 | | |
| Nickel | 0.0005429 | 0.0014559 | V0 | 0.0002717 | V0 | 0.0000384 | V0 | | |
| Niobium | 0.0000202 | 0.0001647 | V0 | 0.0000223 | V0 | 0.0000000 | V1 | | |
| Palladium | 0.0000632 | 0.0000209 | V0 | 0.0000065 | V0 | 0.0000000 | V1 | | |
| Phosphorus | 0.0459574 | 0.0392646 | V0 | 0.0315825 | V0 | 0.0063258 | V0 | | |
| Platinum | 0.0000088 | 0.0000023 | V0 | 0.0000031 | V0 | 0.0000019 | V0 | | |
| Potassium | 0.0061261 | 0.4750084 | V0 | 0.1255608 | V0 | 0.0011509 | V0 | | |
| Praseodymium | 0.0000070 | 0.0001763 | V0 | 0.0000279 | V0 | 0.0000000 | V1 | | |
| Rubidium | 0.0000184 | 0.0020735 | V0 | 0.0002993 | V0 | 0.0000000 | V1 | | |
| Samarium | 0.0000133 | 0.0001314 | V0 | 0.0000184 | V0 | 0.0000000 | V1 | | |
| Selenium | 0.0003366 | 0.0008309 | V0 | 0.0001921 | V0 | 0.0000168 | V0 | | |
| Silicon | 0.7676322 | 4.6036304 | V0 | 0.7122386 | V0 | 0.0000000 | V1 | | |
| Silver | 0.0000100 | 0.0000092 | V0 | 0.0000029 | V0 | 0.0000009 | V0 | | |
| Sodium | 0.0169447 | 0.1898732 | V0 | 0.0416212 | V0 | 0.0008684 | V0 | | |
| Strontium | 0.0003375 | 0.0067369 | V0 | 0.0009975 | V0 | 0.0000000 | V1 | | |
| Tantalum | 0.0000394 | 0.0000114 | V0 | 0.0000019 | V0 | 0.0000000 | V1 | | |
| Thallium | 0.0000090 | 0.0000163 | V0 | 0.0000028 | V0 | 0.0000000 | V1 | | |
| Thorium | 0.0000059 | 0.0002056 | V0 | 0.0000299 | V0 | 0.0000000 | V1 | | |
| Tin | 0.0004414 | 0.0001235 | V0 | 0.0001756 | V0 | 0.0000000 | V1 | | |
| Titanium | 0.0015201 | 0.0578994 | V0 | 0.0075664 | V0 | 0.0013217 | V0 | | |
| Tungsten | 0.0000938 | 0.0001583 | V0 | 0.0000705 | V0 | 0.0000000 | V1 | | |
| Uranium | 0.0000048 | 0.0000608 | V0 | 0.0000084 | V0 | 0.0000000 | V1 | | |
| Vanadium | 0.0007697 | 0.0036667 | V0 | 0.0004284 | V0 | 0.0000000 | V1 | | |
| Zinc | 0.0055897 | 0.0068256 | V0 | 0.0045416 | V0 | 0.0003675 | V0 | | |



| Compound Name | MDL (µg/sample) | Athabasca Valley | | Anzac | | Travel Blank | |
|--------------------|-----------------|------------------|---------|-----------------|---------|-----------------|---------|
| | | Results (µg/m³) | QC Flag | Results (µg/m³) | QC Flag | Results (µg/m³) | QC Flag |
| Particulate Matter | 1.00 | 18.16 | V0 | 9.44 | V0 | 0.10 | V0 |
| Aluminum | 0.1380326 | 0.2528024 | V0 | 0.0488670 | V0 | 0.0000000 | V1 |
| Antimony | 0.0001784 | 0.0003781 | V0 | 0.0000824 | V0 | 0.0000000 | V1 |
| Arsenic | 0.0001060 | 0.0001422 | V0 | 0.0000831 | V0 | 0.0000000 | V1 |
| Barium | 0.0092847 | 0.0073732 | V0 | 0.0010993 | V0 | 0.0000000 | V1 |
| Beryllium | 0.0000946 | 0.0000097 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Bismuth | 0.0000093 | 0.0000150 | V0 | 0.0000020 | V0 | 0.0000000 | V1 |
| Cadmium | 0.0000174 | 0.0000086 | V0 | 0.0000072 | V0 | 0.0000000 | V1 |
| Calcium | 0.4112124 | 0.4751788 | V0 | 0.0663102 | V0 | 0.0000000 | V1 |
| Cerium | 0.0000174 | 0.0003122 | V0 | 0.0000606 | V0 | 0.0000000 | V1 |
| Cesium | 0.0000100 | 0.0000170 | V0 | 0.0000030 | V0 | 0.0000000 | V1 |
| Chromium | 0.0022262 | 0.0006899 | V0 | 0.0002367 | V0 | 0.0000000 | V1 |
| Cobalt | 0.0000273 | 0.0000934 | V0 | 0.0000193 | V0 | 0.0000000 | V1 |
| Copper | 0.0017171 | 0.0027675 | V0 | 0.0006150 | V0 | 0.0001151 | V0 |
| Iron | 0.0393063 | 0.3876749 | V0 | 0.0756131 | V0 | 0.0000000 | V1 |
| Lanthanum | 0.0000130 | 0.0001468 | V0 | 0.0000313 | V0 | 0.0000000 | V1 |
| Lead | 0.0008577 | 0.0002175 | V0 | 0.0000527 | V0 | 0.0000000 | V1 |
| Lithium | 0.0000374 | 0.0002116 | V0 | 0.0000319 | V0 | 0.0000000 | V1 |
| Magnesium | 0.0091409 | 0.1112261 | V0 | 0.0214820 | V0 | 0.0000000 | V1 |
| Manganese | 0.0006949 | 0.0061822 | V0 | 0.0016967 | V0 | 0.0000000 | V1 |
| Molybdenum | 0.0007116 | 0.0001876 | V0 | 0.0001888 | V0 | 0.0000607 | V0 |
| Neodymium | 0.0000140 | 0.0001356 | V0 | 0.0000259 | V0 | 0.0000000 | V1 |
| Nickel | 0.0005429 | 0.0007779 | V0 | 0.0001909 | V0 | 0.0000384 | V0 |
| Niobium | 0.0000202 | 0.0000336 | V0 | 0.0000056 | V0 | 0.0000000 | V1 |
| Palladium | 0.0000632 | 0.0000134 | V0 | 0.0000036 | V0 | 0.0000000 | V1 |
| Phosphorus | 0.0459574 | 0.0315476 | V0 | 0.0344925 | V0 | 0.0063258 | V0 |
| Platinum | 0.0000088 | 0.0000048 | V0 | 0.0000025 | V0 | 0.0000019 | V0 |
| Potassium | 0.0061261 | 0.1468511 | V0 | 0.0753872 | V0 | 0.0011509 | V0 |
| Praseodymium | 0.0000070 | 0.0000366 | V0 | 0.0000068 | V0 | 0.0000000 | V1 |
| Rubidium | 0.0000184 | 0.0003702 | V0 | 0.0001073 | V0 | 0.0000000 | V1 |
| Samarium | 0.0000133 | 0.0000234 | V0 | 0.0000044 | V0 | 0.0000000 | V1 |
| Selenium | 0.0003366 | 0.0002128 | V0 | 0.0001343 | V0 | 0.0000168 | V0 |
| Silicon | 0.7676322 | 1.0786986 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Silver | 0.0000100 | 0.0000031 | V0 | 0.0000018 | V0 | 0.0000009 | V0 |
| Sodium | 0.0169447 | 0.0514020 | V0 | 0.0146023 | V0 | 0.0008684 | V0 |
| Strontium | 0.0003375 | 0.0014030 | V0 | 0.0002247 | V0 | 0.0000000 | V1 |
| Tantalum | 0.0000394 | 0.0000029 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Thallium | 0.0000090 | 0.0000034 | V0 | 0.0000009 | V0 | 0.0000000 | V1 |
| Thorium | 0.0000059 | 0.0000412 | V0 | 0.0000085 | V0 | 0.0000000 | V1 |
| Tin | 0.0004414 | 0.0003865 | V0 | 0.0000977 | V0 | 0.0000000 | V1 |
| Titanium | 0.0015201 | 0.0116609 | V0 | 0.0054310 | V0 | 0.0013217 | V0 |
| Tungsten | 0.0000938 | 0.0001445 | V0 | 0.0000273 | V0 | 0.0000000 | V1 |
| Uranium | 0.0000048 | 0.0000118 | V0 | 0.0000022 | V0 | 0.0000000 | V1 |
| Vanadium | 0.0007697 | 0.0006086 | V0 | 0.0001135 | V0 | 0.0000000 | V1 |
| Zinc | 0.0055897 | 0.0101080 | V0 | 0.0013411 | V0 | 0.0003675 | V0 |



| Compound Name | MDL (µg/sample) | Fort McKay South | | Horizon | | Travel Blank | |
|------------------------------------|-----------------|------------------------------|------------------|------------------------------|------------------|------------------------------|------------------|
| | | AMS 13 | AMS 15 | AMS 15 | AMS 15 | AMS 15 | AMS 15 |
| Station Name | Station # | Sample Date | Particulate Size | Particulate Size | Particulate Size | Particulate Size | Particulate Size |
| Total Air Volume (m ³) | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 33.37 | V0 | 17.33 | V0 | 0.10 | V0 |
| Aluminum | 0.1380326 | 1.1984313 | V0 | 0.4380404 | V0 | 0.0000000 | V1 |
| Antimony | 0.0001784 | 0.0000507 | V0 | 0.0000355 | V0 | 0.0000000 | V1 |
| Arsenic | 0.0001060 | 0.0002787 | V0 | 0.0001128 | V0 | 0.0000000 | V1 |
| Barium | 0.0092847 | 0.0103413 | V0 | 0.0036718 | V0 | 0.0000000 | V1 |
| Beryllium | 0.0000946 | 0.0000327 | V0 | 0.0000133 | V0 | 0.0000000 | V1 |
| Bismuth | 0.0000093 | 0.0000079 | V0 | 0.0000040 | V0 | 0.0000000 | V1 |
| Cadmium | 0.0000174 | 0.0000149 | V0 | 0.0000112 | V0 | 0.0000000 | V1 |
| Calcium | 0.4112124 | 0.7661019 | V0 | 0.1610079 | V0 | 0.0000000 | V1 |
| Cerium | 0.0000174 | 0.0011761 | V0 | 0.0003907 | V0 | 0.0000000 | V1 |
| Cesium | 0.0000100 | 0.0000896 | V0 | 0.0000338 | V0 | 0.0000000 | V1 |
| Chromium | 0.0022262 | 0.0014310 | V0 | 0.0005229 | V0 | 0.0000000 | V1 |
| Cobalt | 0.0000273 | 0.0003009 | V0 | 0.0001021 | V0 | 0.0000000 | V1 |
| Copper | 0.0017171 | 0.0011691 | V0 | 0.0005539 | V0 | 0.0001151 | V0 |
| Iron | 0.0393063 | 0.9070079 | V0 | 0.2659074 | V0 | 0.0000000 | V1 |
| Lanthanum | 0.0000130 | 0.0005696 | V0 | 0.0001934 | V0 | 0.0000000 | V1 |
| Lead | 0.0008577 | 0.0003804 | V0 | 0.0001603 | V0 | 0.0000000 | V1 |
| Lithium | 0.0000374 | 0.0010864 | V0 | 0.0003830 | V0 | 0.0000000 | V1 |
| Magnesium | 0.0091409 | 0.2422935 | V0 | 0.0785404 | V0 | 0.0000000 | V1 |
| Manganese | 0.0006949 | 0.0133194 | V0 | 0.0042116 | V0 | 0.0000000 | V1 |
| Molybdenum | 0.0007116 | 0.0001996 | V0 | 0.0000922 | V0 | 0.0000607 | V0 |
| Neodymium | 0.0000140 | 0.0005220 | V0 | 0.0001829 | V0 | 0.0000000 | V1 |
| Nickel | 0.0005429 | 0.0011452 | V0 | 0.0004085 | V0 | 0.0000384 | V0 |
| Niobium | 0.0000202 | 0.0001226 | V0 | 0.0000441 | V0 | 0.0000000 | V1 |
| Palladium | 0.0000632 | 0.0000149 | V0 | 0.0000054 | V0 | 0.0000000 | V1 |
| Phosphorus | 0.0459574 | 0.0341197 | V0 | 0.0301988 | V0 | 0.0063258 | V0 |
| Platinum | 0.0000088 | 0.0000019 | V0 | 0.0000018 | V0 | 0.0000019 | V0 |
| Potassium | 0.0061261 | 0.3570256 | V0 | 0.1600732 | V0 | 0.0011509 | V0 |
| Praseodymium | 0.0000070 | 0.0001368 | V0 | 0.0000489 | V0 | 0.0000000 | V1 |
| Rubidium | 0.0000184 | 0.0015543 | V0 | 0.0006009 | V0 | 0.0000000 | V1 |
| Samarium | 0.0000133 | 0.0001038 | V0 | 0.0000334 | V0 | 0.0000000 | V1 |
| Selenium | 0.0003366 | 0.0006848 | V0 | 0.0002586 | V0 | 0.0000168 | V0 |
| Silicon | 0.7676322 | 3.3878782 | V0 | 1.1908635 | V0 | 0.0000000 | V1 |
| Silver | 0.0000100 | 0.0000067 | V0 | 0.0000038 | V0 | 0.0000009 | V0 |
| Sodium | 0.0169447 | 0.1601304 | V0 | 0.0551006 | V0 | 0.0008684 | V0 |
| Strontium | 0.0003375 | 0.0040335 | V0 | 0.0012838 | V0 | 0.0000000 | V1 |
| Tantalum | 0.0000394 | 0.0000083 | V0 | 0.0000029 | V0 | 0.0000000 | V1 |
| Thallium | 0.0000090 | 0.0000116 | V0 | 0.0000046 | V0 | 0.0000000 | V1 |
| Thorium | 0.0000059 | 0.0001613 | V0 | 0.0000561 | V0 | 0.0000000 | V1 |
| Tin | 0.0004414 | 0.0001247 | V0 | 0.0000800 | V0 | 0.0000000 | V1 |
| Titanium | 0.0015201 | 0.0406686 | V0 | 0.0152858 | V0 | 0.0013217 | V0 |
| Tungsten | 0.0000938 | 0.0000797 | V0 | 0.0000241 | V0 | 0.0000000 | V1 |
| Uranium | 0.0000048 | 0.0000431 | V0 | 0.0000165 | V0 | 0.0000000 | V1 |
| Vanadium | 0.0007697 | 0.0027615 | V0 | 0.0009903 | V0 | 0.0000000 | V1 |
| Zinc | 0.0055897 | 0.0070578 | V0 | 0.0022201 | V0 | 0.0003675 | V0 |



| Station Name | Muskeg River | | | Travel Blank | |
|------------------------------------|-----------------|------------------------------|---------|------------------------------|---------|
| Station # | AMS 16 | | | 12-Jul | |
| Sample Date | 12-Jul | | | 12-Jul | |
| Particulate Size | PM10 | | | 24 | |
| Total Air Volume (m ³) | 24 | | | 24 | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 49.27 | V0 | 0.10 | V0 |
| Aluminum | 0.1380326 | 1.8538471 | V0 | 0.0000000 | V1 |
| Antimony | 0.0001784 | 0.0000582 | V0 | 0.0000000 | V1 |
| Arsenic | 0.0001060 | 0.0003705 | V0 | 0.0000000 | V1 |
| Barium | 0.0092847 | 0.0144414 | V0 | 0.0000000 | V1 |
| Beryllium | 0.0000946 | 0.0000546 | V0 | 0.0000000 | V1 |
| Bismuth | 0.0000093 | 0.0000119 | V0 | 0.0000000 | V1 |
| Cadmium | 0.0000174 | 0.0000191 | V0 | 0.0000000 | V1 |
| Calcium | 0.4112124 | 2.6719969 | V0 | 0.0000000 | V1 |
| Cerium | 0.0000174 | 0.0021266 | V0 | 0.0000000 | V1 |
| Cesium | 0.0000100 | 0.0001225 | V0 | 0.0000000 | V1 |
| Chromium | 0.0022262 | 0.0020877 | V0 | 0.0000000 | V1 |
| Cobalt | 0.0000273 | 0.0004781 | V0 | 0.0000000 | V1 |
| Copper | 0.0017171 | 0.0013710 | V0 | 0.0001151 | V0 |
| Iron | 0.0393063 | 2.1196746 | V0 | 0.0000000 | V1 |
| Lanthanum | 0.0000130 | 0.0010271 | V0 | 0.0000000 | V1 |
| Lead | 0.0008577 | 0.0005927 | V0 | 0.0000000 | V1 |
| Lithium | 0.0000374 | 0.0019828 | V0 | 0.0000000 | V1 |
| Magnesium | 0.0091409 | 0.3930762 | V0 | 0.0000000 | V1 |
| Manganese | 0.0006949 | 0.0351311 | V0 | 0.0000000 | V1 |
| Molybdenum | 0.0007116 | 0.0004420 | V0 | 0.0000607 | V0 |
| Neodymium | 0.0000140 | 0.0008857 | V0 | 0.0000000 | V1 |
| Nickel | 0.0005429 | 0.0020504 | V0 | 0.0000384 | V0 |
| Niobium | 0.0000202 | 0.0002295 | V0 | 0.0000000 | V1 |
| Palladium | 0.0000632 | 0.0000267 | V0 | 0.0000000 | V1 |
| Phosphorus | 0.0459574 | 0.0384210 | V0 | 0.0063258 | V0 |
| Platinum | 0.0000088 | 0.0000023 | V0 | 0.0000019 | V0 |
| Potassium | 0.0061261 | 0.4869263 | V0 | 0.0011509 | V0 |
| Praseodymium | 0.0000070 | 0.0002365 | V0 | 0.0000000 | V1 |
| Rubidium | 0.0000184 | 0.0022884 | V0 | 0.0000000 | V1 |
| Samarium | 0.0000133 | 0.0001629 | V0 | 0.0000000 | V1 |
| Selenium | 0.0003366 | 0.0011851 | V0 | 0.0000168 | V0 |
| Silicon | 0.7676322 | 4.1612847 | V0 | 0.0000000 | V1 |
| Silver | 0.0000100 | 0.0000100 | V0 | 0.0000009 | V0 |
| Sodium | 0.0169447 | 0.1308486 | V0 | 0.0008684 | V0 |
| Strontium | 0.0003375 | 0.0061047 | V0 | 0.0000000 | V1 |
| Tantalum | 0.0000394 | 0.0000155 | V0 | 0.0000000 | V1 |
| Thallium | 0.0000090 | 0.0000196 | V0 | 0.0000000 | V1 |
| Thorium | 0.0000059 | 0.0002814 | V0 | 0.0000000 | V1 |
| Tin | 0.0004414 | 0.0002211 | V0 | 0.0000000 | V1 |
| Titanium | 0.0015201 | 0.0717245 | V0 | 0.0013217 | V0 |
| Tungsten | 0.0000938 | 0.0000725 | V0 | 0.0000000 | V1 |
| Uranium | 0.0000048 | 0.0000723 | V0 | 0.0000000 | V1 |
| Vanadium | 0.0007697 | 0.0047404 | V0 | 0.0000000 | V1 |
| Zinc | 0.0055897 | 0.0076522 | V0 | 0.0003675 | V0 |



| Compound Name | Bertha Ganter - Fort | | | | | | | | |
|------------------------------------|------------------------------|-----------|------------------------------|-----------|------------------------------|-----------|--------|--------------|--|
| | Station Name | McKay | | | Patricia McInnes | | | Travel Blank | |
| | Station # | AMS 1 | | AMS 6 | | | 18-Jul | | |
| | Sample Date | 18-Jul | | 18-Jul | | | | | |
| Particulate Size | PM10 | | PM10 | | | | | | |
| Total Air Volume (m ³) | 24 | | 24 | | | | | | |
| MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | | | |
| Particulate Matter | 1.00 | 4.38 | V0 | 11.33 | V0 | 0.44 | V0 | | |
| Aluminum | 0.1380326 | 0.0702795 | V0 | 0.2850863 | V0 | 0.0000000 | V1 | | |
| Antimony | 0.0001784 | 0.0000170 | V0 | 0.0000456 | V0 | 0.0000000 | V1 | | |
| Arsenic | 0.0001060 | 0.0000404 | V0 | 0.0001175 | V0 | 0.0000000 | V1 | | |
| Barium | 0.0092847 | 0.0006857 | V0 | 0.0040325 | V0 | 0.0000000 | V1 | | |
| Beryllium | 0.0000946 | 0.0000000 | V1 | 0.0000107 | V0 | 0.0000000 | V1 | | |
| Bismuth | 0.0000093 | 0.0000011 | V0 | 0.0000038 | V0 | 0.0000000 | V1 | | |
| Cadmium | 0.0000174 | 0.0000074 | V0 | 0.0000076 | V0 | 0.0000000 | V1 | | |
| Calcium | 0.4112124 | 0.1221961 | V0 | 0.5463526 | V0 | 0.0000000 | V1 | | |
| Cerium | 0.0000174 | 0.0000626 | V0 | 0.0003049 | V0 | 0.0000000 | V1 | | |
| Cesium | 0.0000100 | 0.0000046 | V0 | 0.0000172 | V0 | 0.0000000 | V1 | | |
| Chromium | 0.0022262 | 0.0003670 | V0 | 0.0003693 | V0 | 0.0000000 | V1 | | |
| Cobalt | 0.0000273 | 0.0000219 | V0 | 0.0000822 | V0 | 0.0000000 | V1 | | |
| Copper | 0.0017171 | 0.0010655 | V0 | 0.0005086 | V0 | 0.0001788 | V0 | | |
| Iron | 0.0393063 | 0.0684078 | V0 | 0.3279933 | V0 | 0.0000000 | V1 | | |
| Lanthanum | 0.0000130 | 0.0000311 | V0 | 0.0001604 | V0 | 0.0000000 | V1 | | |
| Lead | 0.0008577 | 0.0000500 | V0 | 0.0001546 | V0 | 0.0000000 | V1 | | |
| Lithium | 0.0000374 | 0.0000647 | V0 | 0.0001887 | V0 | 0.0000000 | V1 | | |
| Magnesium | 0.0091409 | 0.0172564 | V0 | 0.1441222 | V0 | 0.0000000 | V1 | | |
| Manganese | 0.0006949 | 0.0012804 | V0 | 0.0057240 | V0 | 0.0000000 | V1 | | |
| Molybdenum | 0.0007116 | 0.0000745 | V0 | 0.0001289 | V0 | 0.0000620 | V0 | | |
| Neodymium | 0.0000140 | 0.0000262 | V0 | 0.0001292 | V0 | 0.0000000 | V1 | | |
| Nickel | 0.0005429 | 0.0001570 | V0 | 0.0003488 | V0 | 0.0000497 | V0 | | |
| Niobium | 0.0000202 | 0.0000064 | V0 | 0.0000305 | V0 | 0.0000000 | V1 | | |
| Palladium | 0.0000632 | 0.0000000 | V1 | 0.0000045 | V0 | 0.0000000 | V1 | | |
| Phosphorus | 0.0459574 | 0.0174619 | V0 | 0.0174917 | V0 | 0.0070620 | V0 | | |
| Platinum | 0.0000088 | 0.0000019 | V0 | 0.0000031 | V0 | 0.0000024 | V0 | | |
| Potassium | 0.0061261 | 0.0473200 | V0 | 0.0991863 | V0 | 0.0017915 | V0 | | |
| Praseodymium | 0.0000070 | 0.0000070 | V0 | 0.0000343 | V0 | 0.0000000 | V1 | | |
| Rubidium | 0.0000184 | 0.0001044 | V0 | 0.0003482 | V0 | 0.0000000 | V1 | | |
| Samarium | 0.0000133 | 0.0000051 | V0 | 0.0000226 | V0 | 0.0000000 | V1 | | |
| Selenium | 0.0003366 | 0.0000522 | V0 | 0.0001845 | V0 | 0.0000000 | V1 | | |
| Silicon | 0.7676322 | 0.0334025 | V0 | 0.9299446 | V0 | 0.0636597 | V0 | | |
| Silver | 0.0000100 | 0.0000023 | V0 | 0.0000025 | V0 | 0.0000000 | V1 | | |
| Sodium | 0.0169447 | 0.0302292 | V0 | 0.0897167 | V0 | 0.0010306 | V0 | | |
| Strontium | 0.0003375 | 0.0002783 | V0 | 0.0017792 | V0 | 0.0000000 | V1 | | |
| Tantalum | 0.0000394 | 0.0000000 | V1 | 0.0000020 | V0 | 0.0000000 | V1 | | |
| Thallium | 0.0000090 | 0.0000009 | V0 | 0.0000033 | V0 | 0.0000000 | V1 | | |
| Thorium | 0.0000059 | 0.0000085 | V0 | 0.0000450 | V0 | 0.0000000 | V1 | | |
| Tin | 0.0004414 | 0.0001040 | V0 | 0.0000913 | V0 | 0.0000354 | V0 | | |
| Titanium | 0.0015201 | 0.0032458 | V0 | 0.0119018 | V0 | 0.0013628 | V0 | | |
| Tungsten | 0.0000938 | 0.0000094 | V0 | 0.0000530 | V0 | 0.0000000 | V1 | | |
| Uranium | 0.0000048 | 0.0000022 | V0 | 0.0000144 | V0 | 0.0000000 | V1 | | |
| Vanadium | 0.0007697 | 0.0001373 | V0 | 0.0006049 | V0 | 0.0000000 | V1 | | |
| Zinc | 0.0055897 | 0.0013210 | V0 | 0.0019845 | V0 | 0.0000000 | V1 | | |



| Station Name Station # Sample Date Particulate Size Total Air Volume (m ³) | Athabasca Valley | | | Anzac | | Travel Blank | |
|--|-------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| | AMS 7 18-Jul PM10 24 | AMS 14 18-Jul PM10 24 | AMS 14 18-Jul PM10 24 | AMS 14 18-Jul PM10 24 | AMS 14 18-Jul PM10 24 | AMS 14 18-Jul PM10 24 | AMS 14 18-Jul PM10 24 |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 8.00 | V0 | 5.30 | V0 | 0.44 | V0 |
| Aluminum | 0.1380326 | 0.1460083 | V0 | 0.0590797 | V0 | 0.0000000 | V1 |
| Antimony | 0.0001784 | 0.0002564 | V0 | 0.0000106 | V0 | 0.0000000 | V1 |
| Arsenic | 0.0001060 | 0.0000544 | V0 | 0.0000493 | V0 | 0.0000000 | V1 |
| Barium | 0.0092847 | 0.0042325 | V0 | 0.0008504 | V0 | 0.0000000 | V1 |
| Beryllium | 0.0000946 | 0.0000055 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Bismuth | 0.0000093 | 0.0000097 | V0 | 0.0000008 | V0 | 0.0000000 | V1 |
| Cadmium | 0.0000174 | 0.0000048 | V0 | 0.0000031 | V0 | 0.0000000 | V1 |
| Calcium | 0.4112124 | 0.3093790 | V0 | 0.1334372 | V0 | 0.0000000 | V1 |
| Cerium | 0.0000174 | 0.0002078 | V0 | 0.0000619 | V0 | 0.0000000 | V1 |
| Cesium | 0.0000100 | 0.0000100 | V0 | 0.0000042 | V0 | 0.0000000 | V1 |
| Chromium | 0.0022262 | 0.0003783 | V0 | 0.0001471 | V0 | 0.0000000 | V1 |
| Cobalt | 0.0000273 | 0.0000532 | V0 | 0.0000242 | V0 | 0.0000000 | V1 |
| Copper | 0.0017171 | 0.0017547 | V0 | 0.0006231 | V0 | 0.0001788 | V0 |
| Iron | 0.0393063 | 0.2091165 | V0 | 0.0594408 | V0 | 0.0000000 | V1 |
| Lanthanum | 0.0000130 | 0.0000927 | V0 | 0.0000287 | V0 | 0.0000000 | V1 |
| Lead | 0.0008577 | 0.0001325 | V0 | 0.0000390 | V0 | 0.0000000 | V1 |
| Lithium | 0.0000374 | 0.0001218 | V0 | 0.0000454 | V0 | 0.0000000 | V1 |
| Magnesium | 0.0091409 | 0.0588464 | V0 | 0.0194102 | V0 | 0.0000000 | V1 |
| Manganese | 0.0006949 | 0.0036018 | V0 | 0.0014552 | V0 | 0.0000000 | V1 |
| Molybdenum | 0.0007116 | 0.0000981 | V0 | 0.0000328 | V0 | 0.0000620 | V0 |
| Neodymium | 0.0000140 | 0.0000849 | V0 | 0.0000287 | V0 | 0.0000000 | V1 |
| Nickel | 0.0005429 | 0.0003315 | V0 | 0.0001086 | V0 | 0.0000497 | V0 |
| Niobium | 0.0000202 | 0.0000200 | V0 | 0.0000069 | V0 | 0.0000000 | V1 |
| Palladium | 0.0000632 | 0.0000096 | V0 | 0.0000030 | V0 | 0.0000000 | V1 |
| Phosphorus | 0.0459574 | 0.0154484 | V0 | 0.0128868 | V0 | 0.0070620 | V0 |
| Platinum | 0.0000088 | 0.0000035 | V0 | 0.0000011 | V0 | 0.0000024 | V0 |
| Potassium | 0.0061261 | 0.0697802 | V0 | 0.0375721 | V0 | 0.0017915 | V0 |
| Praseodymium | 0.0000070 | 0.0000226 | V0 | 0.0000068 | V0 | 0.0000000 | V1 |
| Rubidium | 0.0000184 | 0.0002129 | V0 | 0.0000910 | V0 | 0.0000000 | V1 |
| Samarium | 0.0000133 | 0.0000137 | V0 | 0.0000049 | V0 | 0.0000000 | V1 |
| Selenium | 0.0003366 | 0.0001485 | V0 | 0.0000620 | V0 | 0.0000000 | V1 |
| Silicon | 0.7676322 | 0.4203094 | V0 | 0.1919877 | V0 | 0.0636597 | V0 |
| Silver | 0.0000100 | 0.0000055 | V0 | 0.0000010 | V0 | 0.0000000 | V1 |
| Sodium | 0.0169447 | 0.0403595 | V0 | 0.0169950 | V0 | 0.0010306 | V0 |
| Strontium | 0.0003375 | 0.0008839 | V0 | 0.0003473 | V0 | 0.0000000 | V1 |
| Tantalum | 0.0000394 | 0.0000000 | V1 | 0.0000000 | V1 | 0.0000000 | V1 |
| Thallium | 0.0000090 | 0.0000020 | V0 | 0.0000008 | V0 | 0.0000000 | V1 |
| Thorium | 0.0000059 | 0.0000237 | V0 | 0.0000085 | V0 | 0.0000000 | V1 |
| Tin | 0.0004414 | 0.0002353 | V0 | 0.0000902 | V0 | 0.0000354 | V0 |
| Titanium | 0.0015201 | 0.0072812 | V0 | 0.0021687 | V0 | 0.0013628 | V0 |
| Tungsten | 0.0000938 | 0.0000637 | V0 | 0.0000237 | V0 | 0.0000000 | V1 |
| Uranium | 0.0000048 | 0.0000068 | V0 | 0.0000027 | V0 | 0.0000000 | V1 |
| Vanadium | 0.0007697 | 0.0004451 | V0 | 0.0001614 | V0 | 0.0000000 | V1 |
| Zinc | 0.0055897 | 0.0056556 | V0 | 0.0010988 | V0 | 0.0000000 | V1 |



| Compound Name | Station Name Station # Sample Date Particulate Size Total Air Volume (m ³) | Fort McKay South | | | Horizon | | Travel Blank | |
|--------------------|--|--------------------------------|------------------------------|-----------|--------------------------------|------------------------------|--------------|---|
| | | AMS 13 18-Jul PM10 24 | Results (µg/m ³) | QC Flag | AMS 15 18-Jul PM10 24 | Results (µg/m ³) | QC Flag | 24 Results (µg/m ³) QC Flag |
| Particulate Matter | 1.00 | 3.08 | V0 | 5.98 | V0 | 0.44 | V0 | |
| Aluminum | 0.1380326 | 0.0257722 | V0 | 0.1624708 | V0 | 0.0000000 | V1 | |
| Antimony | 0.0001784 | 0.0000000 | V1 | 0.0000214 | V0 | 0.0000000 | V1 | |
| Arsenic | 0.0001060 | 0.0000187 | V0 | 0.0000379 | V0 | 0.0000000 | V1 | |
| Barium | 0.0092847 | 0.0000000 | V1 | 0.0014141 | V0 | 0.0000000 | V1 | |
| Beryllium | 0.0000946 | 0.0000000 | V1 | 0.0000000 | V1 | 0.0000000 | V1 | |
| Bismuth | 0.0000093 | 0.0000000 | V1 | 0.0000014 | V0 | 0.0000000 | V1 | |
| Cadmium | 0.0000174 | 0.0000011 | V0 | 0.0000022 | V0 | 0.0000000 | V1 | |
| Calcium | 0.4112124 | 0.0280875 | V0 | 0.0458455 | V0 | 0.0000000 | V1 | |
| Cerium | 0.0000174 | 0.0000226 | V0 | 0.0001793 | V0 | 0.0000000 | V1 | |
| Cesium | 0.0000100 | 0.0000018 | V0 | 0.0000129 | V0 | 0.0000000 | V1 | |
| Chromium | 0.0022262 | 0.0001503 | V0 | 0.0003444 | V0 | 0.0000000 | V1 | |
| Cobalt | 0.0000273 | 0.0000064 | V0 | 0.0000398 | V0 | 0.0000000 | V1 | |
| Copper | 0.0017171 | 0.0001521 | V0 | 0.0002659 | V0 | 0.0001788 | V0 | |
| Iron | 0.0393063 | 0.0275209 | V0 | 0.1016024 | V0 | 0.0000000 | V1 | |
| Lanthanum | 0.0000130 | 0.0000105 | V0 | 0.0000801 | V0 | 0.0000000 | V1 | |
| Lead | 0.0008577 | 0.0000000 | V1 | 0.0000542 | V0 | 0.0000000 | V1 | |
| Lithium | 0.0000374 | 0.0000225 | V0 | 0.0001566 | V0 | 0.0000000 | V1 | |
| Magnesium | 0.0091409 | 0.0090226 | V0 | 0.0266870 | V0 | 0.0000000 | V1 | |
| Manganese | 0.0006949 | 0.0005084 | V0 | 0.0018074 | V0 | 0.0000000 | V1 | |
| Molybdenum | 0.0007116 | 0.0000436 | V0 | 0.0000430 | V0 | 0.0000620 | V0 | |
| Neodymium | 0.0000140 | 0.0000097 | V0 | 0.0000783 | V0 | 0.0000000 | V1 | |
| Nickel | 0.0005429 | 0.0001079 | V0 | 0.0002619 | V0 | 0.0000497 | V0 | |
| Niobium | 0.0000202 | 0.0000027 | V0 | 0.0000196 | V0 | 0.0000000 | V1 | |
| Palladium | 0.0000632 | 0.0000000 | V1 | 0.0000000 | V1 | 0.0000000 | V1 | |
| Phosphorus | 0.0459574 | 0.0142215 | V0 | 0.0162322 | V0 | 0.0070620 | V0 | |
| Platinum | 0.0000088 | 0.0000021 | V0 | 0.0000025 | V0 | 0.0000024 | V0 | |
| Potassium | 0.0061261 | 0.0268357 | V0 | 0.0665516 | V0 | 0.0017915 | V0 | |
| Praseodymium | 0.0000070 | 0.0000026 | V0 | 0.0000205 | V0 | 0.0000000 | V1 | |
| Rubidium | 0.0000184 | 0.0000464 | V0 | 0.0002320 | V0 | 0.0000000 | V1 | |
| Samarium | 0.0000133 | 0.0000020 | V0 | 0.0000155 | V0 | 0.0000000 | V1 | |
| Selenium | 0.0003366 | 0.0000329 | V0 | 0.0001140 | V0 | 0.0000000 | V1 | |
| Silicon | 0.7676322 | 0.1129261 | V0 | 0.4819956 | V0 | 0.0636597 | V0 | |
| Silver | 0.0000100 | 0.0000005 | V0 | 0.0000013 | V0 | 0.0000000 | V1 | |
| Sodium | 0.0169447 | 0.0146732 | V0 | 0.0336116 | V0 | 0.0010306 | V0 | |
| Strontium | 0.0003375 | 0.0001137 | V0 | 0.0004495 | V0 | 0.0000000 | V1 | |
| Tantalum | 0.0000394 | 0.0000000 | V1 | 0.0000000 | V1 | 0.0000000 | V1 | |
| Thallium | 0.0000090 | 0.0000000 | V1 | 0.0000017 | V0 | 0.0000000 | V1 | |
| Thorium | 0.0000059 | 0.0000031 | V0 | 0.0000235 | V0 | 0.0000000 | V1 | |
| Tin | 0.0004414 | 0.0000325 | V0 | 0.0000416 | V0 | 0.0000354 | V0 | |
| Titanium | 0.0015201 | 0.0017053 | V0 | 0.0065895 | V0 | 0.0013628 | V0 | |
| Tungsten | 0.0000938 | 0.0000000 | V1 | 0.0000090 | V0 | 0.0000000 | V1 | |
| Uranium | 0.0000048 | 0.0000008 | V0 | 0.0000063 | V0 | 0.0000000 | V1 | |
| Vanadium | 0.0007697 | 0.0000540 | V0 | 0.0003441 | V0 | 0.0000000 | V1 | |
| Zinc | 0.0055897 | 0.0003795 | V0 | 0.0008699 | V0 | 0.0000000 | V1 | |



| Compound Name | MDL (µg/sample) | Muskeg River | | Travel Blank | | |
|--------------------|-----------------|--------------|------------------|------------------------------------|------------------------------|------------------------------|
| | | AMS 16 | QC Flag | 18-Jul | QC Flag | |
| Station Name | Station # | Sample Date | Particulate Size | Total Air Volume (m ³) | 24 | 24 |
| | | | | | Results (µg/m ³) | Results (µg/m ³) |
| Particulate Matter | 1.00 | 16.85 | V0 | | 0.44 | V0 |
| Aluminum | 0.1380326 | 0.5497151 | V0 | | 0.0000000 | V1 |
| Antimony | 0.0001784 | 0.0000219 | V0 | | 0.0000000 | V1 |
| Arsenic | 0.0001060 | 0.0000983 | V0 | | 0.0000000 | V1 |
| Barium | 0.0092847 | 0.0039588 | V0 | | 0.0000000 | V1 |
| Beryllium | 0.0000946 | 0.0000213 | V0 | | 0.0000000 | V1 |
| Bismuth | 0.0000093 | 0.0000030 | V0 | | 0.0000000 | V1 |
| Cadmium | 0.0000174 | 0.0000045 | V0 | | 0.0000000 | V1 |
| Calcium | 0.4112124 | 0.5066053 | V0 | | 0.0000000 | V1 |
| Cerium | 0.0000174 | 0.0006288 | V0 | | 0.0000000 | V1 |
| Cesium | 0.0000100 | 0.0000361 | V0 | | 0.0000000 | V1 |
| Chromium | 0.0022262 | 0.0018420 | V0 | | 0.0000000 | V1 |
| Cobalt | 0.0000273 | 0.0001672 | V0 | | 0.0000000 | V1 |
| Copper | 0.0017171 | 0.0007240 | V0 | | 0.0001788 | V0 |
| Iron | 0.0393063 | 0.6617734 | V0 | | 0.0000000 | V1 |
| Lanthanum | 0.0000130 | 0.0002775 | V0 | | 0.0000000 | V1 |
| Lead | 0.0008577 | 0.0001944 | V0 | | 0.0000000 | V1 |
| Lithium | 0.0000374 | 0.0009334 | V0 | | 0.0000000 | V1 |
| Magnesium | 0.0091409 | 0.0984713 | V0 | | 0.0000000 | V1 |
| Manganese | 0.0006949 | 0.0111058 | V0 | | 0.0000000 | V1 |
| Molybdenum | 0.0007116 | 0.0001617 | V0 | | 0.0000620 | V0 |
| Neodymium | 0.0000140 | 0.0002605 | V0 | | 0.0000000 | V1 |
| Nickel | 0.0005429 | 0.0006799 | V0 | | 0.0000497 | V0 |
| Niobium | 0.0000202 | 0.0000705 | V0 | | 0.0000000 | V1 |
| Palladium | 0.0000632 | 0.0000102 | V0 | | 0.0000000 | V1 |
| Phosphorus | 0.0459574 | 0.0177146 | V0 | | 0.0070620 | V0 |
| Platinum | 0.0000088 | 0.0000022 | V0 | | 0.0000024 | V0 |
| Potassium | 0.0061261 | 0.1373884 | V0 | | 0.0017915 | V0 |
| Praseodymium | 0.0000070 | 0.0000682 | V0 | | 0.0000000 | V1 |
| Rubidium | 0.0000184 | 0.0006395 | V0 | | 0.0000000 | V1 |
| Samarium | 0.0000133 | 0.0000462 | V0 | | 0.0000000 | V1 |
| Selenium | 0.0003366 | 0.0003209 | V0 | | 0.0000000 | V1 |
| Silicon | 0.7676322 | 1.3864345 | V0 | | 0.0636597 | V0 |
| Silver | 0.0000100 | 0.0000027 | V0 | | 0.0000000 | V1 |
| Sodium | 0.0169447 | 0.0560592 | V0 | | 0.0010306 | V0 |
| Strontium | 0.0003375 | 0.0018338 | V0 | | 0.0000000 | V1 |
| Tantalum | 0.0000394 | 0.0000042 | V0 | | 0.0000000 | V1 |
| Thallium | 0.0000090 | 0.0000059 | V0 | | 0.0000000 | V1 |
| Thorium | 0.0000059 | 0.0000780 | V0 | | 0.0000000 | V1 |
| Tin | 0.0004414 | 0.0000603 | V0 | | 0.0000354 | V0 |
| Titanium | 0.0015201 | 0.0201811 | V0 | | 0.0013628 | V0 |
| Tungsten | 0.0000938 | 0.0000653 | V0 | | 0.0000000 | V1 |
| Uranium | 0.0000048 | 0.0000247 | V0 | | 0.0000000 | V1 |
| Vanadium | 0.0007697 | 0.0010503 | V0 | | 0.0000000 | V1 |
| Zinc | 0.0055897 | 0.0030283 | V0 | | 0.0000000 | V1 |



| Compound Name | Bertha Ganter - Fort | | | | | | |
|------------------------------------|------------------------------|-----------|------------------------------|------------------|------------------------------|--------------|----|
| | Station Name | McKay | | Patricia McInnes | | Travel Blank | |
| | Station # | AMS 1 | | AMS 6 | | | |
| | Sample Date | 24-Jul | | 24-Jul | | | |
| Particulate Size | PM10 | | PM10 | | | | |
| Total Air Volume (m ³) | 24 | | 24 | | | | |
| MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | |
| Particulate Matter | 1.00 | 56.27 | V0 | 26.41 | V0 | 0.04 | V1 |
| Aluminum | 0.1380326 | 1.8409034 | V0 | 0.8630535 | V0 | 0.0000000 | V1 |
| Antimony | 0.0001784 | 0.0000283 | V0 | 0.0000406 | V0 | 0.0000000 | V1 |
| Arsenic | 0.0001060 | 0.0004961 | V0 | 0.0001718 | V0 | 0.0000000 | V1 |
| Barium | 0.0092847 | 0.0176996 | V0 | 0.0056589 | V0 | 0.0000000 | V1 |
| Beryllium | 0.0000946 | 0.0000590 | V0 | 0.0000238 | V0 | 0.0000000 | V1 |
| Bismuth | 0.0000093 | 0.0000089 | V0 | 0.0000047 | V0 | 0.0000000 | V1 |
| Cadmium | 0.0000174 | 0.0000156 | V0 | 0.0000120 | V0 | 0.0000008 | V0 |
| Calcium | 0.4112124 | 2.9374566 | V0 | 0.4792035 | V0 | 0.0000000 | V1 |
| Cerium | 0.0000174 | 0.0020848 | V0 | 0.0008492 | V0 | 0.0000000 | V1 |
| Cesium | 0.0000100 | 0.0001325 | V0 | 0.0000546 | V0 | 0.0000000 | V1 |
| Chromium | 0.0022262 | 0.0020757 | V0 | 0.0009285 | V0 | 0.0002488 | V0 |
| Cobalt | 0.0000273 | 0.0005542 | V0 | 0.0002129 | V0 | 0.0000025 | V0 |
| Copper | 0.0017171 | 0.0010727 | V0 | 0.0008225 | V0 | 0.0001222 | V0 |
| Iron | 0.0393063 | 1.8747952 | V0 | 0.4702793 | V0 | 0.0022387 | V0 |
| Lanthanum | 0.0000130 | 0.0009735 | V0 | 0.0003743 | V0 | 0.0000006 | V0 |
| Lead | 0.0008577 | 0.0007647 | V0 | 0.0002684 | V0 | 0.0000423 | V0 |
| Lithium | 0.0000374 | 0.0016160 | V0 | 0.0008749 | V0 | 0.0000000 | V1 |
| Magnesium | 0.0091409 | 0.3408921 | V0 | 0.1257657 | V0 | 0.0000000 | V1 |
| Manganese | 0.0006949 | 0.0268574 | V0 | 0.0086382 | V0 | 0.0000000 | V1 |
| Molybdenum | 0.0007116 | 0.0001194 | V0 | 0.0002607 | V0 | 0.0000820 | V0 |
| Neodymium | 0.0000140 | 0.0009017 | V0 | 0.0003653 | V0 | 0.0000000 | V1 |
| Nickel | 0.0005429 | 0.0015670 | V0 | 0.0008476 | V0 | 0.0000820 | V0 |
| Niobium | 0.0000202 | 0.0002272 | V0 | 0.0000959 | V0 | 0.0000000 | V1 |
| Palladium | 0.0000632 | 0.0000245 | V0 | 0.0000137 | V0 | 0.0000060 | V0 |
| Phosphorus | 0.0459574 | 0.0411035 | V0 | 0.0228117 | V0 | 0.0054937 | V0 |
| Platinum | 0.0000088 | 0.0000018 | V0 | 0.0000028 | V0 | 0.0000017 | V0 |
| Potassium | 0.0061261 | 0.5604609 | V0 | 0.2289041 | V0 | 0.0015118 | V0 |
| Praseodymium | 0.0000070 | 0.0002397 | V0 | 0.0000941 | V0 | 0.0000000 | V1 |
| Rubidium | 0.0000184 | 0.0025516 | V0 | 0.0010477 | V0 | 0.0000000 | V1 |
| Samarium | 0.0000133 | 0.0001684 | V0 | 0.0000673 | V0 | 0.0000000 | V1 |
| Selenium | 0.0003366 | 0.0012478 | V0 | 0.0005425 | V0 | 0.0000163 | V0 |
| Silicon | 0.7676322 | 5.8908075 | V0 | 2.6125390 | V0 | 0.0586599 | V0 |
| Silver | 0.0000100 | 0.0000094 | V0 | 0.0000047 | V0 | 0.0000000 | V1 |
| Sodium | 0.0169447 | 0.1662292 | V0 | 0.1071551 | V0 | 0.0014734 | V0 |
| Strontium | 0.0003375 | 0.0066713 | V0 | 0.0021385 | V0 | 0.0000000 | V1 |
| Tantalum | 0.0000394 | 0.0000150 | V0 | 0.0000059 | V0 | 0.0000000 | V1 |
| Thallium | 0.0000090 | 0.0000220 | V0 | 0.0000089 | V0 | 0.0000000 | V1 |
| Thorium | 0.0000059 | 0.0002813 | V0 | 0.0001006 | V0 | 0.0000000 | V1 |
| Tin | 0.0004414 | 0.0001170 | V0 | 0.0001174 | V0 | 0.0000518 | V0 |
| Titanium | 0.0015201 | 0.0734688 | V0 | 0.0302038 | V0 | 0.0017872 | V0 |
| Tungsten | 0.0000938 | 0.0000485 | V0 | 0.0000558 | V0 | 0.0000000 | V1 |
| Uranium | 0.0000048 | 0.0000738 | V0 | 0.0000307 | V0 | 0.0000000 | V1 |
| Vanadium | 0.0007697 | 0.0040758 | V0 | 0.0022491 | V0 | 0.0000000 | V1 |
| Zinc | 0.0055897 | 0.0051472 | V0 | 0.0031234 | V0 | 0.0000000 | V1 |



| Station Name Station # Sample Date Particulate Size Total Air Volume (m ³) | Athabasca Valley | | | Anzac | | Travel Blank | |
|--|------------------|-------------------------------|---------|----------------------------------|---------|------------------------------|---------|
| | MDL (µg/sample) | AMS 7 24-Jul PM10 24 | QC Flag | AMS 14 24-Jul PM10 23.6 | QC Flag | 24 24 | QC Flag |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 30.79 | V0 | 17.28 | V0 | 0.04 | V1 |
| Aluminum | 0.1380326 | 1.1304699 | V0 | 0.3627456 | V0 | 0.0000000 | V1 |
| Antimony | 0.0001784 | 0.0000817 | V0 | 0.0000077 | V0 | 0.0000000 | V1 |
| Arsenic | 0.0001060 | 0.0001883 | V0 | 0.0001156 | V0 | 0.0000000 | V1 |
| Barium | 0.0092847 | 0.0079927 | V0 | 0.0022703 | V0 | 0.0000000 | V1 |
| Beryllium | 0.0000946 | 0.0000302 | V0 | 0.0000095 | V0 | 0.0000000 | V1 |
| Bismuth | 0.0000093 | 0.0000059 | V0 | 0.0000016 | V0 | 0.0000000 | V1 |
| Cadmium | 0.0000174 | 0.0000148 | V0 | 0.0000119 | V0 | 0.0000008 | V0 |
| Calcium | 0.4112124 | 0.8385996 | V0 | 0.2129474 | V0 | 0.0000000 | V1 |
| Cerium | 0.0000174 | 0.0010562 | V0 | 0.0003197 | V0 | 0.0000000 | V1 |
| Cesium | 0.0000100 | 0.0000732 | V0 | 0.0000251 | V0 | 0.0000000 | V1 |
| Chromium | 0.0022262 | 0.0011896 | V0 | 0.0004155 | V0 | 0.0002488 | V0 |
| Cobalt | 0.0000273 | 0.0002619 | V0 | 0.0000852 | V0 | 0.0000025 | V0 |
| Copper | 0.0017171 | 0.0015552 | V0 | 0.0003202 | V0 | 0.0001222 | V0 |
| Iron | 0.0393063 | 0.5399770 | V0 | 0.1573545 | V0 | 0.0022387 | V0 |
| Lanthanum | 0.0000130 | 0.0004812 | V0 | 0.0001435 | V0 | 0.0000006 | V0 |
| Lead | 0.0008577 | 0.0003269 | V0 | 0.0001232 | V0 | 0.0000423 | V0 |
| Lithium | 0.0000374 | 0.0011375 | V0 | 0.0003670 | V0 | 0.0000000 | V1 |
| Magnesium | 0.0091409 | 0.1454280 | V0 | 0.0470904 | V0 | 0.0000000 | V1 |
| Manganese | 0.0006949 | 0.0101354 | V0 | 0.0031035 | V0 | 0.0000000 | V1 |
| Molybdenum | 0.0007116 | 0.0001562 | V0 | 0.0000746 | V0 | 0.0000820 | V0 |
| Neodymium | 0.0000140 | 0.0004476 | V0 | 0.0001360 | V0 | 0.0000000 | V1 |
| Nickel | 0.0005429 | 0.0009175 | V0 | 0.0003080 | V0 | 0.0000820 | V0 |
| Niobium | 0.0000202 | 0.0001343 | V0 | 0.0000340 | V0 | 0.0000000 | V1 |
| Palladium | 0.0000632 | 0.0000173 | V0 | 0.0000055 | V0 | 0.0000060 | V0 |
| Phosphorus | 0.0459574 | 0.0299571 | V0 | 0.0220579 | V0 | 0.0054937 | V0 |
| Platinum | 0.0000088 | 0.0000033 | V0 | 0.0000023 | V0 | 0.0000017 | V0 |
| Potassium | 0.0061261 | 0.3172804 | V0 | 0.1277642 | V0 | 0.0015118 | V0 |
| Praseodymium | 0.0000070 | 0.0001180 | V0 | 0.0000374 | V0 | 0.0000000 | V1 |
| Rubidium | 0.0000184 | 0.0014159 | V0 | 0.0005097 | V0 | 0.0000000 | V1 |
| Samarium | 0.0000133 | 0.0000838 | V0 | 0.0000250 | V0 | 0.0000000 | V1 |
| Selenium | 0.0003366 | 0.0007012 | V0 | 0.0002081 | V0 | 0.0000163 | V0 |
| Silicon | 0.7676322 | 2.8442771 | V0 | 1.0191827 | V0 | 0.0586599 | V0 |
| Silver | 0.0000100 | 0.0000061 | V0 | 0.0000028 | V0 | 0.0000000 | V1 |
| Sodium | 0.0169447 | 0.1315706 | V0 | 0.0406477 | V0 | 0.0014734 | V0 |
| Strontium | 0.0003375 | 0.0029550 | V0 | 0.0008575 | V0 | 0.0000000 | V1 |
| Tantalum | 0.0000394 | 0.0000100 | V0 | 0.0000021 | V0 | 0.0000000 | V1 |
| Thallium | 0.0000090 | 0.0000107 | V0 | 0.0000042 | V0 | 0.0000000 | V1 |
| Thorium | 0.0000059 | 0.0001319 | V0 | 0.0000408 | V0 | 0.0000000 | V1 |
| Tin | 0.0004414 | 0.0001353 | V0 | 0.0000562 | V0 | 0.0000518 | V0 |
| Titanium | 0.0015201 | 0.0414192 | V0 | 0.0140212 | V0 | 0.0017872 | V0 |
| Tungsten | 0.0000938 | 0.0000782 | V0 | 0.0000124 | V0 | 0.0000000 | V1 |
| Uranium | 0.0000048 | 0.0000394 | V0 | 0.0000113 | V0 | 0.0000000 | V1 |
| Vanadium | 0.0007697 | 0.0020751 | V0 | 0.0006487 | V0 | 0.0000000 | V1 |
| Zinc | 0.0055897 | 0.0057668 | V0 | 0.0020384 | V0 | 0.0000000 | V1 |



| Compound Name | Station Name Station # Sample Date Particulate Size Total Air Volume (m ³) | Fort McKay South | | | Horizon | | Travel Blank | |
|--------------------|--|------------------|--------------------------------|------------------------------|-----------|--------------------------------|------------------------------|---------|
| | | MDL (µg/sample) | AMS 13 24-Jul PM10 24 | Results (µg/m ³) | QC Flag | AMS 15 24-Jul PM10 24 | Results (µg/m ³) | QC Flag |
| Particulate Matter | | 1.00 | 25.65 | V0 | 41.10 | V0 | 0.04 | V1 |
| Aluminum | | 0.1380326 | 0.5932972 | V0 | 1.2098243 | V0 | 0.0000000 | V1 |
| Antimony | | 0.0001784 | 0.0000140 | V0 | 0.0000495 | V0 | 0.0000000 | V1 |
| Arsenic | | 0.0001060 | 0.0002140 | V0 | 0.0003077 | V0 | 0.0000000 | V1 |
| Barium | | 0.0092847 | 0.0053093 | V0 | 0.0106982 | V0 | 0.0000000 | V1 |
| Beryllium | | 0.0000946 | 0.0000221 | V0 | 0.0000413 | V0 | 0.0000000 | V1 |
| Bismuth | | 0.0000093 | 0.0000032 | V0 | 0.0000061 | V0 | 0.0000000 | V1 |
| Cadmium | | 0.0000174 | 0.0000110 | V0 | 0.0000167 | V0 | 0.0000008 | V0 |
| Calcium | | 0.4112124 | 0.6243324 | V0 | 0.5109457 | V0 | 0.0000000 | V1 |
| Cerium | | 0.0000174 | 0.0006397 | V0 | 0.0013932 | V0 | 0.0000000 | V1 |
| Cesium | | 0.0000100 | 0.0000431 | V0 | 0.0000866 | V0 | 0.0000000 | V1 |
| Chromium | | 0.0022262 | 0.0008822 | V0 | 0.0025427 | V0 | 0.0002488 | V0 |
| Cobalt | | 0.0000273 | 0.0001761 | V0 | 0.0003681 | V0 | 0.0000025 | V0 |
| Copper | | 0.0017171 | 0.0005152 | V0 | 0.0009956 | V0 | 0.0001222 | V0 |
| Iron | | 0.0393063 | 0.6725226 | V0 | 1.3012879 | V0 | 0.0022387 | V0 |
| Lanthanum | | 0.0000130 | 0.0002922 | V0 | 0.0006512 | V0 | 0.0000006 | V0 |
| Lead | | 0.0008577 | 0.0002152 | V0 | 0.0004479 | V0 | 0.0000423 | V0 |
| Lithium | | 0.0000374 | 0.0005791 | V0 | 0.0011530 | V0 | 0.0000000 | V1 |
| Magnesium | | 0.0091409 | 0.1361309 | V0 | 0.2050126 | V0 | 0.0000000 | V1 |
| Manganese | | 0.0006949 | 0.0104705 | V0 | 0.0164797 | V0 | 0.0000000 | V1 |
| Molybdenum | | 0.0007116 | 0.0000876 | V0 | 0.0001471 | V0 | 0.0000820 | V0 |
| Neodymium | | 0.0000140 | 0.0002787 | V0 | 0.0006629 | V0 | 0.0000000 | V1 |
| Nickel | | 0.0005429 | 0.0005818 | V0 | 0.0018050 | V0 | 0.0000820 | V0 |
| Niobium | | 0.0000202 | 0.0000688 | V0 | 0.0001463 | V0 | 0.0000000 | V1 |
| Palladium | | 0.0000632 | 0.0000121 | V0 | 0.0000172 | V0 | 0.0000060 | V0 |
| Phosphorus | | 0.0459574 | 0.0218758 | V0 | 0.0377289 | V0 | 0.0054937 | V0 |
| Platinum | | 0.0000088 | 0.0000027 | V0 | 0.0000018 | V0 | 0.0000017 | V0 |
| Potassium | | 0.0061261 | 0.1875263 | V0 | 0.3408819 | V0 | 0.0015118 | V0 |
| Praseodymium | | 0.0000070 | 0.0000736 | V0 | 0.0001668 | V0 | 0.0000000 | V1 |
| Rubidium | | 0.0000184 | 0.0008284 | V0 | 0.0015612 | V0 | 0.0000000 | V1 |
| Samarium | | 0.0000133 | 0.0000498 | V0 | 0.0001292 | V0 | 0.0000000 | V1 |
| Selenium | | 0.0003366 | 0.0003772 | V0 | 0.0007701 | V0 | 0.0000163 | V0 |
| Silicon | | 0.7676322 | 2.2126733 | V0 | 4.0645637 | V0 | 0.0586599 | V0 |
| Silver | | 0.0000100 | 0.0000038 | V0 | 0.0000069 | V0 | 0.0000000 | V1 |
| Sodium | | 0.0169447 | 0.0667706 | V0 | 0.1145294 | V0 | 0.0014734 | V0 |
| Strontium | | 0.0003375 | 0.0020382 | V0 | 0.0031230 | V0 | 0.0000000 | V1 |
| Tantalum | | 0.0000394 | 0.0000046 | V0 | 0.0000093 | V0 | 0.0000000 | V1 |
| Thallium | | 0.0000090 | 0.0000084 | V0 | 0.0000162 | V0 | 0.0000000 | V1 |
| Thorium | | 0.0000059 | 0.0000838 | V0 | 0.0001804 | V0 | 0.0000000 | V1 |
| Tin | | 0.0004414 | 0.0000756 | V0 | 0.0000717 | V0 | 0.0000518 | V0 |
| Titanium | | 0.0015201 | 0.0289774 | V0 | 0.0451461 | V0 | 0.0017872 | V0 |
| Tungsten | | 0.0000938 | 0.0000251 | V0 | 0.0000270 | V0 | 0.0000000 | V1 |
| Uranium | | 0.0000048 | 0.0000239 | V0 | 0.0000666 | V0 | 0.0000000 | V1 |
| Vanadium | | 0.0007697 | 0.0013105 | V0 | 0.0033814 | V0 | 0.0000000 | V1 |
| Zinc | | 0.0055897 | 0.0030069 | V0 | 0.0042250 | V0 | 0.0000000 | V1 |



| Station Name | Muskeg River | | | Travel Blank | |
|------------------------------------|-----------------|------------------------------|---------|------------------------------|---------|
| Station # | AMS 16 | | | 24-Jul | |
| Sample Date | 24-Jul | | | 24-Jul | |
| Particulate Size | PM10 | | | 24 | |
| Total Air Volume (m ³) | 24 | | | 24 | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 95.93 | V0 | 0.04 | V1 |
| Aluminum | 0.1380326 | 5.1992480 | V0 | 0.0000000 | V1 |
| Antimony | 0.0001784 | 0.0000444 | V0 | 0.0000000 | V1 |
| Arsenic | 0.0001060 | 0.0006119 | V0 | 0.0000000 | V1 |
| Barium | 0.0092847 | 0.0322829 | V0 | 0.0000000 | V1 |
| Beryllium | 0.0000946 | 0.0001516 | V0 | 0.0000000 | V1 |
| Bismuth | 0.0000093 | 0.0000180 | V0 | 0.0000000 | V1 |
| Cadmium | 0.0000174 | 0.0000221 | V0 | 0.0000008 | V0 |
| Calcium | 0.4112124 | 3.1600546 | V0 | 0.0000000 | V1 |
| Cerium | 0.0000174 | 0.0053655 | V0 | 0.0000000 | V1 |
| Cesium | 0.0000100 | 0.0003196 | V0 | 0.0000000 | V1 |
| Chromium | 0.0022262 | 0.0057052 | V0 | 0.0002488 | V0 |
| Cobalt | 0.0000273 | 0.0010588 | V0 | 0.0000025 | V0 |
| Copper | 0.0017171 | 0.0020125 | V0 | 0.0001222 | V0 |
| Iron | 0.0393063 | 4.4761170 | V0 | 0.0022387 | V0 |
| Lanthanum | 0.0000130 | 0.0024514 | V0 | 0.0000006 | V0 |
| Lead | 0.0008577 | 0.0012188 | V0 | 0.0000423 | V0 |
| Lithium | 0.0000374 | 0.0068462 | V4 | 0.0000000 | V1 |
| Magnesium | 0.0091409 | 0.7685600 | V0 | 0.0000000 | V1 |
| Manganese | 0.0006949 | 0.0640065 | V0 | 0.0000000 | V1 |
| Molybdenum | 0.0007116 | 0.0005386 | V0 | 0.0000820 | V0 |
| Neodymium | 0.0000140 | 0.0022593 | V0 | 0.0000000 | V1 |
| Nickel | 0.0005429 | 0.0034680 | V0 | 0.0000820 | V0 |
| Niobium | 0.0000202 | 0.0006480 | V0 | 0.0000000 | V1 |
| Palladium | 0.0000632 | 0.0000693 | V0 | 0.0000060 | V0 |
| Phosphorus | 0.0459574 | 0.0583310 | V0 | 0.0054937 | V0 |
| Platinum | 0.0000088 | 0.0000049 | V0 | 0.0000017 | V0 |
| Potassium | 0.0061261 | 1.1844721 | V0 | 0.0015118 | V0 |
| Praseodymium | 0.0000070 | 0.0005983 | V0 | 0.0000000 | V1 |
| Rubidium | 0.0000184 | 0.0055284 | V0 | 0.0000000 | V1 |
| Samarium | 0.0000133 | 0.0004067 | V0 | 0.0000000 | V1 |
| Selenium | 0.0003366 | 0.0029229 | V0 | 0.0000163 | V0 |
| Silicon | 0.7676322 | 11.0242414 | V0 | 0.0586599 | V0 |
| Silver | 0.0000100 | 0.0000195 | V0 | 0.0000000 | V1 |
| Sodium | 0.0169447 | 0.8070985 | V4 | 0.0014734 | V0 |
| Strontium | 0.0003375 | 0.0135357 | V0 | 0.0000000 | V1 |
| Tantalum | 0.0000394 | 0.0000446 | V0 | 0.0000000 | V1 |
| Thallium | 0.0000090 | 0.0000450 | V0 | 0.0000000 | V1 |
| Thorium | 0.0000059 | 0.0007239 | V0 | 0.0000000 | V1 |
| Tin | 0.0004414 | 0.0002053 | V0 | 0.0000518 | V0 |
| Titanium | 0.0015201 | 0.1971498 | V0 | 0.0017872 | V0 |
| Tungsten | 0.0000938 | 0.0001988 | V0 | 0.0000000 | V1 |
| Uranium | 0.0000048 | 0.0001870 | V0 | 0.0000000 | V1 |
| Vanadium | 0.0007697 | 0.0078426 | V0 | 0.0000000 | V1 |
| Zinc | 0.0055897 | 0.0096550 | V0 | 0.0000000 | V1 |



| Compound Name | Bertha Ganter - Fort | | | | | | |
|------------------------------------|------------------------------|-----------|------------------------------|------------------|------------------------------|--------------|----|
| | Station Name | McKay | | Patricia McInnes | | Travel Blank | |
| | Station # | AMS 1 | | AMS 6 | | 30-Jul | |
| | Sample Date | 30-Jul | | 30-Jul | | 30-Jul | |
| Particulate Size | PM10 | | PM10 | | 24 | | |
| Total Air Volume (m ³) | 24 | | 24 | | 24 | | |
| MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | |
| Particulate Matter | 1.00 | 13.16 | V0 | 12.71 | V0 | 0.22 | V0 |
| Aluminum | 0.1380326 | 0.1653532 | V0 | 0.1714918 | V0 | 0.0000000 | V1 |
| Antimony | 0.0001784 | 0.0000569 | V0 | 0.0001119 | V0 | 0.0000000 | V1 |
| Arsenic | 0.0001060 | 0.0000868 | V0 | 0.0000875 | V0 | 0.0000000 | V1 |
| Barium | 0.0092847 | 0.0015992 | V0 | 0.0029325 | V0 | 0.0000000 | V1 |
| Beryllium | 0.0000946 | 0.0000052 | V0 | 0.0000059 | V0 | 0.0000000 | V1 |
| Bismuth | 0.0000093 | 0.0000022 | V0 | 0.0000063 | V0 | 0.0000000 | V1 |
| Cadmium | 0.0000174 | 0.0000088 | V0 | 0.0000203 | V0 | 0.0000000 | V1 |
| Calcium | 0.4112124 | 0.2388625 | V0 | 0.2395169 | V0 | 0.0000000 | V1 |
| Cerium | 0.0000174 | 0.0001811 | V0 | 0.0001897 | V0 | 0.0000000 | V1 |
| Cesium | 0.0000100 | 0.0000117 | V0 | 0.0000119 | V0 | 0.0000000 | V1 |
| Chromium | 0.0022262 | 0.0003755 | V0 | 0.0004258 | V0 | 0.0000000 | V1 |
| Cobalt | 0.0000273 | 0.0000474 | V0 | 0.0000435 | V0 | 0.0000012 | V0 |
| Copper | 0.0017171 | 0.0012750 | V0 | 0.0008580 | V0 | 0.0000823 | V0 |
| Iron | 0.0393063 | 0.1624285 | V0 | 0.1665947 | V0 | 0.0016940 | V0 |
| Lanthanum | 0.0000130 | 0.0000790 | V0 | 0.0000959 | V0 | 0.0000000 | V1 |
| Lead | 0.0008577 | 0.0000853 | V0 | 0.0001228 | V0 | 0.0000000 | V1 |
| Lithium | 0.0000374 | 0.0001608 | V0 | 0.0001154 | V0 | 0.0000000 | V1 |
| Magnesium | 0.0091409 | 0.0384444 | V0 | 0.0623439 | V0 | 0.0000000 | V1 |
| Manganese | 0.0006949 | 0.0032139 | V0 | 0.0032727 | V0 | 0.0000000 | V1 |
| Molybdenum | 0.0007116 | 0.0000875 | V0 | 0.0000905 | V0 | 0.0000000 | V1 |
| Neodymium | 0.0000140 | 0.0000724 | V0 | 0.0000802 | V0 | 0.0000000 | V1 |
| Nickel | 0.0005429 | 0.0002719 | V0 | 0.0002548 | V0 | 0.0000637 | V0 |
| Niobium | 0.0000202 | 0.0000198 | V0 | 0.0000207 | V0 | 0.0000000 | V1 |
| Palladium | 0.0000632 | 0.0000110 | V0 | 0.0000125 | V0 | 0.0000065 | V0 |
| Phosphorus | 0.0459574 | 0.0189628 | V0 | 0.0211155 | V0 | 0.0078533 | V0 |
| Platinum | 0.0000088 | 0.0000015 | V0 | 0.0000032 | V0 | 0.0000023 | V0 |
| Potassium | 0.0061261 | 0.0847279 | V0 | 0.1019860 | V0 | 0.0005901 | V0 |
| Praseodymium | 0.0000070 | 0.0000188 | V0 | 0.0000210 | V0 | 0.0000000 | V1 |
| Rubidium | 0.0000184 | 0.0002368 | V0 | 0.0002683 | V0 | 0.0000000 | V1 |
| Samarium | 0.0000133 | 0.0000129 | V0 | 0.0000139 | V0 | 0.0000000 | V1 |
| Selenium | 0.0003366 | 0.0001406 | V0 | 0.0001573 | V0 | 0.0000149 | V0 |
| Silicon | 0.7676322 | 0.5879911 | V0 | 0.6222029 | V0 | 0.0656722 | V0 |
| Silver | 0.0000100 | 0.0000026 | V0 | 0.0000054 | V0 | 0.0000006 | V0 |
| Sodium | 0.0169447 | 0.0280473 | V0 | 0.0431517 | V0 | 0.0017359 | V0 |
| Strontium | 0.0003375 | 0.0006686 | V0 | 0.0009387 | V0 | 0.0000000 | V1 |
| Tantalum | 0.0000394 | 0.0000000 | V1 | 0.0000000 | V1 | 0.0000000 | V1 |
| Thallium | 0.0000090 | 0.0000023 | V0 | 0.0000027 | V0 | 0.0000000 | V1 |
| Thorium | 0.0000059 | 0.0000215 | V0 | 0.0000241 | V0 | 0.0000000 | V1 |
| Tin | 0.0004414 | 0.0000707 | V0 | 0.0001425 | V0 | 0.0000275 | V0 |
| Titanium | 0.0015201 | 0.0062812 | V0 | 0.0081481 | V0 | 0.0005021 | V0 |
| Tungsten | 0.0000938 | 0.0000140 | V0 | 0.0000293 | V0 | 0.0000000 | V1 |
| Uranium | 0.0000048 | 0.0000061 | V0 | 0.0000075 | V0 | 0.0000000 | V1 |
| Vanadium | 0.0007697 | 0.0004794 | V0 | 0.0003831 | V0 | 0.0000000 | V1 |
| Zinc | 0.0055897 | 0.0022662 | V0 | 0.0040216 | V0 | 0.0000000 | V1 |



| Station Name Station # Sample Date Particulate Size Total Air Volume (m ³) | Athabasca Valley | | | Anzac | | Travel Blank | |
|--|-------------------------------|------------------------------|---------|--------------------------------|------------------------------|------------------------------|---|
| | AMS 7 30-Jul PM10 24 | Results (µg/m ³) | QC Flag | AMS 14 30-Jul PM10 24 | Results (µg/m ³) | QC Flag | 30-Jul 24 Results (µg/m ³) QC Flag |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 14.29 | V0 | 13.47 | V0 | 0.22 | V0 |
| Aluminum | 0.1380326 | 0.1676018 | V0 | 0.0706771 | V0 | 0.0000000 | V1 |
| Antimony | 0.0001784 | 0.0002251 | V0 | 0.0000271 | V0 | 0.0000000 | V1 |
| Arsenic | 0.0001060 | 0.0001206 | V0 | 0.0000475 | V0 | 0.0000000 | V1 |
| Barium | 0.0092847 | 0.0039778 | V0 | 0.0008921 | V0 | 0.0000000 | V1 |
| Beryllium | 0.0000946 | 0.0000053 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Bismuth | 0.0000093 | 0.0000154 | V0 | 0.0000015 | V0 | 0.0000000 | V1 |
| Cadmium | 0.0000174 | 0.0000174 | V0 | 0.0000186 | V0 | 0.0000000 | V1 |
| Calcium | 0.4112124 | 0.2586394 | V0 | 0.0715552 | V0 | 0.0000000 | V1 |
| Cerium | 0.0000174 | 0.0002094 | V0 | 0.0000794 | V0 | 0.0000000 | V1 |
| Cesium | 0.0000100 | 0.0000121 | V0 | 0.0000049 | V0 | 0.0000000 | V1 |
| Chromium | 0.0022262 | 0.0004027 | V0 | 0.0001923 | V0 | 0.0000000 | V1 |
| Cobalt | 0.0000273 | 0.0000511 | V0 | 0.0000199 | V0 | 0.0000012 | V0 |
| Copper | 0.0017171 | 0.0015511 | V0 | 0.0004271 | V0 | 0.0000823 | V0 |
| Iron | 0.0393063 | 0.2135927 | V0 | 0.0602823 | V0 | 0.0016940 | V0 |
| Lanthanum | 0.0000130 | 0.0000954 | V0 | 0.0000424 | V0 | 0.0000000 | V1 |
| Lead | 0.0008577 | 0.0001751 | V0 | 0.0000819 | V0 | 0.0000000 | V1 |
| Lithium | 0.0000374 | 0.0001283 | V0 | 0.0000470 | V0 | 0.0000000 | V1 |
| Magnesium | 0.0091409 | 0.0606447 | V0 | 0.0182168 | V0 | 0.0000000 | V1 |
| Manganese | 0.0006949 | 0.0036680 | V0 | 0.0017600 | V0 | 0.0000000 | V1 |
| Molybdenum | 0.0007116 | 0.0001128 | V0 | 0.0000496 | V0 | 0.0000000 | V1 |
| Neodymium | 0.0000140 | 0.0000836 | V0 | 0.0000286 | V0 | 0.0000000 | V1 |
| Nickel | 0.0005429 | 0.0002722 | V0 | 0.0001594 | V0 | 0.0000637 | V0 |
| Niobium | 0.0000202 | 0.0000229 | V0 | 0.0000077 | V0 | 0.0000000 | V1 |
| Palladium | 0.0000632 | 0.0000132 | V0 | 0.0000000 | V1 | 0.0000065 | V0 |
| Phosphorus | 0.0459574 | 0.0255688 | V0 | 0.0183104 | V0 | 0.0078533 | V0 |
| Platinum | 0.0000088 | 0.0000028 | V0 | 0.0000009 | V0 | 0.0000023 | V0 |
| Potassium | 0.0061261 | 0.1138100 | V0 | 0.0743578 | V0 | 0.0005901 | V0 |
| Praseodymium | 0.0000070 | 0.0000211 | V0 | 0.0000080 | V0 | 0.0000000 | V1 |
| Rubidium | 0.0000184 | 0.0002621 | V0 | 0.0001417 | V0 | 0.0000000 | V1 |
| Samarium | 0.0000133 | 0.0000152 | V0 | 0.0000058 | V0 | 0.0000000 | V1 |
| Selenium | 0.0003366 | 0.0001566 | V0 | 0.0000735 | V0 | 0.0000149 | V0 |
| Silicon | 0.7676322 | 0.5433462 | V0 | 0.1890963 | V0 | 0.0656722 | V0 |
| Silver | 0.0000100 | 0.0000040 | V0 | 0.0000039 | V0 | 0.0000006 | V0 |
| Sodium | 0.0169447 | 0.0401417 | V0 | 0.0153588 | V0 | 0.0017359 | V0 |
| Strontium | 0.0003375 | 0.0008200 | V0 | 0.0002642 | V0 | 0.0000000 | V1 |
| Tantalum | 0.0000394 | 0.0000025 | V0 | 0.0000000 | V1 | 0.0000000 | V1 |
| Thallium | 0.0000090 | 0.0000028 | V0 | 0.0000017 | V0 | 0.0000000 | V1 |
| Thorium | 0.0000059 | 0.0000229 | V0 | 0.0000081 | V0 | 0.0000000 | V1 |
| Tin | 0.0004414 | 0.0002167 | V0 | 0.0000557 | V0 | 0.0000275 | V0 |
| Titanium | 0.0015201 | 0.0081223 | V0 | 0.0031165 | V0 | 0.0005021 | V0 |
| Tungsten | 0.0000938 | 0.0000632 | V0 | 0.0000080 | V0 | 0.0000000 | V1 |
| Uranium | 0.0000048 | 0.0000069 | V0 | 0.0000027 | V0 | 0.0000000 | V1 |
| Vanadium | 0.0007697 | 0.0004262 | V0 | 0.0001680 | V0 | 0.0000000 | V1 |
| Zinc | 0.0055897 | 0.0050071 | V0 | 0.0023861 | V0 | 0.0000000 | V1 |



| Compound Name | Station Name Station # Sample Date Particulate Size Total Air Volume (m ³) | Fort McKay South | | | Horizon | | Travel Blank | |
|--------------------|--|--------------------------------|------------------------------|-----------|--------------------------------|-----------|------------------------------|---------|
| | | AMS 13 30-Jul PM10 24 | Results (µg/m ³) | QC Flag | AMS 15 30-Jul PM10 24 | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 12.14 | V0 | 9.32 | V0 | 0.22 | V0 | |
| Aluminum | 0.1380326 | 0.1536196 | V0 | 0.1385468 | V0 | 0.0000000 | V1 | |
| Antimony | 0.0001784 | 0.0000603 | V0 | 0.0000205 | V0 | 0.0000000 | V1 | |
| Arsenic | 0.0001060 | 0.0001087 | V0 | 0.0000596 | V0 | 0.0000000 | V1 | |
| Barium | 0.0092847 | 0.0014183 | V0 | 0.0012485 | V0 | 0.0000000 | V1 | |
| Beryllium | 0.0000946 | 0.0000000 | V1 | 0.0000000 | V1 | 0.0000000 | V1 | |
| Bismuth | 0.0000093 | 0.0000022 | V0 | 0.0000011 | V0 | 0.0000000 | V1 | |
| Cadmium | 0.0000174 | 0.0000100 | V0 | 0.0000069 | V0 | 0.0000000 | V1 | |
| Calcium | 0.4112124 | 0.1393458 | V0 | 0.0691502 | V0 | 0.0000000 | V1 | |
| Cerium | 0.0000174 | 0.0001468 | V0 | 0.0001267 | V0 | 0.0000000 | V1 | |
| Cesium | 0.0000100 | 0.0000108 | V0 | 0.0000109 | V0 | 0.0000000 | V1 | |
| Chromium | 0.0022262 | 0.0002718 | V0 | 0.0002584 | V0 | 0.0000000 | V1 | |
| Cobalt | 0.0000273 | 0.0000407 | V0 | 0.0000352 | V0 | 0.0000012 | V0 | |
| Copper | 0.0017171 | 0.0002835 | V0 | 0.0002768 | V0 | 0.0000823 | V0 | |
| Iron | 0.0393063 | 0.1228895 | V0 | 0.1171326 | V0 | 0.0016940 | V0 | |
| Lanthanum | 0.0000130 | 0.0000698 | V0 | 0.0000610 | V0 | 0.0000000 | V1 | |
| Lead | 0.0008577 | 0.0000754 | V0 | 0.0000538 | V0 | 0.0000000 | V1 | |
| Lithium | 0.0000374 | 0.0001330 | V0 | 0.0001182 | V0 | 0.0000000 | V1 | |
| Magnesium | 0.0091409 | 0.0314579 | V0 | 0.0271955 | V0 | 0.0000000 | V1 | |
| Manganese | 0.0006949 | 0.0024315 | V0 | 0.0022152 | V0 | 0.0000000 | V1 | |
| Molybdenum | 0.0007116 | 0.0000734 | V0 | 0.0000571 | V0 | 0.0000000 | V1 | |
| Neodymium | 0.0000140 | 0.0000695 | V0 | 0.0000570 | V0 | 0.0000000 | V1 | |
| Nickel | 0.0005429 | 0.0002240 | V0 | 0.0002231 | V0 | 0.0000637 | V0 | |
| Niobium | 0.0000202 | 0.0000175 | V0 | 0.0000133 | V0 | 0.0000000 | V1 | |
| Palladium | 0.0000632 | 0.0000041 | V0 | 0.0000062 | V0 | 0.0000065 | V0 | |
| Phosphorus | 0.0459574 | 0.0228574 | V0 | 0.0220667 | V0 | 0.0078533 | V0 | |
| Platinum | 0.0000088 | 0.0000018 | V0 | 0.0000018 | V0 | 0.0000023 | V0 | |
| Potassium | 0.0061261 | 0.0859218 | V0 | 0.0754143 | V0 | 0.0005901 | V0 | |
| Praseodymium | 0.0000070 | 0.0000169 | V0 | 0.0000145 | V0 | 0.0000000 | V1 | |
| Rubidium | 0.0000184 | 0.0002276 | V0 | 0.0001966 | V0 | 0.0000000 | V1 | |
| Samarium | 0.0000133 | 0.0000122 | V0 | 0.0000116 | V0 | 0.0000000 | V1 | |
| Selenium | 0.0003366 | 0.0001344 | V0 | 0.0001135 | V0 | 0.0000149 | V0 | |
| Silicon | 0.7676322 | 0.4463851 | V0 | 0.3844212 | V0 | 0.0656722 | V0 | |
| Silver | 0.0000100 | 0.0000023 | V0 | 0.0000015 | V0 | 0.0000006 | V0 | |
| Sodium | 0.0169447 | 0.0260097 | V0 | 0.0201872 | V0 | 0.0017359 | V0 | |
| Strontium | 0.0003375 | 0.0005343 | V0 | 0.0004279 | V0 | 0.0000000 | V1 | |
| Tantalum | 0.0000394 | 0.0000000 | V1 | 0.0000000 | V1 | 0.0000000 | V1 | |
| Thallium | 0.0000090 | 0.0000022 | V0 | 0.0000016 | V0 | 0.0000000 | V1 | |
| Thorium | 0.0000059 | 0.0000179 | V0 | 0.0000165 | V0 | 0.0000000 | V1 | |
| Tin | 0.0004414 | 0.0000564 | V0 | 0.0000409 | V0 | 0.0000275 | V0 | |
| Titanium | 0.0015201 | 0.0055708 | V0 | 0.0047161 | V0 | 0.0005021 | V0 | |
| Tungsten | 0.0000938 | 0.0000092 | V0 | 0.0000073 | V0 | 0.0000000 | V1 | |
| Uranium | 0.0000048 | 0.0000062 | V0 | 0.0000046 | V0 | 0.0000000 | V1 | |
| Vanadium | 0.0007697 | 0.0004320 | V0 | 0.0004083 | V0 | 0.0000000 | V1 | |
| Zinc | 0.0055897 | 0.0020008 | V0 | 0.0011588 | V0 | 0.0000000 | V1 | |



| Station Name | Muskeg River | | | Travel Blank | |
|------------------------------------|-----------------|------------------------------|---------|------------------------------|---------|
| Station # | AMS 16 | | | 30-Jul | |
| Sample Date | 30-Jul | | | 30-Jul | |
| Particulate Size | PM10 | | | 24 | |
| Total Air Volume (m ³) | 24 | | | 24 | |
| Compound Name | MDL (µg/sample) | Results (µg/m ³) | QC Flag | Results (µg/m ³) | QC Flag |
| Particulate Matter | 1.00 | 23.13 | V0 | 0.22 | V0 |
| Aluminum | 0.1380326 | 0.6350790 | V0 | 0.0000000 | V1 |
| Antimony | 0.0001784 | 0.0000397 | V0 | 0.0000000 | V1 |
| Arsenic | 0.0001060 | 0.0001480 | V0 | 0.0000000 | V1 |
| Barium | 0.0092847 | 0.0052923 | V0 | 0.0000000 | V1 |
| Beryllium | 0.0000946 | 0.0000213 | V0 | 0.0000000 | V1 |
| Bismuth | 0.0000093 | 0.0000040 | V0 | 0.0000000 | V1 |
| Cadmium | 0.0000174 | 0.0000112 | V0 | 0.0000000 | V1 |
| Calcium | 0.4112124 | 0.8373704 | V0 | 0.0000000 | V1 |
| Cerium | 0.0000174 | 0.0007417 | V0 | 0.0000000 | V1 |
| Cesium | 0.0000100 | 0.0000394 | V0 | 0.0000000 | V1 |
| Chromium | 0.0022262 | 0.0007808 | V0 | 0.0000000 | V1 |
| Cobalt | 0.0000273 | 0.0001881 | V0 | 0.0000012 | V0 |
| Copper | 0.0017171 | 0.0005170 | V0 | 0.0000823 | V0 |
| Iron | 0.0393063 | 0.9015332 | V0 | 0.0016940 | V0 |
| Lanthanum | 0.0000130 | 0.0003564 | V0 | 0.0000000 | V1 |
| Lead | 0.0008577 | 0.0002282 | V0 | 0.0000000 | V1 |
| Lithium | 0.0000374 | 0.0007167 | V0 | 0.0000000 | V1 |
| Magnesium | 0.0091409 | 0.1400175 | V0 | 0.0000000 | V1 |
| Manganese | 0.0006949 | 0.0149590 | V0 | 0.0000000 | V1 |
| Molybdenum | 0.0007116 | 0.0001716 | V0 | 0.0000000 | V1 |
| Neodymium | 0.0000140 | 0.0003114 | V0 | 0.0000000 | V1 |
| Nickel | 0.0005429 | 0.0007294 | V0 | 0.0000637 | V0 |
| Niobium | 0.0000202 | 0.0000784 | V0 | 0.0000000 | V1 |
| Palladium | 0.0000632 | 0.0000116 | V0 | 0.0000065 | V0 |
| Phosphorus | 0.0459574 | 0.0260322 | V0 | 0.0078533 | V0 |
| Platinum | 0.0000088 | 0.0000022 | V0 | 0.0000023 | V0 |
| Potassium | 0.0061261 | 0.1894843 | V0 | 0.0005901 | V0 |
| Praseodymium | 0.0000070 | 0.0000832 | V0 | 0.0000000 | V1 |
| Rubidium | 0.0000184 | 0.0007722 | V0 | 0.0000000 | V1 |
| Samarium | 0.0000133 | 0.0000572 | V0 | 0.0000000 | V1 |
| Selenium | 0.0003366 | 0.0004535 | V0 | 0.0000149 | V0 |
| Silicon | 0.7676322 | 1.6838681 | V0 | 0.0656722 | V0 |
| Silver | 0.0000100 | 0.0000039 | V0 | 0.0000006 | V0 |
| Sodium | 0.0169447 | 0.0811770 | V0 | 0.0017359 | V0 |
| Strontium | 0.0003375 | 0.0022892 | V0 | 0.0000000 | V1 |
| Tantalum | 0.0000394 | 0.0000048 | V0 | 0.0000000 | V1 |
| Thallium | 0.0000090 | 0.0000074 | V0 | 0.0000000 | V1 |
| Thorium | 0.0000059 | 0.0000876 | V0 | 0.0000000 | V1 |
| Tin | 0.0004414 | 0.0000782 | V0 | 0.0000275 | V0 |
| Titanium | 0.0015201 | 0.0243565 | V0 | 0.0005021 | V0 |
| Tungsten | 0.0000938 | 0.0000516 | V0 | 0.0000000 | V1 |
| Uranium | 0.0000048 | 0.0000242 | V0 | 0.0000000 | V1 |
| Vanadium | 0.0007697 | 0.0016397 | V0 | 0.0000000 | V1 |
| Zinc | 0.0055897 | 0.0029421 | V0 | 0.0000000 | V1 |



| Station Name | Bertha Ganter - Fort McKay | Bertha Ganter - Fort McKay | Bertha Ganter - Fort McKay | Bertha Ganter - Fort McKay |
|--------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Station # | AMS 1 | AMS 1 | AMS 1 | AMS 1 |
| Sample Date | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 |
| Particulate Size | PM10 | PM10 | PM10 | PM10 |
| Compound Name | Average µg/m ³ | Std Dev µg/m ³ | Total Samples (#) | Total ≥ MDL (#) |
| Particulate Matter | 26.49 | 23.63 | 5 | 5 |
| Aluminum | 0.7772149 | 0.8338212 | 5 | 5 |
| Antimony | 0.0000359 | 0.0000255 | 5 | 5 |
| Arsenic | 0.0002092 | 0.0002046 | 5 | 5 |
| Barium | 0.0071874 | 0.0078684 | 5 | 5 |
| Beryllium | 0.0000242 | 0.0000266 | 5 | 4 |
| Bismuth | 0.0000049 | 0.0000042 | 5 | 5 |
| Cadmium | 0.0000109 | 0.0000049 | 5 | 5 |
| Calcium | 1.4117096 | 1.3349264 | 5 | 5 |
| Cerium | 0.0008264 | 0.0009146 | 5 | 5 |
| Cesium | 0.0000583 | 0.0000618 | 5 | 5 |
| Chromium | 0.0010774 | 0.0008855 | 5 | 5 |
| Cobalt | 0.0002226 | 0.0002420 | 5 | 5 |
| Copper | 0.0013460 | 0.0008327 | 5 | 5 |
| Iron | 0.7450249 | 0.8261094 | 5 | 5 |
| Lanthanum | 0.0003930 | 0.0004323 | 5 | 5 |
| Lead | 0.0003100 | 0.0003141 | 5 | 5 |
| Lithium | 0.0007095 | 0.0007401 | 5 | 5 |
| Magnesium | 0.1606175 | 0.1676953 | 5 | 5 |
| Manganese | 0.0112670 | 0.0116260 | 5 | 5 |
| Molybdenum | 0.0001084 | 0.0000724 | 5 | 5 |
| Neodymium | 0.0003633 | 0.0004020 | 5 | 5 |
| Nickel | 0.0007662 | 0.0006859 | 5 | 5 |
| Niobium | 0.0000902 | 0.0000994 | 5 | 5 |
| Palladium | 0.0000129 | 0.0000099 | 5 | 4 |
| Phosphorus | 0.0262491 | 0.0128405 | 5 | 5 |
| Platinum | 0.0000018 | 0.0000003 | 5 | 5 |
| Potassium | 0.2542058 | 0.2432997 | 5 | 5 |
| Praseodymium | 0.0000949 | 0.0001060 | 5 | 5 |
| Rubidium | 0.0010809 | 0.0011431 | 5 | 5 |
| Samarium | 0.0000682 | 0.0000760 | 5 | 5 |
| Selenium | 0.0004915 | 0.0005236 | 5 | 5 |
| Silicon | 2.4094696 | 2.6496169 | 5 | 5 |
| Silver | 0.0000051 | 0.0000039 | 5 | 5 |
| Sodium | 0.0885550 | 0.0821292 | 5 | 5 |
| Strontium | 0.0031875 | 0.0032450 | 5 | 5 |
| Tantalum | 0.0000058 | 0.0000070 | 5 | 3 |
| Thallium | 0.0000090 | 0.0000095 | 5 | 5 |
| Thorium | 0.0001113 | 0.0001241 | 5 | 5 |
| Tin | 0.0000936 | 0.0000305 | 5 | 5 |
| Titanium | 0.0305010 | 0.0327232 | 5 | 5 |
| Tungsten | 0.0000482 | 0.0000636 | 5 | 5 |
| Uranium | 0.0000310 | 0.0000337 | 5 | 5 |
| Vanadium | 0.0017974 | 0.0019069 | 5 | 5 |
| Zinc | 0.0033470 | 0.0025165 | 5 | 5 |



| Station Name | Patricia McInnes | Patricia McInnes | Patricia McInnes | Patricia McInnes |
|--------------------|------------------------------|------------------------------|-------------------|------------------|
| Station # | AMS 6 | AMS 6 | AMS 6 | AMS 6 |
| Sample Date | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 |
| Particulate Size | PM10 | PM10 | PM10 | PM10 |
| Compound Name | Average µg/m ³ | Std Dev µg/m ³ | Total Samples (#) | Total ≥ MDL (#) |
| Particulate Matter | 16.97 | 6.49 | 5 | 5 |
| Aluminum | 0.4255915 | 0.3008248 | 5 | 5 |
| Antimony | 0.0000851 | 0.0000503 | 5 | 5 |
| Arsenic | 0.0001293 | 0.0000357 | 5 | 5 |
| Barium | 0.0046532 | 0.0017974 | 5 | 5 |
| Beryllium | 0.0000135 | 0.0000077 | 5 | 5 |
| Bismuth | 0.0000064 | 0.0000030 | 5 | 5 |
| Cadmium | 0.0000134 | 0.0000054 | 5 | 5 |
| Calcium | 0.5253296 | 0.2948542 | 5 | 5 |
| Cerium | 0.0004569 | 0.0002965 | 5 | 5 |
| Cesium | 0.0000280 | 0.0000199 | 5 | 5 |
| Chromium | 0.0006024 | 0.0002904 | 5 | 5 |
| Cobalt | 0.0001184 | 0.0000792 | 5 | 5 |
| Copper | 0.0008567 | 0.0002354 | 5 | 5 |
| Iron | 0.3949804 | 0.2280237 | 5 | 5 |
| Lanthanum | 0.0002212 | 0.0001312 | 5 | 5 |
| Lead | 0.0001985 | 0.0000807 | 5 | 5 |
| Lithium | 0.0003619 | 0.0003181 | 5 | 5 |
| Magnesium | 0.1346435 | 0.0706800 | 5 | 5 |
| Manganese | 0.0068309 | 0.0035231 | 5 | 5 |
| Molybdenum | 0.0001188 | 0.0000847 | 5 | 5 |
| Neodymium | 0.0001962 | 0.0001285 | 5 | 5 |
| Nickel | 0.0004904 | 0.0002775 | 5 | 5 |
| Niobium | 0.0000485 | 0.0000341 | 5 | 5 |
| Palladium | 0.0000096 | 0.0000040 | 5 | 5 |
| Phosphorus | 0.0227880 | 0.0052823 | 5 | 5 |
| Platinum | 0.0000030 | 0.0000002 | 5 | 5 |
| Potassium | 0.1509432 | 0.0594029 | 5 | 5 |
| Praseodymium | 0.0000512 | 0.0000330 | 5 | 5 |
| Rubidium | 0.0005534 | 0.0003518 | 5 | 5 |
| Samarium | 0.0000353 | 0.0000240 | 5 | 5 |
| Selenium | 0.0002804 | 0.0001604 | 5 | 5 |
| Silicon | 1.4824666 | 1.0030372 | 5 | 5 |
| Silver | 0.0000040 | 0.0000012 | 5 | 5 |
| Sodium | 0.0835271 | 0.0410344 | 5 | 5 |
| Strontium | 0.0018307 | 0.0009676 | 5 | 5 |
| Tantalum | 0.0000030 | 0.0000025 | 5 | 4 |
| Thallium | 0.0000050 | 0.0000029 | 5 | 5 |
| Thorium | 0.0000591 | 0.0000366 | 5 | 5 |
| Tin | 0.0001287 | 0.0000319 | 5 | 5 |
| Titanium | 0.0161171 | 0.0099627 | 5 | 5 |
| Tungsten | 0.0000724 | 0.0000477 | 5 | 5 |
| Uranium | 0.0000183 | 0.0000115 | 5 | 5 |
| Vanadium | 0.0010242 | 0.0008106 | 5 | 5 |
| Zinc | 0.0033955 | 0.0009719 | 5 | 5 |



| Station Name | Athabasca Valley | Athabasca Valley | Athabasca Valley | Athabasca Valley |
|--------------------|------------------------------|------------------------------|-------------------|------------------|
| Station # | AMS 7 | AMS 7 | AMS 7 | AMS 7 |
| Sample Date | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 |
| Particulate Size | PM10 | PM10 | PM10 | PM10 |
| Compound Name | Average µg/m ³ | Std Dev µg/m ³ | Total Samples (#) | Total ≥ MDL (#) |
| Particulate Matter | 17.29 | 8.41 | 5 | 5 |
| Aluminum | 0.4253424 | 0.4097111 | 5 | 5 |
| Antimony | 0.0002414 | 0.0001064 | 5 | 5 |
| Arsenic | 0.0002170 | 0.0002083 | 5 | 5 |
| Barium | 0.0060725 | 0.0018481 | 5 | 5 |
| Beryllium | 0.0000128 | 0.0000103 | 5 | 5 |
| Bismuth | 0.0000116 | 0.0000040 | 5 | 5 |
| Cadmium | 0.0000112 | 0.0000050 | 5 | 5 |
| Calcium | 0.4881790 | 0.2305705 | 5 | 5 |
| Cerium | 0.0004556 | 0.0003552 | 5 | 5 |
| Cesium | 0.0000289 | 0.0000263 | 5 | 5 |
| Chromium | 0.0006736 | 0.0003272 | 5 | 5 |
| Cobalt | 0.0001201 | 0.0000873 | 5 | 5 |
| Copper | 0.0018821 | 0.0005066 | 5 | 5 |
| Iron | 0.3763799 | 0.1623596 | 5 | 5 |
| Lanthanum | 0.0002100 | 0.0001620 | 5 | 5 |
| Lead | 0.0002187 | 0.0000734 | 5 | 5 |
| Lithium | 0.0003924 | 0.0004277 | 5 | 5 |
| Magnesium | 0.1028414 | 0.0413537 | 5 | 5 |
| Manganese | 0.0063381 | 0.0028362 | 5 | 5 |
| Molybdenum | 0.0001333 | 0.0000374 | 5 | 5 |
| Neodymium | 0.0001919 | 0.0001516 | 5 | 5 |
| Nickel | 0.0005628 | 0.0002794 | 5 | 5 |
| Niobium | 0.0000518 | 0.0000474 | 5 | 5 |
| Palladium | 0.0000130 | 0.0000029 | 5 | 5 |
| Phosphorus | 0.0243076 | 0.0069356 | 5 | 5 |
| Platinum | 0.0000038 | 0.0000009 | 5 | 5 |
| Potassium | 0.1622777 | 0.0937692 | 5 | 5 |
| Praseodymium | 0.0000508 | 0.0000401 | 5 | 5 |
| Rubidium | 0.0005679 | 0.0004944 | 5 | 5 |
| Samarium | 0.0000347 | 0.0000290 | 5 | 5 |
| Selenium | 0.0002929 | 0.0002318 | 5 | 5 |
| Silicon | 1.2916954 | 0.9815424 | 5 | 5 |
| Silver | 0.0000044 | 0.0000013 | 5 | 5 |
| Sodium | 0.0660255 | 0.0382070 | 5 | 5 |
| Strontium | 0.0015848 | 0.0008751 | 5 | 5 |
| Tantalum | 0.0000038 | 0.0000037 | 5 | 4 |
| Thallium | 0.0000047 | 0.0000035 | 5 | 5 |
| Thorium | 0.0000564 | 0.0000451 | 5 | 5 |
| Tin | 0.0002534 | 0.0000935 | 5 | 5 |
| Titanium | 0.0170542 | 0.0141254 | 5 | 5 |
| Tungsten | 0.0000927 | 0.0000356 | 5 | 5 |
| Uranium | 0.0000165 | 0.0000135 | 5 | 5 |
| Vanadium | 0.0009058 | 0.0006897 | 5 | 5 |
| Zinc | 0.0068846 | 0.0021022 | 5 | 5 |



| Station Name | Anzac | Anzac | Anzac | Anzac |
|--------------------|------------------------------|------------------------------|-------------------|-----------------|
| Station # | AMS 14 | AMS 14 | AMS 14 | AMS 14 |
| Sample Date | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 |
| Particulate Size | PM10 | PM10 | PM10 | PM10 |
| Compound Name | Average µg/m ³ | Std Dev µg/m ³ | Total Samples (#) | Total ≥ MDL (#) |
| Particulate Matter | 10.21 | 5.17 | 5 | 5 |
| Aluminum | 0.1242027 | 0.1338560 | 5 | 5 |
| Antimony | 0.0000386 | 0.0000336 | 5 | 5 |
| Arsenic | 0.0000709 | 0.0000287 | 5 | 5 |
| Barium | 0.0012751 | 0.0005807 | 5 | 5 |
| Beryllium | 0.0000019 | 0.0000042 | 5 | 1 |
| Bismuth | 0.0000021 | 0.0000015 | 5 | 5 |
| Cadmium | 0.0000094 | 0.0000060 | 5 | 5 |
| Calcium | 0.1132769 | 0.0617597 | 5 | 5 |
| Cerium | 0.0001193 | 0.0001123 | 5 | 5 |
| Cesium | 0.0000085 | 0.0000093 | 5 | 5 |
| Chromium | 0.0002592 | 0.0001049 | 5 | 5 |
| Cobalt | 0.0000347 | 0.0000283 | 5 | 5 |
| Copper | 0.0004543 | 0.0001592 | 5 | 5 |
| Iron | 0.0898528 | 0.0406316 | 5 | 5 |
| Lanthanum | 0.0000569 | 0.0000487 | 5 | 5 |
| Lead | 0.0000691 | 0.0000342 | 5 | 5 |
| Lithium | 0.0001114 | 0.0001434 | 5 | 5 |
| Magnesium | 0.0252043 | 0.0122905 | 5 | 5 |
| Manganese | 0.0019022 | 0.0006838 | 5 | 5 |
| Molybdenum | 0.0000773 | 0.0000643 | 5 | 5 |
| Neodymium | 0.0000505 | 0.0000479 | 5 | 5 |
| Nickel | 0.0001840 | 0.0000753 | 5 | 5 |
| Niobium | 0.0000124 | 0.0000121 | 5 | 5 |
| Palladium | 0.0000024 | 0.0000024 | 5 | 3 |
| Phosphorus | 0.0201607 | 0.0088856 | 5 | 5 |
| Platinum | 0.0000022 | 0.0000013 | 5 | 5 |
| Potassium | 0.0710787 | 0.0364411 | 5 | 5 |
| Praseodymium | 0.0000135 | 0.0000134 | 5 | 5 |
| Rubidium | 0.0001918 | 0.0001787 | 5 | 5 |
| Samarium | 0.0000092 | 0.0000089 | 5 | 5 |
| Selenium | 0.0001062 | 0.0000652 | 5 | 5 |
| Silicon | 0.3302349 | 0.3965569 | 5 | 4 |
| Silver | 0.0000021 | 0.0000012 | 5 | 5 |
| Sodium | 0.0201958 | 0.0115079 | 5 | 5 |
| Strontium | 0.0003970 | 0.0002613 | 5 | 5 |
| Tantalum | 0.0000004 | 0.0000009 | 5 | 1 |
| Thallium | 0.0000017 | 0.0000015 | 5 | 5 |
| Thorium | 0.0000150 | 0.0000144 | 5 | 5 |
| Tin | 0.0000776 | 0.0000201 | 5 | 5 |
| Titanium | 0.0055354 | 0.0048976 | 5 | 5 |
| Tungsten | 0.0000245 | 0.0000169 | 5 | 5 |
| Uranium | 0.0000044 | 0.0000039 | 5 | 5 |
| Vanadium | 0.0002520 | 0.0002229 | 5 | 5 |
| Zinc | 0.0015233 | 0.0006741 | 5 | 5 |



| Station Name | Fort McKay South | Fort McKay South | Fort McKay South | Fort McKay South |
|--------------------|------------------------------|------------------------------|-------------------|------------------|
| Station # | AMS 13 | AMS 13 | AMS 13 | AMS 13 |
| Sample Date | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 |
| Particulate Size | PM10 | PM10 | PM10 | PM10 |
| Compound Name | Average µg/m ³ | Std Dev µg/m ³ | Total Samples (#) | Total ≥ MDL (#) |
| Particulate Matter | 15.88 | 13.17 | 5 | 5 |
| Aluminum | 0.4217187 | 0.4853267 | 5 | 5 |
| Antimony | 0.0000250 | 0.0000286 | 5 | 3 |
| Arsenic | 0.0001306 | 0.0001134 | 5 | 5 |
| Barium | 0.0036275 | 0.0042571 | 5 | 4 |
| Beryllium | 0.0000119 | 0.0000148 | 5 | 3 |
| Bismuth | 0.0000029 | 0.0000030 | 5 | 4 |
| Cadmium | 0.0000083 | 0.0000055 | 5 | 5 |
| Calcium | 0.3292152 | 0.3401385 | 5 | 5 |
| Cerium | 0.0004237 | 0.0004834 | 5 | 5 |
| Cesium | 0.0000310 | 0.0000365 | 5 | 5 |
| Chromium | 0.0005988 | 0.0005469 | 5 | 5 |
| Cobalt | 0.0001110 | 0.0001251 | 5 | 5 |
| Copper | 0.0004671 | 0.0004157 | 5 | 5 |
| Iron | 0.3635045 | 0.3993126 | 5 | 5 |
| Lanthanum | 0.0002006 | 0.0002331 | 5 | 5 |
| Lead | 0.0001428 | 0.0001554 | 5 | 4 |
| Lithium | 0.0003875 | 0.0004463 | 5 | 5 |
| Magnesium | 0.0886906 | 0.0994753 | 5 | 5 |
| Manganese | 0.0056532 | 0.0058261 | 5 | 5 |
| Molybdenum | 0.0000808 | 0.0000744 | 5 | 4 |
| Neodymium | 0.0001871 | 0.0002140 | 5 | 5 |
| Nickel | 0.0004467 | 0.0004314 | 5 | 5 |
| Niobium | 0.0000451 | 0.0000503 | 5 | 5 |
| Palladium | 0.0000070 | 0.0000062 | 5 | 4 |
| Phosphorus | 0.0211233 | 0.0085696 | 5 | 5 |
| Platinum | 0.0000020 | 0.0000005 | 5 | 5 |
| Potassium | 0.1409563 | 0.1356893 | 5 | 5 |
| Praseodymium | 0.0000487 | 0.0000564 | 5 | 5 |
| Rubidium | 0.0005643 | 0.0006307 | 5 | 5 |
| Samarium | 0.0000357 | 0.0000422 | 5 | 5 |
| Selenium | 0.0002611 | 0.0002717 | 5 | 5 |
| Silicon | 1.2917549 | 1.4432471 | 5 | 5 |
| Silver | 0.0000030 | 0.0000024 | 5 | 5 |
| Sodium | 0.0569111 | 0.0614116 | 5 | 5 |
| Strontium | 0.0014192 | 0.0016427 | 5 | 5 |
| Tantalum | 0.0000026 | 0.0000038 | 5 | 2 |
| Thallium | 0.0000047 | 0.0000050 | 5 | 4 |
| Thorium | 0.0000565 | 0.0000665 | 5 | 5 |
| Tin | 0.0000677 | 0.0000354 | 5 | 5 |
| Titanium | 0.0162046 | 0.0175459 | 5 | 5 |
| Tungsten | 0.0000243 | 0.0000323 | 5 | 4 |
| Uranium | 0.0000157 | 0.0000177 | 5 | 5 |
| Vanadium | 0.0010137 | 0.0010788 | 5 | 5 |
| Zinc | 0.0026718 | 0.0026526 | 5 | 5 |



| Station Name Station # Sample Date Particulate Size Compound Name | Horizon AMS 15 Jul 06 - Jul 30 PM10 Average µg/m ³ | Horizon AMS 15 Jul 06 - Jul 30 PM10 Std Dev µg/m ³ | Horizon AMS 15 Jul 06 - Jul 30 PM10 Total Samples (#) | Horizon AMS 15 Jul 06 - Jul 30 PM10 Total ≥ MDL (#) |
|---|--|--|---|---|
| Particulate Matter | 17.68 | 13.82 | 5 | 5 |
| Aluminum | 0.5487444 | 0.4547841 | 5 | 5 |
| Antimony | 0.0000314 | 0.0000119 | 5 | 5 |
| Arsenic | 0.0001269 | 0.0001066 | 5 | 5 |
| Barium | 0.0045840 | 0.0039079 | 5 | 5 |
| Beryllium | 0.0000150 | 0.0000171 | 5 | 3 |
| Bismuth | 0.0000032 | 0.0000021 | 5 | 5 |
| Cadmium | 0.0000084 | 0.0000057 | 5 | 5 |
| Calcium | 0.1965778 | 0.1864476 | 5 | 5 |
| Cerium | 0.0005718 | 0.0005241 | 5 | 5 |
| Cesium | 0.0000413 | 0.0000327 | 5 | 5 |
| Chromium | 0.0009568 | 0.0009475 | 5 | 5 |
| Cobalt | 0.0001454 | 0.0001379 | 5 | 5 |
| Copper | 0.0005417 | 0.0002992 | 5 | 5 |
| Iron | 0.4490378 | 0.4977057 | 5 | 5 |
| Lanthanum | 0.0002721 | 0.0002459 | 5 | 5 |
| Lead | 0.0001830 | 0.0001614 | 5 | 5 |
| Lithium | 0.0005212 | 0.0004440 | 5 | 5 |
| Magnesium | 0.0892728 | 0.0735999 | 5 | 5 |
| Manganese | 0.0065073 | 0.0060614 | 5 | 5 |
| Molybdenum | 0.0000881 | 0.0000408 | 5 | 5 |
| Neodymium | 0.0002632 | 0.0002490 | 5 | 5 |
| Nickel | 0.0006953 | 0.0006579 | 5 | 5 |
| Niobium | 0.0000624 | 0.0000555 | 5 | 5 |
| Palladium | 0.0000083 | 0.0000067 | 5 | 4 |
| Phosphorus | 0.0247850 | 0.0090501 | 5 | 5 |
| Platinum | 0.0000020 | 0.0000003 | 5 | 5 |
| Potassium | 0.1692583 | 0.1118683 | 5 | 5 |
| Praseodymium | 0.0000677 | 0.0000625 | 5 | 5 |
| Rubidium | 0.0007158 | 0.0005714 | 5 | 5 |
| Samarium | 0.0000507 | 0.0000485 | 5 | 5 |
| Selenium | 0.0003311 | 0.0002725 | 5 | 5 |
| Silicon | 1.6473022 | 1.5184472 | 5 | 5 |
| Silver | 0.0000034 | 0.0000023 | 5 | 5 |
| Sodium | 0.0607814 | 0.0377331 | 5 | 5 |
| Strontium | 0.0014588 | 0.0011386 | 5 | 5 |
| Tantalum | 0.0000036 | 0.0000040 | 5 | 3 |
| Thallium | 0.0000061 | 0.0000060 | 5 | 5 |
| Thorium | 0.0000757 | 0.0000676 | 5 | 5 |
| Tin | 0.0000616 | 0.0000188 | 5 | 5 |
| Titanium | 0.0201193 | 0.0169293 | 5 | 5 |
| Tungsten | 0.0000184 | 0.0000095 | 5 | 5 |
| Uranium | 0.0000246 | 0.0000254 | 5 | 5 |
| Vanadium | 0.0014043 | 0.0012688 | 5 | 5 |
| Zinc | 0.0020641 | 0.0013216 | 5 | 5 |



| Station Name | Muskeg River | Muskeg River | Muskeg River | Muskeg River |
|--------------------|------------------------------|------------------------------|-------------------|-----------------|
| Station # | AMS 16 | AMS 16 | AMS 16 | AMS 16 |
| Sample Date | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 |
| Particulate Size | PM10 | PM10 | PM10 | PM10 |
| Compound Name | Average µg/m ³ | Std Dev µg/m ³ | Total Samples (#) | Total ≥ MDL (#) |
| Particulate Matter | 42.34 | 32.36 | 5 | 5 |
| Aluminum | 1.8754155 | 1.9291367 | 5 | 5 |
| Antimony | 0.0000371 | 0.0000157 | 5 | 5 |
| Arsenic | 0.0002809 | 0.0002119 | 5 | 5 |
| Barium | 0.0129099 | 0.0115608 | 5 | 5 |
| Beryllium | 0.0000566 | 0.0000548 | 5 | 5 |
| Bismuth | 0.0000092 | 0.0000061 | 5 | 5 |
| Cadmium | 0.0000124 | 0.0000079 | 5 | 5 |
| Calcium | 1.6552648 | 1.1826344 | 5 | 5 |
| Cerium | 0.0020359 | 0.0019536 | 5 | 5 |
| Cesium | 0.0001182 | 0.0001178 | 5 | 5 |
| Chromium | 0.0023535 | 0.0019393 | 5 | 5 |
| Cobalt | 0.0004387 | 0.0003679 | 5 | 5 |
| Copper | 0.0010524 | 0.0006305 | 5 | 5 |
| Iron | 1.8995092 | 1.5435443 | 5 | 5 |
| Lanthanum | 0.0009479 | 0.0008901 | 5 | 5 |
| Lead | 0.0005129 | 0.0004244 | 5 | 5 |
| Lithium | 0.0023666 | 0.0025503 | 5 | 5 |
| Magnesium | 0.3223291 | 0.2737497 | 5 | 5 |
| Manganese | 0.0291832 | 0.0214994 | 5 | 5 |
| Molybdenum | 0.0002922 | 0.0001842 | 5 | 5 |
| Neodymium | 0.0008528 | 0.0008241 | 5 | 5 |
| Nickel | 0.0016519 | 0.0011571 | 5 | 5 |
| Niobium | 0.0002332 | 0.0002404 | 5 | 5 |
| Palladium | 0.0000267 | 0.0000247 | 5 | 5 |
| Phosphorus | 0.0317766 | 0.0170248 | 5 | 5 |
| Platinum | 0.0000026 | 0.0000013 | 5 | 5 |
| Potassium | 0.4532960 | 0.4299421 | 5 | 5 |
| Praseodymium | 0.0002261 | 0.0002183 | 5 | 5 |
| Rubidium | 0.0021155 | 0.0020155 | 5 | 5 |
| Samarium | 0.0001546 | 0.0001482 | 5 | 5 |
| Selenium | 0.0011022 | 0.0010698 | 5 | 5 |
| Silicon | 4.2603908 | 3.9411937 | 5 | 5 |
| Silver | 0.0000081 | 0.0000069 | 5 | 5 |
| Sodium | 0.2340226 | 0.3214966 | 5 | 5 |
| Strontium | 0.0054452 | 0.0048173 | 5 | 5 |
| Tantalum | 0.0000155 | 0.0000169 | 5 | 5 |
| Thallium | 0.0000178 | 0.0000161 | 5 | 5 |
| Thorium | 0.0002675 | 0.0002678 | 5 | 5 |
| Tin | 0.0001364 | 0.0000733 | 5 | 5 |
| Titanium | 0.0712066 | 0.0732762 | 5 | 5 |
| Tungsten | 0.0000910 | 0.0000608 | 5 | 5 |
| Uranium | 0.0000703 | 0.0000681 | 5 | 5 |
| Vanadium | 0.0034744 | 0.0028204 | 5 | 5 |
| Zinc | 0.0054880 | 0.0030139 | 5 | 5 |



Wood Buffalo Environmental Association

PM10 Metal (µg/sample) Summary

2017 July

| Compound | % Det | N | N < Det. | Min. | 10% | 25% | 50% | 60% | 75% | 80% | 90% | 95% | 99% Max. | Mean | Std. Dev. | Median | Outlier Test | |
|--------------------|--------|----|----------|--------|--------|---------|---------|---------|---------|---------|---------|----------|----------|----------|-----------|---------|--------------|----------|
| Particulate Matter | 100.0% | 35 | 0 | 74 | 127 | 227 | 352 | 416 | 634 | 739 | 1141 | 1350 | 2302 | 2302 | 503 | 447 | 352 | 2737 |
| Aluminum | 100.0% | 35 | 0 | 0.6185 | 1.6867 | 3.5042 | 7.0870 | 13.1932 | 20.7133 | 27.3405 | 36.3419 | 44.4923 | 124.7820 | 124.7820 | 15.7569 | 22.6701 | 7.0870 | 129.1075 |
| Antimony | 94.3% | 35 | 2 | 0.0001 | 0.0002 | 0.0005 | 0.0011 | 0.0014 | 0.0016 | 0.0020 | 0.0054 | 0.0064 | 0.0088 | 0.0088 | 0.0017 | 0.0020 | 0.0011 | 0.0118 |
| Arsenic | 100.0% | 35 | 0 | 0.0004 | 0.0010 | 0.0014 | 0.0027 | 0.0033 | 0.0045 | 0.0067 | 0.0089 | 0.0139 | 0.0147 | 0.0147 | 0.0040 | 0.0036 | 0.0027 | 0.0222 |
| Barium | 97.1% | 35 | 1 | 0.0070 | 0.0214 | 0.0339 | 0.0955 | 0.1274 | 0.1747 | 0.2058 | 0.3255 | 0.4248 | 0.7748 | 0.7748 | 0.1383 | 0.1508 | 0.0955 | 0.8924 |
| Beryllium | 74.3% | 35 | 9 | 0.0000 | 0.0001 | 0.0001 | 0.0003 | 0.0005 | 0.0006 | 0.0008 | 0.0011 | 0.0014 | 0.0036 | 0.0036 | 0.0005 | 0.0007 | 0.0003 | 0.0038 |
| Bismuth | 97.1% | 35 | 1 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0003 | 0.0004 | 0.0004 | 0.0004 | 0.0001 | 0.0001 | 0.0001 | 0.0007 |
| Cadmium | 100.0% | 35 | 0 | 0.0000 | 0.0001 | 0.0001 | 0.0002 | 0.0003 | 0.0004 | 0.0004 | 0.0004 | 0.0004 | 0.0005 | 0.0005 | 0.0003 | 0.0001 | 0.0002 | 0.0009 |
| Calcium | 100.0% | 35 | 0 | 0.6741 | 1.6596 | 3.2025 | 8.4670 | 12.2627 | 20.0969 | 24.2108 | 64.1279 | 70.4990 | 75.8413 | 75.8413 | 16.1707 | 20.5934 | 8.4670 | 119.1378 |
| Cerium | 100.0% | 35 | 0 | 0.0005 | 0.0015 | 0.0035 | 0.0073 | 0.0151 | 0.0204 | 0.0282 | 0.0364 | 0.0510 | 0.1288 | 0.1288 | 0.0168 | 0.0238 | 0.0073 | 0.1355 |
| Cesium | 100.0% | 35 | 0 | 0.0000 | 0.0001 | 0.0003 | 0.0006 | 0.0009 | 0.0015 | 0.0018 | 0.0028 | 0.0032 | 0.0077 | 0.0077 | 0.0011 | 0.0014 | 0.0006 | 0.0083 |
| Chromium | 100.0% | 35 | 0 | 0.0035 | 0.0057 | 0.0083 | 0.0125 | 0.0187 | 0.0286 | 0.0343 | 0.0498 | 0.0610 | 0.1369 | 0.1369 | 0.0223 | 0.0253 | 0.0125 | 0.1487 |
| Cobalt | 100.0% | 35 | 0 | 0.0002 | 0.0005 | 0.0010 | 0.0020 | 0.0040 | 0.0051 | 0.0072 | 0.0098 | 0.0133 | 0.0254 | 0.0254 | 0.0041 | 0.0050 | 0.0020 | 0.0292 |
| Copper | 100.0% | 35 | 0 | 0.0037 | 0.0066 | 0.0122 | 0.0174 | 0.0239 | 0.0306 | 0.0372 | 0.0428 | 0.0648 | 0.0662 | 0.0662 | 0.0226 | 0.0159 | 0.0174 | 0.1022 |
| Iron | 100.0% | 35 | 0 | 0.6605 | 1.6418 | 2.8112 | 6.3818 | 11.2867 | 18.0345 | 21.7682 | 33.0933 | 50.8722 | 107.4268 | 107.4268 | 14.7971 | 20.5425 | 6.3818 | 117.5096 |
| Lanthanum | 100.0% | 35 | 0 | 0.0003 | 0.0008 | 0.0017 | 0.0035 | 0.0067 | 0.0090 | 0.0137 | 0.0177 | 0.0247 | 0.0588 | 0.0588 | 0.0079 | 0.0110 | 0.0035 | 0.0627 |
| Lead | 97.1% | 35 | 1 | 0.0004 | 0.0012 | 0.0018 | 0.0038 | 0.0051 | 0.0072 | 0.0079 | 0.0123 | 0.0184 | 0.0293 | 0.0293 | 0.0056 | 0.0058 | 0.0038 | 0.0346 |
| Lithium | 100.0% | 35 | 0 | 0.0005 | 0.0011 | 0.0028 | 0.0072 | 0.0112 | 0.0224 | 0.0273 | 0.0337 | 0.0476 | 0.1643 | 0.1643 | 0.0166 | 0.0286 | 0.0072 | 0.1597 |
| Magnesium | 100.0% | 35 | 0 | 0.2165 | 0.4658 | 0.6527 | 2.2315 | 3.0184 | 3.4903 | 5.0765 | 8.1814 | 9.4338 | 18.4454 | 18.4454 | 3.1642 | 3.6029 | 2.2315 | 21.1785 |
| Manganese | 100.0% | 35 | 0 | 0.0122 | 0.0359 | 0.0532 | 0.1078 | 0.1945 | 0.2887 | 0.3590 | 0.4971 | 0.8431 | 1.5362 | 1.5362 | 0.2319 | 0.2969 | 0.1078 | 1.7163 |
| Molybdenum | 97.1% | 35 | 1 | 0.0005 | 0.0010 | 0.0014 | 0.0024 | 0.0029 | 0.0039 | 0.0044 | 0.0054 | 0.0106 | 0.0129 | 0.0129 | 0.0031 | 0.0026 | 0.0024 | 0.0161 |
| Neodymium | 100.0% | 35 | 0 | 0.0002 | 0.0007 | 0.0017 | 0.0032 | 0.0063 | 0.0088 | 0.0125 | 0.0165 | 0.0216 | 0.0542 | 0.0542 | 0.0072 | 0.0101 | 0.0032 | 0.0576 |
| Nickel | 100.0% | 35 | 0 | 0.0026 | 0.0038 | 0.0054 | 0.0091 | 0.0163 | 0.0203 | 0.0275 | 0.0376 | 0.0492 | 0.0832 | 0.0832 | 0.0164 | 0.0169 | 0.0091 | 0.1010 |
| Niobium | 100.0% | 35 | 0 | 0.0001 | 0.0002 | 0.0004 | 0.0008 | 0.0017 | 0.0023 | 0.0032 | 0.0040 | 0.0055 | 0.0156 | 0.0156 | 0.0019 | 0.0028 | 0.0008 | 0.0159 |
| Palladium | 85.7% | 35 | 5 | 0.0000 | 0.0001 | 0.0001 | 0.0003 | 0.0003 | 0.0003 | 0.0004 | 0.0005 | 0.0006 | 0.0017 | 0.0017 | 0.0003 | 0.0003 | 0.0003 | 0.0017 |
| Phosphorus | 100.0% | 35 | 0 | 0.3010 | 0.3413 | 0.4198 | 0.5206 | 0.5486 | 0.7382 | 0.8189 | 0.9221 | 0.9865 | 1.3999 | 1.3999 | 0.5861 | 0.2434 | 0.5206 | 1.8033 |
| Platinum | 100.0% | 35 | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0000 | 0.0001 | 0.0002 |
| Potassium | 100.0% | 35 | 0 | 0.6441 | 1.1357 | 1.8093 | 3.0152 | 3.9280 | 5.4937 | 7.6147 | 11.4002 | 13.4511 | 28.4273 | 28.4273 | 4.8029 | 5.2308 | 3.0152 | 30.9571 |
| Praseodymium | 100.0% | 35 | 0 | 0.0001 | 0.0002 | 0.0004 | 0.0009 | 0.0016 | 0.0023 | 0.0033 | 0.0042 | 0.0058 | 0.0144 | 0.0144 | 0.0019 | 0.0027 | 0.0009 | 0.0152 |
| Rubidium | 100.0% | 35 | 0 | 0.0011 | 0.0026 | 0.0051 | 0.0105 | 0.0153 | 0.0251 | 0.0340 | 0.0498 | 0.0612 | 0.1327 | 0.1327 | 0.0198 | 0.0253 | 0.0105 | 0.1463 |
| Samarium | 100.0% | 35 | 0 | 0.0000 | 0.0001 | 0.0003 | 0.0006 | 0.0011 | 0.0016 | 0.0024 | 0.0032 | 0.0040 | 0.0098 | 0.0098 | 0.0013 | 0.0018 | 0.0006 | 0.0105 |
| Selenium | 100.0% | 35 | 0 | 0.0008 | 0.0015 | 0.0032 | 0.0049 | 0.0077 | 0.0130 | 0.0164 | 0.0199 | 0.0299 | 0.0702 | 0.0702 | 0.0098 | 0.0129 | 0.0049 | 0.0742 |
| Silicon | 97.1% | 35 | 1 | 0.0997 | 4.5383 | 10.0874 | 24.0527 | 37.7243 | 62.7009 | 73.1070 | 99.8708 | 141.3794 | 264.5818 | 264.5818 | 43.5612 | 52.4603 | 24.0527 | 305.8626 |
| Silver | 100.0% | 35 | 0 | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0005 | 0.0005 | 0.0001 | 0.0001 | 0.0001 | 0.0005 |
| Sodium | 100.0% | 35 | 0 | 0.3210 | 0.3686 | 0.6731 | 1.2028 | 1.6025 | 2.5717 | 3.1404 | 3.8431 | 4.5570 | 19.3704 | 19.3704 | 2.0901 | 3.2281 | 1.2028 | 18.2304 |
| Strontium | 100.0% | 35 | 0 | 0.0027 | 0.0067 | 0.0108 | 0.0328 | 0.0447 | 0.0709 | 0.0792 | 0.1465 | 0.1617 | 0.3249 | 0.3249 | 0.0525 | 0.0638 | 0.0328 | 0.3715 |
| Tantalum | 62.9% | 35 | 13 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0003 | 0.0004 | 0.0011 | 0.0011 | 0.0001 | 0.0002 | 0.0001 | 0.0011 |
| Thallium | 97.1% | 35 | 1 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0002 | 0.0003 | 0.0004 | 0.0005 | 0.0011 | 0.0011 | 0.0002 | 0.0002 | 0.0001 | 0.0012 |
| Thorium | 100.0% | 35 | 0 | 0.0001 | 0.0002 | 0.0004 | 0.0010 | 0.0019 | 0.0024 | 0.0039 | 0.0049 | 0.0068 | 0.0174 | 0.0174 | 0.0022 | 0.0032 | 0.0010 | 0.0182 |
| Tin | 100.0% | 35 | 0 | 0.0008 | 0.0012 | 0.0014 | 0.0022 | 0.0028 | 0.0032 | 0.0042 | 0.0053 | 0.0070 | 0.0090 | 0.0090 | 0.0028 | 0.0018 | 0.0022 | 0.0120 |
| Titanium | 100.0% | 35 | 0 | 0.0409 | 0.0748 | 0.1337 | 0.2856 | 0.4843 | 0.7249 | 0.9941 | 1.3896 | 1.7633 | 4.7316 | 4.7316 | 0.6056 | 0.8572 | 0.2856 | 4.8918 |
| Tungsten | 97.1% | 35 | 1 | 0.0001 | 0.0002 | 0.0003 | 0.0012 | 0.0013 | 0.0017 | 0.0019 | 0.0034 | 0.0038 | 0.0048 | 0.0048 | 0.0013 | 0.0012 | 0.0012 | 0.0071 |
| Uranium | 100.0% | 35 | 0 | 0.0000 | 0.0001 | 0.0001 | 0.0003 | 0.0006 | 0.0007 | 0.0010 | 0.0016 | 0.0018 | 0.0045 | 0.0045 | 0.0006 | 0.0008 | 0.0003 | 0.0048 |
| Vanadium | 100.0% | 35 | 0 | 0.0013 | 0.0039 | 0.0098 | 0.0151 | 0.0252 | 0.0498 | 0.0540 | 0.0880 | 0.1138 | 0.1882 | 0.1882 | 0.0338 | 0.0399 | 0.0151 | 0.2331 |
| Zinc | 100.0% | 35 | 0 | 0.0091 | 0.0219 | 0.0322 | 0.0722 | 0.0965 | 0.1235 | 0.1384 | 0.1837 | 0.2317 | 0.2365 | 0.2365 | 0.0868 | 0.0620 | 0.0722 | 0.3968 |



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

INTEGRATED MONITORING PROGRAM MONTHLY REPORT

POLYCYCLIC AROMATIC HYDROCARBONS DATA SUMMARY JULY 2017

Prepared
September 27, 2017

SAMPLE COLLECTION AND DATA COMPILATION BY:

Wood Buffalo Environmental Association
Fort McMurray, Alberta

LABORATORY ANALYSIS BY:

PAHs: Airzone One Ltd
Mississauga, Ontario



| FILE CONTENTS DESCRIPTION | PAH - Speciated PAH Gas + Particle Phase Measurements |
|---|---|
| SAMPLING INTERVAL | 24 hour |
| SAMPLING FREQUENCY OF DATA | Once every 6 days |
| UNITS | ng/m ³ (nanogram per cubic meter) |
| OBSERVATION TYPE | Particles + gas |
| FIELD SAMPLING OR MEASUREMENT PRINCIPLE | filtration and adsorbent |
| PARTICLE DIAMETER | TSP (total suspended particle) |
| MEDIUM | a glass fiber filter + PUF/XAD-2/PUF |
| ANALYTICAL METHOD | Gas Chromatograph/Mass Spectrometer (GC/MS) |
| SAMPLE PREPARATION | Solvent Extraction |
| ANALYTICAL LABORATORY | AIRZONE One Inc. |
| USER NOTE 1 | Data are recovery corrected |
| USER NOTE 2 | Volume is given at actual conditions of temperature and pressure during sampling as measured by the sampler |
| USER NOTE 3 | Blank sample concentration (ng/m ³) is calculated using expected actual volume of sampler |
| VOLUME STANDARDIZATION | Actual Volume at Ambient Conditions |
| SAMPLING INSTRUMENT TYPE | Tisch TE-1000 High-Volume Sampler |
| FLAGS USED | |
| V0 | Valid value |
| V1 | Valid value but comprised wholly or partially of below detection limit data |
| V4 | Valid value despite failing to meet some QC or statistical criteria |
| V5 | Valid value but qualified because of possible contamination |
| V6 | Valid value but qualified due to non-standard sampling conditions |
| M1 | Missing value because no value is available |
| M2 | Missing value because invalidated by Data Originator |



| Station Name | Bertha Ganter - | | | | | | |
|------------------------------------|--------------------------|------------------------------|---------|------------------------------|------------------|------------------------------|--------------|
| | Station # | Fort McKay | | | Patricia McInnes | | Travel Blank |
| Sample Date | AMS 1 | AMS 6 | | | AMS 6 | | AMS 6 |
| Total Air Volume (m ³) | 06-Jul | 06-Jul | | | 06-Jul | | 06-Jul |
| | 315.98 | 315.99 | | | 315.99 | | 316 |
| Compound Name | MDL (ng/m ³) | Results (ng/m ³) | QC Flag | Results (ng/m ³) | QC Flag | Results (ng/m ³) | QC Flag |
| Naphthalene | 0.008 | 6.859 | V0 | 11.212 | V0 | 0.128 | V0 |
| Acenaphthylene | 0.011 | 2.122 | V0 | 2.149 | V0 | 0.078 | V0 |
| Acenaphthene | 0.006 | 2.203 | V0 | 1.426 | V0 | 0.085 | V0 |
| Fluorene | 0.007 | 1.081 | V0 | 0.571 | V0 | 0.051 | V0 |
| Phenanthrene | 0.007 | 1.858 | V0 | 1.218 | V0 | 0.056 | V0 |
| Anthracene | 0.017 | 0.167 | V0 | 0.140 | V0 | 0.009 | V1 |
| Acridine | 0.019 | 0.064 | V0 | 0.007 | V1 | 0.007 | V1 |
| Fluoranthene | 0.007 | 0.176 | V0 | 0.213 | V0 | 0.013 | V0 |
| Pyrene | 0.008 | 0.175 | V0 | 0.250 | V0 | 0.011 | V0 |
| Benzo(c)phenanthrene | 0.015 | 0.005 | V1 | 0.009 | V1 | 0.003 | V1 |
| Benz(a)anthracene | 0.014 | 0.091 | V0 | 0.055 | V0 | 0.009 | V1 |
| Chrysene | 0.013 | 0.050 | V0 | 0.105 | V0 | 0.007 | V1 |
| 7,12-Dimethylbenz(a)anthracene | 0.013 | 0.025 | V0 | 0.095 | V0 | 0.004 | V1 |
| Benzo(b)fluoranthene | 0.020 | 0.025 | V0 | 0.087 | V0 | 0.004 | V1 |
| Benzo(k)fluoranthene | 0.013 | 0.025 | V0 | 0.087 | V0 | 0.004 | V1 |
| Benzo(a)pyrene | 0.016 | 0.018 | V0 | 0.025 | V0 | 0.002 | V1 |
| 3-Methylcholanthrene | 0.022 | 0.002 | V1 | 0.010 | V1 | 0.003 | V1 |
| Indeno(123-cd)pyrene | 0.017 | 0.010 | V1 | 0.015 | V1 | 0.002 | V1 |
| Dibenz(a,h)anthracene | 0.020 | 0.007 | V1 | 0.012 | V1 | 0.002 | V1 |
| Benzo(ghi)perylene | 0.020 | 0.029 | V0 | 0.033 | V0 | 0.003 | V1 |
| Dibenzo(a,l)pyrene | 0.024 | 0.005 | V1 | 0.006 | V1 | 0.002 | V1 |
| Dibenzo(a,i)pyrene | 0.025 | 0.005 | V1 | 0.006 | V1 | 0.002 | V1 |
| Dibenzo(a,h)pyrene | 0.020 | 0.007 | V1 | 0.007 | V1 | 0.002 | V1 |



| Station Name | Athabasca Valley | | | Anzac | | Travel Blank | |
|------------------------------------|--------------------------|------------------------------|---------|------------------------------|---------|------------------------------|---------|
| Station # | AMS 7 | | | AMS 14 | | 06-Jul | |
| Sample Date | 06-Jul | | | 06-Jul | | 06-Jul | |
| Total Air Volume (m ³) | 316.02 | | | 315.85 | | 316 | |
| Compound Name | MDL (ng/m ³) | Results (ng/m ³) | QC Flag | Results (ng/m ³) | QC Flag | Results (ng/m ³) | QC Flag |
| Naphthalene | 0.008 | 9.660 | V0 | 24.696 | V0 | 0.128 | V0 |
| Acenaphthylene | 0.011 | 5.037 | V0 | 4.573 | V0 | 0.078 | V0 |
| Acenaphthene | 0.006 | 1.735 | V0 | 6.166 | V0 | 0.085 | V0 |
| Fluorene | 0.007 | 0.908 | V0 | 4.137 | V0 | 0.051 | V0 |
| Phenanthrene | 0.007 | 1.867 | V0 | 14.113 | V0 | 0.056 | V0 |
| Anthracene | 0.017 | 0.350 | V0 | 1.477 | V0 | 0.009 | V1 |
| Acridine | 0.019 | 0.051 | V0 | 0.071 | V0 | 0.007 | V1 |
| Fluoranthene | 0.007 | 0.360 | V0 | 1.270 | V0 | 0.013 | V0 |
| Pyrene | 0.008 | 0.565 | V0 | 0.527 | V0 | 0.011 | V0 |
| Benzo(c)phenanthrene | 0.015 | 0.016 | V0 | 0.005 | V1 | 0.003 | V1 |
| Benz(a)anthracene | 0.014 | 0.118 | V0 | 0.081 | V0 | 0.009 | V1 |
| Chrysene | 0.013 | 0.086 | V0 | 0.059 | V0 | 0.007 | V1 |
| 7,12-Dimethylbenz(a)anthracene | 0.013 | 0.055 | V0 | 0.040 | V0 | 0.004 | V1 |
| Benzo(b)fluoranthene | 0.020 | 0.055 | V0 | 0.014 | V1 | 0.004 | V1 |
| Benzo(k)fluoranthene | 0.013 | 0.055 | V0 | 0.014 | V0 | 0.004 | V1 |
| Benzo(a)pyrene | 0.016 | 0.029 | V0 | 0.012 | V1 | 0.002 | V1 |
| 3-Methylcholanthrene | 0.022 | 0.011 | V1 | 0.005 | V1 | 0.003 | V1 |
| Indeno(123-cd)pyrene | 0.017 | 0.016 | V1 | 0.009 | V1 | 0.002 | V1 |
| Dibenz(a,h)anthracene | 0.020 | 0.006 | V1 | 0.007 | V1 | 0.002 | V1 |
| Benzo(ghi)perylene | 0.020 | 0.037 | V0 | 0.032 | V0 | 0.003 | V1 |
| Dibenzo(a,l)pyrene | 0.024 | 0.006 | V1 | 0.005 | V1 | 0.002 | V1 |
| Dibenzo(a,i)pyrene | 0.025 | 0.010 | V1 | 0.010 | V1 | 0.002 | V1 |
| Dibenzo(a,h)pyrene | 0.020 | 0.007 | V1 | 0.005 | V1 | 0.002 | V1 |



| Station Name | Bertha Ganter - | | | | | | |
|------------------------------------|--------------------------|------------------------------|---------|------------------------------|------------------|------------------------------|--------------|
| | Station # | Fort McKay | | | Patricia McInnes | | Travel Blank |
| Sample Date | AMS 1 | AMS 6 | | | AMS 6 | | 12-Jul |
| Total Air Volume (m ³) | 12-Jul | 12-Jul | | | 12-Jul | | 12-Jul |
| | 315.98 | 315.98 | | | 315.98 | | 316 |
| Compound Name | MDL (ng/m ³) | Results (ng/m ³) | QC Flag | Results (ng/m ³) | QC Flag | Results (ng/m ³) | QC Flag |
| Naphthalene | 0.008 | 3.766 | V0 | 8.729 | V0 | 0.111 | V0 |
| Acenaphthylene | 0.011 | 2.071 | V0 | 1.810 | V0 | 0.049 | V0 |
| Acenaphthene | 0.006 | 1.208 | V0 | 2.080 | V0 | 0.040 | V0 |
| Fluorene | 0.007 | 0.577 | V0 | 0.865 | V0 | 0.036 | V0 |
| Phenanthrene | 0.007 | 0.639 | V0 | 1.492 | V0 | 0.029 | V0 |
| Anthracene | 0.017 | 0.074 | V0 | 0.171 | V0 | 0.008 | V1 |
| Acridine | 0.019 | 0.020 | V0 | 0.022 | V0 | 0.008 | V1 |
| Fluoranthene | 0.007 | 0.139 | V0 | 0.332 | V0 | 0.006 | V1 |
| Pyrene | 0.008 | 0.083 | V0 | 0.343 | V0 | 0.006 | V1 |
| Benzo(c)phenanthrene | 0.015 | 0.010 | V1 | 0.011 | V1 | 0.002 | V1 |
| Benz(a)anthracene | 0.014 | 0.018 | V0 | 0.059 | V0 | 0.005 | V1 |
| Chrysene | 0.013 | 0.015 | V0 | 0.046 | V0 | 0.005 | V1 |
| 7,12-Dimethylbenz(a)anthracene | 0.013 | 0.015 | V0 | 0.041 | V0 | 0.003 | V1 |
| Benzo(b)fluoranthene | 0.020 | 0.014 | V1 | 0.025 | V0 | 0.005 | V1 |
| Benzo(k)fluoranthene | 0.013 | 0.014 | V0 | 0.025 | V0 | 0.004 | V1 |
| Benzo(a)pyrene | 0.016 | 0.014 | V1 | 0.035 | V0 | 0.003 | V1 |
| 3-Methylcholanthrene | 0.022 | 0.008 | V1 | 0.008 | V1 | 0.002 | V1 |
| Indeno(123-cd)pyrene | 0.017 | 0.009 | V1 | 0.010 | V1 | 0.002 | V1 |
| Dibenz(a,h)anthracene | 0.020 | 0.011 | V1 | 0.013 | V1 | 0.003 | V1 |
| Benzo(ghi)perylene | 0.020 | 0.011 | V1 | 0.022 | V0 | 0.002 | V1 |
| Dibenzo(a,l)pyrene | 0.024 | 0.007 | V1 | 0.008 | V1 | 0.001 | V1 |
| Dibenzo(a,i)pyrene | 0.025 | 0.011 | V1 | 0.012 | V1 | 0.001 | V1 |
| Dibenzo(a,h)pyrene | 0.020 | 0.008 | V1 | 0.008 | V1 | 0.001 | V1 |



| Station Name | Athabasca Valley | | | Anzac | | Travel Blank | |
|------------------------------------|--------------------------|------------------------------|---------|------------------------------|---------|------------------------------|---------|
| Station # | AMS 7 | | | AMS 14 | | 12-Jul | |
| Sample Date | 12-Jul | | | 12-Jul | | 12-Jul | |
| Total Air Volume (m ³) | 316 | | | 315.85 | | 316 | |
| Compound Name | MDL (ng/m ³) | Results (ng/m ³) | QC Flag | Results (ng/m ³) | QC Flag | Results (ng/m ³) | QC Flag |
| Naphthalene | 0.008 | 10.188 | V0 | 14.954 | V0 | 0.111 | V0 |
| Acenaphthylene | 0.011 | 3.105 | V0 | 2.149 | V0 | 0.049 | V0 |
| Acenaphthene | 0.006 | 2.293 | V0 | 7.642 | V0 | 0.040 | V0 |
| Fluorene | 0.007 | 0.913 | V0 | 4.679 | V0 | 0.036 | V0 |
| Phenanthrene | 0.007 | 1.769 | V0 | 7.771 | V0 | 0.029 | V0 |
| Anthracene | 0.017 | 0.216 | V0 | 1.047 | V0 | 0.008 | V1 |
| Acridine | 0.019 | 0.058 | V0 | 0.019 | V0 | 0.008 | V1 |
| Fluoranthene | 0.007 | 0.305 | V0 | 1.178 | V0 | 0.006 | V1 |
| Pyrene | 0.008 | 0.345 | V0 | 0.352 | V0 | 0.006 | V1 |
| Benzo(c)phenanthrene | 0.015 | 0.011 | V1 | 0.008 | V1 | 0.002 | V1 |
| Benz(a)anthracene | 0.014 | 0.028 | V0 | 0.013 | V1 | 0.005 | V1 |
| Chrysene | 0.013 | 0.060 | V0 | 0.024 | V0 | 0.005 | V1 |
| 7,12-Dimethylbenz(a)anthracene | 0.013 | 0.021 | V0 | 0.015 | V0 | 0.003 | V1 |
| Benzo(b)fluoranthene | 0.020 | 0.031 | V0 | 0.011 | V1 | 0.005 | V1 |
| Benzo(k)fluoranthene | 0.013 | 0.031 | V0 | 0.011 | V1 | 0.004 | V1 |
| Benzo(a)pyrene | 0.016 | 0.029 | V0 | 0.014 | V1 | 0.003 | V1 |
| 3-Methylcholanthrene | 0.022 | 0.008 | V1 | 0.007 | V1 | 0.002 | V1 |
| Indeno(123-cd)pyrene | 0.017 | 0.014 | V1 | 0.006 | V1 | 0.002 | V1 |
| Dibenz(a,h)anthracene | 0.020 | 0.009 | V1 | 0.008 | V1 | 0.003 | V1 |
| Benzo(ghi)perylene | 0.020 | 0.025 | V0 | 0.013 | V1 | 0.002 | V1 |
| Dibenzo(a,l)pyrene | 0.024 | 0.008 | V1 | 0.008 | V1 | 0.001 | V1 |
| Dibenzo(a,i)pyrene | 0.025 | 0.014 | V1 | 0.010 | V1 | 0.001 | V1 |
| Dibenzo(a,h)pyrene | 0.020 | 0.010 | V1 | 0.007 | V1 | 0.001 | V1 |



| Station Name | Bertha Ganter - | | | | | | |
|------------------------------------|--------------------------|------------------------------|---------|------------------------------|------------------|------------------------------|--------------|
| | Station # | Fort McKay | | | Patricia McInnes | | Travel Blank |
| Sample Date | AMS 1 | AMS 6 | | | AMS 6 | | 18-Jul |
| Total Air Volume (m ³) | 18-Jul | 18-Jul | | | 18-Jul | | 18-Jul |
| | 315.98 | 315.98 | | | 315.98 | | 316 |
| Compound Name | MDL (ng/m ³) | Results (ng/m ³) | QC Flag | Results (ng/m ³) | QC Flag | Results (ng/m ³) | QC Flag |
| Naphthalene | 0.008 | 4.818 | V0 | 4.139 | V0 | 0.128 | V0 |
| Acenaphthylene | 0.011 | 0.955 | V0 | 1.076 | V0 | 0.034 | V0 |
| Acenaphthene | 0.006 | 2.319 | V0 | 1.295 | V0 | 0.058 | V0 |
| Fluorene | 0.007 | 0.986 | V0 | 0.827 | V0 | 0.052 | V0 |
| Phenanthrene | 0.007 | 2.331 | V0 | 1.238 | V0 | 0.052 | V0 |
| Anthracene | 0.017 | 0.313 | V0 | 0.152 | V0 | 0.014 | V1 |
| Acridine | 0.019 | 0.072 | V0 | 0.060 | V0 | 0.008 | V1 |
| Fluoranthene | 0.007 | 0.315 | V0 | 0.245 | V0 | 0.007 | V0 |
| Pyrene | 0.008 | 0.338 | V0 | 0.237 | V0 | 0.007 | V1 |
| Benzo(c)phenanthrene | 0.015 | 0.014 | V1 | 0.011 | V1 | 0.003 | V1 |
| Benz(a)anthracene | 0.014 | 0.043 | V0 | 0.029 | V0 | 0.007 | V1 |
| Chrysene | 0.013 | 0.082 | V0 | 0.086 | V0 | 0.006 | V1 |
| 7,12-Dimethylbenz(a)anthracene | 0.013 | 0.022 | V0 | 0.049 | V0 | 0.004 | V1 |
| Benzo(b)fluoranthene | 0.020 | 0.068 | V0 | 0.041 | V0 | 0.006 | V1 |
| Benzo(k)fluoranthene | 0.013 | 0.068 | V0 | 0.041 | V0 | 0.006 | V1 |
| Benzo(a)pyrene | 0.016 | 0.016 | V0 | 0.027 | V0 | 0.003 | V1 |
| 3-Methylcholanthrene | 0.022 | 0.009 | V1 | 0.008 | V1 | 0.003 | V1 |
| Indeno(123-cd)pyrene | 0.017 | 0.023 | V0 | 0.016 | V1 | 0.003 | V1 |
| Dibenz(a,h)anthracene | 0.020 | 0.012 | V1 | 0.013 | V1 | 0.003 | V1 |
| Benzo(ghi)perylene | 0.020 | 0.030 | V0 | 0.020 | V0 | 0.003 | V1 |
| Dibenzo(a,l)pyrene | 0.024 | 0.008 | V1 | 0.007 | V1 | 0.002 | V1 |
| Dibenzo(a,i)pyrene | 0.025 | 0.013 | V1 | 0.010 | V1 | 0.002 | V1 |
| Dibenzo(a,h)pyrene | 0.020 | 0.011 | V1 | 0.007 | V1 | 0.001 | V1 |



| Station Name | Athabasca Valley | | | Anzac | | Travel Blank | |
|------------------------------------|--------------------------|------------------------------|---------|------------------------------|---------|------------------------------|---------|
| Station # | AMS 7 | | | AMS 14 | | 18-Jul | |
| Sample Date | 18-Jul | | | 18-Jul | | 18-Jul | |
| Total Air Volume (m ³) | 316 | | | 315.85 | | 316 | |
| Compound Name | MDL (ng/m ³) | Results (ng/m ³) | QC Flag | Results (ng/m ³) | QC Flag | Results (ng/m ³) | QC Flag |
| Naphthalene | 0.008 | 7.236 | V0 | 10.152 | V0 | 0.128 | V0 |
| Acenaphthylene | 0.011 | 1.882 | V0 | 2.249 | V0 | 0.034 | V0 |
| Acenaphthene | 0.006 | 2.053 | V0 | 3.786 | V0 | 0.058 | V0 |
| Fluorene | 0.007 | 0.660 | V0 | 2.521 | V0 | 0.052 | V0 |
| Phenanthrene | 0.007 | 1.376 | V0 | 3.206 | V0 | 0.052 | V0 |
| Anthracene | 0.017 | 0.175 | V0 | 0.373 | V0 | 0.014 | V1 |
| Acridine | 0.019 | 0.068 | V0 | 0.051 | V0 | 0.008 | V1 |
| Fluoranthene | 0.007 | 0.209 | V0 | 0.217 | V0 | 0.007 | V0 |
| Pyrene | 0.008 | 0.255 | V0 | 0.163 | V0 | 0.007 | V1 |
| Benzo(c)phenanthrene | 0.015 | 0.007 | V1 | 0.007 | V1 | 0.003 | V1 |
| Benz(a)anthracene | 0.014 | 0.019 | V0 | 0.038 | V0 | 0.007 | V1 |
| Chrysene | 0.013 | 0.080 | V0 | 0.033 | V0 | 0.006 | V1 |
| 7,12-Dimethylbenz(a)anthracene | 0.013 | 0.016 | V0 | 0.022 | V0 | 0.004 | V1 |
| Benzo(b)fluoranthene | 0.020 | 0.035 | V0 | 0.019 | V1 | 0.006 | V1 |
| Benzo(k)fluoranthene | 0.013 | 0.034 | V0 | 0.019 | V0 | 0.006 | V1 |
| Benzo(a)pyrene | 0.016 | 0.021 | V0 | 0.018 | V0 | 0.003 | V1 |
| 3-Methylcholanthrene | 0.022 | 0.010 | V1 | 0.010 | V1 | 0.003 | V1 |
| Indeno(123-cd)pyrene | 0.017 | 0.014 | V1 | 0.013 | V1 | 0.003 | V1 |
| Dibenz(a,h)anthracene | 0.020 | 0.010 | V1 | 0.011 | V1 | 0.003 | V1 |
| Benzo(ghi)perylene | 0.020 | 0.019 | V1 | 0.016 | V1 | 0.003 | V1 |
| Dibenzo(a,l)pyrene | 0.024 | 0.010 | V1 | 0.011 | V1 | 0.002 | V1 |
| Dibenzo(a,i)pyrene | 0.025 | 0.012 | V1 | 0.011 | V1 | 0.002 | V1 |
| Dibenzo(a,h)pyrene | 0.020 | 0.013 | V1 | 0.011 | V1 | 0.001 | V1 |



| Station Name | Bertha Ganter - | | | | | | |
|------------------------------------|--------------------------|------------------------------|---------|------------------------------|------------------|------------------------------|--------------|
| | Station # | Fort McKay | | | Patricia McInnes | | Travel Blank |
| Sample Date | AMS 1 | AMS 6 | | | AMS 6 | | 24-Jul |
| Total Air Volume (m ³) | 24-Jul | 24-Jul | | | 24-Jul | | 24-Jul |
| | 315.98 | 315.98 | | | 315.98 | | 316 |
| Compound Name | MDL (ng/m ³) | Results (ng/m ³) | QC Flag | Results (ng/m ³) | QC Flag | Results (ng/m ³) | QC Flag |
| Naphthalene | 0.008 | 7.092 | V0 | 5.251 | V0 | 0.099 | V0 |
| Acenaphthylene | 0.011 | 1.725 | V0 | 4.172 | V0 | 0.059 | V0 |
| Acenaphthene | 0.006 | 2.897 | V0 | 2.794 | V0 | 0.041 | V0 |
| Fluorene | 0.007 | 1.229 | V0 | 0.984 | V0 | 0.042 | V0 |
| Phenanthrene | 0.007 | 1.795 | V0 | 1.819 | V0 | 0.036 | V0 |
| Anthracene | 0.017 | 0.201 | V0 | 0.226 | V0 | 0.010 | V1 |
| Acridine | 0.019 | 0.079 | V0 | 0.032 | V0 | 0.007 | V1 |
| Fluoranthene | 0.007 | 0.207 | V0 | 0.250 | V0 | 0.005 | V1 |
| Pyrene | 0.008 | 0.326 | V0 | 0.293 | V0 | 0.006 | V1 |
| Benzo(c)phenanthrene | 0.015 | 0.015 | V0 | 0.020 | V0 | 0.002 | V1 |
| Benz(a)anthracene | 0.014 | 0.020 | V0 | 0.039 | V0 | 0.005 | V1 |
| Chrysene | 0.013 | 0.095 | V0 | 0.101 | V0 | 0.003 | V1 |
| 7,12-Dimethylbenz(a)anthracene | 0.013 | 0.051 | V0 | 0.105 | V0 | 0.002 | V1 |
| Benzo(b)fluoranthene | 0.020 | 0.043 | V0 | 0.048 | V0 | 0.005 | V1 |
| Benzo(k)fluoranthene | 0.013 | 0.043 | V0 | 0.048 | V0 | 0.004 | V1 |
| Benzo(a)pyrene | 0.016 | 0.029 | V0 | 0.031 | V0 | 0.003 | V1 |
| 3-Methylcholanthrene | 0.022 | 0.016 | V1 | 0.030 | V0 | 0.003 | V1 |
| Indeno(123-cd)pyrene | 0.017 | 0.010 | V1 | 0.013 | V1 | 0.001 | V1 |
| Dibenz(a,h)anthracene | 0.020 | 0.011 | V1 | 0.033 | V0 | 0.002 | V1 |
| Benzo(ghi)perylene | 0.020 | 0.019 | V1 | 0.036 | V0 | 0.002 | V1 |
| Dibenzo(a,l)pyrene | 0.024 | 0.014 | V1 | 0.013 | V1 | 0.002 | V1 |
| Dibenzo(a,i)pyrene | 0.025 | 0.015 | V1 | 0.008 | V1 | 0.001 | V1 |
| Dibenzo(a,h)pyrene | 0.020 | 0.016 | V1 | 0.008 | V1 | 0.001 | V1 |



| Station Name | Athabasca Valley | | | Anzac | | Travel Blank | |
|------------------------------------|--------------------------|------------------------------|---------|------------------------------|---------|------------------------------|---------|
| Station # | AMS 7 | | | AMS 14 | | 24-Jul | |
| Sample Date | 24-Jul | | | 24-Jul | | 24-Jul | |
| Total Air Volume (m ³) | 316.01 | | | 315.86 | | 316 | |
| Compound Name | MDL (ng/m ³) | Results (ng/m ³) | QC Flag | Results (ng/m ³) | QC Flag | Results (ng/m ³) | QC Flag |
| Naphthalene | 0.008 | 5.024 | V0 | 5.821 | V0 | 0.099 | V0 |
| Acenaphthylene | 0.011 | 3.437 | V0 | 1.596 | V0 | 0.059 | V0 |
| Acenaphthene | 0.006 | 2.620 | V0 | 4.273 | V0 | 0.041 | V0 |
| Fluorene | 0.007 | 1.592 | V0 | 2.099 | V0 | 0.042 | V0 |
| Phenanthrene | 0.007 | 1.532 | V0 | 3.524 | V0 | 0.036 | V0 |
| Anthracene | 0.017 | 0.137 | V0 | 0.411 | V0 | 0.010 | V1 |
| Acridine | 0.019 | 0.083 | V0 | 0.050 | V0 | 0.007 | V1 |
| Fluoranthene | 0.007 | 0.163 | V0 | 0.449 | V0 | 0.005 | V1 |
| Pyrene | 0.008 | 0.257 | V0 | 0.240 | V0 | 0.006 | V1 |
| Benzo(c)phenanthrene | 0.015 | 0.012 | V1 | 0.008 | V1 | 0.002 | V1 |
| Benz(a)anthracene | 0.014 | 0.016 | V0 | 0.053 | V0 | 0.005 | V1 |
| Chrysene | 0.013 | 0.083 | V0 | 0.047 | V0 | 0.003 | V1 |
| 7,12-Dimethylbenz(a)anthracene | 0.013 | 0.076 | V0 | 0.035 | V0 | 0.002 | V1 |
| Benzo(b)fluoranthene | 0.020 | 0.043 | V0 | 0.016 | V1 | 0.005 | V1 |
| Benzo(k)fluoranthene | 0.013 | 0.043 | V0 | 0.016 | V0 | 0.004 | V1 |
| Benzo(a)pyrene | 0.016 | 0.041 | V0 | 0.023 | V0 | 0.003 | V1 |
| 3-Methylcholanthrene | 0.022 | 0.008 | V1 | 0.006 | V1 | 0.003 | V1 |
| Indeno(123-cd)pyrene | 0.017 | 0.015 | V1 | 0.009 | V1 | 0.001 | V1 |
| Dibenz(a,h)anthracene | 0.020 | 0.037 | V0 | 0.014 | V1 | 0.002 | V1 |
| Benzo(ghi)perylene | 0.020 | 0.033 | V0 | 0.006 | V1 | 0.002 | V1 |
| Dibenzo(a,l)pyrene | 0.024 | 0.010 | V1 | 0.011 | V1 | 0.002 | V1 |
| Dibenzo(a,i)pyrene | 0.025 | 0.011 | V1 | 0.007 | V1 | 0.001 | V1 |
| Dibenzo(a,h)pyrene | 0.020 | 0.013 | V1 | 0.012 | V1 | 0.001 | V1 |



| Compound Name | Bertha Ganter - | | | | | | |
|------------------------------------|------------------------------|------------|------------------------------|---------|------------------------------|---------|--------------|
| | Station Name | Fort McKay | | | Patricia McInnes | | Travel Blank |
| | Station # | AMS 1 | | AMS 6 | | | |
| | Sample Date | 30-Jul | | 30-Jul | | 30-Jul | |
| Total Air Volume (m ³) | 315.98 | | 315.98 | | 316 | | |
| MDL (ng/m ³) | Results (ng/m ³) | QC Flag | Results (ng/m ³) | QC Flag | Results (ng/m ³) | QC Flag | |
| Naphthalene | 0.008 | 4.119 | V0 | 6.299 | V0 | 0.123 | V0 |
| Acenaphthylene | 0.011 | 3.843 | V0 | 1.012 | V0 | 0.069 | V0 |
| Acenaphthene | 0.006 | 3.154 | V0 | 1.897 | V0 | 0.034 | V0 |
| Fluorene | 0.007 | 1.270 | V0 | 0.444 | V0 | 0.036 | V0 |
| Phenanthrene | 0.007 | 2.104 | V0 | 1.809 | V0 | 0.030 | V0 |
| Anthracene | 0.017 | 0.251 | V0 | 0.138 | V0 | 0.005 | V1 |
| Acridine | 0.019 | 0.098 | V0 | 0.046 | V0 | 0.009 | V1 |
| Fluoranthene | 0.007 | 0.193 | V0 | 0.398 | V0 | 0.005 | V1 |
| Pyrene | 0.008 | 0.329 | V0 | 0.376 | V0 | 0.005 | V1 |
| Benzo(c)phenanthrene | 0.015 | 0.013 | V1 | 0.021 | V0 | 0.003 | V1 |
| Benz(a)anthracene | 0.014 | 0.033 | V0 | 0.026 | V0 | 0.004 | V1 |
| Chrysene | 0.013 | 0.101 | V0 | 0.103 | V0 | 0.003 | V1 |
| 7,12-Dimethylbenz(a)anthracene | 0.013 | 0.100 | V0 | 0.072 | V0 | 0.002 | V1 |
| Benzo(b)fluoranthene | 0.020 | 0.028 | V0 | 0.041 | V0 | 0.004 | V1 |
| Benzo(k)fluoranthene | 0.013 | 0.028 | V0 | 0.041 | V0 | 0.004 | V1 |
| Benzo(a)pyrene | 0.016 | 0.021 | V0 | 0.045 | V0 | 0.003 | V1 |
| 3-Methylcholanthrene | 0.022 | 0.008 | V1 | 0.011 | V1 | 0.002 | V1 |
| Indeno(123-cd)pyrene | 0.017 | 0.007 | V1 | 0.009 | V1 | 0.002 | V1 |
| Dibenz(a,h)anthracene | 0.020 | 0.018 | V1 | 0.009 | V1 | 0.001 | V1 |
| Benzo(ghi)perylene | 0.020 | 0.010 | V1 | 0.019 | V1 | 0.002 | V1 |
| Dibenzo(a,l)pyrene | 0.024 | 0.011 | V1 | 0.007 | V1 | 0.001 | V1 |
| Dibenzo(a,i)pyrene | 0.025 | 0.009 | V1 | 0.008 | V1 | 0.002 | V1 |
| Dibenzo(a,h)pyrene | 0.020 | 0.009 | V1 | 0.015 | V1 | 0.001 | V1 |



| Station Name | Athabasca Valley | | | Anzac | | Travel Blank | |
|------------------------------------|--------------------------|------------------------------|---------|------------------------------|---------|------------------------------|---------|
| Station # | AMS 7 | | | AMS 14 | | 30-Jul | |
| Sample Date | 30-Jul | | | 30-Jul | | 30-Jul | |
| Total Air Volume (m ³) | 316.01 | | | 315.86 | | 316 | |
| Compound Name | MDL (ng/m ³) | Results (ng/m ³) | QC Flag | Results (ng/m ³) | QC Flag | Results (ng/m ³) | QC Flag |
| Naphthalene | 0.008 | 6.755 | V0 | 7.081 | V0 | 0.123 | V0 |
| Acenaphthylene | 0.011 | 2.572 | V0 | 2.690 | V0 | 0.069 | V0 |
| Acenaphthene | 0.006 | 1.004 | V0 | 6.266 | V0 | 0.034 | V0 |
| Fluorene | 0.007 | 1.071 | V0 | 2.707 | V0 | 0.036 | V0 |
| Phenanthrene | 0.007 | 2.091 | V0 | 5.050 | V0 | 0.030 | V0 |
| Anthracene | 0.017 | 0.210 | V0 | 0.408 | V0 | 0.005 | V1 |
| Acridine | 0.019 | 0.025 | V0 | 0.066 | V0 | 0.009 | V1 |
| Fluoranthene | 0.007 | 0.425 | V0 | 0.626 | V0 | 0.005 | V1 |
| Pyrene | 0.008 | 0.577 | V0 | 0.420 | V0 | 0.005 | V1 |
| Benzo(c)phenanthrene | 0.015 | 0.013 | V1 | 0.010 | V1 | 0.003 | V1 |
| Benz(a)anthracene | 0.014 | 0.043 | V0 | 0.078 | V0 | 0.004 | V1 |
| Chrysene | 0.013 | 0.114 | V0 | 0.079 | V0 | 0.003 | V1 |
| 7,12-Dimethylbenz(a)anthracene | 0.013 | 0.025 | V0 | 0.036 | V0 | 0.002 | V1 |
| Benzo(b)fluoranthene | 0.020 | 0.048 | V0 | 0.027 | V0 | 0.004 | V1 |
| Benzo(k)fluoranthene | 0.013 | 0.048 | V0 | 0.027 | V0 | 0.004 | V1 |
| Benzo(a)pyrene | 0.016 | 0.041 | V0 | 0.022 | V0 | 0.003 | V1 |
| 3-Methylcholanthrene | 0.022 | 0.023 | V0 | 0.020 | V1 | 0.002 | V1 |
| Indeno(123-cd)pyrene | 0.017 | 0.011 | V1 | 0.009 | V1 | 0.002 | V1 |
| Dibenz(a,h)anthracene | 0.020 | 0.010 | V1 | 0.012 | V1 | 0.001 | V1 |
| Benzo(ghi)perylene | 0.020 | 0.028 | V0 | 0.013 | V1 | 0.002 | V1 |
| Dibenzo(a,l)pyrene | 0.024 | 0.009 | V1 | 0.009 | V1 | 0.001 | V1 |
| Dibenzo(a,i)pyrene | 0.025 | 0.010 | V1 | 0.012 | V1 | 0.002 | V1 |
| Dibenzo(a,h)pyrene | 0.020 | 0.009 | V1 | 0.015 | V1 | 0.001 | V1 |



| Station Name Station # Sample Date | Bertha Ganter - Fort McKay AMS 1 Jul 06 - Jul 30 | Bertha Ganter - Fort McKay AMS 1 Jul 06 - Jul 30 | Bertha Ganter - Fort McKay AMS 1 Jul 06 - Jul 30 | Bertha Ganter - Fort McKay AMS 1 Jul 06 - Jul 30 |
|--|---|---|---|---|
| | Average ng/m ³ | Std Dev ng/m ³ | Total Samples (#) | Total ≥ MDL (#) |
| Compound Name | | | | |
| Naphthalene | 5.331 | 1.551 | 5 | 5 |
| Acenaphthylene | 2.143 | 1.059 | 5 | 5 |
| Acenaphthene | 2.356 | 0.754 | 5 | 5 |
| Fluorene | 1.029 | 0.277 | 5 | 5 |
| Phenanthrene | 1.745 | 0.654 | 5 | 5 |
| Anthracene | 0.201 | 0.090 | 5 | 5 |
| Acridine | 0.067 | 0.029 | 5 | 5 |
| Fluoranthene | 0.206 | 0.066 | 5 | 5 |
| Pyrene | 0.250 | 0.116 | 5 | 5 |
| Benzo(c)phenanthrene | 0.011 | 0.004 | 5 | 1 |
| Benz(a)anthracene | 0.041 | 0.030 | 5 | 5 |
| Chrysene | 0.069 | 0.036 | 5 | 5 |
| 7,12-Dimethylbenz(a)anthracene | 0.043 | 0.035 | 5 | 5 |
| Benzo(b)fluoranthene | 0.036 | 0.021 | 5 | 4 |
| Benzo(k)fluoranthene | 0.036 | 0.021 | 5 | 5 |
| Benzo(a)pyrene | 0.020 | 0.006 | 5 | 4 |
| 3-Methylcholanthrene | 0.009 | 0.005 | 5 | 0 |
| Indeno(123-cd)pyrene | 0.012 | 0.007 | 5 | 1 |
| Dibenz(a,h)anthracene | 0.012 | 0.004 | 5 | 0 |
| Benzo(ghi)perylene | 0.020 | 0.010 | 5 | 2 |
| Dibenzo(a,l)pyrene | 0.009 | 0.004 | 5 | 0 |
| Dibenzo(a,i)pyrene | 0.011 | 0.004 | 5 | 0 |
| Dibenzo(a,h)pyrene | 0.010 | 0.004 | 5 | 0 |



| Compound Name | Station Name | Patricia McInnes | Patricia McInnes | Patricia McInnes | Patricia McInnes |
|--------------------------------|--------------|------------------------------|------------------------------|-------------------|------------------|
| | Station # | AMS 6 | AMS 6 | AMS 6 | AMS 6 |
| | Sample Date | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 |
| | | Average ng/m ³ | Std Dev ng/m ³ | Total Samples (#) | Total ≥ MDL (#) |
| Naphthalene | | 7.126 | 2.846 | 5 | 5 |
| Acenaphthylene | | 2.044 | 1.284 | 5 | 5 |
| Acenaphthene | | 1.898 | 0.596 | 5 | 5 |
| Fluorene | | 0.738 | 0.223 | 5 | 5 |
| Phenanthrene | | 1.515 | 0.294 | 5 | 5 |
| Anthracene | | 0.165 | 0.036 | 5 | 5 |
| Acridine | | 0.033 | 0.021 | 5 | 4 |
| Fluoranthene | | 0.288 | 0.076 | 5 | 5 |
| Pyrene | | 0.300 | 0.059 | 5 | 5 |
| Benzo(c)phenanthrene | | 0.014 | 0.006 | 5 | 2 |
| Benz(a)anthracene | | 0.042 | 0.015 | 5 | 5 |
| Chrysene | | 0.088 | 0.025 | 5 | 5 |
| 7,12-Dimethylbenz(a)anthracene | | 0.072 | 0.028 | 5 | 5 |
| Benzo(b)fluoranthene | | 0.048 | 0.023 | 5 | 5 |
| Benzo(k)fluoranthene | | 0.048 | 0.023 | 5 | 5 |
| Benzo(a)pyrene | | 0.033 | 0.008 | 5 | 5 |
| 3-Methylcholanthrene | | 0.014 | 0.010 | 5 | 1 |
| Indeno(123-cd)pyrene | | 0.013 | 0.003 | 5 | 0 |
| Dibenz(a,h)anthracene | | 0.016 | 0.009 | 5 | 1 |
| Benzo(ghi)perylene | | 0.026 | 0.008 | 5 | 4 |
| Dibenzo(a,l)pyrene | | 0.008 | 0.003 | 5 | 0 |
| Dibenzo(a,i)pyrene | | 0.009 | 0.002 | 5 | 0 |
| Dibenzo(a,h)pyrene | | 0.009 | 0.003 | 5 | 0 |



| Compound Name | Station Name | Athabasca Valley | Athabasca Valley | Athabasca Valley | Athabasca Valley |
|--------------------------------|--------------|------------------------------|------------------------------|-------------------|------------------|
| | Station # | AMS 7 | AMS 7 | AMS 7 | AMS 7 |
| | Sample Date | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 |
| | | Average ng/m ³ | Std Dev ng/m ³ | Total Samples (#) | Total ≥ MDL (#) |
| Naphthalene | | 7.773 | 2.137 | 5 | 5 |
| Acenaphthylene | | 3.207 | 1.180 | 5 | 5 |
| Acenaphthene | | 1.941 | 0.616 | 5 | 5 |
| Fluorene | | 1.029 | 0.348 | 5 | 5 |
| Phenanthrene | | 1.727 | 0.281 | 5 | 5 |
| Anthracene | | 0.217 | 0.081 | 5 | 5 |
| Acridine | | 0.057 | 0.021 | 5 | 5 |
| Fluoranthene | | 0.292 | 0.107 | 5 | 5 |
| Pyrene | | 0.400 | 0.161 | 5 | 5 |
| Benzo(c)phenanthrene | | 0.012 | 0.003 | 5 | 1 |
| Benz(a)anthracene | | 0.045 | 0.042 | 5 | 5 |
| Chrysene | | 0.084 | 0.020 | 5 | 5 |
| 7,12-Dimethylbenz(a)anthracene | | 0.039 | 0.026 | 5 | 5 |
| Benzo(b)fluoranthene | | 0.042 | 0.010 | 5 | 5 |
| Benzo(k)fluoranthene | | 0.042 | 0.010 | 5 | 5 |
| Benzo(a)pyrene | | 0.032 | 0.009 | 5 | 5 |
| 3-Methylcholanthrene | | 0.012 | 0.006 | 5 | 1 |
| Indeno(123-cd)pyrene | | 0.014 | 0.002 | 5 | 0 |
| Dibenz(a,h)anthracene | | 0.014 | 0.013 | 5 | 1 |
| Benzo(ghi)perylene | | 0.028 | 0.007 | 5 | 4 |
| Dibenzo(a,l)pyrene | | 0.009 | 0.001 | 5 | 0 |
| Dibenzo(a,i)pyrene | | 0.011 | 0.002 | 5 | 0 |
| Dibenzo(a,h)pyrene | | 0.010 | 0.002 | 5 | 0 |



| Compound Name | Station Name | Anzac | Anzac | Anzac | Anzac |
|--------------------------------|--------------|-------------------|-------------------|-------------------|-----------------|
| | Station # | AMS 14 | AMS 14 | AMS 14 | AMS 14 |
| | Sample Date | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 | Jul 06 - Jul 30 |
| | | Average | Std Dev | Total Samples (#) | Total ≥ MDL (#) |
| | | ng/m ³ | ng/m ³ | | |
| Naphthalene | | 12.541 | 7.652 | 5 | 5 |
| Acenaphthylene | | 2.651 | 1.143 | 5 | 5 |
| Acenaphthene | | 5.627 | 1.580 | 5 | 5 |
| Fluorene | | 3.229 | 1.115 | 5 | 5 |
| Phenanthrene | | 6.733 | 4.503 | 5 | 5 |
| Anthracene | | 0.743 | 0.498 | 5 | 5 |
| Acridine | | 0.051 | 0.020 | 5 | 5 |
| Fluoranthene | | 0.748 | 0.459 | 5 | 5 |
| Pyrene | | 0.340 | 0.144 | 5 | 5 |
| Benzo(c)phenanthrene | | 0.008 | 0.002 | 5 | 0 |
| Benz(a)anthracene | | 0.053 | 0.028 | 5 | 4 |
| Chrysene | | 0.048 | 0.022 | 5 | 5 |
| 7,12-Dimethylbenz(a)anthracene | | 0.029 | 0.011 | 5 | 5 |
| Benzo(b)fluoranthene | | 0.017 | 0.006 | 5 | 1 |
| Benzo(k)fluoranthene | | 0.017 | 0.006 | 5 | 4 |
| Benzo(a)pyrene | | 0.018 | 0.005 | 5 | 3 |
| 3-Methylcholanthrene | | 0.010 | 0.006 | 5 | 0 |
| Indeno(123-cd)pyrene | | 0.009 | 0.003 | 5 | 0 |
| Dibenz(a,h)anthracene | | 0.010 | 0.003 | 5 | 0 |
| Benzo(ghi)perylene | | 0.016 | 0.010 | 5 | 1 |
| Dibenzo(a,l)pyrene | | 0.009 | 0.003 | 5 | 0 |
| Dibenzo(a,i)pyrene | | 0.010 | 0.002 | 5 | 0 |
| Dibenzo(a,h)pyrene | | 0.010 | 0.004 | 5 | 0 |



Wood Buffalo Environmental Association

PAH (ng/m³) Summary

2017 July

| Compound | % Det | N | N < Det. | Min. | 10% | 25% | 50% | 60% | 75% | 80% | 90% | 95% | 99% | Max. | Mean | Std. Dev. | Median | Outlier Test |
|--------------------------------|--------|----|----------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|--------|-----------|--------|--------------|
| Naphthalene | 100.0% | 20 | 0 | 3.7657 | 4.1387 | 5.2508 | 7.0810 | 7.2364 | 10.1524 | 10.1879 | 14.9541 | 24.6956 | 24.6956 | 24.6956 | 8.1926 | 4.7935 | 7.0810 | 32.1600 |
| Acenaphthylene | 100.0% | 20 | 0 | 0.9547 | 1.0760 | 1.8104 | 2.1492 | 2.5717 | 3.4367 | 3.8431 | 4.5734 | 5.0371 | 5.0371 | 5.0371 | 2.5113 | 1.1734 | 2.1492 | 8.3784 |
| Acenaphthene | 100.0% | 20 | 0 | 1.0042 | 1.2953 | 1.8971 | 2.3188 | 2.7937 | 3.7865 | 4.2730 | 6.2662 | 7.6420 | 7.6420 | 7.6420 | 2.9556 | 1.8267 | 2.3188 | 12.0892 |
| Fluorene | 100.0% | 20 | 0 | 0.4444 | 0.5771 | 0.8653 | 1.0710 | 1.2292 | 2.0994 | 2.5215 | 4.1369 | 4.6793 | 4.6793 | 4.6793 | 1.5062 | 1.1705 | 1.0710 | 7.3585 |
| Phenanthrene | 100.0% | 20 | 0 | 0.6388 | 1.2377 | 1.5316 | 1.8581 | 2.0905 | 3.2061 | 3.5238 | 7.7713 | 14.1132 | 14.1132 | 14.1132 | 2.9301 | 3.0784 | 1.8581 | 18.3222 |
| Anthracene | 100.0% | 20 | 0 | 0.0742 | 0.1379 | 0.1667 | 0.2155 | 0.2510 | 0.3733 | 0.4076 | 1.0472 | 1.4769 | 1.4769 | 1.4769 | 0.3318 | 0.3395 | 0.2155 | 2.0292 |
| Acridine | 95.0% | 20 | 1 | 0.0066 | 0.0199 | 0.0323 | 0.0577 | 0.0644 | 0.0705 | 0.0719 | 0.0828 | 0.0979 | 0.0979 | 0.0979 | 0.0520 | 0.0245 | 0.0577 | 0.1743 |
| Fluoranthene | 100.0% | 20 | 0 | 0.1387 | 0.1763 | 0.2089 | 0.3046 | 0.3321 | 0.4253 | 0.4488 | 1.1778 | 1.2697 | 1.2697 | 1.2697 | 0.3834 | 0.3111 | 0.3046 | 1.9388 |
| Pyrene | 100.0% | 20 | 0 | 0.0827 | 0.1746 | 0.2503 | 0.3291 | 0.3432 | 0.3756 | 0.4203 | 0.5648 | 0.5775 | 0.5775 | 0.5775 | 0.3225 | 0.1285 | 0.3291 | 0.9652 |
| Benzo(c)phenanthrene | 20.0% | 20 | 16 | 0.0047 | 0.0068 | 0.0083 | 0.0111 | 0.0116 | 0.0138 | 0.0150 | 0.0203 | 0.0210 | 0.0210 | 0.0210 | 0.0112 | 0.0044 | 0.0111 | 0.0334 |
| Benzo(a)anthracene | 95.0% | 20 | 1 | 0.0131 | 0.0176 | 0.0259 | 0.0388 | 0.0434 | 0.0593 | 0.0780 | 0.0907 | 0.1175 | 0.1175 | 0.1175 | 0.0450 | 0.0282 | 0.0388 | 0.1861 |
| Chrysene | 100.0% | 20 | 0 | 0.0147 | 0.0326 | 0.0500 | 0.0821 | 0.0856 | 0.1008 | 0.1011 | 0.1047 | 0.1144 | 0.1144 | 0.1144 | 0.0723 | 0.0290 | 0.0821 | 0.2174 |
| 7,12-Dimethylbenz(a)anthracene | 100.0% | 20 | 0 | 0.0148 | 0.0165 | 0.0217 | 0.0400 | 0.0489 | 0.0724 | 0.0759 | 0.1004 | 0.1051 | 0.1051 | 0.1051 | 0.0458 | 0.0293 | 0.0400 | 0.1925 |
| Benzo(b)fluoranthene | 75.0% | 20 | 5 | 0.0113 | 0.0143 | 0.0249 | 0.0345 | 0.0412 | 0.0480 | 0.0482 | 0.0685 | 0.0872 | 0.0872 | 0.0872 | 0.0360 | 0.0194 | 0.0345 | 0.1329 |
| Benzo(k)fluoranthene | 95.0% | 20 | 1 | 0.0113 | 0.0143 | 0.0249 | 0.0345 | 0.0411 | 0.0480 | 0.0481 | 0.0685 | 0.0872 | 0.0872 | 0.0872 | 0.0359 | 0.0194 | 0.0345 | 0.1328 |
| Benzo(a)pyrene | 85.0% | 20 | 3 | 0.0121 | 0.0145 | 0.0185 | 0.0245 | 0.0286 | 0.0312 | 0.0352 | 0.0412 | 0.0454 | 0.0454 | 0.0454 | 0.0256 | 0.0096 | 0.0245 | 0.0735 |
| 3-Methylcholanthrene | 10.0% | 20 | 18 | 0.0021 | 0.0057 | 0.0076 | 0.0089 | 0.0101 | 0.0114 | 0.0159 | 0.0226 | 0.0304 | 0.0304 | 0.0304 | 0.0109 | 0.0067 | 0.0089 | 0.0442 |
| Indeno(123-cd)pyrene | 5.0% | 20 | 19 | 0.0062 | 0.0086 | 0.0092 | 0.0111 | 0.0135 | 0.0150 | 0.0151 | 0.0160 | 0.0235 | 0.0235 | 0.0235 | 0.0120 | 0.0040 | 0.0111 | 0.0322 |
| Dibenz(a,h)anthracene | 10.0% | 20 | 18 | 0.0065 | 0.0070 | 0.0092 | 0.0114 | 0.0121 | 0.0134 | 0.0137 | 0.0325 | 0.0368 | 0.0368 | 0.0368 | 0.0131 | 0.0079 | 0.0114 | 0.0525 |
| Benzo(ghi)perylene | 55.0% | 20 | 9 | 0.0063 | 0.0115 | 0.0165 | 0.0217 | 0.0275 | 0.0320 | 0.0333 | 0.0361 | 0.0368 | 0.0368 | 0.0368 | 0.0226 | 0.0093 | 0.0217 | 0.0692 |
| Dibenzo(a,l)pyrene | 0.0% | 20 | 20 | 0.0046 | 0.0060 | 0.0070 | 0.0084 | 0.0093 | 0.0111 | 0.0112 | 0.0127 | 0.0139 | 0.0139 | 0.0139 | 0.0086 | 0.0025 | 0.0084 | |
| Dibenzo(a,i)pyrene | 0.0% | 20 | 20 | 0.0053 | 0.0072 | 0.0086 | 0.0105 | 0.0110 | 0.0123 | 0.0124 | 0.0136 | 0.0146 | 0.0146 | 0.0146 | 0.0102 | 0.0025 | 0.0105 | |
| Dibenzo(a,h)pyrene | 0.0% | 20 | 20 | 0.0055 | 0.0068 | 0.0073 | 0.0094 | 0.0108 | 0.0127 | 0.0127 | 0.0150 | 0.0159 | 0.0159 | 0.0159 | 0.0099 | 0.0031 | 0.0094 | |



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

INTEGRATED MONITORING PROGRAM MONTHLY REPORT

PRECIPITATION DATA SUMMARY JULY 2017

Prepared
September 27, 2017

SAMPLE COLLECTION AND DATA COMPILATION BY:

Wood Buffalo Environmental Association
Fort McMurray, Alberta

LABORATORY ANALYSIS BY:

Precipitation: InnoTech Alberta, Inc.
Vegreville, Alberta



| FILE CONTENTS DESCRIPTION | Precipitation Measurement of ions, pH and conductivity |
|---|--|
| SAMPLING INTERVAL | A week |
| SAMPLING FREQUENCY OF DATA | A week |
| EXPLANATION OF ZERO VALUES | Zero values are contained in this file and should be treated as values below detection - Method Detection values (MDL.) are provided with each observation |
| UNITS | mg/L (milligram per liter) |
| OBSERVATION TYPE | Wet Precipitation |
| FIELD SAMPLING OR MEASUREMENT PRINCIPLE | moveable cover with precipitation sensors |
| MEDIUM | Polyethylene Collection bucket |
| ANALYTICALMETHODS | pH by pH meter Conductivity by Conductivity meter IONS by Ion Chromatography (IC) |
| ANALYTICAL LABORATORY | InnoTech Alberta Inc |
| USER NOTE 1 | Data are not blank corrected |
| SAMPLING INSTRUMENT TYPE | Total Precipitation Collector (TPC-3000) |
| FLAGS USED | |
| V0 | Valid value |
| V1 | Valid value but comprised wholly or partially of below detection limit data |
| V4 | Valid value despite failing to meet some QC or statistical criteria |
| V5 | Valid value but qualified because of possible contamination |
| V6 | Valid value but qualified due to non-standard sampling conditions |
| V8 | Dry Week |
| V9 | Insufficient sample collected for analyzes |
| V10 | Insufficient data to conduct all quality control checks |
| M1 | Missing value because no value is available |
| M2 | Missing value because invalidated by Data Originator |



Wood Buffalo Environmental Association
Precipitation summary

2017 July

| Fort McKay-Bertha Ganter AMS 1 | Start Date End Date Dry Week Precip | 05-Jul-17 11-Jul-17 | | | 11-Jul-17 17-Jul-17 | | | 17-Jul-17 25-Jul-17 | | | 25-Jul-17 02-Aug-17 | | |
|--------------------------------------|--|------------------------|-------|------|------------------------|-------|------|------------------------|-------|------|------------------------|-------|------|
| | | X | | | X | | | X | | | X | | |
| | | Results | MDL | Flag | Results | MDL | Flag | Results | MDL | Flag | Results | MDL | Flag |
| Acidity | µeq/L | 18 | 2 | V0 | 20 | 2 | V0 | -9999 | 2 | V8 | 17 | 2 | V0 |
| Ammonium | mg/L | 0.351 | 0.009 | V0 | 0.258 | 0.009 | V0 | -9999 | 0.009 | V8 | 0.094 | 0.009 | V0 |
| Bicarbonate (calc) | µeq/L | 37 | | | 75 | | | -9999 | | | 81 | | |
| Calcium | mg/L | 2.23 | 0.005 | V0 | 1.43 | 0.005 | V0 | -9999 | 0.005 | V8 | 2.3 | 0.005 | V0 |
| Chloride | mg/L | 0.718 | 0.004 | V0 | 0.143 | 0.004 | V0 | -9999 | 0.004 | V8 | 0.266 | 0.004 | V0 |
| Conductivity (25°C) | µS/cm | 22 | 1 | V0 | 12 | 1 | V0 | -9999 | 1 | V8 | 17 | 1 | V0 |
| Conductivity (calc) | µS/cm | 20.8 | | | 13.6 | | | -9999 | | | 16.4 | | |
| Conductivity Difference % | | -3.1 | | V0 | 11 | | V0 | -9999 | | | -1.56 | | V0 |
| Magnesium | mg/L | 0.242 | 0.009 | V0 | 0.172 | 0.009 | V0 | -9999 | 0.009 | V8 | 0.276 | 0.069 | V0 |
| Nitrate | mg/L | 2.47 | 0.004 | V0 | 0.792 | 0.004 | V0 | -9999 | 0.004 | V8 | 1.2 | 0.004 | V0 |
| pH | | 6.86 | | | 7.17 | | | -9999 | | | 7.2 | | |
| Phosphate | mg/L | <0.04 | 0.04 | V1 | <0.04 | 0.04 | V1 | -9999 | 0.04 | V8 | <0.04 | 0.04 | V1 |
| Potassium | mg/L | 0.349 | 0.006 | V0 | 0.098 | 0.006 | V0 | -9999 | 0.006 | V8 | 0.145 | 0.006 | V0 |
| Sodium | mg/L | 0.351 | 0.006 | V0 | 0.105 | 0.006 | V1 | -9999 | 0.006 | V8 | 0.212 | 0.006 | V0 |
| Sulfate | mg/L | 2.57 | 0.004 | V0 | 1.45 | 0.004 | V0 | -9999 | 0.004 | V8 | 1.05 | 0.004 | V0 |
| Sum Anions | µeq/L | 150 | | | 125 | | | -9999 | | | 130 | | |
| Sum Cations | µeq/L | 175 | | | 107 | | | -9999 | | | 156 | | |
| Total Ions | µeq/L | 325 | | | 232 | | | -9999 | | | 286 | | |
| Ion Difference | % | 7.49 | | V0 | -7.72 | | V0 | -9999 | | | 9.07 | | V0 |
| Ion Difference | µeq/L | 25 | | | -18 | | | -9999 | | | 26 | | |



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